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Monitoring of nitrate and phosphate levels in surface and ground water in the Kalpitiya peninsula and Walawe area

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Kalpitiya peninsula (KP) is an agricultural area with many types of crops. The estimated rates of Irrigation and recharge are 2.45 m and 2.57 m per season, respectively. Walawe area (WA) is also a main agricultural area. An Irrigation system (SS1), which consists of three reservoirs, Pthirana Wewa (PW), Kattakaduwa Wewa (KW) and Warayaya Wewa (WW) are located in Angunakolapelessa block (AB). These reservoirs are fed by agricultural drainage and stored water is used for irrigation and drinking. Nitrate (NO_3^-) and total phosphate ($PO\ PO^{3-}_4$) levels were monitored in ground water (GW) and surface water (SW) in KP and WA using ion liquid chromatographic, spectrophotometric, colorimetric, phenoldisulphonic and ascorbic acid methods.

Three agricultural sites, nine wells from each site including two irrigation wells in the field (W1S), five wells outside of the field (W2S) and two wells more than 100 m away from the field (W3S) were monitored in the years 2004 and 2005. Bata-atha branch canal (BC), PW, WW, KW, main inlets of Pthirana Wewa (D1), Warayaya Wewa (D2), and Kattakaduwa wewa (D3) were monitored for SS1. Chandrika Wewa (CW), Sooriya Wewa (SOW), Kiriibban Wewa (KIW), Habaralu Wewa (HW), Shallow wells from both KIW block (KWB) and AB were selected as GW and SW sources.

W1S indicates the maximum NO_3^- levels. Its NO_3^- range was 168-447 mg/L with a mean of 275±89 mg/L. Nitrate levels vary with estimated fertilizer application and crop type. Mean of NO_3^- level of W3S was 7±4 mg/L and significantly lower than W1S and W2S. Nitrate levels decreased from inside to outside of the field. Mean NO_3^- levels of CW, KIW, HW, SW, were 0.9, 1.3, 0.9, and 1.8 mg/L, respectively. Mean NO_3^- levels of BC was 0.9 mg/L. Although PW, WW and KW of SS1 were fed by agricultural drainage water no considerable changes in the NO_3^- levels were observed compared to other reservoirs and those values were 2.7, 2.2 and 1.3 mg/L, respectively. D1, D2, D3 and D4 of SS1 indicated relatively high NO_3^- levels than the reservoirs and those values were 5.3, 3.1, 3.5 and 4.0 mg/L, respectively. Mean NO_3^- levels of shallow wells of AB and KIWB were 0.8 and 0.6 mg/L. Nitrate levels of WA and W3S in KP were well below the WHO guidelines for drinking water (50 mg/L). But NO_3^- levels of W1S and W2S in KP these values were significantly higher than the WHO guide line. Except for one sample from KP, PO^{3-}_4 levels of all samples of KP and WA were below the maximum permissible level of SLS 614 (2.0 mg/L).

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