

нарізних та насипних терасах. Особливо це характерно для містечок Вінницького Придністер'я де схилі місцевості домінують у їх ландшафтній структурі (Муровані Курилівці – 72 %, Могилів-Подільський – 62 %, Чернівці – 76 %, Ямпіль – 54 %). Кожна така ніша, або насип на схилі – окремий мікроосередок зсувних, ерозійних, або акумулятивних процесів. Дороги вздовж схилу, навіть заасфальтовані, руйнуються ерозійними процесами у 3-4 рази швидше, а в поперек схилу призводять до формування «поперечних ярів» [3]. У сучасній розбудові приватних садиб, навіть при майже повному «окультуренні» схилів, терас, площадок та догляді за ними, несприятливі процеси постійно проявляються у різних формах, особливо при крутизні схилу від 28-30° і більше. Подібна ситуація і у містечкових ландшафтах Середнього Побужжя, лише інтенсивність їх прояву із-за менших площ і крутизни поверхні схилів та геологічної будови.

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THE PROBLEM OF DRINKING WATER SCARCITY AND WATER POLLUTION IN GLOBAL CITIES AROUND THE WORLD

Zastavetska L.B., Zastavetskyi T.B., Taranova N.B.

zast.lesia@gmail.com

Ternopil Volodymyr Hnatiuk National Pedagogical University

One of the most important problems of modern global cities is the problem of drinking water shortage and water pollution. Large metropolises of the world, such as Istanbul, Cape Town, London, Tokyo, etc., set before themselves one of the primary tasks - providing residents with high-quality drinking water. The article discusses the global cities of the world that are most affected by the shortage of drinking water.

Key words: *city, ecology, water, water resources.*

Despite the fact that water covers about 70% of the planet's territory, there is not so much water, especially drinking water - only about 3% of fresh water on Earth. More than a billion people do not have adequate access to water, and another 2.7 billion experience water shortages for at least one month a year.

According to the results of a study of the situation in the world's 500 largest cities published in 2014, every fourth of these settlements is in a state of "water stress". According to the definition of the United Nations, water stress is a situation when the water supply is less than 1700 m³ per person per year [4].

According to expert forecasts approved by the UN, the global demand for fresh water in 2035 will exceed the supply by 45% due to a whole set of factors, including climate change, human activity and population growth.

There are large cities experiencing water shortages on all continents, and there is less and

less time left to solve the problem. We will give examples of some global cities facing this problem.

Sao Paulo. The financial capital of Brazil and one of the 10 most populous cities in the world (home to more than 22 million people), São Paulo faced serious problems in 2015 when the city's water reserves fell below 4%. At the height of the crisis, the city had less than 20 days of water left, and police had to guard water tankers.

The crisis is believed to have been caused by a drought in southeastern Brazil, but the UN mission in Sao Paulo has issued a series of criticisms of the authorities, saying they are not planning properly and not making the necessary investments. The water crisis more or less ended in 2016, but in January of the following year, the main reserves again fell 15% below the planned level for this period, which once again called into question the prospects of the city's water supply.

Cape Town. In 2018, residents of Cape Town, South Africa faced a serious water shortage. The water collapse of the metropolis was caused by the overuse of water resources in the developing region's agricultural sector, combined with the city's population growth and a drought that lasted three years in a row.

Bangalore. This Indian city, having turned into a major technological center in recent decades, is experiencing a rapid construction boom that followed, and is unable to cope with the load on the sewage and water supply systems. The city's old water system is in urgent need of restoration: a report commissioned by the Indian government indicates that the city is simply losing half of its drinking water through leaks.

As in China, most water bodies in India suffer from pollution, and Bangalore is no exception: a study of the city's lakes found that 85% of them have water suitable only for irrigation or industrial cooling. You cannot swim in any of the lakes or drink water from it.

Beijing. According to the World Bank, we can talk about a water shortage when people in a certain area receive less than 1,000 m³ of fresh water per person per year. In 2014, each resident of Beijing, with a population of more than 20 million people, received only 145 cubic meters of fresh water.

