

## Water for Sustainable Development: Example from Past to Future

**Fatma ŞENSOY**  
Dr., İstanbul, Turkey

**Abstract:** Freshwater is not only a finite resource that is imperative for sustainable development but also economic growth, political and social stability, human and ecosystem health, and poverty eradication. While water issues have long been on the international agenda, the debate on how to meet the growing global demand for freshwater has intensified in recent years: over 800 million people currently lack access to safe drinking water, while about 2.5 billion lack access to adequate sanitation.

In response to these challenges, the World Water Forum was initiated as a platform to include water issues on the international agenda. The WWC, an international policy think-tank established in 1996, addresses global concerns over the pressures on the Earth's freshwater resources.

Besides today's global water issues, the historical example given below is a way to enlighten our future by the means of usage and management of the water supplies. In XVI. Century in İstanbul there was a strong scarcity on water. The increasing population and welfare by time, the consumption of water has increased during the time. The water supply systems were not sufficient for İstanbul. The dimension of this scarcity was mentioned by Selaniki. One bottle of water was 15 akçe. Those days, a worker's daily wage was 6 akçe. A skilled worker's daily wage was 12 akçe. Due to these problems; in 1554 Suleiman the Magnificent ordered his architect Sinan to supply water to the İstanbul from the forests located on the north of the city. The grand vizier of Sultan, opposed this huge project because of its cost. The grand vizier notified that if the water comes to the city in large amounts; the İstanbul would become an attractive position for people from many nations and occupations. This would cause the increase in the population of the city coming aside with many other problems.

Kanuni has endowed 5 villages and a town for the finance of this big investment. Kanuni mentioned that his will is "fountains should be built to every district. To the high places that, the construction of fountain is impossible the fresh water well should be placed. By that the old people, poor women, infants can fill their water caps and that they can pray for the continuity of regality.

In the consensus of İstanbul given by the 5.th World Water Forum was a reflection from an event held centuries ago. The contribution of Kanuni is an event that still should enlighten today's modern approaches toward the use of water. "Access to good quality water and sanitation is a basic right for all human beings and plays an essential role in life and livelihoods, the preservation of the health of the population and the fight against poverty."

**Keywords:** Water; Kanuni; Water supply systems.

### 1. Introduction

#### 1.1. Water Is Life

Water is the source of life. But today everyone knows that this vital element is being consumed up more and more every day because of misusing by humanity. This reality is becoming a global crisis. Climate change, ecosystem degradation, the food crises, energy crisis, economic crisis all increase the problems more difficult. Thus our children will inherit a global problem. For saving our planet needs global solutions.

Water is ever increasingly becoming the single most precious and essential item that sustains life in this world, enabling all human need for life and the development of civilizations. For that reason, the first civilizations in history appeared in regions which are rich in terms of water such as Mesopotamia in Anatolia, and the river Nile in Africa... and established the grounds of agriculture, trade and science.

The vital importance of water is the same degree from the ancient times to today. In many cultures water is considered to be one of the four elements, along with fire, air and soil. In Ottoman culture these were known as *anasır-ı erbaa*. A verse from the Qur'an, which is frequently inscribed on fountains, "We made from water every living thing" (Anbiyaa, 21/30)

In a hadith Prophet Muhammad was asked which form of charity he approved of and the answer he gave was "water." This and similar hadiths encourage Muslims to provide water, to offer it and to help in the

constructions of water structures. Water is not only important in belief and religion, but also it is important for the formation and the development of cities and civilizations.

## 1.2. The Definition of Sustainable Development

Sustainable development has been defined in many ways, but the most frequently quoted definition is from *Our Common Future*, also known as the Brundtland Report.

*"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts:*

- *the concept of **needs**, in particular the essential needs of the world's poor, to which overriding priority should be given; and*
- *the idea of **limitations** imposed by the state of technology and social organization on the environment's ability to meet present and future needs."*

All definitions of sustainable development require that we see the world as a system—a system that connects space; and a system that connects time.

