Sampling Plan for soil testing-Fogafale & Outer islets
By Selotia Tausi MELAD

Soils will be collected from the following locations to determine the nutrient status of Tuvalu Soils

Brief introduction on the plan

Sample soil tests will be collect in a field or garden plot. Soil treatment recommendations assume that data from the analysis of that tiny fraction represent the entire area to be treated. Therefore, care must be taken to ensure that the soil sample truly represents the field or plot. If differences can be seen in the soil from various parts of the overall area to be sampled, each distinct subarea should be sampled separately. Differences in soil color or texture are obvious reasons for taking separate samples. Other reasons include differences in land slope, soil drainage, crop management history (different soil amendments or fertilizers), variations currently observed in crop growth, or variations in the natural vegetation. Each soil sample analyzed should be a combination of 2 to 3 subsamples taken from the soil area of interest. The subsamples should each be about the same amount of soil, and they should be mixed thoroughly as they are collected. The composite sample is then test to know the NPK in the soil. How large an area to sample? For home gardens, one sample that is representative of the garden plot is usually sufficient. For large areas it should be subdivided into sample areas of 0.2 acres and sampled separately.

Plan:

	April	**May**	**June/July**
	• Designing a soil test plan • Preparation of the test kits • Identifying the areas for testing • Soil testing start	• Continue with the testing • Soil-testing (Faunafala, Papaelise & Muli te fala) • Demonstrating study • Collecting soil sample	• Packing and packaging of sample • Sending to Fiji or Australia • Reporting

		• Analyzing the soil content • Heating of soil sample • Recording	

Testing the Soil Why and How to Take a Soil-Test Sample

Questions to be answer to myself to know to do the soil test.

Why have a soil tested? Does my soil have problems? Does my crop need fertilizer/compost? What kind of fertilizer/compost should I use? How much should I apply?
A soil analysis can help farmers and gardeners answer these questions. A basic soil analysis provides information on two important soil characteristics:
• **Soil pH** is a measurement on a scale from acid (low pH) to alkaline (high pH). Most soils are on the acid side of the pH spectrum. Good soils for crop production are often moderately acid, but some soils in Hawaii are acidic to the extent that crops grow poorly. Soil tests indicate pH problems and allow recommendations for correcting them.
• **Available nutrient** levels in the soil determine how good crop growth will be. Testing for phosphorus (P), potassium (K), calcium (Ca), and magnesium (Mg) helps determine the need for soil amendments (phosphate, and lime or dolomite) and the right fertilizer formulations for the crop to be grown. In addition to the basic information on pH and levels of major nutrients, specialized soil analyses can help to investigate other factors that may limit crop growth:
• **Soil salinity** a problem that faced by the farmers and can build up in coastal areas and in soils irrigated with brackish water or to which too much fertilizer has been applied.
• **Nitrogen** (N) is required in large quantities by most crops, and adding N is a basic part of most fertilizer/compost programs. In special circumstances, N can be analyzed as total N, ammoniacal N (NH4 -N), or nitrate N (NO3 -N), but this is not usually done because N does not remain in the root zone for very long.
• **Organic carbon** (C) analysis, like N analysis, is useful only in special circumstances. Most soils benefit from additions of organic matter.
• **Aluminum** (Al) in soils can be toxic to plants if pH is low and the Al is too available to them. Knowing the soil's pH and classification is the first step in predicting Al problems, and tests for "extractable" Al can then be done if necessary.
• **Micronutrient** levels in the soil may be analyzed when crop symptoms suggest problems. Micronutrients often measured include boron (B), copper (Cu), manganese (Mn), and zinc (Zn). These specialized soil tests usually are not called for unless crop growth problems have been observed or there are other reasons to suspect that they are needed.

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Taking a good soil sample

At each location 5 soil samples should be taken. At the center of the sampling area the soil should be sampled to a depth of 30 cm in 10 cm increments. 4 further soil samples should be collected from the sampling area to a depth of 10 cm

What equipment do I need?

• **map** the area sampled if you are taking more than one sample. Mark each sampled area on the map with a label that you will also write on the sample bag.

• **spade or shovel** (for specialized soil tests, tools should preferably be made of steel, because tools made of brass, bronze, or galvanized metal may contaminate samples with copper or zinc) • plastic bucket or large plastic bag for collecting and mixing subsamples

- **Ruler or tape measure** to determine the depth of the hole

• **plastic bag** to contain about 2 cups (1 pint) of the final, composite soil sample (thin plastic bags that can "breathe," such as sandwich bags, are better than thick plastic bags for storing soil; brown paper bags can contaminate samples to be tested for boron)

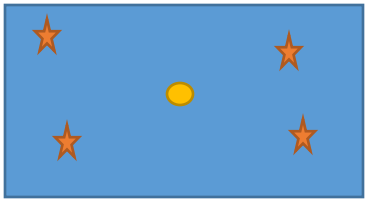
• **Marker** to label the plastic bag to identify the sample

- **Notepad and digital camera**

Collecting the soil sample

Each soil sample will be place in individually sampling bags. The bags are to be labelled with a unique sample identification number using a marker pen. Often the label on the outside of the bag can rub off during transport. We recommend that a paper label or tag with the sample identification number writing on with lead pencil is placed in the bag.

The five sampling spots should be in a pattern that ensures a balanced representation of the whole area sampled. Don't sample spots that look atypical of the area being sampled.



An example of the location of different sampling locations with the plot.

Use clean tools to sample soil, and clean bags to store it. Small amounts of contaminants, especially fertilizer or lime, can distort the analysis results.

Take a photo of the sampling site and identify the location with the sampling number

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While at the site record sample details and site location in a record sheet (see example). Also record other data such what is the history of the site, such as has compost been applied.

How deep to sample?

- Center sample within the plot will be sampled to a depth of 30 cm in 10 cm increments.
- The other 4 sampling locations will be sampled to a depth of 10 cm

The sampling method:

1. Clear surface litter and plant growth from the sample spot. Dig a hole about as wide as your spade and as deep as the layer you are sampling.
2. With the spade tip placed one inch outside the edge of the hole, cut down to remove a slice of one side of the hole wall.
3. Keeping that slice on the blade of the spade, use a trowel, knife, or stick to cut away the sides of the slice, leaving a center section about 3 cm wide. This 3 x 7.6 cm vertical section of the soil is your subsample.
4. Place the soil in the labelled plastic bag. There needs to be about 300 grams or 2-3 cups of soil per sample.

Back at the office/lab

We need to split the sample for shipment to Fiji and Australia

1. Get the soil sample and mix the sample in the bag.
2. Label the second sample bag with the original sample number and add “MIR” onto the label. Also place a sample number paper label which is written in pencil into the bag.
3. Subsample ~50 g of soil from the original sample and place it into the MIR bag. Seal both bags.
4. To enable the importation of the soil samples into Fiji and Australia we need to supply to Quarantine the mass of each sample and the associated sample identification. At this stage recorded the sample masses of each bag. Place the “MIR” sample into a box and the original sample bag into a different box.
5. Repeat this process until all the samples are subsampled.
6. All the MIR samples will be shipped to Ami Sharma in Fiji and the original samples will be sent to Queensland Analytical Labs in Brisbane Australia.
7. Complete the Australian and Fiji import permits and send the boxes to each lab.
8. Write up the field sheets in an word document and send the field photos to Australia.

Conclusion:

Soil testing is very important mainly to the farmers to actually identify the nutrient loss and what they need to add in order to improve and increase the production.

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The testing also extend to the home garden in outer islands where some of the people are settle there and they also grow vegetables, root crops, and tree crops