

Role of Freshwater Resources in Sustainable Economic Development in 21st Century: Exploratory Study

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Abstract

Freshwater is essential for human life, the environment, and it is intimately connected to all aspects of economic development. It is crucial to pay close attention to its management, be aware of its future challenges, and react to them when necessary. Thus, Sustainable economic development can be attained if freshwater resources are managed proficiently and successfully. The main purpose of this article is to envision the solutions to freshwater scarcity to promote viable economic development wherever it is needed and it is a stirring call to prevent freshwater base conflicts among communities around the world. Efficient freshwater management can contribute commendably to social and political issues surrounding all sectors of the economy. To succeed in these goals, worldwide governments, international organizations and NGOs are central to the actual implementation of enhanced freshwater management strategies. The quintessence of this effort is that a collaborative determination is vital for freshwater resource management that will certainly influence sustainable economic development in every corner of our planet.

Keywords: Freshwater; Sustainable; Scarcity; Earth; Irrigation

1. Introduction

Freshwater resource plays an important role in sustainable economic development and is critical to global environment as well. It is of highest importance for the survival of humankind and all living species (Matt McGrath, BBC World Service, 2012). Freshwater is a basic human need, and it is estimated that more than one billion people across the Earth Planet do not have access to safe and clean water. Thus, the shortage of freshwater resource is contributing to health hazards, because freshwater is the reason for life. For instance, an assessment of freshwater in Africa reveals that more than 300 million people are said not to have access to safe drinking water and sanitation (Matt McGrath, BBC World Service, 2012). It is obvious that the demand for freshwater is set to grow noticeably in coming decades because population growth is definitely correlated with freshwater demand. Hence, as the population grows, the need for freshwater and irrigation to grow crops increases.

Based on the aforementioned observations, it is very important that we anticipate the solution of freshwater scarcity rather than just talk about it. The solution to water shortage must combine policies and agendas, and be able to execute them in the most efficient manner (Rohit Sing, 2009). Having said that, each person in every community across the planet needs to immediately play a specific role in a sustainable manner, managing the current and future lack of access to safe and clean water. The issue of freshwater shortage is widely known; there is also a real problem of managing available resources ingeniously and successfully (Rohit Sing, 2009). Water supplies are currently suffering from a large demand-supply gap, as well as poor financial management, in most countries around the world (Rohit Sing, 2009). As freshwater plays a key role in all aspects of life, from health to education, and energy to food, its crisis became one of the top global risks facing not only human beings, but businesses in the 21st century (Rohit Sing, 2009). Since freshwater sustains life, it is intimately connected to all aspects of economic development. Hence, business and political leaders around the planet must understand the issue, and increase the awareness of their own use of freshwater in the communities where they live and work. As the economic value of drinking water is expected to increase, cross-sector collaboration must improve sharply as well, to sustain freshwater stress.

Thus, freshwater is and will continue to be the basis for agricultural, municipal and industrial development around the world. This precious resource will continue to shape, contour, and stimulate economic development if managed diligently. We all know in the 21st century that the challenge for developing countries is to provide freshwater to growing populations and economies in the face of progressively limited supplies, and a need to satisfactorily manage our freshwater resource (Rohit Sing, 2009).

The main purpose of this article is to envision the solution to drinking water scarcity to face economic development where it is needed. For instance, in third world countries where the freshwater crisis is high, individuals spend an average of five or more hours per day walking to freshwater sources. By exchanging the time spent looking for water with work and school, adults and children would drastically improve their skills, which would increase their efficiency and contributions to society (World Water Assessment Programme, 2001). We all know this issue is not unknown by policymakers, but the solutions of freshwater shortage must speedily materialize. The United Nations has already pledged to meet various Millennium Development Goals (MDG) of equitable progress for the developing world; one of which is to reduce by half the number of people facing

freshwater stress and basic hygiene. Based on our findings, if this goal is met, the developing world will enjoy \$38 billion year of economic prosperity (World Bank, 2003).

1.1. Literature Review

Freshwater is a necessity good and we are all dependent on its resources; because we need freshwater every day in so many ways. For example, we all need it to stay fit, for growing food, vegetation, transportation, irrigation, industry, and its absolute life-giving properties.

Yet notwithstanding the importance of freshwater in our lives and well-being, we perceive freshwater resources as being infinite, and take them for granted. Today, freshwater is wasted, used inadequately, vainly, and polluted through abusive use. Thus, per capita accessibility of freshwater is rapidly waning worldwide. If the present freshwater utilization pattern continues, “more than 66% of the world’s population will live in water-stressed conditions, with moderate or severe shortages by the year 2025.” (Kumar 2003)

Previous studies reveal that in the developing world, Africa in general, and Sub-Saharan Africa in particular, has the highest population growth rate of 2.70% (World Bank 2013). However, food production is not increasing at the same rate as population growth (Winrock 1993). One of the most negative factors disturbing the improvement of food production and inspiring economic development in Africa, for instance, is the quantity and/or quality of available freshwater resources. Because food security is so closely linked to potable water availability, which in return instigates sustainable economic development; many countries around our planet are still far from accomplishing their workable economic development goals. Freshwater stress is further jeopardized by the salinization of freshwater. Drinking water near seaside slowly becomes salty because the saltwater is blending with groundwater. Another freshwater stress factor is the lessening groundwater levels. In this particular situation, there will always be a slow reduction in the groundwater level, because of the little quantity of rain replacing the groundwater. Global warming and increased domestic consumption of freshwater as the world population upsurges will continue to weaken the sustainable economic development (S. Edwin, 2010). The fact that less than 1% of the Earth planet’s aquatic endowment is potable water it is imperative to promote greater freshwater management and conservation to inspire viable economic development (Carruthers and Morrisson, 1994; FAO 1993).

