

## Evaluate the Performance of Sri Lanka Navy Built Brackish Water Reverse Osmosis Plants in Chronic Kidney Disease of Unknown Etiology Impacted Areas in Sri Lanka

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### Abstract

The epidemic of Chronic Kidney Disease of unknown etiology (CKDu) has become a health catastrophe for over 3.6 million population in Sri Lanka. Though the etiology of CKDu is unknown, studies revealed the synergic effects of Arsenic and Cadmium as their triggering factors. Consequently, some researchers have emphasized that the quality of drinking water might be the cause of this life-threatening crisis. Sri Lanka Navy (SLN) introduced a sustainable water supply concept in CKDu-impacted areas and provided safe drinking water to more than 2 million people since December 2015 through 1,000 Brackish Water Reverse Osmosis (BWRO) plants. As a result of that, the CKDu prevalence in Sri Lanka drastically came down. However, the membrane fouling in several places is a major drawback which declines permeate flux and the lifetime of the membrane, and increases transmembrane pressure (TMP). To find a suitable solution to minimize membrane fouling, a group of researchers decided to assess the performance of SLN-built BWRO plants based on the quality of product water to achieve Sustainable Development Goals No 6. The groundwater of Dug well (water source) had raised unacceptable levels of alkalinity (94.45%), TDS (61.11%), and hardness (83.34%) as per specified standards. Subsequently, it was revealed that the Fluoride level (< 5mg/L) of the product was lower than defined standards and leading to health issues. SLN-built BWRO plants are 100% operational and supply purified water as per World Health Organization and Sri Lanka Standards to CKDu impacted community. It is recommended to enhance the recovery ratio up to 75%, mix permeate with pre-treated water and improve the minerals level of product water. Further recommends integrating Softner filter to pretreatment process when feed water has more hardness, then treat the reject water and release to the atmosphere.

**Keywords:** *Brackish water reverse osmosis, Chronic Kidney Disease of unknown etiology, Safe drinking water, Sri Lanka Navy*