

Trends in P, Cd, F and U at SQM sites in the Waikato region 2007-2015.

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The agricultural industry and international trade dominates the economy in New Zealand and fertiliser applications are essential for successful agricultural production. Fertilisers are applied by thousands of farmers across New Zealand and in many countries of the world, but fertilisers also contain contaminant trace elements, such as cadmium (Cd), fluoride (F) and uranium (U), as well as the major nutrients, such as P. Mineral P fertilisers can be considered as an important source of contaminant trace elements in agricultural soils.

Continuous monitoring programmes, such as Soil Quality Monitoring, are invaluable for assessing the fate of trace elements in fertilisers as they allow enough time for cumulative applications of fertiliser to reach a critical mass loading. Monitoring of acid recoverable P, Cd, U and total F in soils of the Waikato region has been carried out regularly since 2005 and irregularly before that. Soil monitoring currently consists of 150 soil quality monitoring sites covering the major land uses and soil types in the region. Site selection and sampling follow national guidelines administered by the Land Monitoring Forum. Samples consist of a composite of 40-50 plug samples (2.5 cm by 10 cm deep) from a 50 m transect on a consistent landform. Thirty sites per year are sampled so it takes 5 years to samples all 150 sites. Data are presented as 5 year rolling averages of all 150 sites.

Results show averaged values for Cd, F and U tend to follow P although behaviour depended on land use, e.g. horticulture sites showed increases in all 4 elements, but dairy sites show decreases in P, Cd and U, while total F remained constant. Potential explanations for observations and the fate of these contaminants are discussed.