

WHY SOIL SAMPLE

The benefits of soil sampling to the farmer are:

- Establish the current nutrient status of the soil to provide the basis for future strategies.
- Indicate the ameliorants required to correct a soil's physical and chemical imbalances.
- Determine factors that may be limiting crop and pasture production.
- Identify opportunities to improve farm profitability through efficient soil fertility management.
- Develop an appropriate nutrient plan for the farm based on productivity targets.
- Determine the better fertiliser type to apply in particular situations.
- Monitor the progress of nutrient strategies and indicate any need to fine-tune inputs.
- Assists in the planning process through improved budgeting of farm financial resources.

These benefits may result in better farm management through more cost effective nutrient decisions.

WHAT YOU WILL NEED – SOIL SAMPLING EQUIPMENT

- Clean core sampler to collect topsoil samples
- Screw driver and clean plastic bucket to remove and collect soil from the sampler
- Small spade to remove any excessive debris
- Small hand auger for subsoils
- Hydraulic sampler to collect deep soil nitrogen samples
- Sample collection bag, Submission Form, plastic pocket – all available from the Nutrient Advantage Help Desk on 1800 803 453 or your local Incitec Pivot Agent or Dealer.

Many Agents may have hydraulic samplers, which they provide as a service for their customers.

COLLECTING A SOIL SAMPLE

- Establish appropriate sampling program (see Section A below).
- Ensure the submission form is fully completed and all details are accurate.
- The correct sampling and handling procedures must be followed (see Section B below).

The report and recommendation are only as good as the sample taken and information supplied.

A. SOIL SAMPLING STRATEGY FOR THE WHOLE FARM

1. Select a particular characteristic that is applicable to the property, then group paddocks into categories. Examples of this are:

<u>Characteristic</u>	<u>Categories</u>
Soil type	Poor/good, black/red, sandy/clay.
Paddock History	Hills/flats, planting age, crop rotation, pasture type.
Management Practice	Irrigated/dryland, cultivated/direct drilled.

2. Test one-quarter of the paddocks from each category, using the correct sampling procedure.
3. Study your soil test recommendations carefully. Discuss them with our Incitec Pivot Technical Agronomist or local Incitec Pivot Agent. Be sure to review your management practices and production goals. Apply recommendations to paddocks within the same category.
4. Test another quarter of the paddocks from each category group the following year. Keep doing the same thing over a four-year period until all paddocks have been sampled. This strategy is known as the cyclic program and can provide detailed information and monitor changes in soil fertility, acidity, salinity and sodicity.
5. Once the cycle has been completed, start back through the rotation again. Use either a full analysis or a customised monitor analysis that focuses on key soil factors or problems (eg pH, phosphorus and potassium). This allows management practices and the nutrient status to be closely monitored over time and adjusted if required.
6. Where nitrogen responsive crops are to be sown, deep soil nitrogen tests should be done to determine available soil nitrogen levels. From this information, a nitrogen fertiliser strategy can be planned for the season. In cropping paddocks, nitrogen fertilisers should not be applied without first completing a deep soil nitrogen test.
7. Use subsoil testing once every 8 years where problems are suspected (eg salinity, acidity).

Example: A farmer has chosen to characterise his property on soil type. There are two different soil types A and B with four paddocks in each soil category. The following tables show the whole sampling cycle for this farmer. The result is two samples are collected each year.

Soil Type A

Paddock Name	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8
Home	✓				✓			
Dam		✓				✓		
North			✓				✓	
South				✓				✓

Soil Type B

Paddock Name	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8
West	✓				✓			
East		✓				✓		
Back			✓				✓	
Front				✓				✓

B. SAMPLING PROTOCOL

TOPSOIL – Take 30 (minimum) cores per sample to 10cm depth

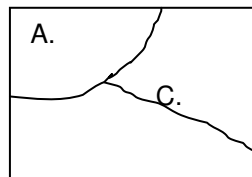
SUBSOIL – Take 15 (minimum) cores per sample from 10cm depth to 30cm depth

DEEP SOIL NITROGEN – Take 8 (minimum) cores per sample from 30cm to 60cm depth

Each sample should comprise a minimum of 500gm of soil.

