M.Sc. Degree in Environmental Science

THE ABUNDANCE OF MICROPLASTIC AND WATER QUALITY OF SURFACE WATER OF ATTANAGALU OYA BASIN

A dissertation submitted

by

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ABSTRACT

The presence of microplastics in freshwater ecosystems has emerged as a significant environmental concern, with potential implications for water quality and ecosystem health. This study investigates the abundance and distribution of microplastics in the surface water of Attanagalu Oya basin which is the most vital water source in western province, with specific objectives including the quantification of microplastics, assessment of water quality, and analysis of socio-economic and environmental contexts. Data were gathered from 100 participants through questionnaires, revealing that 45% of respondents resided in rural areas, with a notable reliance on polythene and plastics for waste management. The survey indicated widespread awareness of water quality issues; however, knowledge of microplastics was limited, particularly among the children. 32 Sampling locations were identified using GPS coordinates. Water quality parameters were assessed, including temperature (27.9 ± 0.1 ^{0}C - 35.3 ± 0.6 ^{0}C) , pH (5.31 - 6.79), electrical conductivity (30 ± 3 µS/cm - 2193 ± 6 µS/cm), total dissolved solids (15 ± 1 ppm – 1096 ± 2 ppm), and turbidity (0.4 ± 0.1 NTU – 9.9 ± 0.1 NTU) at the site with relevant meters and total hardness (< 13 ± 0 mg/L - 262 ± 0 mg/L), total iron (0.3 ± 0 mg/L - 2 ± 0 mg/L) and total fluoride (< 0.1 ± 0 mg/L - 0.4 ± 0 mg/L) in the laboratory (APHA,1999) with significant variations noted in dry season. The abundance and physical characteristics of microplastics were determined using standard methods (Density separation method) and A total of 5,340 microplastics particles were recorded, categorized by shape (fragments most prevalent shape), type (fragments most prevalent type) and color (Blue > Black > White > Yellow > Ash > Transparent > Green > pale > Red > Orange = Brown =Pink , with The findings highlight a concerning level of pollution in Attanagalu Oya bain due to improper waste disposal practices and microplastics contamination, underscoring the urgent need for effective mitigation strategies to safeguard water quality and promote environmental awareness.