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EFFECTS OF SURFACE WATER INFILTRATION ON GROUNDWATER FLUORIDE CONCENTRATION CLOSE TO AN IRRIGATION TANK: A CASE STUDY IN POLONNARUWA DISTRICT.

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A problem of growing concern is the excessive concentrations of fluoride found in many dug wells and water supply bore holes in the low plains of the Dry Zone, notably in the Anuradhapura and Polonnaruwa districts. The fluoride concentration in many of these wells exceed 1.5 mg/l and pose a health hazard to the consumers. There is in these areas, wide prevalence of dental fluorosis specially among children of school going age. The slow rate of groundwater movement and higher evapo-transpiration in the low plains of the Dry zone tend to increase the fluoride concentration.

Within the areas of high fluoride bearing groundwater, it is still possible to find certain areas especially close to irrigation tanks, with considerably low fluoride concentrations with regard to the safe limits of drinking water standards. Since surface water contain low fluoride concentrations compared to ground water, dilution of groundwater by infiltration of surface water from the irrigation tanks could be a major governing factor for this situation.

The possible effects of surface water infiltration on fluoride content of ground water was studied in the Polonnaruwa district, in a small village situated below the major irrigation tank; Parakrama Samudra. The behavioral patterns of the groundwater table and groundwater fluoride content revealed that the concentration of fluoride in groundwater of the area is controlled by the infiltration of the surface water from the tank and the irrigation channel. It was found that the fluoride of groundwater is low in the vicinity to the surface water bodies especially in the down-slope sides. Fluoride concentration increases in the direction of groundwater flow and away from the surface water bodies within the area of influence of the surface water.

On account of the widely spread surface water irrigation network in the Polonnaruwa district, it could be expected that the low fluoride areas close to irrigation tanks and channels are a result of infiltration and dilution of fluoride content by the surface water.