B-50: Utilization of ground water resources for shrimp culture: assessment of water quality in deep and shallow tube wells in Mahawewa, Arachchikattuwa and Puttalam in the North Western Province of Sri Lanka

J M P K Jayasinghe[1], M D S Perera[2], Padminie de Alwis[1], Udeni Edirisinghe[2]
(*[1]NARA, Colombo 15, [2]Dept. of Animal Science, Faculty of Agriculture, Univ. of Peradeniya*)

The rapidly expanding shrimp culture industry in the North Western province of Sri Lanka is increasingly constrained by lack of water of the required quality. High salinity levels in main water sources for shrimp culture need

dilution with less saline water to maintain the favourable salinity ranges in culture ponds. The study assesses the quality of ground water resources for sustainable development in shrimp culture.

Samples were collected for critical water quality parameters from deep wells located in farm sites. Determination of salinity, pH, dissolved oxygen and sulphide concentration was carried out *in situ* while other parameters were determined in the laboratory. All the samples were collected from surface layers and 3 m below the surface layers. General precautions were adopted in sample pre-treatments, sample preservation, transportation and storage. Spectrometric analyses were performed in UV-visible recording spectrophotometer and atomic absorption flame emission spectrophotometer.

Phosphate and nitrite concentrations in all deep wells and shallow wells were found within acceptable ranges for shrimp culture. The mean sulphide concentration (1.3 $\pm$ 0.2 mg/1) was significantly higher in shallow wells when compared to deep wells (0.6 $\pm$ 0. 1 mg/1). Shallow wells recorded high salinities (15.8 $\pm$ 3.1 ppt) when compared to deep wells (2.4 $\pm$ 0.5 ppt) Relatively higher levels of dissolved iron (7.6 $\pm$ 5.1 mg/1) and manganese (1.19 $\pm$ 0.4 mg/1) were recorded in deep wells when compared to shallow wells (0.2 $\pm$ 0.13 and 0.8 $\pm$ 0.22 mg/1 respectively for iron and manganese). Dissolved oxygen levels recorded in 2 types of wells were below acceptable ranges for shrimp culture.

Deep well water was found more suitable to maintain salinity in culture ponds. Treatment systems are recommended to reduce hydrogen sulphide level in shallow wells and iron and manganese levels in deep wells before pumping water to culture ponds for sustainable utilization of ground water resource for shrimp culture.

Financial assistance by NARA and CARP through research grant no. 12/128/114 is acknowledged.