

The MobiLab – A novel technology enabling larger scale nutrient sampling to inform soil management decisions.

The revolutionary application of microfluidics has made possible a new era of affordable and short turnaround nutrient measurement for those who need to measure nitrogen and other compounds in soil, plant sap and water. The MobiLab is a desk top system requiring only a short introduction and some practice for non-specialists to accurately measure nutrients.

Under Topsoil 2 the Wear Rivers Trust will work with 3 farmers and other partners to collect soil and water data to understand how water and nutrients move through the soil. This data will be collected under a range of tillage regimes from traditional ploughing to zero tillage and related to wider soil health and crop development.



Figure 2: WRT staff get to grips with the Mobilab, testing for Nitrogen levels within plant tissue, water & soil samples.

The low operating costs and rapid analysis turnaround represented by the mobilab enables the capture of wider more representative data to improve management visibility, informing the application of necessary but not excess levels of

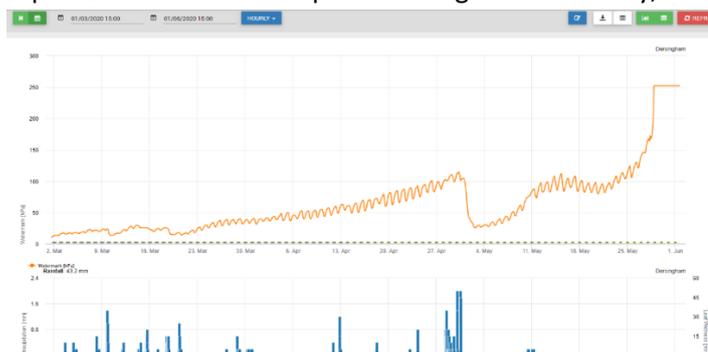


Figure 3: The Field Climate monitoring app highlights the diurnal cycle of moisture uptake during the growing season and displays the reactions of the soil to rainfall (dip in orange line) and drought (rapid rise of orange line).



Figure 1: MobiLab testing for nitrogen levels within freshly taken soil samples with a turnaround of 30 mins.

The MobiLab will be used to analyse soils at depths of 300, 600 and 900mm measuring the levels of Nitrogen compounds across the crop rooting zone. 4 fields will be studied with 10 infield and 1 control hedgerow site per field. Soils will be analysed 3 times per year: Autumn, Spring and Summer to measure nitrogen levels across the soil profile, considering seasonal factors.

Over the course of one year, 4 fields with 11 sample sites at 3 depths, 3 times per year, will require analysis of 396 individual soil samples. In addition to the soil sampling programme, water and plant tissue samples will be taken monthly during the growing season. Results will be interpreted to understand and address any barriers between nutrients available in the soil and uptake by the crop.

The intention is to gather data, derived from local soils and climate over the long term in a Topsoil legacy programme. The programme will provide information to farmers where commercial yields can be maintained with more targeted fertiliser inputs. Thus, mitigating the wash-out of excess nutrients to ground and surface water.

fertiliser. Commercial lab testing incurs delay and cost, perhaps not easily affordable for the widespread sampling required to give representative management information.

The Topsoil 2 programme will provide a local test bed for MobiLab and, it is hoped, encourage farmers to invest in similar to provide immediately available data on which to base management decisions.