

IOT-Enabled Water Purification System Integrating UV-C and Advanced Graphene Technology for Flood-Prone Areas in Bangladesh

Co. Author: Sabik Sultan, South Point School & College

Author: Shafi Sultan, St. Joseph Higher Secondary School & College

Abstract- Increased flooding in Bangladesh has raised several water contamination issues that gravely affect health. In most of these cases, conventional methods of water purification are not competent; hence, the need for newer ideas and ingenuity is a must right now, especially to ensure safe drinking water during flood or even tidal surges during monsoons in the seashore areas of Bangladesh.

The following idea demonstrates the integration of IoT with UV-C disinfection and graphene filtration to develop an efficient water purification system that would work in flood-prone areas of Bangladesh. The proposed water purification system includes three central units: one for preliminary particle removal through coagulation, one for the elimination of pathogens by UV-C disinfection, and one for microlevel impurity removal, including heavy metals and organic pollutants through graphene filtration. In this coagulation tank, an effective coagulant is aluminum sulfate, which can easily agglomerate all suspended particles. A UV-C chamber will use a 5-12 W UV-C lamp to inactivate microorganisms without chemicals, assuring microbiological safety. In the graphene filtration tank, a vast surface area and excellent filtering capability of graphene are utilized to filter even the minor impurities, which is a key factor in making highly contaminated water pure.

A survey has been conducted among professionals and students across Bangladesh, India & Pakistan working in Engineering (Mechanical Engineering, Civil Engineering), IT (Computer Science Engineering), and Environmental Science. As mentioned earlier, the respondents' opinions have been analyzed, and this paper has been constructed accordingly.

Keywords- IoT, UV-C purification, graphene-based filtration, floodwater decontamination, real-time monitoring, water quality management, pathogen removal, desalination, turbidity reduction, sustainable water solutions, flood-prone areas, water purification technology, IoT-enabled systems, environmental impact, socio-economic factors.

I. INTRODUCTION

Water contamination is a major threat facing every part of the world, particularly the

flood-prone areas in Bangladesh. Increased flooding triggered by the rapidly changing climate has heightened the chance of

waterborne diseases affecting the health of millions. So far, conventional purification