

**SPATIAL VARIATION OF WATER QUALITY OF THE
UNNICHCHAI RIGHT BANK CANAL OF BATTICALOA
DISTRICT**



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ABSTRACT

Irrigated agriculture plays a vital role in uplifting the livelihoods of farming communities and ensures the national food security. Over the past decades, quality of irrigation water has become a serious issue faced by the agricultural sector all over the world. Poor quality of irrigation water adversely affects both soil quality and crop production. Hence, irrigating the crops with good quality water is vital to get optimum crop yield without affecting soil quality.

Unnichchai is one of the major irrigation schemes in Batticaloa district. It supplies irrigation water through Right Bank (RB) and Lift Bank (LB) canal for paddy cultivation. There is high spatial variation in paddy yield, affecting the livelihoods of nearly 30,000 farming families. Among several factors, quality of irrigation water is important which has great influence on paddy yield. However, quality of this irrigation water has not yet been assessed. In the above context, the present study was aimed to assess the quality of RB canal water during both cultivation and harvesting periods in dry season. Water samples were taken at 1 km interval along the RB canals during both periods and analyzed for some important quality parameters such as pH, Electric conductivity (EC), Total Suspended Solids (TSS), Total Dissolved Solids (TDS), Sodium (Na^+), Potassium (K^+), Calcium (Ca^{2+}), Magnesium (Mg^{2+}), Bicarbonate (HCO_3^-), Phosphate (PO_4^{3-}), Residual Sodium Carbonate (RSC), Sodium Adsorption Ratio (SAR), Soluble Sodium Percentage (SSP), Calcium / Magnesium ($\text{Ca}^{2+}/\text{Mg}^{2+}$) ratio were entered in Excel sheet and results were analyzed by using descriptive statistics.

It was found that the quality of RB canal water varies along the canal. The pH of canal water varied from 6.72-7.55, indicating slightly acidic in nature. The range of EC, TSS, TDS and PO_4^{3-} was 0.02 dS/m-0.51 dS/m, 37 ppm-79 ppm, 10 ppm-250 ppm, 0.018 ppm-0.082 ppm, respectively. The range of Na^+ , K^+ , Ca^{2+} , Mg^{2+} and HCO_3^- was 0.53 ppm-14.6 ppm, 1.5 ppm-7.9 ppm, 1.2 ppm-3.8 ppm, 1.19 ppm-2.88 ppm and 15 ppm-61 ppm, respectively. The level of these parameters was below the acceptable limit for irrigation purposes. In addition, the derived quality parameters such as RSC, SAR, SSP were varied from 0.048 me/l-0.48 me/l, 0.073-1.48, 8.82%-46.2%, respectively. The value of these derived parameters except SSP was also below the acceptable limit. The level of SSP exceeded the maximum limit of 40 % at the tail end. The $\text{Ca}^{2+}/\text{Mg}^{2+}$ ratio of all samples was more than one. It was also found that the level of these quality parameters of canal water was more or less same up to 15 km distance from the tank and thereafter increased substantially and reached the maximum level at tail end. In overall, RB canal water is safe for irrigation in dry season. However, appropriate management intervention must be implemented to avoid further deterioration of canal water especially from 15 km of canal distance up to tail end.

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