

Unveiling the Multifaceted Potential of Vetiver Grass in Circular Agriculture



Bhani Kongkham, P. Duraivadivel, Suneel Kumar, and Pankaj Kumar

Abstract Circular agriculture represents a shift from conventional chemical-intensive farming towards sustainable farming practices, emphasizing low reliance on external inputs, efficient resource utilization, and minimal environmental impact. Central to this approach is soil and water management, crucial for boosting agricultural resilience and nutrient availability amidst environmental stresses. Among the various strategies for low-cost-efficient management of soil and water, the utilization of vetiver grass seems promising owing to its multifaceted potential. Vetiver is a perennial non-invasive aromatic grass from the Poaceae family with a wide distribution across tropical and subtropical regions including Asia, Africa, America, and Europe. It can withstand varying degree of stresses like extreme temperatures, floods, drought, salinity, and acidic environments, making it an ideal candidate for rehabilitating degraded lands. This is evident from the effectiveness of vetiver in remediating soil and water systems contaminated with pollutants like heavy metals, herbicides, radionuclides, crude oil, etc. The dense, fibrous, and deep penetrating root system of vetiver is efficient in controlling water runoff, soil erosion, slope stabilization, and enhancing soil water retention. The vetiver root system also facilitates carbon sequestration which enhances the soil carbon content over time. These properties make vetiver ideal for sustainable circular agricultural practices. Apart from this, vetiver biomass also finds application in mulching, essential oil extraction, and biofuel production. Considering the immense potential of vetiver, this chapter explores the extensive applications, benefits, and ecological impacts of vetiver grass

Bhani Kongkham and Duraivadivel P. contributed equally to this work.

B. Kongkham · P. Kumar (✉)

One Health and Sustainability Laboratory, Department of Environmental Sciences, Sri Venkateswara College, University of Delhi, New Delhi, India
e-mail: pankaj.evs@svc.ac.in

P. Duraivadivel

Department of Biotechnology, College of Engineering and Technology, IILM University, Uttar Pradesh, Greater Noida, India

S. Kumar

Department of Commerce, Shaheed Bhagat Singh College, University of Delhi, New Delhi, India