China is home to 20% of the Earth's population, and the country has only 7% of the world's fresh water reserves. Columbia University estimates that China's water supplies declined by 13% between 2000 and 2009. The pollution factor cannot be ignored either: statistics for 2015 show that 40% of Beijing's open water bodies were so polluted that they were unsuitable even for agricultural or industrial needs. The Chinese authorities are trying to solve this problem by creating a large-scale sewage diversion project, as well as educating the public about water conservation and raising water prices for large industrial enterprises.

Cairo. The Nile is the main lifeline of the city, which is the cradle of civilization, but these days this great river is not going through the best of times. 97% of all water used by the Egyptian population comes from it, but all untreated agricultural and domestic sewage flows into it.

According to the World Health Organization, among middle-income countries, Egypt has one of the highest deaths caused by water pollution. According to the UN, a critical shortage of fresh water in the country may occur by 2025.

Jakarta. Like many coastal cities around the world, the capital of Indonesia has faced the threat of rising sea levels. In Jakarta, however, the situation has worsened directly as a result of the human factor: with only less than half of the capital's 10 million people having access to tap water, the city thrives on an illegal well-mining business that devastates the underground aquifer, virtually emptying it. As a result, according to World Bank estimates, about 40% of Jakarta's population lives below sea level. The situation is worsened by the fact that the aquifer is not replenished, even despite heavy rainfall, due to the large number of asphalted or concreted areas, which does not allow the soil to absorb water .

Istanbul. According to official data from the Turkish authorities, the country is in a situation of "water stress" after water supplies fell to less than 1,700 cubic meters per person in 2017. Local experts warn that the situation could possibly worsen by 2030, when there will be a

shortage of water. In recent years, densely populated areas such as Istanbul (home to 14 million people) have begun to experience similar shortages during the dry months. Water levels in city reservoirs have fallen: they now have less than 30% of their early 2015 capacity.

Mexico-City. Lack of water is not news for most of the 21 million inhabitants of the Mexican capital. Every fifth citizen has tap water for several hours a week, and 20% receive tap water only at certain times of the day. The city imports about 40% of all fresh water it consumes from distant sources and has no serious water reuse programs. About 40% of water is also lost due to leakage from old water pipes.

London. It was hardly possible to assume that London would be on the list of cities in the world where a lack of water can be felt. In reality, things are not so good: the average annual rainfall here is around 600 mm (less than Paris and only half of what New York experiences), so 80% of the water consumed by the British capital comes from rivers. According to the administration of Greater London, the city consumes the maximum possible, and by 2025 there may be problems with water supply, and by 2040 - a serious shortage of water. It looks like a ban on watering private gardens and allotments with a hose during the driest months could become commonplace for Londoners in the future.

Tokyo. The Japanese capital receives as much precipitation as Seattle, nicknamed the Rainy City by Americans. However, it mostly rains only four months a year. This means that water must be collected, as a drought may occur during the dry season. This is exactly what the city government is busy with: at least 750 private and public buildings in Tokyo have collectors for collecting rainwater and its further use.

More than 30 million people live in Tokyo, and the city's water supply system depends on 70% of water reserves in open bodies of water - rivers, lakes and melted snow. Thanks to recent investments in the water system, water losses due to leaks will be only 3% in the near future.

Miami The state of Florida is among the five rainiest in the USA. Despite this, a water crisis is brewing in one of the most famous cities in the state of Miami. As a result of the unintended consequences of a 20th-century project to drain local marshes, the waters of the Atlantic Ocean began to flow into the Biscayne Aquifer, the city's main source of fresh water.

Although the problem was identified as far back as the 1930s, seawater continues to seep in, especially as sea levels rise faster in the area, breaching the underground barrier structures installed in recent decades.

Neighboring cities are also trying to cope with this problem - Hallandale Beach, which is located a few kilometers north of Miami, had to close six of its eight water intakes precisely because of seawater pollution.

More and more giant cities have to solve the problems described above. According to UN forecasts, by 2030 our planet will have 41 megacities with a population exceeding 10 million people.

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