

Industrialization, Urbanization, and the Role of Water

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Water plays a central role in the protection and health of our environment, from the level of atmospheric and meteorological forces, down to the intimate content of homes and communities. The role water was expected to play used to be closely adapted to the volume available in any given environment, but industrialization is playing havoc with that balance in many parts of the world.

The construction of a reservoir to supply an expanding city population, for example, not only has an environmental impact on its site, but upstream and downstream as well, and may even produce greenhouse gas emissions. Climate change is having an impact on rainfall patterns and surface water flows, including the melting of glaciers, rises in sea levels, and increased frequency of extreme weather events of all kinds. But other human factors relating to the management and use of water resources also feed into environmental stress.

Some rivers have now become artificial systems of linked lakes, while so much water is diverted from others that barely a trickle reaches the sea. These alterations of natural flows have led to losses of plant and fish species and floodplain fertility, and other forms of damage to upstream and downstream ecosystems.

The draining of wetlands used to be regarded as a great process of converting “wet deserts” and “malarial swamps’ into land useful for agricultural production and

human settlement. But the destruction of wildlife habitats, the loss of water for evaporation and hence a reduction in rainfall, and other unforeseen environmental fall-outs have sometimes proved devastating.

This podcast series will take an in depth look at a few environmental pressures that all of us have to deal with today. Those pressures are urbanization, altered flows, and draining wetlands.

Sometime in 2008, the world became predominantly urban. With more inhabitants living in towns and cities than in the countryside, huge pressures are exerted on municipal infrastructure and service provision. The existing infrastructure is already inefficient, with one-third of the water supply in many systems being lost to leakage, and there may be problems with bringing sufficient water into the city. Many cities have already exhausted nearby surface and underground sources. Cities such as Delhi, Santiago and Mexico City are among those pumping water from increasing distance and increasing heights.

Despite claims that privatization of utilities would expand service to poorer citizens, after a brief honeymoon this has usually failed: the rise in service fees required to make operations fully cost-efficient turns out to be politically unacceptable.

Nearly 60 percent of the world's major rivers are impeded by large dams. During the past century, hydraulic engineering projects have impounded, stored and re-channeled the contents of rivers in a monumental exercise to re-design natural flows. Today, there are 50,000 large dams of which 300 are regarded as giant. This has had

the effect of fragmenting many rivers, blocking their natural flow and turning them effectively into series of lakes.

The upstream effects of impounding water on such a scale include the destruction of whole ecosystems and the species that depend on them. Downstream, the loss of the sediment diminishes floodplain fertility. Interrupted or reduced flows destroy wetlands and leave insufficient water for irrigation. River fragmentation is a major factor in endangered freshwater fish species.

Bogs, swamps and marshes play a vital role in the world's water system. Without wetlands, rivers flow too fast, lakes become overburdened with organic matter, and coastlines are eroded. Marshes can detoxify wastewater, and peat bogs are estimated to hold up to a third of the carbon dioxide stored in vegetation and soils. Mangrove swamps play a vital role in protecting the coastline from erosion and storm surges.

The extent of wetland loss worldwide is unknown, but around half of those in industrialized countries were destroyed during the last century. Despite some reclamation, wetlands are deteriorating faster than any other ecosystem. Their destruction has a devastating impact on those who live in them and off them. The freshwater fish in inland wetlands provide vital protein for millions of people in developing countries.

Environmental protection and freshwater conservation are two sides of the same coin, and the critical issue facing policy-makers is how the protection of fresh water and the environment are to be balanced without mounting any new demands.

References

"The Atlas of Water, Second Edition : Maggie Black and Jannet King." *University of California Press*. Web. 17 Apr. 2011. <<http://www.ucpress.edu/book.php?isbn=9780520259348>>.