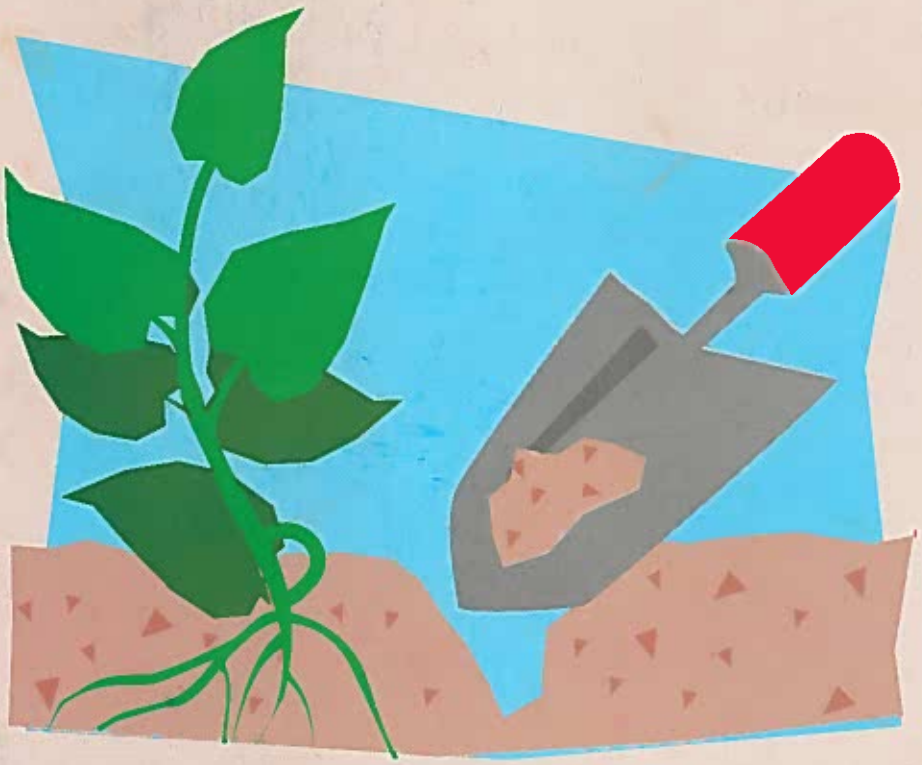
SOIL SAMPLING

For Healthy Plants and a Healthy Environment



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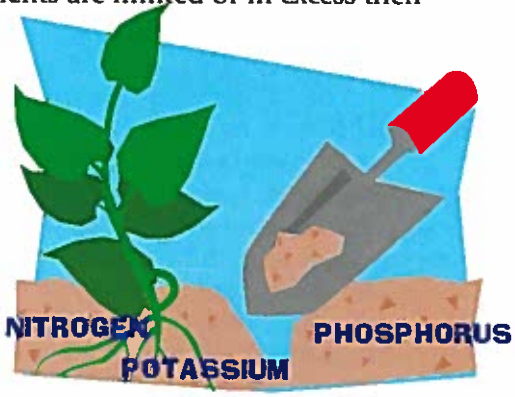
Why Take Soil Samples?

Soil contains nutrients that are essential for healthy-growing plants. If these nutrients are limited or in excess then plant growth may be reduced. Knowledge of the nutrient content of your soil and its chemical properties can help you in deciding the type and quantity of fertilizer or other nutrient sources to apply to meet the nutrient needs of the plants you wish to grow. Overapplication of nutrients reduces farm profits and creates a risk of environmental pollution. The University of Guam Soil and Plant Testing Laboratory and your local Cooperative Extension Service analyze soil samples and provide nutrient recommendations based on the plant-available nutrient content of the soil, the type of plants to be grown, soil type, and the past nutrient cropping history of the field or yard. These recommendations are designed to assist you in managing your soil resource and in minimizing problems related to plant nutrient deficiencies or toxicities.



When To Take Soil Samples And How Often?

Soil sampling can be a guide to proper fertilization. Therefore, best results can be achieved if samples are taken at the beginning of each growing season before your crop has been planted. Taking samples at this time will allow you to plan how you will fertilize the field and what nutrient problems you may encounter with a particular crop. A convenient time to take samples is just after a field has been plowed, disked or rototilled. Remember that it will take the University of Guam Soil and Plant Testing Laboratory approximately two weeks to analyze your soil sample so be sure to submit the sample to the Laboratory as

early as possible before planting. Early submission of samples will insure that you will receive the results back in time to assist you in deciding how much and what type of plant nutrients to put on your field.

