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Editorial

Soil Pollution Prevention and Remediation

Ezio Ranieri,[1] Fabian Bombardelli,[2] Petros Gikas,[3] and Bernardino Chiaia[4]

[1]*DICATECh, Polytechnic University of Bari, Via Orabona 4, 70125 Bari, Italy*
[2]*Department of Civil and Environmental Engineering, University of California, Davis, 3105 Ghausi Hall, One Shields Avenue, Davis, CA 95616, USA*
[3]*School of Environmental Engineering, Technical University of Crete, 73100 Chania, Greece*
[4]*Dipartimento di Ingegneria Strutturale, Edile e Geotecnica, Politecnico di Torino, Corso Duca degli Abruzzi 24, 10129 Torino, Italy*

Correspondence should be addressed to Ezio Ranieri; ezio.ranieri@poliba.it

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In this special issue we have invited authors who are scientists and engineers to contribute original research as well as review articles on recent advances made on techniques and methodologies for the soil pollution prevention and remediation. This journal is in the field of soil science and reflects its multidisciplinary nature including treatments for soil treatment and reclamation.

Soil pollution probably represents the most faced problem in environmental pollution. This is because soil is a point of concentration and recovery of toxic compounds, chemicals, salts, radioactive materials, or disease causing agents, which have adverse effects on plant growth and animal health. Soil pollutants can contaminate water: water infiltration is the movement of water from the soil surface into the soil profile and soil is a valuable resource that support cultures and plant life. Soil pollution is the decrease in the productivity of soil due to the presence of soil pollutants. Moreover soil pollutants have an adverse effect on the physical, chemical, and biological properties of the soil and reduce its productivity.

Main causes of soil pollution are as follows: industrial activity, especially since the amount of mining and manufacturing has increased; agricultural activities, pesticides and fertilizers which are full of chemicals that are not fully degradable in nature and are widely utilized around the world; waste disposal, where there is also a large amount of industrial and municipal waste that is dumped directly into landfills without any treatment; and accidental oil spills, where oil leaks can happen during storage and transport of chemicals.

Main effects of soil pollution are *effect on health of humans*; *effect on growth of plants*; *decreased soil fertility*; and *toxic dust*.

Through expanding our understanding and development of innovative techniques to analyze and treat polluted soils, scientists and engineers can play a crucial role in bringing models and technologies to deal with the environment pollution problem effectively.

The relevant fundamental principles of soil quality management and treatment have been covered. However, the main focus is on assessing sustainable treatment technologies and current case studies related to soil remediation, natural and conventional water treatment, and sustainable drainage systems applied for diffuse pollution treatment.

Academics, professionals, and students in the soil, water, and environmental engineering, science, and management areas, as well as the geologist and hydrological engineers, should be interested in the detailed design, operation, management, and process control for soil and water quality monitoring and applied modeling issues presented in this issue.

This special issue presents a comprehensive collection of timely, novel, and innovative research case studies in the area of soil remediation. It demonstrates to practitioners how natural and innovative systems can be integrated into traditional soil remediation, which are predominantly applied for the treatment of diffuse pollution. Also, it assesses the design, operation, and management of soil remediation technologies and water treatment performance of sustainable drainage systems including hydrology and modeling.

Topics of interest include soil remediation, clogging and soil hydraulic conductivity, phytoremediation and soil remediation technologies, storm water management, urban runoff treatment, and soil quality parameters.

Specifically papers included in the special issue are related to role of inorganic and organic fractions in animal manure compost in lead immobilization and microbial activity in soil; cadmium phytoremediation potential of Napier grass cultivated in Kyushu, Japan; phytoremediation of gold mine tailings amended with iron-coated and uncoated rice husk ash by vetiver grass (*Vetiveria zizanioides* L.); oil and gas production wastewaters: soil contamination and pollution prevention; a rationale for pollutograph evaluation in ungaged areas, using daily rainfall patterns: case studies of Apulia region; the analysis of arsenic speciation in *Pteris vittata* L. and ash; dissolution of biosolid-borne metals of soils; and immobilization of As, Mn, Cu, and Pb in gold mine tailings amended with empty fruit bunch and rice husk biochars pyrolysed at different temperatures.

Particularly urban runoff and phytoremediation have been discussed in the special issue.

Storm water runoff from paved streets, sidewalks, and parking lots, and through lawns and storm drains flows, collects and transports waste, salt, pesticides, fertilizer, oil and grease, and other pollutants [1]. This water drains directly into rivers and sea, without receiving treatment. During their flow through soil pores, the pollutants are subjects to a series of interactions such as adsorption, volatilization, and plant uptake. Polluted storm water therefore can harm soil plants, fish, and wildlife, while degrading the quality of soil and water.

Phytoremediation is an environmentally friendly and low-cost approach for the decontamination of polluted sites and has been greeted with a high degree of public acceptance [2, 3]. Therefore research using phytoremediation technology has been encouraged. In particular, metal hyperaccumulation in different species is investigated with the aim of determining the mechanisms associated with the accumulation and detoxification of heavy metals and using these macrophytes and their rhizomes, roots, stems, and leaves for the decontamination of polluted sites.

Ezio Ranieri
Fabian Bombardelli
Petros Gikas
Bernardino Chiaia

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