POTABLE WATER: A POTENTIAL NATIONAL SECURITY ISSUE IN THE NEAR FUTURE

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Abstract

The paper presents the political, economic, and social trends pertaining to water demand, extraction, and management in the EU countries and beyond, alongside the measures taken by the Romanian government to align with EU policies. Information sourced from international organizations, research, and documents from European and national agencies has been synthesized. In the current context of globalization, as the global population continues to increase, the demand for food and water is anticipated to escalate, precipitating instability, poverty, and the globalization of insecurity. Hence, there is a pressing need to heighten focus on the efficient utilization, conservation, pollution mitigation of water sources, and augmenting their reuse percentage.

1. Introduction

"Water is not merely a commercial commodity but a heritage that must be protected, defended, and treated as such (Directive 2000/60/EC, Article 1)".

Three-quarters of Europeans rely on groundwater for their water supply, and 20% of surface waters are at high risk of pollution. Furthermore, 60% of European cities exploit their groundwater resources unsustainably.

Almost half of the EU population lives in countries experiencing "water stress" - a situation where water demand exceeds available supply during a certain period or when poor water quality restricts its use. Water stress leads to the degradation and depletion of water resources.

Water consumption is distributed among various sectors: 44% for energy generation, 24% for agriculture, 21% for domestic use, and 11% for industry. These consumption patterns vary geographically, with some regions using up to 60-80% of their water for agriculture. Reused water accounts for 2.4% of urban effluents, i.e., 964 million cubic meters with 347 million cubic meters for Spain for Spain and 233 million cubic meters for Italy, both leading in reuse, primarily for agriculture. Romania's water resources are relatively scarce and unevenly distributed in time and space, totaling 134.6 billion cubic meters, as surface and groundwater. According to the degree of hydrographic basin development the usable amount is around 39.5 billion cubic meters. Romania's endogenous resources, i.e., formed from precipitation falling on the country's territory rated to the population number is 1,894 cubic meters per year and per capita. As a result, Romania is one of the countries with the lowest water resources in Europe, as shown in Figure 1.

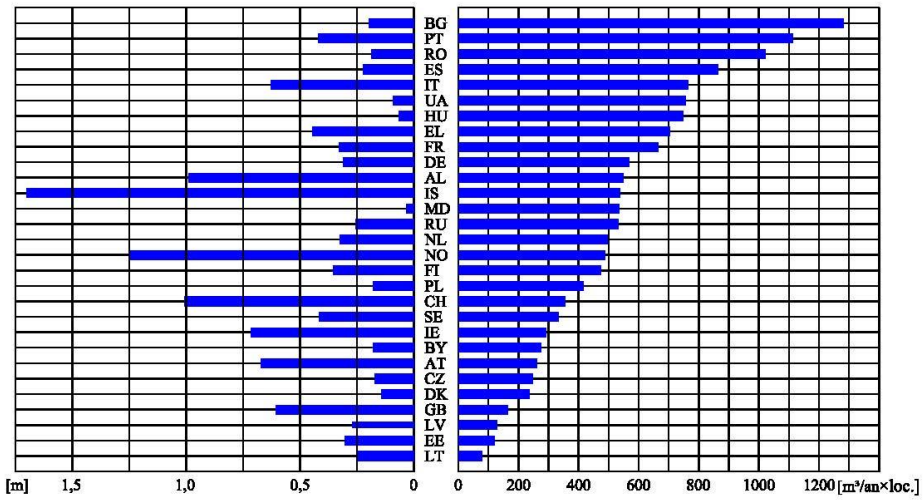

Fig.1. Specific water resources (left) and specific water consumption (right) in European states (according to the European Environment Agency)

2. Romania's Water Resources and Requirements

Considering exogenous water resources, such as the Danube and rivers from the upper Siret basin, equivalent to 170 cubic kilometers per year, Romania's total water resources amount to 212 cubic kilometers per year. The country heavily relies on upstream water resources from other countries, which are not entirely usable. Unlike Western and Northern Europe, insufficient water resources could hinder Romania's economic development unless a strict water management policy is implemented.

Due to variable water regimes, excess water during floods and low flow during droughts necessitate measures like the construction of reservoirs to retain excess water for dry periods. The National Administration "Romanian Waters" plans new hydrological basin projects, including reservoirs, to increase usable water resources and storage capacities during floods.