When we think of the world as a system over space, we grow to understand that air pollution from North America affects air quality in Asia, and that pesticides sprayed in Argentina could harm fish stocks off the coast of Australia. And when we think of the world as a system over time, we start to realize that the decisions our grandparents made about how to farm the land continue to affect agricultural practice today; and the economic policies we endorse today will have an impact on urban poverty when our children are adults. We also understand that quality of life is a system, too. It's good to be physically healthy, but what if we are poor and don't have access to education? It's good to have a secure income, but what if the air in our region is unclean? And it's good to have freedom of religious expression, but what if we can't feed our family? The concept of sustainable development is rooted in these sort of systems of thinking. It helps us to understand ourselves and our world. The problems we face are complex and serious.

"Water has always played a key role in economic development, and economic development has always been accompanied by water development. Investment in water management has been repaid through livelihood security and reductions in health risks, vulnerability and ultimately poverty. Water contributes to poverty alleviation in many ways – through sanitation services, water supply, affordable food and enhanced resilience of poor communities faced with disease, climate shocks and environmental degradation. Water of the right quality can improve health through better sanitation and hygiene and, when applied at the right time, can enhance the productivity of land, labour and other productive inputs. In addition, healthy freshwater ecosystems provide multiple goods and services essential to life and livelihoods."

Water plays an important role on the improvement of human health, productivity of the land, and the economic development as long as it is used at the right time and place. All of these improvements are closely related to the infrastructure of the water. According to the socio-economic analyses, the stock of infrastructure (water supply, sanitation, dams, reservoirs and storage, electricity, and hydropower...) which a country owns is closely linked to its socio-economic development, and as a result these infrastructures are vital for a country's development.

## 2. Water Scarcity from Past to Future

### 2.1. An Example from XVI. Century in İstanbul

The increase in demand for water depend on population growth. The population of İstanbul in the reign of Sultan Süleyman the Magnificent reached 150000-175000. The lack of water that this led to caused great problems. The increasing population and welfare by time, the consumption of water has increased during the time. The water supply systems were not sufficient for İstanbul. The dimension of this scarcity was mentioned by Selaniki. One bottle of water was 15 akçe. Those days, a worker's daily wage was 6 akçe. A skilled worker's daily wage was 12 akçe. ( In 1544 (Irgad) worker: 5,47 akçe; 1555'de (neccar) carpenter: 10,46 akçe, in qualified category that worker stonemason (taşçı): 11,46 akçe, again qualified worker that sewerman (lağımçı): 11,20 akçe daily payment had taken. In 1555 for one okka soup was paid 6,3 akçe by Palace. At the same time for one okka nail was paid approximately 5 akçe.) Due to these problems ; in 1554 Süleyman the Magnificent ordered his architect Sinan to supply water to the İstanbul from the forests located on the north of the city. The grand vizier of Sultan, opposed this huge project because of its cost. The grand vizier notified that if the water comes to the city in large amounts; the İstanbul would became to an attractive position for people from many nations and occupations. This would cause the increase in the population of the city coming aside with many other problems. During the period of Sultan people had encountered many problems but mentioned that next generation would

suffer more. Selanikî additionally mentions the problems that will be faced in 30 years time. In 1567 the settlement and immigration was prohibited to İstanbul.

The Kırkçeşme Waters, completed in 1563, but happened in a great floods of the same year and rapid repaired were carried out, being completed in 1564. In total this construction costed 50 million akçe. This system first started providing services there were 135 fountains; later there were 300 and then 580 fountains. In time the system with 4 dams, 570 additions was expanded. According to the waqf registers it provided 334 lüle(Lüle: One of the units measurement of water. When the diameter of the pipe was 26 mm the amount of water it provided in one day was called a lüle (52 m<sup>3</sup>/day)) (17.423m<sup>3</sup>) The population of İstanbul at that time was around 170.000. Thus that this system provided 100 liters of water per person.

Süleyman the Magnificent has endowed 5 villages and a town for the finance of this big investment. Kanuni mentioned that his will is "fountains should be built to every district. To the high places that, the construction of fountain is impossible the fresh water well should be placed. By that the old people, poor women, infants can full their water caps and that they can pray for the continuity of regality.

In those days The grand vizier of Sultan showed that the reality of key concept of sustainable development. The next generations would be faced many problems. Because of population growth, people again lived the scarcity of water. Not only that scarcity but also social and environmental problems would be appeared.

