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A system for safe, sustainable and eco-friendly waste water treatment to create soil, grass and water (EWT)

Editorial

Human activity has had a negative impact on the environment because it has caused deforestation, ocean acidification and the extinction of important biodiversity. Current sanitation methods convert pollution to disaster; they lead to major problems faced by society today, such as water pollution, water scarcity, loss of soil fertility, global warming, poor economy, poor health and loss of life. These methods decompose (break-up) valuable organic elements, found in the so called waste, into foul gases and acids, even now. The gases badly pollute the air and acids badly pollute the land and sub soil water. Based on intensive field research, field experiments and application of fundamental science, a system for treatment, using waste water, unutilized solar energy, building debris as resources to produce soil with vegetation (say grass) and clean water. Community waste water includes sullage, kitchen sink food waste pulverized waste water, wash water, bath water, sewage, polluted rivers, lakes and sea, etc. It is about 99% water and 1% organic matter primarily made up of natural elements such as carbon, oxygen, hydrogen, nitrogen, sulfur and other trace elements found in all healthy biology, these are nutrients and in EWT are converted to healthy vegetation such as grass. Clean highly aerated water is filtered out, wherein there is no odor, no mosquitoes, no color. The system is occupationally safe and eco-friendly. EWT helps recycling of material and energy enhancement of environment, energy conservation, enhancement of air, soil, water, plants and animals feeding on these plants, bio-energy generation, reduction in global warming and climate change, development of havens for wildlife including flora and fauna, enhanced quantity, quality and distribution of rainfall, enhanced dissolved oxygen in water, watershed development, enhanced aquaculture and fisheries development, flood control. EWT is at least 10 times economical, efficient, safer, sustainable and ecological compared to alternatives.

The purpose of natural treatment systems is the re-establishment of disturbed ecosystems and their sustainability for benefits to human and nature. The working of natural treatment systems on ecological principles and their sustainability in terms of low cost, low energy consumption, and low mechanical technology is highly desirable. The current review presents pros and cons of the natural treatment systems, their performance, and recent developments to use them in the treatment of various types of wastewaters. Fast population growth and economic pressure in some developing countries compel the implementation of principles of natural treatment to protect natural environment. The employment of these principles for waste treatment not only helps in environmental cleanup but also conserves biological communities. The systems particularly suit developing countries of the world. We reviewed information on constructed wetlands, vermicomposting, role of mangroves, land treatment systems, soil-aquifer treatment, and finally aquatic systems for waste treatment. Economic cost and energy requirements to operate various kinds of natural treatment systems were also reviewed. Rightly defined by Mitsch and Jørgensen [1], “the ecological engineering is the design of sustainable ecosystems that integrate human society with its natural environment for the benefit of both.” It involves the restoration of ecosystems that have been substantially disturbed by human activities such as environmental pollution or land disturbance and the development of new sustainable ecosystems that have both human and ecological values. The development of ecological engineering was spawned by several factors, including loss of confidence in the view that all pollution problems can be merely solved through technological means and the realization that with technological means, pollutants are just being moved from one form to another. Conventional approaches require massive amounts of resources to solve these problems, and that in turn perpetuates carbon and nitrogen cycle problems, Sustainable sanitation systems require low cost, with low energy consumption and low mechanical technology. Better choices of low cost treatment systems for rural areas are decentralized processes [3]. Treatment systems with a very small energy input, low operational cost, and low surplus sludge generation are anaerobic digesters and constructed wetlands [3–6]. Other examples of low cost natural treatment systems include oxidation ponds, anaerobic ponds, facultative ponds, terrestrial treatment systems, and vermicomposting constructed wetlands. The objective of the current review was to describe some recent advancements in the design and efficiency of various natural treatment systems and the comparison of their efficiencies. Following sections will highlight the recent developments regarding various types of natural treatment systems.