The quality and quantity of water in urban areas are critical for potable water supply, yet urban pollution contributes significantly to water quality degradation, according to specialists from the World Water Organization. Daily, two million tons of wastewater enter watercourses globally without adequate treatment. Urban population growth and inefficient water use in cities exacerbate these issues, leading to significant water wastage. Efficient management could provide potable water to millions more people.

Global statistics also indicate that "every second, the urban population grows by two people, meaning that every month, five million people move to cities, while 27% of the urban population worldwide does not have access to water supply systems.

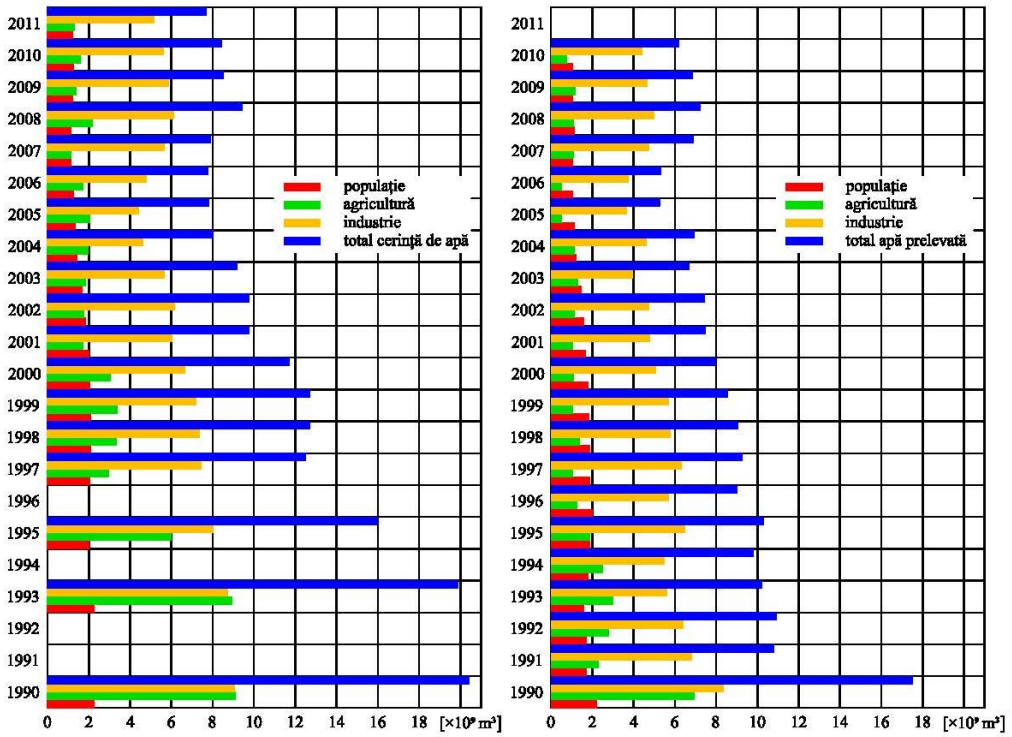

Fig.2. Evolution of water demand (left) and water withdrawals (right) in the period 1990-2010 (according to data provided by ANAR).

Every year, between 250–500 cubic meters of potable water are wasted in large cities globally. If this quantity of water were no longer wasted, an additional 10–20 million people could have potable water in the world's large 2008–2009) and short periods of slight growth (2004–2005, 2007–2008). Domestic water demand has steadily decreased, indicating reduced distribution losses and improved efficiency.

Reality demonstrates that globalization is the most significant and powerful force in shaping a new matrix of international security, being associated with the increase of insecurity, mainly due to one of its characteristics, namely the increase of interdependencies.

The issue of resources and competition for resources represents another important aspect of the globalization of insecurity. The interdependencies between resources, on one hand, and development, prosperity, and power, on the other hand, have decisively shaped the political evolution of the world. The most powerful motivation for war is the acquisition, access, or control of critical resources. As the planet's population continues to increase, so will the consumption of vital resources, leading to poverty, inequality, and both intra- and interstate violence. The scarcity

of resources such as water and food can lead to dysfunctionality at the level of the entire international community.

According to the Human Development Report "Beyond Water Crisis: Power, Poverty, and Global Water Shortage," in many developing countries, unsafe water represents a greater threat to human security than violent conflicts.