### **3. Today's Issues**

#### **3.1. Locally**

The water resources in İstanbul, which has very crowded population and continual enlarging city turned out to be insufficient for meeting the water demand. Expansion of modern urbanization and the consequent construction movement yielded the need for supplying pressured water to the city. The water in Terkos Lake was transferred to the city through a pump with the priorities given the Dersaadet Inc. Water Company during the rule of Sultan Abdülaziz. This development and change have continued with the establishment of İstanbul Water Administration in 1933. In 1981 ISKI (Water and Canalization Administration) formed an incorporated company connected to İstanbul Metropolitan Council. Thus, the period of modern work including the bringing and distribution of water as well as the managing waste water and purification of drinking water reservoirs began. Today ISKI is providing water and disposing waste water in an environment-safely way upon water treatment for over 12 million people living in İstanbul with around an annual budget of 3 billion 239 million L and around eight thousand staff.

Water problems show region specific. However there are several common solutions. In our country which is developing country, the water resources must be developed in an efficient way that optimizes water's benefits- more crop per drop-, while minimizing negative environmental impacts. The availability of water per capita per year in Turkey is only about one fifth of that of the water rich countries. It is therefore necessary that Turkey should improve per capita water availability in order to enhance the quality of life of her people. Therefore, in recent decades Turkey has made great success in water resources development for domestic use, irrigation, power generation, flood control, and other purposes. We are living in a global village. Because of this reality we have many problems too.

#### **3.2. The Global Problem**

The world is facing changes at a faster rate than ever seen before. These changes such as population growth, migration, urbanization, land-use changes and climate variability/change will drive the way in which water resources need to be managed in the future. They also call for concrete contributions from water policies and actions to help the world cope with these changes. While climate change has been the most talked about topic, other changes taking place will likely affect water resources and services and their management to a much greater degree. The population of the planet is estimated to increase by 50%, meaning 3 billion additional inhabitants, by 2050. More than half of the world's population now lives in cities, and this increasing urbanization is set to continue. Population will continue to increase as will rural-urban migration, adding difficulty to reach the agreed Millennium Development Goals (MDGs) on access to water and sanitation and increasing pollution at the same time. The demand and probably prices of natural resources and energy will increase as the planet's inhabitants grow in number and consumption increases. Humans are altering global systems at a rate not previously experienced. These drivers, and the constraints that limit the ability to adapt to them, affect the developed and developing world in different ways.

### **3. Water is a Key to Sustainable Development**

An adequate and dependable source of water is needed to sustain humanity and to support development and growth. Investment in water management has been repaid through increased livelihood security and reductions in health risks, vulnerability and ultimately poverty. Poverty reduction is closely linked to enhanced access to water. Where economic growth has been strong and prosperity has been fairly equitably distributed, poor individuals and households have been able to reach the targets of the Millennium Development Goals.

Conversely, where governments are unable or unwilling to deliver the basic services, water emerges among the most pressing issues.

All over the world living experience shows that access to water is fundamental for economic growth and livelihoods. In rural and agriculture-based economies water is often the most important factor for agricultural production and other livelihood activities. In urban-based, labour-intensive manufacturing economies water is needed for nearly all productive activities. Secure access to water with reliable storage and irrigation has boosted economic growth in many of the developed economies of the Americas and Europe, and through the green revolution in Asia has enabled the transformation of agriculture-based economies to industrial and emerging market economies. Past efforts of development and water use have often ignored the water needs of life on Earth and have placed at risk the resources on which life depends. The links connecting water resources, the environment and economic sectors are complex. As a result, our understanding of all the ways that natural processes influence human well-being remains incomplete, impeding our ability to ensure sustainable economic and social development.

Water infrastructure supports growth and poverty reduction and should be planned by taking the possible impacts into account. The principal drivers of growth and change have often come from outside the domain of water managers. Water development has largely responded to and been affected by developments in the wider political economy, such as market-oriented reforms, openness to global trading systems and advances, supply chains and regional production networks. Storage, irrigation, urban water supply and wastewater have all been part of the enabling infrastructure. These have been led by public policies and microeconomic developments (productivity changes, capital and input accumulation, and technology). In some cases infrastructure development has been promoted by specific sectors in the economy that directly benefit from them, while the costs are usually borne by society at large.

