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# MULTIPLE WATER SOURCES & WATER-SMART SOCIETY FOR EMERGING MARKETS

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**Abstract:** Water is a valuable resource and key-component of national economy development. It affects directly or indirectly 78% of global jobs, accounts for up to 59% of total resource use in industry in developed countries, strongly affecting average annual per capita GDP growth. Each USD invested in water infrastructure brings 3-34 USD of benefits, depending on region and technologies. Water crisis in the group of risks with highest likelihood and impact. Nearly half the global population are already living in potential water scarce areas at least one month per year and this trend is growing. Income growth in emerging markets will be strongly associated with water consumption because of water demand in food production and sanitation. Due to income growth, diet preferences will also change to higher water intensive commodities. Improved living standards are set to change the use of water for lifestyle purposes, affecting energy industry, resulting in water-food-energy nexus. The core challenge water industry faces in emerging markets is balancing economic mechanisms with the intrinsic value of water as a common good that requires new solutions and involvement of multiple stakeholders along the value chain to decision making. In the present conditions of emerging markets, it will be necessary to reduce the growing stress on natural water sources. There will be a need to gradually make multiple alternative water sources available to complement current abstraction from ground and surface waters. This will rise the need in rainwater harvesting solutions, efficient desalination, reuse of wastewater, covering water management strategies, technological and infrastructure development.

**Keywords:** water value; water jobs; water footprint; water investments; water security; scarcity; emerging markets.

## 1. Water & Economic Performance

The value of water comes out through its direct and indirect role in production of goods and services, including drinking water, food, energy, health protection and education, mining and industrial manufacturing, waste treatment, environmental protection and many others (Young 2010).

According to (UNESCO 2016), more than 42% of the world's total active workforce are heavily water-dependent, including work in agriculture, mining and industries ranging from paper to pharmaceuticals. Moreover, another 1.2 billion jobs are moderately water-dependent; though they do not use large quantities, industries such as construction, recreation and transportation do need access to some (Gilquin & Uhlenbrook 2017). In total, 78 percent of global jobs need water.

Among the economic implications of water scarcity is the impact on businesses worldwide leading to higher operating costs and staying competitive (Guarino 2017). According to (UNESCO 2012), in high income nations industry accounts for up to 59% of total water use. The lack of water will have a domino effect on communities: local commerce declines, incomes go down, tax revenues decrease, population declines due to lack of employment opportunities, cities and the surrounding communities shrink dangerously (Guarino 2017).

According to (Tropp 2013), improved water supply and sanitation and water resources management boosts countries' economic growth. Notably, poor countries with improved access to clean water and sanitation have annual average growth of 3.7%, while poor countries with the same per capita income but without improved access had an average annual per capita GDP growth of only 0.1%.

Economic benefits from 3 to 34 USD per 1 USD invested, depending on region and technologies, would be gained in the health, individual and household, agricultural and industrial sectors, if the water and sanitation targets are achieved (Tropp 2013). This will gain 322 million working days per year, and the annual global value of adult working days gained because of less illness would be almost 150 million USD.

## 2. Water Security & Emerging Markets

The World Economic Forum (WEF) includes water crisis in the group of risks with highest likelihood and impact, and strongly interconnects it with other three risks: "Failure of climate-change mitigation and adaptation", "Man-made environmental disasters" and "Extreme weather events" (World Economic Forum 2018). WEF defines water crisis under societal risks as a significant decline in the available quality and quantity of fresh water, resulting in harmful effects on human health and/or economic activity.

Nearly half the global population are already living in potential water scarce areas at least one month per year and this could increase to some 4.8–5.7 billion in 2050 (Burek 2016).

The future global water demand will raise primarily due to population growth, increasing wealth and changing diet preferences. The biggest contributors to these changes will be emerging markets and developing countries that are already suffering from water, food and health problems.

Emerging markets are countries that has some characteristics of a developed market, but does not satisfy standards to be termed a developed market (MSCI 2013).

Current study is focusing on three countries, collaborating under "Water, Society and Climate Change" (WaSo) project (WaSo n.d.):

- Bangladesh – recognized as emerging market by IMF, BRICS, S&P, EM;
- Kenya – listed in The Emerging Markets Index by MasterCard;
- Sri Lanka – classified as emerging market by BBVA and as frontier market by MSCI.

According with the baseline water stress index that measures total annual water withdrawals expressed as a percentage of the total annual available blue water (Gassert et al. 2013), Bangladesh (0.65) and Kenya (0.68) are in the category of "low stress", while Sri Lanka (3.01) is in the "high stress" group.

Income growth in emerging markets will be strongly associated with water consumption because of water demand in food production and sanitation. Due to income growth, diet preferences are also subject to change from predominantly cereal-based to meat-preferred, which are higher water intensive commodities. Improved living standards are set to change the use of water for lifestyle purposes, affecting energy industry (Dinar & Schwabe 2015). The interdependence of these three is referred to as the "water-food-energy" nexus (Flammini & Puri 2013) and can be quantified by Virtual Water Demand Concept (Lillywhite 2010).

Globally, freshwater ecosystems are depreciating rapidly and substantially (Sadoff 2015), rising the problem of water security, especially in emerging markets (Hoekstra & Chapagain 2006).

Increasing water use and scarcity may impose constraints on the economic growth of emerging markets (Dinar & Schwabe 2015). In addition to physical constraints of water availability, many emerging markets are facing increasing environmental and social costs as they devote more infrastructure and institutions to achieving greater water security, but these costs are artificially inflated and the productive benefits reduced because of socially inefficient water policies (Dinar & Schwabe 2015).

## 3. Water Smart Society & Multiple Water Sources

Analysis done by Barbier (Dinar & Schwabe 2015) for 112 developing countries and emerging markets shows that increasing

rates of water utilization has a significant and negative impact on overall economic growth. The most likely reason for this effect is inefficient water policies that requires corrections in water pricing, institutional reforms, encouraging active role of private sector and facilitating transboundary water agreements and management.

The water-smart society model (WssTP 2016) is based on four key principles as outlined below.

(i) "True value of water" to increase rational use and re-use of water resources, but also meaning extracting and exploiting relevant resources from water streams.

(ii) Digitalization of water industry, capturing and using information to manage water in real time.

(iii) Redesign of water distribution and treatment systems into water infrastructure, integrated with nature-based solutions.

(iv) New governance models, focusing on availability of water for all users and sectors, multiple purposes and from multiple sources.

In the present conditions of emerging markets, it will be necessary to reduce the growing stress on natural water sources, both in terms of pollution and in terms of water abstraction. There will be a need to gradually make multiple alternative water sources available to complement current abstraction from ground and surface waters, with useable water from additional sources (i.e. brackish, salt, and recycled water), in a cascading and "fit-for-use" approach (WssTP 2016).

This will rise the need in rainwater harvesting solutions, efficient desalination, reuse of wastewater, covering water management strategies, technological and infrastructure development.

The core challenge water industry faces in emerging markets is balancing economic mechanisms with the intrinsic value of water as a common good that requires new solutions and involvement of multiple stakeholders along the value chain to decision making.

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