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WATER QUALITY ASSESSMENT PRACTICES IN DIFFERENT SOCIO-ECONOMIC AND ENVIRONMENTAL CONTEXTS: A COMPARATIVE STUDY OF UKRAINE, CANADA, AND SAUDI ARABIA

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Water quality assessment is a critical aspect of sustainable water resource management in all countries. Ukraine, Canada, and Kingdom of Saudi Arabia (KSA) are countries that face unique challenges in ensuring access to clean and safe water for their populations due to their varying socio-economic, environmental, and cultural contexts.

This thesis aims to provide a comparative analysis of water quality assessment practices in Ukraine, Canada, and Saudi Arabia, with a focus on identifying similarities and differences in their approaches to water quality assessment and management. By comparing water quality assessment practices in different countries, we can gain a better understanding of the challenges and solutions to

protect water resources for future generations.

The three nations have set sustainability goals related to reducing greenhouse gas emissions, increasing the use of renewable energy sources, promoting sustainable agriculture and fisheries, minimizing water costs, eradicating waste, preventing pollution and protecting biodiversity [2].

Water quality indicators – a set of biological, chemical and physicochemical characteristics of water (trophic state, saprobity, salinity, hardness, hydrogen ion concentration (pH), concentrations of dissolved substances, etc.). The assessment of water quality involves the measurement of physical, chemical, and biological parameters to determine the suitability of water for various uses. Thus, the quality of natural waters is their state presented a set of indicators that reflects the needs of users in the composition and properties of water.

The assessment of water quality in Ukraine, Canada and KSA is based on several parameters such as pH, temperature, dissolved oxygen, biological oxygen demand, total suspended solids, total dissolved solids, nutrients, heavy metals, and bacteria. These parameters are tested using various techniques such as field measurements, laboratory analysis, and remote sensing.

In Ukraine, the total reserves of natural waters amount to 94 km³, of which 56.2 km³ are available for use. The main part of water resources that are constantly renewed is accounted for by river runoff — 85.1 km³ (excluding the Dunai River). The Ukrainian government, through its Ministry of Ecology and Natural Resources, is responsible for monitoring and controlling the quality of water in the country.

Assessment of water quality can be performed: 1) by the method of detailed analysis; 2) by the method of complex indices (indicators); 3) bioindication methods and biotesting as a habitat for living organisms. The water quality assessment system also includes three blocks: 1) indicators of salt composition; 2) tropho-saprobiological indicators; 3) specific indicators of toxic and radiation action [5].

Canada's fresh water can be found in the form of rivers, lakes, groundwater, ice, and snow. Considering that on an average annual basis, Canadian rivers discharge close to 7% of the world's renewable water supply, Canada appears to have a generous water endowment. Approximately 60% of Canada's fresh water drains to the north, while

85% of the population lives within 300 kilometres of the Canada-United States border.

The responsibility for monitoring water quality in Canada is shared between federal, provincial, and territorial governments. Water quality guidelines for the protection of aquatic life are used to calculate the indicators. They come from the Canadian Council of Ministers of the Environment, the United States Environmental Protection Agency, and provincial and territorial government sources.

Water quality is reported in these indicators by measuring a number of chemical and physical properties (parameters) in water. The results for each parameter are compared to its water quality guideline. These indicators are calculated using the water quality index as endorsed by the Canadian Council of Ministers of the Environment. For each site, 5 to 15 water quality parameters are compared to their guideline value using the index calculation. An index score between 1 and 100 is calculated based on these selected parameters. Sites are assigned a water quality category based on the score. The frequency and amplitude by which a parameter does not meet its guideline negatively impacts the water quality score for a given site [4].

The Kingdom of Saudi Arabia is a desert country that extends across most of the Arabian Peninsula with extensive coastlines on the Red Sea and Persian Gulf. Due to its high level of heat and humidity, water is a major concern: surface waters (dams, lakes, and open water reservoirs) are considered to be extremely limited resources and are exploited for almost every use. Paradoxically, it has the third highest per capita fresh-water consumption in the world, despite being one of the world's driest countries. The Ministry of Environment, Water and Agriculture (MEWA) in Saudi Arabia is responsible for monitoring water quality in the country.

According to a research study on drinking water quality in Riadh, Saudi Arabia had been found that KSA stringly relies on groundeater and /or seawater desalination for domestic purposes.

The water quality index (WQI) has been proven to be a simple and effective tool to access the quality of water, as well as a method of reassuring citizens. The distinct and astounding feature is that by using several water quality variables, a single value is expressed to tell just how clean this water is in relations to others.

The concluding factor started that using the WQI method helps the design-methods with monitoring and assessment of the quality of drinking water [1, 3].

Water quality assessment in Ukraine, Canada, and the Kingdom of Saudi Arabia has similarities and differences due to their unique geographical, environmental, and socio-economic factors. These countries must continue to collaborate and learn from each other to ensure that water resources are safe for human consumption and environmental health, as well as promote sustainable water management practices. Overall, comparing water quality assessment practices in different countries can provide valuable insights into effective water resource management and help address the challenges of ensuring access to clean and safe water for all.

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