Actions that target rural economies will benefit the largest number of people. As of 2007, 3 billion people live in rural areas, most of them dependent on agriculture for their livelihood. Agricultural economies are especially vulnerable to lack of water during critical crop-growing seasons. Their performance is influenced by the ability to secure and control water through infrastructure, such as water harvesting storage, reservoirs and canals, and the ability to transport it to crops when required. Investments in physical infrastructure must be accompanied by investments in 'soft' infrastructure, the dense network of institutions and human capacity needed to secure spaces in which individuals, households, firms and communities are able to pursue their day-to-day activities with a reasonable degree of predictability and stability and with due regard for the interests of others. Investments are also required for the operation and maintenance of physical infrastructure literature.

Water contributes to poverty alleviation in many ways – through sanitation services, water supply, affordable food and enhanced resilience of poor communities to disease, climate shocks and environmental degradation. Water of appropriate quantity and quality can improve health and, when applied at the right time, can enhance the productivity of land, labour and other inputs. The daily water supply for multiple household uses is determined by the time, labour and financial costs required to access water. The economic and social returns from water access for different uses determine net livelihood benefits or losses.

### **4. Conclusion**

In Istanbul, on 16 March 2009, Heads of States on Water is decelerate at the end of 5th World Water Forum. "We, the Heads of States, Governments and International Organizations, gathered in Istanbul on 16 March 2009 on the occasion of the, under the theme "Bridging Divides for Water", appeal to all national governments, international organizations and other stakeholders to generate a common vision and framework to develop and manage water resources in a sustainable manner and to guarantee access to safe water and sanitation for all... Many decisions taken at all levels of government both influence and depend significantly on water. Yet this connection is rarely recognized and much less acted upon.

Therefore, we urgently need new policies, adaptation strategies, institutional reforms with the effective contribution of local elected administrations and water users, international commitments, financial mechanisms, technology and innovation in order to address global water issues and adapt water management strategies to the global changes. We affirm our political will to take rapid action bearing in mind the key elements of success: Solidarity, security, adaptability and useful dialogue and cooperation on transboundary waters between neighbours. Working together with a participatory, inter-sectoral and multi-disciplinary approach to manage

water resources, the world can and will attain greater prosperity and increased stability through the sharing of the many benefits of water.

To achieve this, we call on all nations to join efforts in order to develop a global framework for addressing the world's water issues and to implement tools that will help us accomplish solidarity, security and adaptability. We, the Heads of States, Governments and International Organizations gathered in Istanbul, pledge to create a more sustainable and water safe world in the 21st Century and, in this context, appeal to everyone to join us in meeting this challenge.”

## References

1. World Commission on Environment and Development (WCED) (1987). Our common future. Oxford: Oxford University Press.
- 5th World Water Forum Ministerial Process Istanbul Water Guide
- Ahmet Murat Özel, The Culture of Water and Fountains, İstanbul, İSKİ, 2009, s. 8-13.
- Ahmet Murat Özel, The Management Of Water In İstanbul -From The Past To The Present, İstanbul, 2009, p. 48.
- Ahmet Refik, 1935, s.139.
- Ahmet Tabakoğlu, Türk İktisat Tarihi, 2.nd Edition, İstanbul 1994, p.152..
- GWP Technical Committee 2003
- Hussain and Hanjra 2003
- Lipton, Litchfield, and faurès 2003
- Istanbul &Water, ISKI publication, İstanbul
- Selâniki Mustafa Efendi, Tarih-i Selâniki , (haz) Mehmet İpşirli, İstanbul: Edebiyat Fakültesi Basımevi, 1989, p.3;
- Şevket Pamuk, İstanbul ve Diğer Kentlerde 500 yıllık Fiyatlar ve Ücretler 1469–1998, Ankara: T.C. Başbakanlık DİE. Yay. 2000, p. 142, 192.
- UNDP 2006, cited in World Water Development Report 3 Chapter 6.
- UNIDO 2007, cited in World Water Development Report 3 Chapter 6.
- United Nations 2008 cited in Worl Water Development Report 3 Chapter 6.
- Veysel Eroğlu, “Foreword”, Turkey Water Report 2009, Ankara, 2009, p.1-2.
- What is Sustainable Development? Environmental, economic and social well-being for today and tomorrow. <http://www.iisd.org/sd/>
- World Bank 2007, cited in World Water Development Report 3 Chapter 6.
- World Water development report 3 Chapter 6.