Tools for Taking Samples

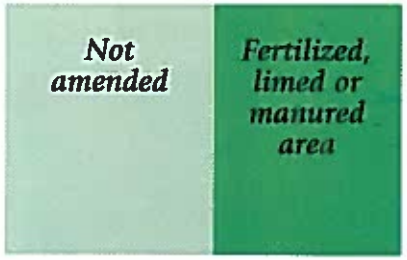
Several types of specialized tools have been designed for taking soil samples. These tools include: the push probe, a stainless steel tool which takes a 1 inch diameter core when pushed into the soil; a soil bucket or screw auger, a steel tool which is twisted into the soil and is usually used for taking deep samples and; a soil corer, a cylinder which is hammered into the soil at different depths. These tools are useful for people who routinely need to take soil samples and can invest in purchasing such tools. However, a hand trowel or shovel can also be used successfully for sampling and have the convenience of being multi-purpose and more widely available on Guam and other islands. Be sure to clean your soil testing tools between sampling to avoid contamination. In addition, stainless steel tools are recommended for sampling soils when testing for micronutrients such as iron.

Identifying Differences in Your Field

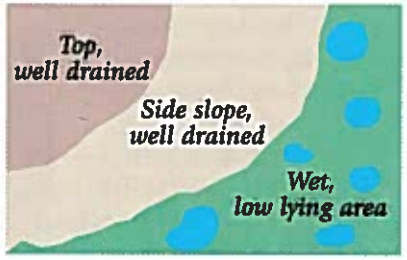
One of the goals of soil sampling is to take a sample that is representative of the field. The difficulty is that you are only sampling approximately 1 pound of soil in a field that contains approximately 2,000,000 pounds of soil per acre plow layer. Not all fields are uniform throughout their whole area

and, therefore, it is important to be able to recognize situations in which you may want to split up the field and take separate samples. One reason for splitting up a field is if you have been managing areas in the field differently. For example, you applied fertilizer previously on one area and none on the other area. Or you grew a crop on one area and left the other area fallow. These differences in management will affect soil nutrient levels. Natural differences in a field can also occur. For example, on slopes which grade down into a depressional area, the type and depth of soil may change. Some possible clues to these changes are the color of the soil or if you notice differences in crop yields from one area to another. Changes in the amounts of sand, silt and clay in a soil may be determined by feeling the soil between your fingers or by the relative drainage of the different areas in the field. If you have just a few small abnormal areas in your field then be sure to avoid those areas when taking your soil sample. Mixing soils from two very different fields will not be representative of either field.

More information regarding the soils of Guam and other islands in the region are available from the Natural Resources Conservation Service of the U.S. Department of Agriculture. The Soil Survey of Guam, for example, contains extensive information and maps of the soils on Guam and can help you identifying the type of soil you have in your field.



Take 2 separate samples, one from each area



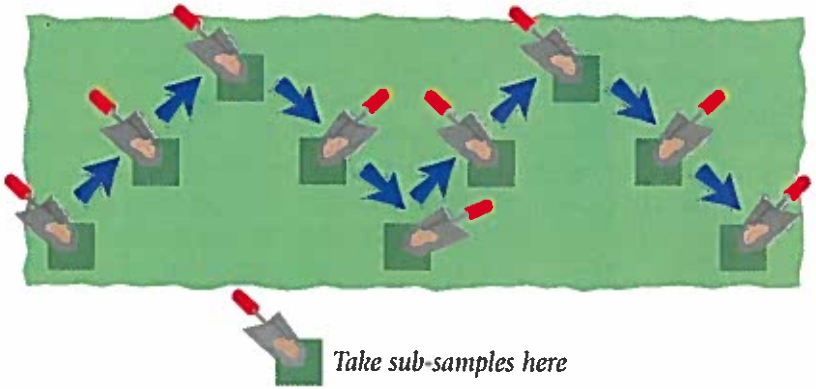
Take 3 separate samples, one from each area

Take 2 separate samples, one from each area

Take 1 sample

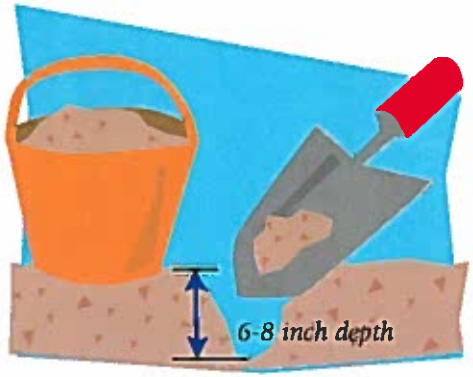
Sampling Pattern

Another method to insure getting a representative sample is by taking several samples throughout the field and then mixing them together to make a composite sample. Take between 10 to 15 sub-samples per field (up to one acre) to make one composite sample. To insure that you take representative samples from the whole field, walk through the field in a "W" pattern as shown in the diagram and take sub-samples along the way, mixing the sub-samples together in one container.



