

The role of sustainable water management in protection of water resources

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Abstract

Water is a very important vital resource for all living organisms. A world without water can not be imagined. However the world is running out of its most precious resource. Water resources must be protected completely before the end of life on Earth, so today management of water resources has become the main agenda topic globally. Effective protection can be provided by sustainable water management system. This study aims to demonstrate the role of sustainable water management for the protection of water resources.

Keywords: Water, Water resources, Sustainable water management

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Introduction

Fresh water is a fundamental resource, integral to all ecological and societal activities, including food and energy production, transportation, waste disposal, industrial development, and human health. Yet fresh water resources are unevenly and irregularly distributed, and some regions of the world are extremely water short. Water is going to be an increasingly salient element of interstate politics, including violent conflict. Water and water supply systems are increasingly likely to be both objectives of military action and instruments of war as human populations grow, as improving standards of living increase the demand for fresh water, as global climatic changes make water supply and demand more problematic and uncertain (Gleick, 1993: 79). This major problem threatens the sustainability of life. However humans continue their unconscious behaviors to this vitally important natural resource. Humans must wake up before it's too late. At this point, sustainable water management system can be used as an important tool.

Importance of Water to Life

Water is fundamental for life and health. The human right to water is indispensable for leading a healthy life in human dignity. It is a pre-requisite to the realization of all other human rights (WHO, 2002). Water is essential for all organisms in the world. Human is one

of these organisms. The importance of water for humans is as follows (Bartram, 2014):

- Life can not exist without water. Humans must constantly be adding fresh water to their body in order to keep it properly hydrated. Humans can go for weeks without food, but only 3 days without water.
- Water makes up nearly 85 percent of humans' brain, about 80 percent of their blood and about 70 percent of their lean muscle. It is difficult for the body to get water from any other source than water itself. Soft drinks and alcohol steal tremendous amounts of water from the body. Other beverages such as coffee and tea are diuretics therefore stealing precious water from the body.
- Water plays a vital role in nearly every bodily function. Lack of water is the #1 trigger of daytime fatigue. A mere 2% drop in body water can trigger fuzzy short-term memory, trouble with basic math, and difficulty focusing on the computer screen or on a printed page.
- Water is essential for proper digestion, nutrient absorption and chemical reactions.
- Water is essential for proper circulation in the body. The levels of oxygen in the bloodstream are greater when the body is well hydrated. The more oxygen the body has readily available the more fat it will burn for energy without the presence of oxygen the body cannot utilize stored fat for energy

efficiently. Not only will the body burn more fat when well hydrated but because there are increased oxygen levels you will also have more energy.

- Water helps remove toxins from the body, in particular from the digestive tract. Water suppresses the appetite naturally and helps the body metabolize stored fat. Studies have shown that a decrease in water intake will cause fat deposits to increase, while an increase in water intake can actually reduce fat deposits. In 37% of Americans, the thirst mechanism is so weak that it is often mistaken for hunger. One glass of water shut down midnight hunger pangs for almost 100% of the dieters studied in a University of Washington study.
- Water regulates the body's cooling system. Sports drinks are useful when consumed after or during vigorous and prolonged exercise in high heat. But most experts agree that water works better than carbohydrates or sugared beverages for moderate exercise. For instance, if you drink 12 ounces of plain water, your body will absorb 8 ounces of it within 15 minutes.
- Consistent failure to drink enough water can lead to Chronic Cellular Dehydration. This condition where the body's cells are never quite hydrated enough leave them in a weakened state, vulnerable to attack from disease. It weakens the body's overall immune system and leads to chemical, nutritional and pH

imbalances that can cause a host of diseases.

- Dehydration can occur at any time of the year, not only during the summer months when it is hot. The dryness that occurs during winter can dehydrate the body even quicker than when it is hot. When you are dehydrated you tend to eat more (Bartram, 2014).

None of the following items is unthinkable without water (UNDESA, 2015):

Agriculture

Agriculture is by far the thirstiest consumer of water globally, accounting for 70% of water withdrawals worldwide, although this figure varies considerably across countries. Rainfed agriculture is the predominant agricultural production system around the world, and its current productivity is, on average, little more than half the potential obtainable under optimal agricultural management. By 2050, world agriculture will need to produce 60% more food globally, and 100% more in developing countries.

Industry and Energy

Industry and energy together account for 20% of water demand. More-developed countries have a much larger proportion of freshwater withdrawals for industry than less-developed countries, where agriculture dominates. Balancing the requirements of sustainability against the conventional view of industrial mass production

creates a number of conundrums for industry. One of the biggest is globalization and how to spread the benefits of industrialization worldwide and without unsustainable impacts on water and other natural resources.

Domestic sector

Domestic sector accounts for 10% of total water use. And yet, worldwide, an estimated 748 million people remain without access to an improved source of water and 2.5 billion remain without access to improved sanitation.

Cities

More than half the world already lives in urban areas and by 2050, it is expected that more than two-thirds of the global population of 9 billion will be living in cities. Furthermore, most of this growth will happen in developing countries, which have limited capacity to deal with this rapid change, and the growth will also lead to increase in the number of people living in slums, which often have very poor living conditions, including inadequate water and sanitation facilities. Therefore, the development of water resources for economic growth, social equity and environmental sustainability will be closely linked with the sustainable development of cities.

Ecosystems

Perhaps the most important challenge to sustainable development to have arisen in the last decades is the unfolding global ecological crisis that is

becoming a barrier to further human development. From an ecological perspective, the sustainable development efforts have not been successful. Global environmental degradation has reached a critical level with major ecosystems approaching thresholds that could trigger massive collapse. The growing understanding of global planetary boundaries, which must be respected to protect Earth's life support systems, needs to be the very basis of the future sustainable development framework (UNDESA, 2015).