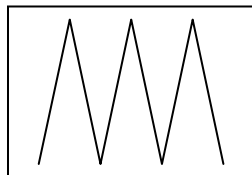
1. Select sampling sites and a sampling pattern as described in the following diagrams:

- **Zone**



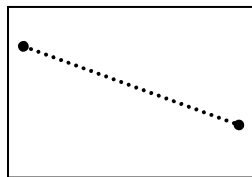
This design is used for changes in soil types and trends across sampling areas (precision farming). Samples are taken from each zone and analysed separately. This design should be adopted in **all sampling strategies**, and should utilise one of the sampling methods below.

- **Zigzag**



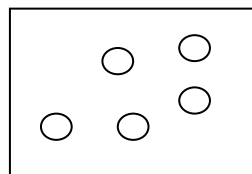
If care is taken this provides good coverage of the sampling area, making it the ideal design for diagnostic sampling. The degree and type of bias vary with experience of operator. Generally use on areas less than 10ha.

- **Transect**



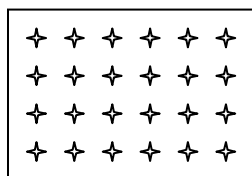
Spot samples are taken at regular intervals along a defined transect. This design allows the same or different operators to repeat the sampling with good precision.

- **Cluster**



This design involves sampling around several points within a sampling area. Where sampling points are defined (dGPS or plotted on map), cluster sampling can produce low variability. However, the results are less likely to be representative of the sampled area. Generally use on large paddocks.

- **Grid**



This design is systematic, with individual samples taken at regular intervals across the sampling area and analysed separately. It is used in precision farming and can help overcome landscape or yield variation, particularly if there is a trend across the sampling area. This design can be expensive if many sampling points are defined.

RECOMMENDATIONS

- Transect and zigzag sampling achieves similar results to grid sampling.
- Transect sampling is the easiest sampling method and is the most practical since the same sample line can be used each season for monitoring fertility trends.
- Cluster sampling produces the lowest variability, but the results are not likely to represent the paddock as a whole.
- Zone sampling should utilise one of the above sampling methods.

B. SAMPLING PROTOCOL (continued)

2. Using the corer/auger, take soil sample cores and remove grass and large debris.
3. Place the cores into a clean bucket and break soil into small crumbs.
4. Mix sample thoroughly by tipping sample back and forth between two buckets, or by mixing on a plastic sheet.
5. Use a separate pre-labelled bag for each sample.
6. After filling with soil, securely seal the bag with wire-tie provided and/or press seal.
7. Areas that should be sampled separately are:
 - Different soil types, topography or paddocks.
 - Areas that have been cropped or fertilised differently.
8. Avoid unusual areas such as:
 - Very wet conditions, stock tracks, windbreaks, fertiliser dump sites or headlands.
 - Areas within 20 metres of fence lines, gates, dams, troughs or trees.
9. Areas that have been fertilised or limed should not be sampled within 8 weeks of application.

GETTING THE SAMPLE TO THE LABORATORY

1. Ensure that you have 500 grams of soil per sample in each bag. Extra soil is used during preparation time at the laboratory for flushing grinders to avoid contamination.
2. Fill out the appropriate Submission Form making sure to supply the correct customer account number.
3. Fill out ONE Form for a maximum of three samples taken from the **same paddock** or with the same histories. These samples can be all topsoils, deep soil nitrogen tests or subsoils, or a combination of these test options.
4. Ensure a test code is clearly indicated using the current Nutrient Advantage Price List.
5. Double check that the barcode numbers on the completed Submission Form match the barcode numbers on the sample bags (remember to keep one for your records).
6. Remember that you must supply accurate information so that correct interpretation and recommendation of test results can be made.
7. Place all Forms in the clear press seal plastic pocket provided. Place the submission form and soil samples into a Freight satchel and seal and deliver to:

**Attn Sample preparation
Nutrient Advantage Laboratory
8 South Rd
Werribee Victoria
Australia 3030**

SUMMARY

Soil testing, results in better information about nutrients and soil ameliorants which leads to more effective farm management decisions being possible.

To optimise this outcome, it is important that the soil sampling strategy is carefully planned and the technique accurately implemented.

Remember, the soil analysis results and recommendations are only as good as the original sampling technique and the level of detailed information supplied for the interpretation by the laboratory.

For more information about Nutrient Advantage please contact the Nutrient Advantage Help Desk on 1800 803 453.

Submission forms, soil bags, freight bags and other materials required for sampling are available from the Nutrient Advantage Help Desk or from your local Incitec Pivot Agent. Submission Forms and current Nutrient Advantage product information are available on our website.

www.incitecpivotfertilisers.com.au.