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Florina BRAN,
Professor PhD

Carmen Valentina RĂDULESCU,
Associate Prosfessor PhD

Ildiko IOAN,
Associate Professor PhD

Cristina POPA,
PhD Students

Academy of Economic Studies, Bucharest
florinabran@yahoo.com

Rezumat

Apa este esenţială pentru viaţă, iar modul în care folosim apa în activităţile noastre are impact direct asupra mediului. Raportul Institutului pentru Sănătate Publică privind calitatea apei potabile din localităţile urbane a evidenţiat faptul că populaţia totală expusă la risc, luând în considerare vechimea reţelei de distribuţie, calitatea şi parametri sursei de apă, este de circa 9.8 milioane de locuitori din mediul urban. Lucrarea analizează principalii factori care afectează calitatea apei potabile, în condiţiile în care peste 100 de milioane de locuitori din regiunile Europei încă nu au acces la apă potabilă sigură şi canalizare adecvată, iar calitatea sursei de apă şi serviciile sanitare s-au deteriorat continuu în ultimii 15 ani, populaţia rurală fiind cea mai afectată.

Cuvinte Cheie: contaminare cu nitraţi, infiltrare, apă potabilă, tratarea apei uzate

ABSTRACT

Water is essential for life and the way we use water in our activity has a direct impact on the environment. The Report of the Public Health Institute on drinking water quality from urban localities highlighted that the total population potentially exposed to the risk, taking into consideration the age of the distribution networks, water source quality and parameters, is estimated to be about 9.8 million inhabitants in urban areas. The paper analyses the main factors that affect the quality of drinking water, in the conditions than 100 million people in the European region still do not have access to safe drinking water and adequate sanitation and the quality of the water supply and sanitation services has deteriorated continuously over the past 15 years, with the rural population being most affected.

Key Words: nitrate contamination, leakage, drinking water, wastewater treatment

JEL Classification: Q56

1. INTRODUCTION

It is widely recognized that the Earth has a limited capacity to meet the growing demand of the socio-economic systems for natural resources and to absorb the destructive effects of their overuse. Climate change, soil erosion and desertification, the pollution of soil, water and air, the shrinking area of tropical forest systems and wetlands, the extinction or decline of a large number of aquatic and terrestrial species, the accelerated depletion of non-renewable natural resources have started to have measurable negative effects on the socio-economic development and on the quality of life of human populations in vast areas of the planet (Bran and Ioan, 2002).

The paper examines how drinking water supply is affected by different water pollution sources, adopting a two level of resolution perspective. Thus, firstly the European water pollution landscape was depicted, emphasizing the most prominent problems. Further, the focus was drawn on Romania, were this environmental issue has an important social impact.

2. EUROPEAN WATER POLLUTION LANDSCAPE

More than 100 million people in the European region still do not have access to safe drinking water and adequate sanitation, the quality of the water supply and sanitation services has deteriorated continuously over the past 15 years, with the rural population being most affected.

One major part of the population lives in countries where water resources are under substantial pressure. High leakage losses in alter distribution systems, poor management and maintenance of irrigation systems, and unsustainable cropping patterns exacerbate the impacts of droughts and water scarcity (Rojanschi et al., 2006).

Moreover nitrate contamination is a problem commonly identified in many national reports. This is likely to be due to intensive agriculture and the use of artificial fertilizers which contaminate raw water sources. Nitrate contamination is often a particular problem in small wells e.g. in Belgium 29% of 5000 wells examined had nitrate levels in excess of 50mg/l nitrate. Excess nitrogen in drinking water is of particular concern for babies where it is known to cause methemoglobinemia, or "blue baby" syndrome.

It is also often a particular problem in rural water supplies, which are not necessarily reported or well monitored since they often only serve small populations and are not covered by the drinking water directive (European Environmental Agency, 2007).

In the Central and Eastern European countries problems with microbiology (e.g. in Slovakia and Hungary) and nitrates (e.g. in Estonia) were also reported. However, the most common problem was

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metal contamination. For example, the Czech Republic has problems with barium, nickel and selenium and in Lithuania 55% of samples from centralized sources have excess iron. Problems with iron and manganese are common in Central and Eastern European countries due to lack of efficient technologies installed for removal of these contaminants which often occur naturally in groundwater. In addition, Slovakia and Hungary had high exceeding for the toxic parameter arsenic.

The sources of arsenic in drinking water are from the water flowing through arsenic rich rocks and also from industrial contamination. Long-term exposure to arsenic contamination causes various skin diseases.