1.1.2. Methodology

Secondary data was used to gather the information and perform this analysis. FAO AQUASTAT tables were exploited to design the figure in this article as well. Other sources of the data were World Resource Institute (WRI) and some scholarly works presented at the difference World Bank and/or UN conferences the last three decades. The study was conducted to predict the solution of freshwater scarcity to face justifiable economic development where it is needed. The data collected from 152 countries or six regions such as Africa, Asia, Europe, North America, South America and Oceania. The use of freshwater in each of the 152 countries or regions was measured in (m³/p/year) to ensure that our data was standardized.

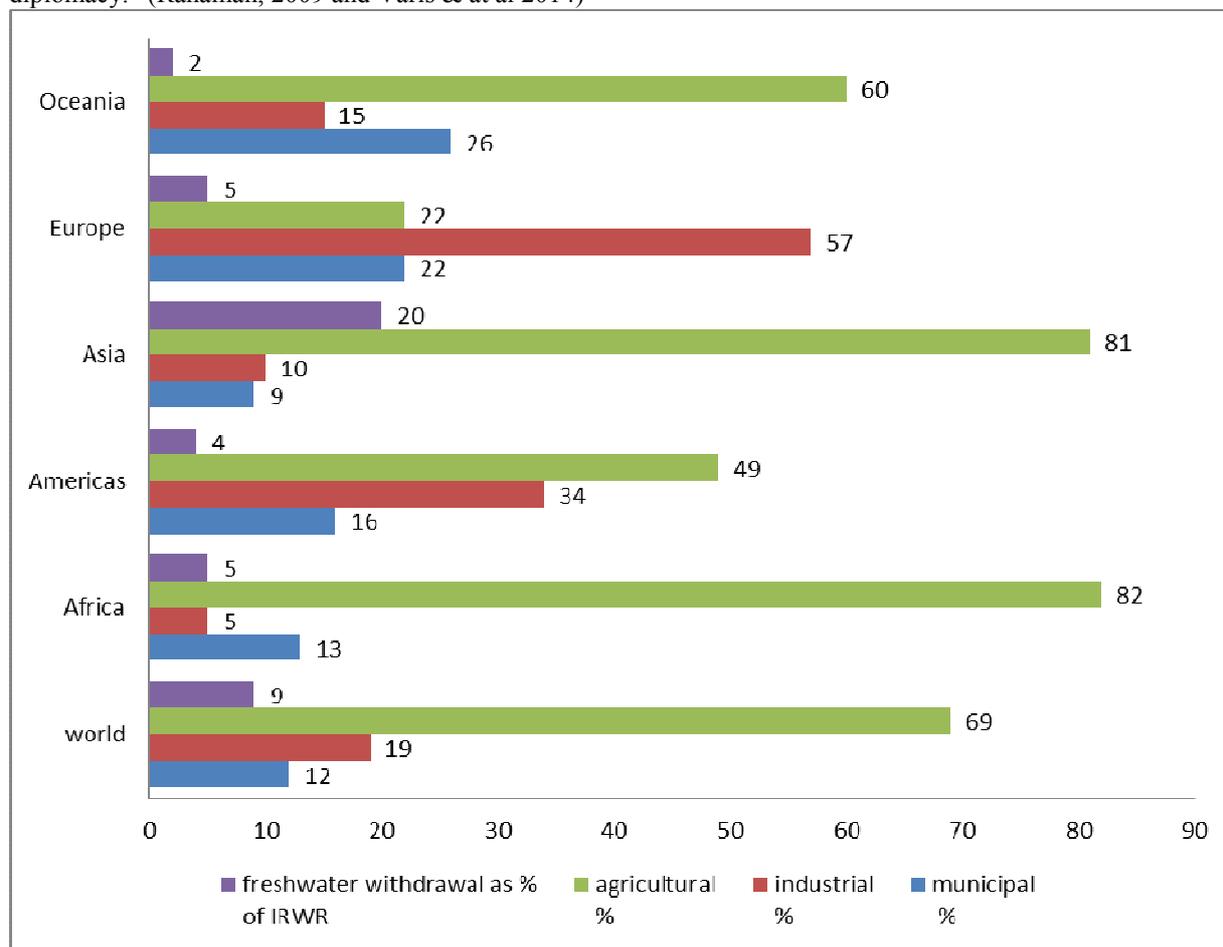
1.1.3. Discussion

Freshwater supply improvement and management is a vital component of sustainable development of any nation or region in the world. Frequently, the freshwater coverage and distribution does not adequately match the demand hubs as it might ideally. Hence, the need for water remains the same if it is not moving in an upward direction to the needed communities. Thus, the idea that the increasing supply of freshwater goes along with growing demand from the agricultural, municipal, and industrial sectors has encouraged rising construction costs, significantly lower cereal prices, a mounting environmental and social awareness, and ineffective irrigation in third world and developing regions such as Africa, for instance (FAO1993). Hence, efficient freshwater management can contribute effectively to social and political issues surrounding all sectors of the economy. The enhanced management of freshwater will involve trade-offs between these sectorial users, as well as between additional economic growth and reduced freshwater resource depletion, degradation and related environmental concerns to sustain water-related conflicts in coming years as the planet’s population increases (FAO 1993). The illustrative ideas of freshwater explain the fact that water is a basic human necessity, and access to minimum quantities of safe freshwater (for an average of 20 liters per person per day) should be the fundamental right of all people (Richard Black, 2012). The scarcity of safe freshwater, as well as cleanness, industrial, and irrigation water, is directly related to poverty and poor health.

Figure 1 shows water withdrawal by sectors in five major regions of the world to explain the role of freshwater in the economic development in the following regions such as Africa; Americas; Asia; Europe and Oceania. The sixth item on figure 1 represents the world data of freshwater withdrawal by sector. Thus, the demand for freshwater comes not just from the need to drink, wash and to deal with human waste; but the highest demand on water supply comes from industry in developed countries, and in the developing world, from agriculture, and irrigation crops in the hot, dry countries of Africa and Asia. For instance, in Africa, agriculture accounts for 82% of water use, while it represents only 69% in the world (FAO AQUASTAT database, 2006). The freshwater use in agriculture in Africa is 13% higher than the world’s freshwater use. Asia is a close second

in terms of water use in agriculture, with 81%, putting it just behind the region of Africa. While Africa uses 5% of freshwater in industrial production, the Asian usage rate of freshwater in the industry is 10%—two times higher than the African freshwater usage rate in its industrial production, and 9% percent less than the world usage rate in industrial production. The remaining regions such as the Americas, Europe and Oceania have a relatively low average freshwater usage rate of 55% in agricultural production. However, the aforementioned three industrialized regions use an average of 35% of freshwater in industrial production, sixteen percent higher than the world’s industrial production rate. As demonstrated in this article, we can confirm that freshwater plays a vital role not only in sustaining human life and the ecosystem, but also in its very significant role in a sustainable economic development of every nation FAO (AQUASTAT database, 2006).

