

GLOBAL FRESHWATER QUANTITY, QUALITY AND DISTRIBUTION

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Summary

The socio-economic development of any society hinges on the availability, distribution and quality of freshwater resources. In order for a society to fulfil the freshwater needs of its population it has to be in possession of a certain volume of freshwater, usually confined within the sovereign borders of the state. The earth/atmosphere environment contains a very large amount of water, but most of that water is either too salty for use or are locked away in glaciers and ice sheets. Freshwater, directly available to humans, can also only be found in abundance in certain locations throughout the world, which indicates the uneven distribution thereof. The water related activities of humans can have a very negative impact on the freshwater resources of a state or region. Pollution of freshwater resources is one of the most pressing issue in the current world-wide water discourse. It needs only a small amount of effluent to pollute a large quantity of freshwater. This will, in turn, have a dire effect on the access to safe water of a given population of humans, which can lead to a drop in the quantity of water and subsequent living standards.

1. Introduction

Sustainable economic development hinges on the availability of water resources, especially in the developing world. Where the industrial sector is not well developed, or weak, water consumption in it can be as high as 80%. This offers support to the socio-political importance of water in the economic development of many regions around the

world. The importance of water to these regions is reflected in the vision of the water sector within some regions. For instance, the water vision of the Southern African Development Community (SADC) states that SADC attempt to “attain the sustainable, integrated planning, development, utilisation and management of water resources that contribute to the attainment of SADC’s overall objective of an integrated regional economy on the basis of balance, equity and mutual benefit for all member states”. Within this vision water is directly linked to the economic development of all SADC member states, which is a good indication of the socio-economic and political importance of water. In other parts of the developing south, it is estimated that more than 1.7 billion people, spread over 80 countries, are suffering from water shortages which further signify the importance of water to humans and the societies they live in. Basic human consumption, survival and economic well-being of a large part of the population residing within developing and developed regions rests on this scarce resource. This suggests that there should be enough water to cater to the needs of society and that the water resources should also be of a good quality.

The assessment of the global freshwater budget, the distribution of water and the quality thereof is most certainly one of the most important aspect in the sustainable development and management of the earth’s freshwater resources. It is important, for the simple reason that a quantitative calculation of this renewable resource must be made in order to find the best ways on how it should be developed and distributed among the world’s population.

In this article we will take a closer look at the importance of water on planet earth (in the first section), how much water there is in the global water budget, how it is distributed (in the second part) and what the state of water quality is in some parts of the world (third section of the article). In the final part of the article some conclusions will be drawn with respect to the three aspects of global freshwater.

2. The Living Planet

From outer space, earth is the water planet. There seems to be a hidden irony in the term ‘earth’ because three-quarters of the earth’s surface is covered with water. It looks, as one Apollo astronaut put it, like a “blue marble against the black velvet” background of outer space. Life and life support systems on earth are possible only because of the precise ranges of temperature and pressure found in the atmosphere of our living planet. Accordingly, the life forms found on earth cannot exist if it were not for a number of substances found in the earth/atmosphere. These elements are highly interdependent and consists of fire, air, earth, and water. Together with the precise ranges of temperature and pressure, these elements, form the backbone of life on our planet. Without the precise variables in an interdependent state of change, life would not have been possible. Consequently, our planet would have had the same characteristics as the moon and Mars - lifeless, desolate and inhospitable places. Although water is present on the surface of these heavenly bodies, other minerals or resources are absent, such as oxygen and carbon dioxide (see topic *The Impact Of Climate Change On Water Resources: An Overview*), which gives the Moon and Mars their characteristic desert landscapes.