Another major problem identifying is microbiological contamination of drinking water due to decaying infrastructure e.g. water treatment works that are no longer functioning properly and the prohibitive cost of chlorine which is needed to treat the water. For example in Armenia, 90% of pipes are more than 10 years old and 60% are more than 20 years old.
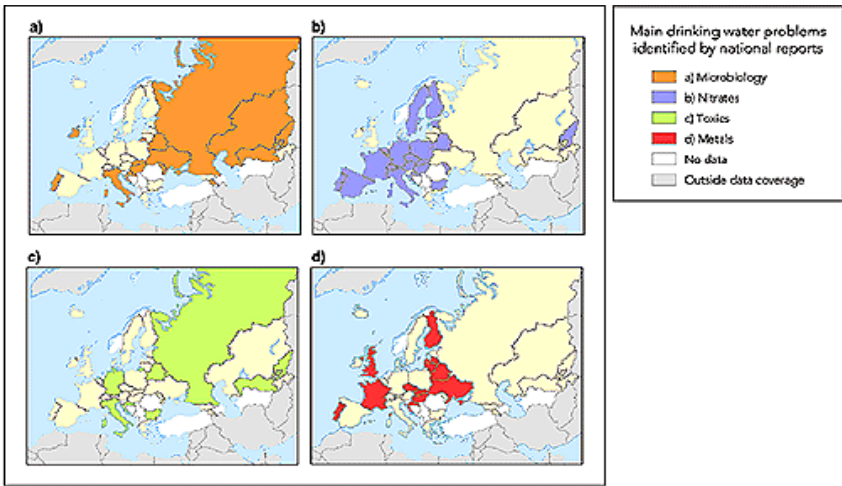
Source: EEA

FIG. 1 MAIN DRINKING WATER PROBLEMS IN EUROPE

Wastewater treatment in all parts of Europe has improved during the last 15-20 years (European Environmental Agency, 2007). The percentage of the population connected to wastewater treatment in the southern, south-eastern and Eastern Europe has increased during last ten years, but is still relative low compared to the central and northern Europe. Percentage of population connected to waste water treatment.

 In northern and also in southern European countries more than 80 % of the population is connected to waste water treatment. In sparsely populated countries with a relative high proportion of the population

living in scattered dwellings these dwelling are not connected to collecting systems and normally served by individual waste water treatment (e.g. septic tanks).

In central Europe more than 90 % is connected. In Eastern Europe only 50 % is connected, whereas in south-eastern Europe (Turkey, Bulgaria and Romania) there is only 35 % that are connected to waste water treatment plants. In south eastern European countries (Turkey, Bulgaria, Romania) only around 40% of the population is connected to the waste water treatment, with most of the connected waste water receiving only secondary or primary treatment.
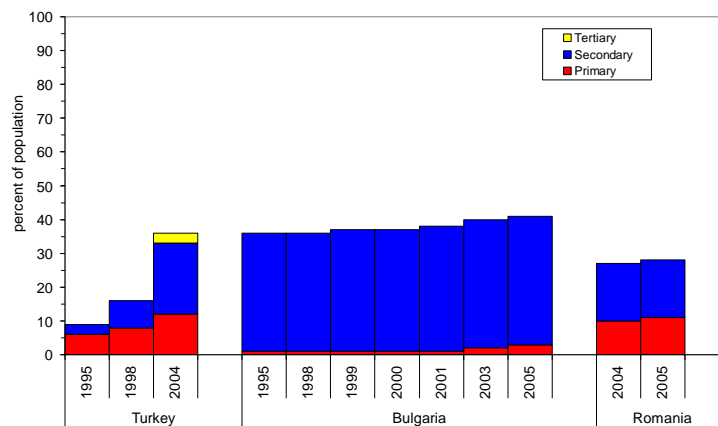

FIG. 2 CHANGES IN WASTEWATER TREATMENT IN COUNTRIES OF EUROPE BETWEEN 1995 AND 2005
Source: EEA

3. DRINKING WATER SUPPLY AND ENVIRONMENTAL THREATS IN ROMANIA

The Report of the Public Health Institute on drinking water quality from urban localities highlighted that the total population potentially exposed to the risk, taking into consideration the age of the distribution networks, water source quality and parameters, could be estimated at about 9.8 million inhabitants in urban areas. Moreover, the supply systems and the distribution networks are mainly made of non-adequate materials, without modern system for their cleaning, the distribution networks are significantly damaged, up to 70-75% of the current pipes have to be replaced.

