

# SOIL AND WATER QUALITY CHARACTERISTICS OF AGRO-WELLS IN NEWLY DEVELOPED FARMLANDS IN MAHAWELI SYSTEM L – ATHAWATUNUWEWA BLOCK

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Agro-wells are the most reliable water resource in newly developed farmlands in Mahaweli System L. However, water quality of agro-wells and its relationship with nutrient management in surrounding farmlands have not yet investigated. This study was conducted to investigate agro-well water quality, to explore its relationship with soil nutrient management and to explore short-scale soil spatial variability of surrounding areas of agro-wells. Water samples were collected from 10 agro-wells located in the study area at three time points. Soil samples from surrounding farmlands of each agro-well were also collected from 0-15 cm depth. In addition, intensive soil sampling was done surrounding a selected well to prepare soil short-scale spatial variability maps using Inverse Distance Weighting interpolation technique. Water samples were analysed for pH, EC, TDS, Mg, Ca, Na, K, NO<sub>3</sub>-N, NH<sub>4</sub>-N, Available phosphorus, Available Sulphur and Cd, As, Pb. Moreover, Sodium Adsorption Ratio (SAR) and Residual Sodium Carbonate (RSC) were calculated of each water sample. Measured water quality parameters were compared with FAO guidelines. Soil samples were analysed for pH, EC, Available N, P, K, Mg, Ca, Na, S and total N, Cd, As, Pb. Correlation analysis was performed to investigate relationship between soil and water quality parameters of measured nutrients. All water quality parameters except NO<sub>3</sub>-N, K and Cd were within acceptable range. K, Cd in all studied agro-wells and NO<sub>3</sub>-N levels in 6 agro-wells have exceeded the maximum permissible level. Correlation analysis revealed a strong positive linear correlation between soil and water concentrations of NO<sub>3</sub>-N ( $r = 0.83$ ) Available Sulphur ( $r = 0.81$ ) and Ca ( $r = 0.82$ ). Natural short-scale spatial variability pattern of soil N, P, K in the studied area have been altered due to anthropogenic activities such as fertilizer applications.

**Keywords:** Agro-well, Soil spatial variability, Water quality