**Outline of the Problem (Supported by Research)**

**Ensuring Access to Clean Drinking Water (UN Sustainable Development Goal 6)**

Access to clean and safe drinking water is a fundamental human right, yet millions of people worldwide lack consistent access to potable water. According to the World Health Organization (WHO, 2017), approximately 785 million people lack access to basic drinking water services, and over 2 billion people use contaminated water sources that pose severe health risks.

Contaminated drinking water is a leading cause of waterborne diseases such as cholera, typhoid, and diarrhea. The presence of turbidity, chemical pollutants, and microbial contaminants significantly reduces water quality. According to Sankhla et al. (2016), heavy metals such as lead and arsenic, commonly found in untreated water, pose serious health threats, including neurological and developmental disorders.

To address this challenge, the United Nations Sustainable Development Goal 6 (Clean Water and Sanitation) aims to ensure universal and equitable access to safe drinking water by 2030. One effective approach to achieving this goal is through real-time water quality monitoring using smart sensors and IoT technology.

**IoT-Based Water Quality Monitoring as a Solution**

Traditional methods of water testing involve manual sample collection and laboratory analysis, which are time-consuming and not feasible for continuous monitoring. However, advancements in IoT (Internet of Things) technology allow for real-time data collection and remote monitoring of water quality.

Studies such as those by Lakshmikantha et al. (2021) and Koditala & Pandey (2018) highlight the benefits of using low-cost sensors integrated with IoT platforms like Blynk to measure turbidity, temperature, and other key parameters. These systems enable users to receive real-time alerts if water quality falls below safety standards.

**Our Project's Contribution**

Our project utilizes an Arduino UNO R4 Wi-Fi, Jopto TSW-30 & SEN0189 Turbidity Sensor, and DS18B20 Waterproof Temperature Sensorto continuously monitor water quality and send data to the Blynk application. This system allows individuals to check the condition of their drinking water remotely, ensuring that it meets safety standards before consumption.

Beyond individual health benefits, our system can be scaled for community-level water monitoring, helping municipalities and organizations ensure water quality in real-time. The collected data can be analysed for long-term trends, identifying pollution sources and enabling proactive measures to improve water safety. By providing accessible and cost-effective water quality monitoring, our project contributes to achieving SDG 6, reducing health risks, and promoting sustainable water management.

**References**

* Lakshmikantha, V., Hiriyannagowda, A., Manjunath, A., Patted, A., Basavaiah, J. and Anthony, A.A., 2021. IoT based smart water quality monitoring system. *Global Transitions Proceedings*, *2*(2), pp.181-186. Available at: <https://www.sciencedirect.com/science/article/pii/S2666285X2100090X>
* Sankhla, M.S., Kumari, M., Nandan, M., Kumar, R. and Agrawal, P., 2016. Heavy metals contamination in water and their hazardous effect on human health-a review. *Int. J. Curr. Microbiol. App. Sci*, *5*(10), pp.759-766. Available at: <https://www.ijcmas.com/abstractview.php?ID=1020&vol=5-10-2016&SNo=82>
* WHO. (2017). "Guidelines for Drinking-water Quality." World Health Organization. Available at: <https://www.who.int/publications/i/item/9789241549950>
* Koditala, N.K. and Pandey, P.S., 2018, August. Water quality monitoring system using IoT and machine learning. In *2018 International Conference on Research in Intelligent and Computing in Engineering (RICE)* (pp. 1-5). IEEE. Available at: <https://ieeexplore.ieee.org/abstract/document/8509050>