

# SOIL AND HUMAN HEALTH: THE NATIONAL SOILS INVENTORY OF SCOTLAND

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## SCOTLAND'S NATION-WIDE SOILS DATA

During 1978 – 1988, the Soil Survey of Scotland sampled 721 soils on a 10 km grid across Scotland as an inventory of our soil resource.

We are re-sampling 25 % of the original locations on a 20 km grid (Fig. 1) during 2007 – 2009. These data provide:

- Vital information on the spatial distribution of chemical attributes, e.g. essential nutrients such as selenium
- Information on how soil attributes have changed over the last 25 years – some changes may potentially relate to trends in specific health outcomes.

Fig. 1 – NSIS\_2 sampling design



## HOW MIGHT THESE DATA RELATE TO HUMAN HEALTH?

The national soils data lend themselves to ecological study of health outcomes.

### Asthma

Preliminary work has shown a significant association between soil texture (silt) and indicators of childhood asthma.

Increasing silt content was associated with increasing likelihood of wheezing symptoms and doctor confirmed asthma by the age of 5 years (Fig. 2). In addition increasing silt was associated with decreased lung function and increased markers of lung inflammation (exhaled nitric oxide) at 5 years.

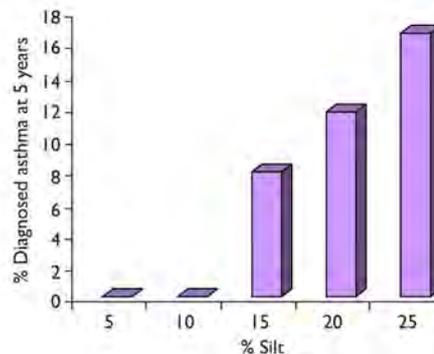


Fig. 2 – Association between percentage silt (in soil at place of residence) and doctor-diagnosed asthma at five years.

### Essential nutrients

Economic and environmental concerns have raised the profile of locally-sourced food. The distributions of essential nutrients, such as selenium, have the potential to inform about the quality of diet expected from different regions (Fig. 3).

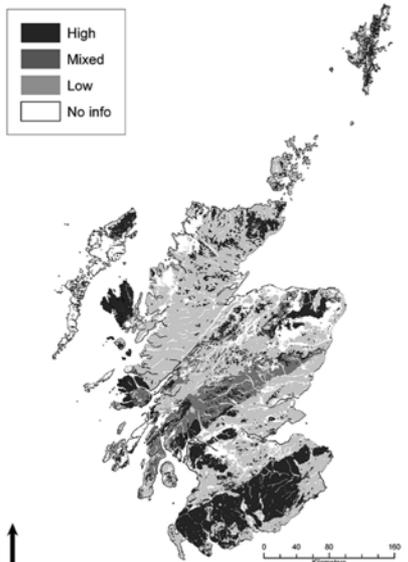


Fig. 3 – Predicted levels of selenium in soils across Scotland

### DNA archive

We are also extracting DNA from soils to create a DNA archive (Fig. 4).

This will enable us to begin to examine the spatial patterns and associations with soil and land use of pathogens (e.g. enteric pathogens capable of surviving in the soil environment). Linking these data with soil characteristics, catchment hydrology and epidemiological data will aid our understanding of how these factors interact in terms of risk to human health.

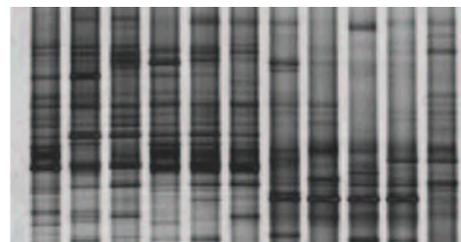


Fig. 4 – Soil DNA profile

## FUTURE POTENTIAL

- The National Soils Inventory of Scotland provides excellent opportunities for testing and developing of hypothesis relating human health to soils.
- Hypothesis developed could be explored further. For example, case-control studies for specific outcomes of interest could be implemented. This would include evaluating exposure to soil (or components of soil) in study populations.