Global challenges of water an ecological perspective from ancient practices to nanotechnologie.

Stefania Mura, Gianfranco Greppi

Nucleo di Ricerca sulla Desertificazione, DADU, Dipartimento di Architettura Design e Urbanistica
Università degli Studi di Sassari, P.za Duomo 07041 Alghero

In history of water (Maneglier 1994) described, meanwhile, reports that the man had with the water, identifying, according to his definition, four ages: primary, one of the lustral waters; secondary, that the domestication of water for agricultural irrigation; tertiary education, one in which "the individual wells prevailed on the aqueducts collective"; quaternary, born at the end of the nineteenth century," with the discovery of the comfort and the notion of drinking water.

Key water facts

1 in 8 people not have access to drinking water.
884 million people lack access to safe water.
140 litres Is a waterfootprint for a cup of coffe
15.988 desalination plants
66.5 million cubic meters per day, for 300 million/
1800 km^3global water demand increases in 2030.
2.6 billion people lack access to proper toilets.
24.000 litres is a waterfootprint for 1 kg of chocolat.
25 million people are suffering from fluorosis.
29.000 children died in Somaliam in 2011.
3.6 million die each year from water-related diseases.
6 km is the average distance walk to fetch water.
65 million are at risk of arsenic poisoning.
43% deaths are due to diarrhoea.
84% deaths are in children ages 0–14.
84% live in rural areas.
87% water imported in Kuwait.
98% deaths occur in the developing world.

The conservation of freshwater ecosystems is fundamental to sustainable development as they provide services that are essential for human survival. The need to provide clean water for domestic use, agriculture and industry, support fisheries, recycle nutrients, remove waste, replenish groundwater help prevent soil erosion and flood protection and substantially to mitigate climate change.

Water is an invaluable resource for human health, food security, sustainable development and the environment, however, water resources are constantly under pressure from climate change, urbanization, pollution and overexploitation of freshwater resources. The world today is plagued with daunting challenges of water - water security and biodiversity are at risk, the global demand for water is growing, and drought and floods cause deadly disasters. **Aquaphotomics** provides an opportunity to start building up a "water vocabulary" . Aquaphotomics as a concept "Omes and omics" technologies and all the technologies that analysis of hyperspectral IR, Raman spectroscopy and THz time-resolved measurements are non-invasive and destructive of aqueous systems. Information on the absorbance bands and models absorbance can provide a distinctive knowledge of water structures and intrinsic interactions between water and other components of the aqueous system, also represent a segment of nanotechnology. By understanding the dynamics of light-water interaction and its relation to biological functions, aquaphotomics brings together the knowledge gained from other disciplines such as omics, genomics, proteomics, metabolomics, etc. that describe the individual elements of biological systems.

Nanoporous	Nanopore® membrane filters on a support material such as alumina.
Carbon nano tubes	Efficiently remove micro- to nano-scale contaminants from water
Desalination membrane	Combination of polymers and nanoparticles that draws in water ions and repels dissolved salts
Nano silver catalist	Incorporation of nano silver in traditional candle filters for disinfection
Nanorust	Nano Iron binds with arsenic and is removed from water using a magnetic field.
Nanosponge	Polymers and glass nanoparticles that can be printed onto surfaces
Nanosilver	Pesticide filter to adsorb and then degrade three pesticides
Zeolites	Zeolites are adsorptive nanomaterials with lattice-structures that form pores.