SOIL ANALYSIS METHODOLOGY **v.3.0 (11/4/13)**

NORPLAN / DACAAR: Proposed method for analysis of soil samples

Small modifications made relative to v.1.0, regarding soil analysis, shown by yellow shading.
Small modifications made relative to v.2.0, 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, $SO_4^{=}$, HCO_3^{-} $CO_3^{=}$, Cl^{-}, F^{-}, 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, 60 ml of the supernatant liquid should be filtered (0.45 µm filter) into a clean new 60 mL polythene flask and shipped to BGS (England) for duplicate analysis.

Quality control

10. Additionally, for quality control, four 60 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} (mg/kg) = C_{liq} (mg/L) x 0.4 x 50 = C_{liq} (mg/L) x 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