Clean water

We know that inland wetlands (rivers, lakes, ponds, marshes, etc.) perform a vital function in filtering and purifying freshwater, rendering it 'clean' for human use. And never has it been a more valuable service for human populations than today, when over one billion people lack access to clean water supplies. That's one in five people in the developing world.

That inland waters trap sediments, nutrients, and pollutants has been long established. Lakes and marshes can remove high levels of nutrients, especially phosphorus and nitrogen that are associated with agricultural runoff, thus preventing eutrophication in surface and groundwaters as well as in coastal areas. For example, cypress swamps in **Florida** in the United States can remove 98% of the nitrogen and 97% of the phosphorus preventing it contaminating groundwater. And specific wetland plant species are known to remove heavy metals and other toxic materials. Although often a major problem in wetlands, the invasive plant Water hyacinth, *Eichhornia crassipes*, and other wetland plants such as *Typha* and *Phragmites* species, have been used to treat effluents that contain high concentrations of heavy metals such as cadmium, zinc, mercury, nickel, copper, and vanadium.

Until recently, the 5.3 square-kilometre Nakivubo papyrus swamp near **Kampala** in Uganda played a key role in purifying the water from urban run-off and from the outfall of the Kampala sewage treatment plant, a service valued at US$1.5 million a year. The filtered water flowed into Lake Victoria just three kilometres away from the inflow for the Ggaba waterworks, which provided Kampala with its water supply. In recent years most of the papyrus has been cleared and large areas of the swamp area converted to the growing of yams. Thriving in wetlands, and providing food and income for their propagators, yams cannot carry out the same services of filtration and purification as the papyrus, and the swamp has lost its natural cleansing properties.

The capacity for wetland ecosystems to help 'clean' water is well documented, and the knowledge and understanding of how wetlands purify water forms the basis for the construction in and around urban and rural communities of artificial wetlands that 'mimic' natural systems.

But wetlands can help clean water only if we keep them healthy through effective management. What happens when we destroy our wetlands is obvious – we lose this source of clean water, as well as all the other ecosystem services they provide. But what happens to our clean water supply when we add too many human by-products to wetlands? The reality is that wetlands have limits, and there are many situations where poor sanitation, uncontrolled disposal of industrial wastes, and excessive agricultural runoff (fertilizers, pesticides, etc.) surpass the cleansing capacity of wetlands. . . . Find out more on this in our sections on pollution and water-related diseases.

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