Sustainable Water Management and Its Role in the Protection of Water

Resources

Sustainability as a policy concept has its origin in the Brundtland Report of 1987. That document was concerned with the tension between the aspirations of mankind towards a better life on the one hand and the limitations imposed by nature on the other hand. Sustainability is the development that meets the needs of the present without compromising the ability of future generations to meet their own needs (Kuhlman and Farrington, 2010). Water sustainability could be defined as supplying or being supplied with water for life or, perhaps more precisely, as the continual supply of clean water for human uses and for other living things. It does not specify exactly how much water we have, nor does it imply the unrestrained, infinite availability of water. Rather, it refers to the sufficient

availability of water into the foreseeable future (Schnoor, 2010). The desired future in relation to water is one where water is available in adequate quantity and quality for present and future generations, serving to achieve sustainability (Jansız, 2011: 11).

Water is at the core of sustainable development and is critical for socio-economic development, healthy ecosystems and for human survival itself. It is vital for reducing the global burden of disease and improving the health, welfare and productivity of populations. It is central to the production and preservation of a host of benefits and services for people. Water is also at the heart of adaptation to climate change, serving as the crucial link between the climate system, human society and the environment (UNDESA, 2015).

Water is crucial for the economy. Virtually every industry from agriculture, electric power and industrial manufacturing to beverage, apparel, and tourism relies on it to grow and ultimately sustain their business. Yet water is becoming scarcer globally and every indication is that it will become even more so in the future. Water is already over-appropriated in many regions of the world. More than one-third of the world's population – roughly 2.4 billion people – live in water-stressed countries and by 2025 the number is expected to rise to two-thirds. Groundwater tables and river levels are receding in many parts of the world due to human water use. In India,

for example, farmers are now using nearly 80 percent of the country's available water, largely from groundwater wells; at current rates, the World Bank estimates that India will have exhausted available water supplies by 2050 (Morrison, Morikawa, Murphy and Schulte, 2009). Every states in the world be careful about this crucial subject. In order to achieve protective standards, states should (Environmental Quality Board, 2008):

- Work with local governments, regional development staff and others to plan and manage water systematically at an area-wide scale through designated water appropriation and use management areas. It should identify priority areas and priorities for their implementation based upon a system of criteria that includes an assessment of an area's water sustainability limits, the competition for water, water quality concerns, future growth prospects and local interest.
- Understand how state and local activities and incentives to encourage economic development may affect water availability and sustainability in the areas of interest prior to release of funds or approval of plans.
- Develop a system of incentives to reward local units of government that incorporate water availability and sustainability considerations into their water and land use plans and decisions.

- Continue efforts to develop and apply water sustainability models and planning tools, integrating new information and research results, as well as additional social, economic and environmental data. As part of these efforts, states should establish a water sustainability information system steering committee to consider; system users and the questions they need addressed, scale and scope implications of user needs, available information and database management issues, design for easy and continuous information updates, a long term business management plan.
- Develop one place's resource system planning capability, including efforts to define water sustainability limits; link water management to land use decision-making; seek opportunities for conjunctive surface and ground water management; and consider the use of economic mechanisms in water management.
- Continue to track and assess the implications of population, economic, climate and land use changes on management practice, sustainability planning and priority setting.
- Examine opportunities to employ economic policies and incentives in support of sustainable water management. These should include; requiring water users to conduct more aquifer and watershed monitoring and to help support information systems development

and analysis, providing additional incentives for water conservation and wise management, encouraging consideration of alternative water supplies, gray water reuse, conjunctive use and other water saving measures when siting high water uses (Environmental Quality Board, 2008).

Conclusion

At the beginning of the twenty-first century, the Earth, with its diverse and abundant life forms, including over six billion humans, is facing a serious water crisis. All the signs suggest that it is getting worse and will continue to do so, unless corrective action is taken. This crisis is one of water governance, essentially caused by the ways in which humans mismanage water (UNESCO, 2003). Whereas some 300 000 people were killed in armed conflict in 2000, as many people die each and every month because of contaminated water or lack of adequate sanitation. Access to reliable and sufficient water sources is usually accepted as a fundamental human right. According to World Bank estimates, over one billion people do not have access to safe water, 40 per cent of the world's population faces water shortages, and three billion lack sanitation. Some 80 per cent of infectious diseases are waterborne, killing millions of children every year. Water has in many cases exacerbated or been the cause of conflict in several regions of the world. Many of these conflicts could have been prevented

through sustainable water management agreements, for which fact-finding projects on water resources are a prerequisite (NATO, 2005.) With sustainable water management, the following principles can be recognized (Jordan's Water Strategy, 2008):

1. Humans must recognize that there are limits to the available water supply.
2. Citizens, Private and Public Sectors must share responsibility for water management and protection and work together to improve conditions within their local watershed.
3. A deeper knowledge of the available amounts, actual quality and natural protection of water resources is the foundation for effective decision making.
4. Humans must use water more effectively and efficiently and will use and reuse water wisely and responsibly.
5. Healthy aquatic ecosystems are vital to a high quality of life and must be preserved.
6. Groundwater and surface water quality must be preserved in pursuing economic and community development.
7. States will take care of the drinking water quality and standards to ensure that humans have safe and secure drinking water.

Local governments are of great importance in the implementation of these principles, because local governments are often at the front line in providing water and sanitation services. They are frequently given responsibility by national governments to ensure access to these services as

well as the power to determine who receives the services, and under what conditions. National government must ensure that local authorities have at their disposal sufficient resources to maintain and extend the necessary water services and facilities. However, local authorities must also respect the right to water of everyone in their jurisdiction (WHO, 2003).

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