Waste Land Management through Plants

Title	**Plant species diversity for vegetation restoration in manganese tailing wasteland**
Author Name	Jun Wang, Xinghua Luo, Yifan Zhang, Yanhong Huang, Manikandan Rajendran, Shengguo Xue
Journal Name	Environmental Science and Pollution Research
Year	2018
Pages	24101-24110
Abstracts	Vegetation restoration is one of the most effective measures to restore degraded ecosystem in mining wasteland. A field experiment was conducted to study the effects of some site treatments' three different approaches on the benefits of selective vegetation in the manganese mine. Three different approaches included (1) exposed tailings, the control treatment (tailing site); (2) soil covering of 10-cm thickness (external-soil site), and (3) soil covering of 10-cm thickness, soil ameliorating (adding fowl dung), and seeding propagation of Cynodon dactylon (Linn.) Pers. (rehabilitation site). The results indicated that 18 herb species were taken from 8 families and 4 woody plants in three sites after 1 year. After 3 years, 29 species from 14 families were observed in 3 sites. Meanwhile, compared with tailing site, the plant species of rehabilitation site was more than tailing site, and the plant abundance of external-soil site was similar to rehabilitation site. It was worthy to be mentioned that the plant species of external-soil site and rehabilitation site had a better effect on the plant community coverage of herb layer as compared with tailing site. In summary, the plant species of rehabilitation site had the most species diversity and could be recommended as the ve-restoration modes in manganese tail wasteland.
Keywords	Manganese; Tailing wasteland; Vegetation restoration; Plant species diversity; Cynodon dactylon (Linn.) Pers

Title	The use of vegetation as a natural strategy for landfill restoration
Author Name	Magdalena D. Vaverková, Maja Radziemska, Stanislav Bartoň, Artemi Cerdà, Eugeniusz Koda
Journal Name	Land Degradation and Development
Year	2018
Volume and Issue	29
Pages	3674-3680
Abstracts	It is well-known that the disposal of municipal solid waste in landfills has adverse effects on the environment and human health. Restoration of closed landfills is essential to compensate for disturbances in the ecosystem, minimize negative impact on the environment, and ensure safety in further use. It was hypothesized that specific plant succession knowledge can present nature-based solutions to restore and rehabilitate degraded ecosystems at municipal solid waste landfills. The goal of the 8-year study was to identify restoration strategies based on vegetation succession. For the vegetation survey, we recorded the vegetation over the period 2007–2015. The study was carried out on the surface of the landfill site. We also used four mathematical models to analyze the increase of plant species over time. During the study period, 195 vascular plant species were recorded. There was a progressive change in plant communities and an increase in biodiversity. What is more, the growth prediction models show that the diversity of plant species over time at the landfill site has an increasing tendency, which has beneficial implications for landfill restoration. During the vegetation survey period, there was no evidence to suggest that the landfill site had a significant impact on the biotic composition of the environment. We can conclude that the health status of plants occurring in the landfill was good. Plants both contributed to and indicated the health of the landfill site and were found to be a convenient and natural component of landfill restoration.
Keywords	Municipal solid waste; landfills; vascular plant; landfill restoration; biotic

Title	**Interspecific associations of plant populations in rare earth mining wasteland in southern China**
Author Name	Liting Liu, Xiaodong Wang, Qiang Wen, Quanquan Jia, Qijing Liu
Journal Name	International Biodeterioration & Biodegradation
Year	2017
Volume and Issue	118
Pages	82-88
Abstracts	Currently, there is limited research regarding revegetation in ion-adsorption rare earth mining wastelands, although this is essential for sustainable mining. We conducted a field survey to investigate species composition and interspecific associations in naturally rehabilitated vegetation in a rare earth mining wasteland in Xinfeng, Jiangxi Province, China. The interspecific associations of major species were quantitatively analyzed using a 2 × 2 contingency table, variance ratio, χ2 test, and interspecific association coefficients. The results showed that, as the time of natural rehabilitation increased from 5 years to 15 years, the overall interspecific associations changed gradually from negative to positive. The succession of naturally rehabilitated plant communities in mining wasteland changed over time and gradually became stable. However, no significant correlation was found between most pairs of species, indicating that the communities had simple structures, and were still in the early stage of succession. These findings suggest that planted communities are more effective at speeding up succession than naturally colonized communities in the initial stage of vegetation restoration in this rare earth mining wasteland. The first three species with the highest importance values were Pinus massoniana (0.72), Miscanthus floridulus (0.30) and Dicranopteris dichotoma (0.18). The interspecific association coefficients for P. massoniana-M. floridulus, P. massoniana-D. dichotoma and M. floridulus-D. dichotoma pairs, which increased with rehabilitation time, were 0.41, 0.64 and 0.45, respectively. Therefore, the dominant species, such as P. massoniana, M. floridulus and D. dichotoma, are recommended for mixed planting.
Keywords	Rare earth mining; Revegetation; Interspecific association

Title	Biological Recultivation of Mine Industry Deserts: Facilitating the Formation of Phytocoenosis in the Middle Ural Region, Russia
Author Name	T.S. Chibrik, N.V. Lukina, E.I. Filimonova, M.A. Glazyrina, E.A. Rakov, M.G. Maleva, M.N.V. Prasad
Journal Name	Bioremediation and Bioeconomy
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Abstracts	Rapid urban growth and industrial development led to irreversible changes in the landscape, especially the natural vegetation. The fly ash dumps at thermal power plants, in the Middle Ural region occupy a large area. These fly ash dump sites are the main source of air and soil pollution. To restore these fly ash-ravaged sites and to prevent harmful effects on the environment, biological reclamation has been carried out. The key objective of this exercise is to create a biological reclamation on the surface of dump sites by transforming them through biogeocenosis into productive areas for agriculture, forestry, and recreation.
Keywords	Ash dumps; Coal deposits; Biological recultivation; Phytocoenosis monitoring; Phytodiversity; Steppe; Taiga