The main source of freshwater pollution can be attributed to discharge of untreated waste, dumping of industrial effluent, and run-off from agricultural fields. Industrial growth, urbanization and the increasing use of synthetic organic substances have serious and adverse impacts on freshwater bodies (National Environmental Protection Agency, 2008). It is a generally accepted fact that the developed countries suffer from problems of chemical discharge into the water sources mainly groundwater, while developing countries face problems of agricultural run-off in water sources. Polluted water like

chemicals in drinking water causes problem to health and leads to water-borne diseases which can be prevented by taking measures can be taken even at the household level. From the volume of wastewaters discharged almost 55% needed to be treated. Out of the total volume of wastewater needed to be treated, approximately 29% have been sufficiently treated, while other almost 71% of wastewater was discharged into the natural receivers, especially rivers, untreated or insufficiently treated.

Water pollution from household, industrial and agricultural sources has a negative impact on drinking water supplies. Poor water quality arises mainly from poor controls over industrial effluents and discharges and from inadequate wastewater infrastructure. The chemical quality of water distributed through public supply systems, characterized by general indicators for drinking water, was established by analyses made in order to identify the toxic substances in water. (4% having values above the admitted concentrations), the chemical oxygen demand (5% having values above the admitted concentrations), the ammonium (5% inadequate values)and the nitrates (3% inadequate results).

The 2004 Report of the Public Health Institute on drinking water quality from urban localities highlighted that about 3% of the population connected to water supply system is affected by intermittent water supply, of over 8 hours daily.

The supply systems and the distribution networks are mainly made of non-adequate materials (azbo-cement and lead), 30 % of the pipes are made of iron and there is no modern system for their cleaning. Up to 70-75% of the current pipes have to be replaced. The distribution networks are significantly damaged, which leads to sensorial changes in the quality of distributed water. Also, the interruption of drinking water supply damages its quality.

Over time, anthropogenic activities have affected surface and underground water quality, particularly that of aquifer. Only 57.5% of the total monitored river length is suitable for use as drinking water through the centralized water distribution network.

Out of the total potential resources, only 45.5% are technically usable, mainly because of contamination at the source. Consequently, usable water resources amount to 2,660 cubic meters per person per year (while the potential supply is 5,930 cu m/cp.year) compared to the European average of 4,000 with m/cp.year, placing Romania among the countries with relatively scarce usable water resources.

The state of basic infrastructure in Romania is still far below the EU average standards; considerable gaps will have to be filled with regard to most of the principal indicators. The existing safe water supply

systems cover the needs of only 65% of the population. The quality of the water supplied by the 1,398 installations for drinking water treatment is often below the accepted standards for chemical pollutants.

On the whole, 52% of the total number of people have access both to drinking water and sanitation, 16% only to safe water, but not to sanitation, and 32% to none of the services. Only 33% of the villagers are connected to running water supply systems (compared to 87% in the EU) and only 10% have access to modern sewerage systems (European Commission, 2008).

According to an investigation of the total number of wastewater treatment installations, only 37.6% were functioning according to required standards. As a result, almost 71% of the water coming from the principal polluting sources was discharged into natural recipients, especially in rivers, untreated or insufficiently treated.

Romania obtained, under the terms of the Accession Treaty, transition periods for compliance with the Acquis, 2015 is the target year for complying with drinking water quality standards. Integrated water and wastewater systems will be promoted through a regional approach in order to provide water services to the population and other consumers according to the required quality standards and at affordable prices.

The targets proposed for 2015 are: to secure or rehabilitate the water sources so as to achieve potable quality and to improve water treatment facilities in 300 townships (compared to 60 in 2006); to expand or rehabilitate the drinking water distribution networks in order to ensure access for 70% of the population (compared to 52% in 2006); to expand the sewerage systems in townships having over 2,000 inhabitants so as to achieve a 69.1% coverage by 2013, 80.2% in 2015 and 100% in 2018 (compared to 48.7% in 2005); to build wastewater treatment stations and to rehabilitate the existing ones in townships having over 2,000 inhabitants so as to insure a 60.6% coverage in 2013, 76.7% in 2015 and 100% in 2018 (compared to 34.9% in 2005); to raise the share of properly treated wastewater to 60% in 2015 (compared to 35% in 2006).

Water infrastructure investments in rural areas will be funded, in correlation with the investments from structural funds, through the European Agricultural Fund for Rural Development.

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