SECTION D

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ORIGIN AND RECHARGE OF GROUNDWATER THROUGH ISOTOPE STUDIES IN MADULLA DIVISION, MONARAGALA DISTRICT

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Drilling of 94 deep tube-wells in the crystalline rocks of Madulla Division, Monaragala District, has gained momentum in promoting the programme of rural community water supply, especially in the dry zone of the country. The area is essentially covered by the crystalline rocks constituted of hornblende-biotite gneisses, undifferentiated metasediments and granitic gneisses. The area around Madulla is highly tectonised.

As large scale groundwater development is planned in this region in the near future, it is considered very essential to establish the origin and recharge to this source on priority. To obtain this information fast, an isotope approach was adopted, as a pilot study.

The stable isotopes viz. Oxygen-18 and Deuterium occur naturally in rain water and their variation has been used to establish the origin of ground water. From 13 tube-well water samples, one spring and a river sample, it was established that these waters were of meteoric origin. The average values of Oxygen-18 and Deuterium for ground water and spring water (in δ-notation, $\delta D = -35\%$, and $\delta^{18}O = -5.75\%$) are those expected for local precipitation of the region. Hence, it was concluded that ground water originated from precipitation in the vicinity of Monaragala.

Tritiated water injections in soil at two locations yielded a direct recharge of about 20 cm for the period from September 1982 to May 1983. Chemical analyses provided additional information as to the origin of ground water and a fast circulating system within the fractures.