The authors of the report argue that annually 1.8 million children die from diarrhea, a disease that could be prevented by consuming a glass of water and ensuring sanitary conditions; due to water-related diseases, approximately 443 million school days are lost; and nearly 50% of the population in developing countries suffer from illnesses caused by the lack of water and sanitation at the same time. Moreover, the water and sanitation crisis hinder economic development, with sub-Saharan African countries losing 5% of GDP annually, more than the aid they receive.

According to researchers from the World Resources Institute, water will be considered the primary asset of the 21st century, much like oil was considered in the last century. The causes of conflicts and insecurity are multiple, complex, and well-integrated.

It is increasingly evident that environmental degradation and resource depletion play a significant role in the generation and exacerbation of human insecurity.

cities. "Compared to 1990, there have been two dramatic decreases in water demand. The first occurred between 1990 and 1999, when water demand for the three main categories decreased from 20.4 billion cubic meters in 1990 to 11.74 billion cubic meters in 2000. The second decrease occurred between 2001 and 2010, with water demand reaching 8.45 billion cubic meters in 2010, compared to the year 2000. Figure 2 presents the decrease in water demand and withdrawals. The water requirement for industry has halved, from 9.06 billion cubic meters, as it was in 1990, to 4.4 billion cubic meters, in 2005. Agricultural water demand has been volatile, reflecting hydrological conditions and irrigation capacity, experiencing years of sharp decline (1990–1997, 2000–2001.

3. Environmental Security and Water Sources Security are Integral Components of National Security

Annual economic growth, once quantified in billions of dollars, is now measured in trillions of dollars. However, as the economy grows exponentially, the Earth's natural capacities have not kept pace. In other words, humanity's global demands have surpassed the Earth's regenerative power. Today, global demands on natural systems exceed their sustainable capacity by over 25%.

From a more nuanced perspective, some specialists argue that the link between the environment (biodiversity loss, soil erosion, climate change) and security is so complex that it requires a new way of thinking. The consequences of global environmental crises will be so significant that protecting the global environment will need to become a matter of national security.

According to some, the Earth has environmental capacity limits, which is why they anticipate an increase in environmental crises leading to refugee crises and authoritarian regimes. As many states will face these challenges, non-state paramilitary structures and conflicts over energy and water resources will proliferate.

Global water scarcity is the result of tripling demand over the past half-century. Beyond traditional causes of water supply insecurity, climate change also affects water resources. Higher temperatures increase evaporation rates, alter precipitation patterns, and melt glaciers that feed rivers, as the Earth's climate system and the hydrological cycle are very closely linked.

Among the most visible manifestations of diminishing water resources are the drying up of rivers and the disappearance of lakes. The connection between water and food is strong; 70% of the total volume of water used is for irrigation, 22% in industry, and 8% for domestic purposes. Due to the increasing water demand in all three categories, competition between sectors is becoming more intense, with agriculture almost always losing out.

According to United Nations data, the total volume of water on Earth is 1.4 billion km³, of which 97.5% is salt water, and the remaining 2.5%, or 35 million km³, is fresh water.

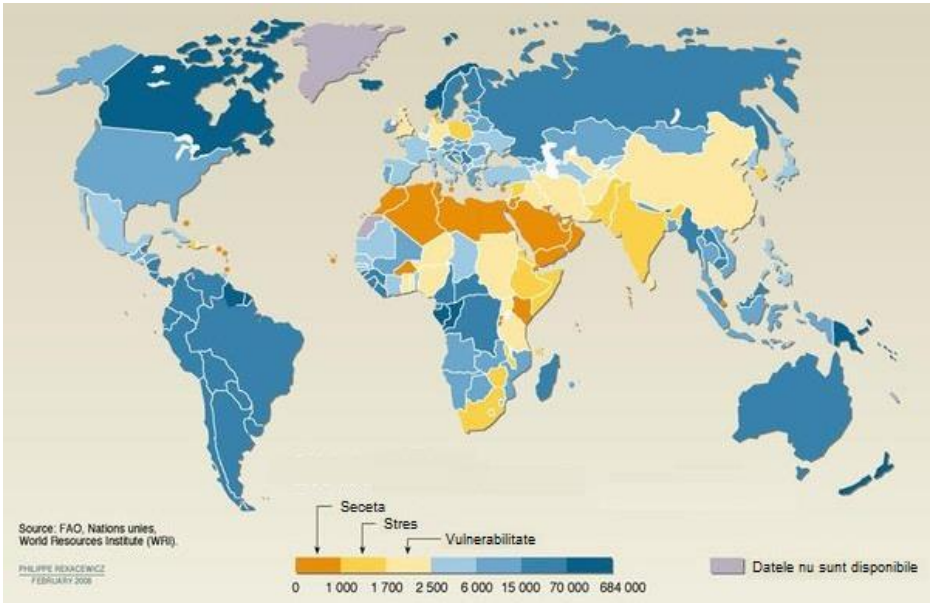

Fig.3. Availability of potable water (cubic meters per person per year, 2007).