Thus, one may say that regions such as Africa and Asia still have a strong need of sustainable economic development and the improvement of the water infrastructure in those regions that are home of nearly 50% of the world’s population is vital; even though some economic development needs are still being felt in developed countries. Hence, freshwater, by its nature and function in human life, should be recognized as a tool for sustainable economic development and for “community development, peace building, and preventive diplomacy.” (Rahaman, 2009 and Varis & at al 2014)



Source: Aquastat 2006

Figure 1
 Freshwater withdrawal by Sector (%)

1.1.4. Conclusion/Recommendation

It is believed that sustainable economic development can be attained if freshwater resources are managed efficiently and effectively. Since freshwater resources are essential for human life and the environment, there is a need to pay close attention to their management, and to be aware of future challenges, and react to them when necessary. It is believed that “in the field of capacity building, the need for education and training regarding water wisdom, research, effective water institution, knowledge sharing, and innovative technologies must be prioritized.” (Rahaman and Varis, 2005) One of the key components to achieving sustainable development is to improve water use efficiency, facilitate public-private partnerships, and to involve all participants in the decision-making process, enhancing education, combating corruption, and minimizing freshwater conflicts.

Sustainable freshwater management not only deals with water availability and wastewater treatment, it

combines many other functions, including food control, poverty alleviation, food production, ecosystem conservation and drought management (Moriarty P, 2001). To succeed in these goals, worldwide governments, international organizations and NGOs are central to the effective implementation of justifiable freshwater management strategies. The essence of this effort is that a collaborative work is essential for freshwater resource management that will positively impact viable economic development in every corner of our planet (Moriarty P, 2001).

Thus, it is important to foresee efficient and effective management of rainwater through storage, allocation and transfer for use and preservation of the quality of the freshwater resource to support our ecosystems. Water supply and delivery must minimize losses and consumption through prevention of wastage. Wastewater must be treated and be reused in irrigation to support agricultural production. Efficient use of water must be implemented through the adoption of water-saving technologies and cropping patterns; for example, expanding the use of “desalination,” and developing genetically-modified crops that use less freshwater or more saline water (Kumar 2003).

1.1.5. Future Research

The rise of the world population is directly correlated with freshwater resources demand; thus, it will be necessary to anticipate a proficient management of freshwater resources. Hence, the direction of future research should focus on the improvement of freshwater supply to assist International Organization, NGOs and worldwide government decision-makers to craft sound freshwater resources policies to minimize conflicts among communities around the world.

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