Earth, on the other hand, is different. Water is important for every living creature. Water, for instance, is needed for different chemical reactions that enable our cells to derive energy, reproduce, and perform other functions. These reactions also quite often consume or produce water molecules. Living cells consist of water and also come to being in water. Nothing alive would have existed in such an animated state if it was not for water. With respect to life on earth, it is stated that wherever there is life there is water, no matter how small the amount or the state it is in. Our planet is humming with life and different life forms, from the most basic one cell organisms such as bacteria and viruses to the more complex like insects and mammals. One of these beings have the mental capacity for reason and communication, which brings it into contact with others of its kind on a profound and different level than any other animal species. These organisms, called homo sapiens (humans), share the living planet with other life forms, and can, due to our actions have an effect on these creatures. Furthermore, humans also rely on water for an existence, not only for basic life support but also for economic purposes. This importance of water was recognised a long time ago.

The Greek philosopher, Thales, for instance, who lived in the early sixth century BC in Miletus, believed that all things are made of water. In relation to this, Thales also believed that everything started in and from water and come to an end or dies into water. Thales also accepted that the entirety of things on earth consist of water. Besides, Thales had the mythical believe that the earth rested on a bed of water, which he borrowed from Egyptian and/or Babylonian creation legends. Accordingly, earth was created from water by one or more gods. Water was a divine entity for Thales, and consequently possessed a soul. He contended in this sense that water could be considered as divine. Thales therefore deduced that, because everything consists of water, and water had a soul, so everything contained a soul and was divine. Considering Thales, water is central to every ecosystem in the biosphere, something that was realised over 2 500 years ago. Not only that, water also makes up the mythical, religious and political interpretation of humans' existence on the living planet.

Therefore, some of the distinctive features of water that make it so important for life include the following:

- Earth has more water than any other planet in the solar system.
- The temperate temperatures of Earth's atmosphere, relative to those of other planets, make it possible for water to occur in all three states - solid, liquid, and vapour. With respect to these conditions of water, water is always in a state of flux, changing constantly from solid to liquid, and from liquid to vapour on a micro and macro scale. Water is therefore highly mobile. It can be found in rocks and the earth as groundwater, occur in frozen lakes, glaciers, icecaps and icebergs, flow in river channels, the oceans and the atmosphere. Also remarkable is that water, while appearing in these states, is not restricted to any human made barrier or sovereign boundary. Even when humans endeavour to lock water behind a dam or in a channel does it flow into the atmosphere or percolate the ground to get around these restrictions.
- Relatively large amounts of energy, derived from the sun's heat, is needed to change water from solid to liquid and from liquid to vapour. It was this process that gave rise to earth's atmosphere and ultimately to life.

- Water can also transport a number of substances that can be just as vital to life. This is because water has excellent dissolving capabilities. A great number of amalgams are split up into smaller components by the addition of a molecule of water - a process called hydrolysis. This function of water makes it possible for living organisms to digest food for the purposes of energy extraction and absorption.
- One of the most important feats to be found in nature is that all living organisms consists primarily of water (approximately 70 % in the case of humans).
- Water has another peculiar characteristic, and this is by no means an unnatural phenomena. It can bring groups of people together in a co-operative manner or dissolve there unity into disagreement or conflict. This process is called water or hydropolitics.

Water is therefore a common and life sustaining element found throughout the global environment. What needs to be done at this point is to direct attention to the amount of water there is to keep live going and how it is distributed across the globe.

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Biographical Sketches

Richard Meissner received his training as a political scientist at the Rand Afrikaans University (RAU) in Johannesburg. He obtained a Magister Artium (M.A.) degree in Political Studies from the same university in 1999 and is currently busy with a D.Phil. in International Relations at the University of Pretoria (UP). He was one of the first students in South Africa to complete a Master's thesis on water politics.

He was employed by the Political Studies department at the Rand Afrikaans University from 1996 to 1998 as a research assistant. He is currently employed as a research associate by the African Water Issues Research Unit (AWIRU) which he joined in 1999. He was involved in a number of studies regarding the management of national and international water resources in Southern Africa and the Middle East. He has also written a number of articles which were published in accredited journals. His scope of interest lies within the field of water politics and particularly the interaction of diverse actors within the domestic and international domains regarding water resource issues. Richard Meissner is a member of the South African Political Studies Association and the South African Institute of International Affairs.

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