

VULNERABILITY OF THE WATER CONTAMINATION IN AN AGRICULTURAL AREA: A CASE STUDY FROM DAMBULLA

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The Dambulla division of the Matale district falls within the Central Province and is of an agricultural-based highly populated area. The investigated area consisting of almost 144 km² belongs to the dry zone. The leaching of excess fertilizer nutrients to the nearby water resources can be the cause for environmental problems, mainly eutrophication and health hazards. Therefore, nitrate and phosphorous concentrations of water in lakes, rivers, streams, shallow wells and tube wells have been measured to study their variation with the hydrological conditions and the agricultural practices.

The results show that most of the samples fall within the WHO limits for nitrate (10 ppm NO₃-N) and almost all are within the acceptable range for phosphate (2 ppm, PO₄⁻³). In contrast, the electrical conductivity of certain samples exceeds the WHO limits. Twenty-four sampling points have been selected considering the land use and the geology while three samples have been taken per point and three trials have been carried out.

Wells found in the area which are not exposed to the cultivation give a very low amount of nitrate (0.1 – 8.8 ppm). The agricultural wells situated within the paddy fields show clearly the increase of nitrate (up to 30.8 ppm), which can be directly related to the fertilization. Some lakes also have significant amount of nitrate (29.1 - 29.3 ppm), which may have been accumulated from the streams and canals running through the agricultural fields. The results show that the phosphate concentrations in both surface and groundwater are not considerably high. It may be due to either low application of phosphorous fertilizer or the precipitation upon the combination with available cations in the water.

The downstream flow through the paddy fields may gather excess nutrients leached out from agricultural fields to which fertilizer has been applied. This accretion of nutrients in water bodies can be a threat to the untouched groundwater resources of the area.