

Dairy farm borehole water quality in the greater Mangaung region of the Free State Province, South Africa

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Abstract

Most dairy farm effluent is discharged onto pastures and land by irrigation and poses a risk of enriching groundwater including borehole drinking water. Nitrate, coliforms and *Escherichia coli* (*E. coli*), in particular, may cause disease in humans and animals drinking contaminated water. The aim of this study was to obtain an understanding of the status of borehole drinking water quality, including physical, chemical and microbiological properties, on 75 dairy farms in the greater Mangaung region of the Free State, South Africa. Borehole drinking water samples were collected during autumn and spring of 2009 and the physical, chemical and microbiological parameters analysed and compared to the required standards prescribed by the South Africa National Standards (SANS) 241 of 2006. Most farms were compliant; however for combined nitrate and nitrite N, 37 of the farms exceeded the prescribed limit. Similarly, for total coliforms, 45, and for *E. coli*, 22 of the farms exceeded the acceptable limits. Nine of the farm boreholes were contaminated by N and *E. coli*. On two of the farms four of the chemical parameters exceeded the prescribed limits, including those for N; both farms were, however, compliant for *E. coli*. The results of this study suggest that further research on water and waste management on dairy farms in the Mangaung region of the Free State should be conducted.

Keywords: Water quality; borehole drinking water; water standards; *E. coli*; coliforms; nitrate