In Europe, 44% of water resources are allocated to energy production, 24% to agriculture, 21% to population supply, and 11% to industry.

On the European continent, lakes and rivers supply 81% of the total freshwater, serving as the primary source of water for industry, energy, and agriculture. Conversely, the water supply for the population is primarily dependent on groundwater.

Romania's most significant water resources are surface waters—rivers, lakes, the Danube River, and groundwater. A special category of resources includes mineral waters (carbonated, sulfurous, ferruginous, etc.) and geothermal waters. These resources are relatively scarce and unevenly distributed in time and space, theoretically totaling 134.6 billion cubic meters, of which the usable resource, according to the degree of development of the hydrographic basins, is about 40 billion cubic meters.

The World Bank study, titled "Romania – Functional Review of the Environment, Water and Forestry Sector," revealed that half of the population is not connected to potable water supply and sewerage networks (compared to over 70%, the EU average), resulting in high levels of pollution that exceed the European average, including nitrate contamination of groundwater and land.

Romania's accession to the EU was a challenging exercise in complying with European environmental protection standards, reflected in the numerous transition periods in key areas such as water quality, water supply and sewerage networks, and the development of wastewater treatment plants.

The risk factors for potable water supply systems (conveyance, treatment, purification, sewerage) are:

- The conduct of economic activities in the sanitary protection zones of potable water resources (raw water intakes from surface sources, as well as groundwater sources) or the conveyances to consumers;
- The lack of necessary human resources to ensure the guarding of facilities (stations, pipelines, aqueducts, reservoirs);
- The lack of demarcation of sanitary protection zones and hydrological protection perimeters at some groundwater sources;
- The lack of specialized equipment and competent personnel at the public health directorates for verifying potable water quality, in accordance with community provisions necessary to ensure continuous testing of water from groundwater sources or reservoirs.

4. Conclusions

The interconnected challenges posed by water and food shortages, energy needs, population growth, climate change, biodiversity loss, and economic interdependence represent a potential "tsunami" for the entire world. These challenges are "unusual" in that they have a scale and level of complexity unprecedented in human history. Understanding their importance and taking appropriate actions are among our common dilemmas regarding security.

Concerning the impact of environmental issues, which can exponentially and directly affect social, physical, and economic security, we can highlight extreme weather events and "shocks" related to water and energy supply, as well as the acceleration of risks and threats such as: precipitation caused by soil erosion and structural instability, degradation of water quality or destruction of water supply sources, the spread of new diseases, degradation of energy supply capacity, pest invasions, destruction of agriculture and fishing, new "causes" of armed conflict, and the amplification of abuses and crimes.

The water crisis is becoming an increasingly acute and noticeable process over time, which, according to researchers, currently represents the second largest global problem of the 21st century, the first being, indisputably, the planet's population growth. The current problem is not one of resources but rather of the efficient distribution and management of water at a global level.

APA POTABILĂ, ÎN VIITORULUI APROPIAT, O POSIBILĂ PROBLEMĂ DE SECURITATE NAȚIONALĂ

Rezumat

Articolul prezintă tendințele politice, economice și sociale legate de cerința, prelevarea și managementul apei în țările UE și nu numai precum și acțiunile întreprinse de statul român pentru alinierea la politicile UE. Au fost sintetizate informații din documente elaborate de organisme internaționale, cercetări și documente ale unor agenții europene și naționale. În contextul actual al procesului de globalizare, pe măsură ce populația globului continuă să crească, va crește și cererea de hrană și apă, care vor genera instabilitate, sărăcie și globalizarea insecurității. De aceea se dorește creșterea atenției acordate utilizării eficiente a apei, a economisirii ei, reducerea poluării surselor de apă și creșterea procentului de reutilizare a ei.

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