Vetiveria zizanioides Vis-À-Vis Rehabilitation of Degraded and Contaminated Soils: Some Case Studies

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Abstract

The staggering increase in human and livestock population, rapid industrialization and urbanization, and intensive agricultural practices are some of the key reasons of environmental degradation which includes the production and release of sizeable amount of toxic waste into the environment and degradation of land. Similarly, vast areas of soil are contaminated with persistent organic contaminants, mainly plant protectants, hydrocarbons, polycyclic aromatic hydrocarbons (PAH) etc. Mitigation of environmental hazards, restoration of soil ecology, soil fertility and productivity are some of the concerns in recent years. It necessitates the researchers to develop a clean, cheap, effective and eco-friendly remediation strategy.

Plant based technology called phytoremediation for mitigating soil toxicity and eco-restoration is gaining importance day by day. *Vetiveria zizanioides* is one of the few plants that has the potential to meet all the criteria required for phytoremediation (Truong, 2000; Danh *et al*, 2010). The crop has received a great attention and interest from the scientists all over the world as an agent for phytoremediation of contaminated lands. Unique morphology, physiology and symbiotic association render vetiver capable of tolerating environmental extremities (Srivastava *et al*, 2008). Vetiver is also helpful in controlling land degradation caused due to natural and anthropogic factors viz toxicity of recalcitrant persistent organic pollutants, soil sodicity and salinity (Patra and Prasad, 2003), erosion, intensive cultivation, water-logging, deforestation, mining, overgrazing or any factors that adversely affect biological agricultural/ productivity, decrease in the land's capacity to support desirable vegetation and maintain the yield level over the years of use.

Vetiver oil is in high demand world-wide. However, in many developing countries including India, heavy demand for food makes it difficult to cultivate medicinal, aromatic and industrially important crops in good quality fertile lands. Utilization of culturable-degraded lands can be one of the viable alternatives for the cultivation of non-edible commercial crops. This strategy will have two-pronged benefits: Enhancing production of vetiver oil and rehabilitation of degraded lands including their phytoremediation. This paper deals with presentation of the results of some studies on use of vetiver on phytoremediation of heavy metals, persistent organic pollutants, saline/ sodic soils, removal of xenobiotics, and other aspects of rehabilitation of degraded lands.