1. Title

Advanced Technology on Soil Remediation in Mined Lands: MIRECO Symposium

2. Type

Inter-Divisional Symposium

3. Organizer(s) & Convener

Conveners:

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Co-conveners:

■ Dr. Jae Yang, Professor, Dept. of Biological Environment, Kangwon National University, Chunchon, Korea 200-701 (yangjay@kangwon.ac.kr) 82-33-250-6446

■ Dr. Jeff Skousen and Dr. Louis McDonald, Professors, Division of Plant and Soil Sciences, West Virginia University, Morgantown, WV 26506-6108, USA (js kousen@wvu.edu, lmmcdona@wvu.edu) (1-304-293-2667)

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4. Rationale

Various kinds of wastes in abandoned/closed mine areas cause soil and water pollution. Arable soil near these mines is often contaminated with heavy metals causing a potentialhealth risk for human beings through the food chain. A variety of technologies have been developed in biology, soil science and civil engineering to reclaim and remediate heavy metal contaminated soils. Several aspects are needed to consider when remediating polluted soils to ensure that soil quality can be restored and madesuitablefor designed uses. Such factors include rockiness, accessibility, degree of acidity and sodicity, cost, ease of application of technology, maintenance, and long-term success of reclamation procedures. Limited information however is available for the remediation of metal contaminated paddy soils in mining lands, which is specific to the Monsoon Asia region. Therefore, a forum to discuss the problem, review and highlight technological opportunities for reclamation, and the levels of success of practicalapplications of remediation of contaminated arable soils in mining lands is necessary.

5. Objectives

To disseminate the practical and up-to-date technologieson soil remediation for contaminated arable lands.

6. Description

Soil remediation technology consists of the implementation of physical, chemical and biological components to reclaim polluted soils to a condition that do not present harm to the environment and residents.Many state-of-the-art technologies have been developed and available for soils contaminated with both heavy metals and organic contaminants. Implementation of such technologies in remediation of arable soils contaminated with heavy metalsnear mining lands is often impractical when considering economic and technical factors.

Three factors need to be considered when remediating arable soils. First, the likelihood of removing the risk, which means one of the following conditions must occur: 1) the metals must be removed from the soil (very difficult or impossible to do), or 2) the metals must be immobilizedin soil to become unavailable to biota or to lower their concentrations below legal standards. Second, soil quality must be restored to maintain or enhance the productivity of the soil after remediation. Third, the ability and cost of implementing such remedial actions must be economical and practical. Thus, remediation of metal-contaminated arable soils requiresa holistic approach to integratechemical, physical and biological tools.

Mine Reclamation Corporation (MIRECO) in Korea is the worldwide leading organization in the prevention and management of mine hazards. Primary missions of MIRECO are to effectively manage mine reclamation, assist the coal supplying business, and boost the economy of mining regions. During the last several years, MIRECO with R&D cooperation from academia and corporations has developed practical technologies in remediating heavy metal contaminated paddy and upland soils. These approaches are somewhat unique in Asia where rice is the staple crop and land use is different from other continents.

Many interdisciplinary research studies have been conducted recently by integrating conventional tools in soil and environmental sciences with those that have been developed from information technology, biotechnology and material sciences, etc. We are interested in bridging these two disciplines and approaches to learn more comprehensive and holistic approaches in soil remediation.

Major components of soil remediation technology which are being developedand tested are stabilization of heavy metals in soil using recyclable organic and inorganic resources, soil layer management engineering, use of wastewater treatment sludges in immobilization of heavy metals, microbial immobilization of metals, and development of monitoring sensors for metals.

This symposium will bring eminent researchers from Korea and abroad to discuss the opportunities of describing and connecting the technologies available for soil remediation from all disciplines. The symposium will consist of one or two keynote presentations and four or five voluntary oral presentations.