

**NORPLAN / DACAAR: Proposed method for analysis of soil samples**

Small modifications made, regarding soil analysis, shown by yellow shading.

Samples returned from field should be around 1.5 kg (see document *Soil salinity survey* v.2.0).

1. The samples should be spread out on a clean tray and allowed to dry at ambient room temperature at the laboratory. The location for drying must be clean and dust-free. The dried sample should be weighed.
2. The sample should then be passed through a clean 2 mm nylon mesh or sieve: this process can be assisted by hand, provided the technician is wearing clean **talcum-free** rubber or latex gloves.

*Note that David has purchased some 2 mm mesh, which can be stretched over a simple clean wooden frame to make a sieve.*

3. The proportion of the sample passing through the mesh and the proportion retained should be measured by weighing.
4. 20 g of the < 2 mm fraction should be added to a clean 500 mL flask with 400 mL of deionised/distilled water and shaken for 1 hr.
5. The flask should then stand for 20 hours in the laboratory to allow the solid fraction to settle.
6. The supernatant liquid should then be extracted using a clean syringe, filtered through a 0.45 µm filter into a clean flask.
7. The liquid should be analysed for the following:

Electrical conductivity, pH, Na, Ca, Mg, K,  $\text{SO}_4^-$ ,  $\text{HCO}_3^-$   $\text{CO}_3^-$ ,  $\text{Cl}^-$ ,  $\text{F}^-$ ,  $\text{NO}_3^-$

**Duplicate samples**

8. For all of the samples delivered to the lab (i.e. all 32 samples), the extraction procedure (Steps 1-6 above) should be duplicated for a second 20 g quantum of the < 2mm fraction.
9. From the supernatant liquid resulting from these 32 duplicates, 100 ml of the supernatant liquid should be filtered (0.45 µm filter) into a clean new 100 mL polythene flask and shipped to BGS (England) for duplicate analysis.

### Quality control

10. Additionally, for quality control, four 100 mL samples of the distilled/deionised water should be subject to the “shaking/settlement” procedure, before being analysed, *without the addition of any sediment*. These “blank” samples should be labelled NOR-SS-B1, NOR-SS-B2, NOR-SS-B3, NOR-SS-B4 and submitted to BGS (England) for analysis.

### Calculation

11. The concentration ( $C_{liq}$ ) mg/L in the supernatant fluid can be converted back to a soluble salt content in the air-dried solid ( $C_{sol}$ ) by the formula:

$$C_{sol} \text{ (mg/kg)} = C_{liq} \text{ (mg/L)} \times 0.4 \times 50 = C_{liq} \text{ (mg/L)} \times 20$$

NOTE: The flasks should be labelled with the same sample number as the soil samples. I.e.

All soil samples should have a unique number, which should be recorded in waterproof pen on a label on the soil sample bag and recorded on the field sheet. For example:

NOR-GW-SS-01 40a

(NOR = NORPLAN, GW = Gurziwan district, SS = soil sample, 01 = sequential number)

This should be followed by one of the following suffixes

40a or 40b = samples collected at 40 cm

70a or 70b = samples collected at 70 cm