# Conflicts between social and economic benefits and potential environmental damages associated with the use of water resources

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**Abstract**

Since the very first communities water resources have been playing an important role in society and economy. Due to the rapid population growth, high demand for energy, lack of sustainability and unequal access, water sources have faced considerable conflicts between the socio-economic development and the significant environmental damage that use of these sources has caused. This report has evaluated the benefits provided by the use of water and the environmental impacts related to its use. It was pointed out the use of water, the production of energy and water desalination. Furthermore, it was described the lack of sustainability, the negative impacts on water sources and threats to communities. Finally, the text shows that the main challenge faced is finding strategies to maintain water resources and progress in harmony.

**Keywords:** production of energy, sustainability, water desalination, scarcity.

# Os conflitos entre os benefícios sociais e econômicos e os potenciais danos ambientais associados ao uso dos recursos hídricos

**Resumo**

Desde as primeiras comunidades os recursos hídricos têm vindo a desempenhar um papel importante na sociedade e na economia. Devido ao rápido crescimento da população, a alta demanda por energia, a falta de sustentabilidade e acesso desigual, fontes de água têm enfrentado conflitos consideráveis entre o desenvolvimento socioeconômico e os danos ambientais significativos que o uso destas fontes tem causado. Este trabalho avaliou os benefícios proporcionados pelo uso da água e os impactos ambientais relacionados ao seu uso. Assinalou-se o uso de água, a produção de energia e dessalinização de água. Além disso, foi descrito a falta de sustentabilidade, os impactos negativos sobre as fontes de água e as ameaças às comunidades. Finalmente, o texto mostra que o principal desafio é encontrar estratégias que mantenham os recursos hídricos e o progresso em harmonia.

**Palavras chave:** produção de energia, sustentabilidade, dessalinização da água, escassez.

In the first communities, hydric resources were seen simply as necessity for transport, consumption and additionally to ensure the fishing and other sources. Later, fixed agricultural communities grew in considerable proportion and consequently the use of water assumed an essential role in survival mode. People established their houses around important sources of water in order to supply agricultural practices

and progressively creating new technologic methods. In recent days, water still represents an important substance that is responsible to maintain environmental harmony and manage several sectors in all nations (FAO, 1993). Due to the rapid population growth, high demand for energy, lack of sustainability and unequal access, water sources have faced considerable conflicts between the socio-economic development and the significant environmental damage that use of these sources has caused. This report will emphasize the benefits provided by the use of water resources around the planet and the principal environmental impacts related to its use.

As it is known, water resources are indispensable to human and environmental health, as well as economic expansion. Almost every sector of human activity needs water, be it for consumption, farming, industrial manufacturing or energy production (UNITED NATIONS, 2012). However, water consumption has been increasing at more than the rate of population growth in the last centuries and the use of freshwater has tripled. Moreover, agricultural sectors around the world account for 70 percent of all water usage, compared to 20 percent for industries and 10 percent for household used over the last half century (WORLDOMETERS, 2014). In this recent scenario, if the agricultural water use does not become more efficient, the need for water in agricultural activities could strongly increase in the near future, generating serious issues in areas where the limits of sources are already facing the beginning of a shortage.

Unfortunately the misuse of water is an issue that has been taking place in the recent world. About four hundred and fifty million citizens in twenty-nine countries experience scarcity of water. By 2030 it is expected that 47 percent of the earth's population probably will be living in regions of immense water stress (UNITED NATIONS, 2012). Gangstad (1990, p.43) reports that: A new era is now upon us: An era in which environmental values are important and the concept of "development at all costs" is being replaced with "development at what cost"?

In other words, water resources have not been used in a sustainable way, as they should be. Therefore, government and environmental organizations have to focus on new methods in order to support economic and social development, but at the same time formulating strategies to keep the resources in harmony for the future generations. Maybe one solution would be to promote payments for ecosystem services as a method of regulating demand for these resources.

The production of energy is another social and economic benefit from water resources. Due to recent situations that allow the development of various economic activities, in Thailand for example, hydropower expansion plans have significant importance on regional economies (SUPRIYASILP *et al.*, 2009).

Hydropower has been used as a main source of energy in many countries around the world. According to The Worldbank (2009):

> "Hydropower is the world's largest source of renewable energy, accounting for a fifth of global electricity. Hydropower has helped drive economic growth in numerous countries, including Brazil, Canada, China, Norway, and the United States."

Despite the fact that hydroelectricity has an important role in socio-economic development, according to Commerford (2011) the ecosystem of flora and fauna upstream as well as downstream of the plant can be changed by hydroelectric dams. Furthermore, plant and animal life modifies intensively after construction. He also claims that some fish species, such as salmon, are frequently

influenced by their incapacity to spawn in areas that were interrupted by the constructions. In this case, there is a concern about these species that can become threatened and it might affect all the food chain. Supriyasilp *et al*. (2009) report that the most well-known problem is related to safety. There is always the probability of dangerous acts, disasters and huge flooding downstream caused by inadequate construction or natural tragedies, bringing panic for the population that lives in the surrounding and affected areas. As it can be clearly understood, the use of water resources is the main power that keeps society and the economy in constant growth. However, the challenge faced is to find a balance between the use of water and its conservation.

