8 Alternative Technologies for Sanitation, Recycling and Reuse

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8.1 Overview

Globally, some 500 million kg of human faeces are generated daily in urban areas and some 600 million kg in rural areas – a total, then, of over one million tons per day. Most of this biodegradable organic material is disposed of untreated or after very little treatment, thus polluting the environment with substances that are highly detrimental to human health.

In the developed countries, sewage systems are efficient enough to ensure that most human waste is safely treated and disposed of. The situation is different in the developing countries. There, about 65% of the population are without adequate sanitation. Sanitation coverage in the developing countries varies greatly from region to region: the best-served regions are West Asia with 68%, and Latin America and the Caribbean with 63%; the least-served regions are Asia and the Pacific with 29%, and Africa with 35%.

Paradoxically, most conventional sewage systems in use in both the developed and developing countries are water-borne. This means that they usually rely on water to transport waste from the point of emission to the point of treatment. Since water itself is a very precious and increasingly scarce resource, the world cannot afford to waste it in this manner. Besides, what is regarded as human waste is itself a useful resource that is not being exploited.

Human faeces and urine contain huge amounts of nutrients and can easily be converted into biofertiliser. The use of conventional sewage systems means that the vast quantities of nutrients present in wastewater are constantly being lost because of the failure of these systems to recycle the waste. Given this situation, it is imperative that alternatives to water-borne sanitation be explored. Such alternative sanitation systems should be based on the principle of conserving and recycling earth's resources.

Sustainable Sanitation

The lack of adequate sanitation in large parts of the world – with the attendant problems of disease and pollution – can be remedied by tackling the issue at the grass-roots level. New integrated sanitation and waste-management systems will have to consider the different qualities of outputs from human settlements: black water, biowaste, grey water and storm water.
Pollution-prevention, sewage reduction and water conservation efforts should be maximised. A conservative technology is based on the principles: Preserve, Conserve and Protect. Health authorities are traditionally sceptical of people’s ability to manage their own problems. The regulatory and sanitary-engineering authorities (generally one and the same body) also believe that matters are best left in their hands. Environmental groups, too, have tended to share the conviction that “end-of-pipe” treatment is the surest way of cleaning polluted water.

The interests of industry are another very important factor that must be taken into account: discharging its waste into public sewers is the cheapest solution for industry; and the system of central sewage collection is extremely expensive, thus ensuring the highest profits for engineering and construction firms.

For example, pipe-laying accounts for some 80% of the total cost of sewage collection and treatment, and engineering and construction firms get a flat 20% share of the total budget here. Fixing the 5-10% of septic systems that are in need of repair or renewal (i.e. overflowing or causing pollution) would never generate the sort of profits to be had from the blanket provision of central collection and treatment facilities.

A great deal of public resources are utilised to build large treatment plants to serve those people whose waste is conducted by a sewage system. This happens in spite of the fact that an average of 60 to 70% of the population of developing countries has no access to sewage piping systems nor to the amount of water required to conduct such human waste. The problem cannot be solved by investigating the situation in which there is access to a sewage system. Instead it is necessary to look at those who urgently need dry solutions or small wastewater treatment plants in order to treat their water as close as possible to their homes and in a way that the population can afford.

Combining decentralised technologies with recycling and reuse can lead to solutions such as the so-called SIRDO. SIRDO is an integral system for recycling organic waste (Mena-Abraham 2000). It is promoted by GTA (Grupo de Tecnologica Alternativa, S.C.), which is a non-profit organisation focused on developing alternative technologies for recycling liquid and solid domestic waste. GTA’s president Josefina Mena-Abraham and her assistant of many years, Veronica Corella-Barud, provided material about the Mexican patent SIRDO. Its design is based on the biochemical process which characterises the indigenous Mexican “chinampa“ (Mena-Abraham 2000). It comprises two main models for two different situations, the products generated are water for agricultural purposes and biofertilizer:

1. the wet treatment (with a collecting pipe system for grey and black waters, either mixed or separated) for situations in which water is sufficiently available;
2. the dry treatment (similar to a composting toilet) for water-scarce situations.