As mentioned before, water is fundamental for all of human activities. However, it is not an available resource for all the areas of the world. The Foundation for Water Research (2011) points out that of all the existing water in nature, only 1% is water available for the needs of all the living organisms. Almost 2% of the water is ice maintained in glaciers and in polar ice and about 97% of the water on the earth is in the sea. In this case, areas such as the Middle East, North Africa, Europe and Australia (Western) need to use water desalination as an alternative to provide fresh water for their populations (ROYAL ACADEMY OF ENGINEERING, 2010). According to Holechek (2000) there are many desalination plants in the U.S. Despite the fact that it is an expensive procedure, it can be a solution to supply water in several areas. Besides, the desalination process is a substantial process used in many areas around the world in order to provide fresh water where it is not available (see figure 1).

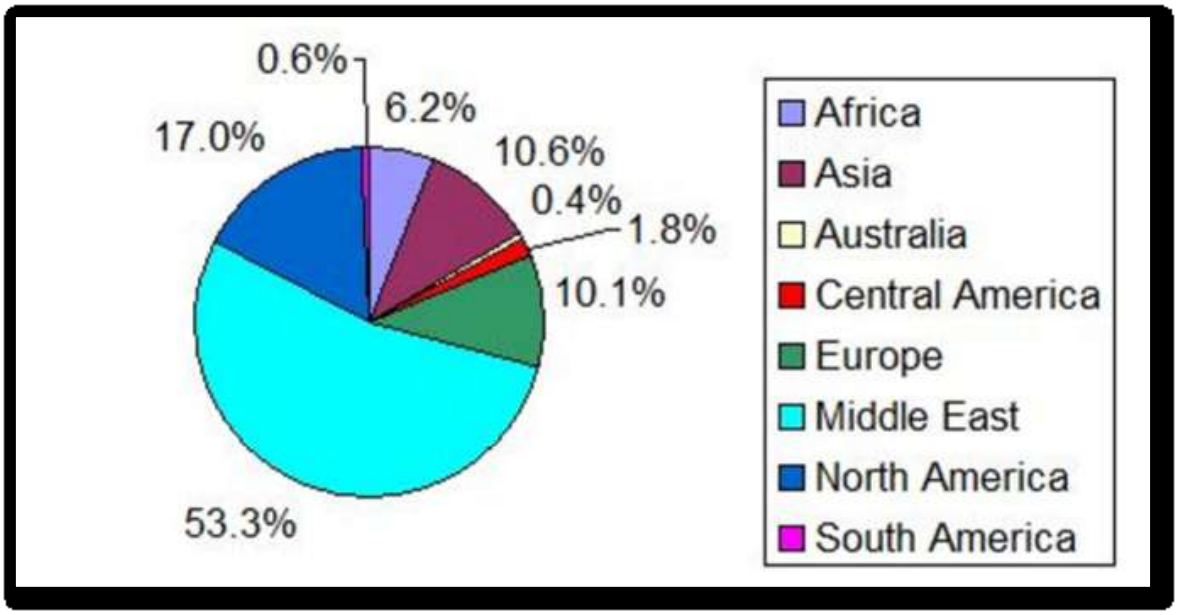


**Figure 1**: The use of water desalination around the world according to Poseidon (as cited in The Foundation for Water Research 2011, p. 07).The graph represents the eight main areas where the process of desalination is commonly used, especially in the Middle East (53.3%) which is the largest user of seawater.

While the desalination process ensures water available for use in many areas, this procedure also causes environmental damage on water sources where this process is carried out. Lattemann and Höpner (2008) observe that despite the fact that water desalination provides a range of apparently infinite gains, there are concerns about the probable negative impacts. These impacts are principally related to the concentration and chemical release that might affect on coastal water condition and influence on the marine life. Additionally, the release of

pollutant from the energy demand of the processes can also contribute to air pollution. In this case, establishes a clear conflict between providing water for thousands of citizens deprived of this resource and the expected conservation of the oceans from where water is withdrawn. On that occasion, the question that should be the basis for every decision taken by the society and economy is how could the progress of civilization and water resources walk together on the same track supporting each other in a harmonic proportion? Probably the inclusion of this question in every step taken by society and economy might contribute to new perspectives in relation to the use of water as well as to manage this use in effective strategies and sustainably correct, in the current days and obviously in the future.

In conclusion, water is a crucial element in the existence of humanity and on a smaller scale it is the primary resource for all nations maintain their economic progressions. However, due to the intense misuse, the high need for energy from water sources (i.e. hydroelectricity) and the plausible reason that natural resources are not equally distributed throughout the world, the use of water persists as a debated issue in the present century. Moreover, a conflict between the need for water in society and economy and the main environmental impacts is clearly established, mainly because of the loss of biodiversity and the possibility of scarcity that this use may cause where water is withdrawn. In this current context, economists, environmentalists and population should unite to seek alternative strategies and measures that might achieve the harmonic balance between progress and conservation. Then, water resources and the all of the sectors of society could mutually ensure themselves for the new generations.

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