Sampling and Submission Procedures

1. **Dig** a V-shaped wedge in the soil down to the bottom of the plow layer when taking a sample with a trowel or shovel. The depth of the plow layer is usually 6 to 8 inches (15 to 20 cm) but it can be less in shallow soils.



2. **Place** the soil into a clean plastic bucket. Do not use buckets that have been used for mixing fertilizers since the fertilizer will contaminate the sample. Once you have put the 10 to 15 subsamples in the bucket, mix the soil thoroughly.

3. **Place** about 1 lb (454 grams) of the mixed soil in a clean plastic bag. Be sure to write your name and the field location on the bag with an indelible marker. Having a simple system for identifying the field location of each sample will help you in keeping soil test records for each field.

4. **Fill out** a soil sample information sheet one of which you can find enclosed in this brochure. You can obtain additional sheets from the offices of Guam Cooperative Extension at the University of Guam. The information you provide on this sheet such as the crop you wish to grow, previous crop grown, soil series name and previous fertilizers and manures applied are necessary for providing a good recommendation so please take the time to fill it out. If you have any problems in completing the information sheet then please ask your local extension agent to assist you.

5. **Drop off** or send your sample and the information sheet to the offices of Guam Cooperative Extension or the Soil and Plant Testing Laboratory at the University of Guam. If you are submitting samples from outside the island of Guam, read the section in this bulletin on "Sending Soil Samples for Analysis from Outside Guam" for special instructions. Be sure to ask if there are any charges associated with the laboratory services you are requesting. All charges should be settled prior to receiving laboratory results.

Drop-off or send samples to one of the following locations:

Soil and Plant Testing Laboratory
College of Agriculture and Life Sciences
University of Guam
Room 216
UOG Station
Mangilao, Guam 96923
Telephone no. (671) 735-2143
Email: soillab@uog9.uog.edu

Agriculture and Natural Resources
College of Agriculture and Life Sciences
Guam Cooperative Extension
University of Guam
Room 105
UOG Station
Mangilao, Guam 96923
Telephone no. (671) 735-2080

Getting Results and Recommendations

You will receive your soil test results within approximately two weeks after the time the Soil and Plant Testing Laboratory receives your samples. A rush service of four working days is also available for an additional charge. The routine soil test results will give you information about soil pH (a measure of soil acidity) and the amount of organic matter, phosphorus, potassium, calcium and magnesium in your soil. If your soils are from Guam, an extension agent will contact you and give you fertilizer recommendations based on your soil test results and the information you provided with your sample. If you have any questions regarding fertility management of your soil be sure to ask your local extension agent.

Sending Soil Samples for Analysis from Outside Guam

The U.S Department of Agriculture's Animal and Plant Health Inspection Service (APHIS) regulations require that all soil samples that are sent to Guam for analysis be imported under a valid license held by the University of Guam Soil and Plant Testing Laboratory. This license allows the Laboratory to receive soil samples without undue delays due to inspection, quarantine or sterilization procedures. The following procedure is required for preparation and sending of soil samples to Guam:

1. **Air-dry** and, if possible, pass the soil through a sieve with 2 millimeter diameter openings.

2. **Double bag** the soil in plastic and securely seal the bags to insure no leakage of soil. Be sure to identify each soil on the outside of the bag. Fill out a soil information sheet. If a soil information sheet is not available, include a list of all the soil samples and their identification. Be sure to include your name, address and telephone and fax numbers. Please also indicate form of payment.
3. **Place** the marked bags in a sturdy mailing container, securely seal the container and affix a photocopy of PPQ form 550 on the outside of the container. The form can be obtained from the Soil and Plant Testing Laboratory. This form shows plant health inspectors that the package contains soil samples and is being imported under license.
4. **Send** the package via U.S. mail or other postal services to:

Soil and Plant Testing Laboratory
College of Agriculture and Life Sciences
University of Guam
UOG Station
Mangilao, Guam 96923 USA

Special Situations for Soil Sampling

If you are sampling soils in special situations, such as for plant containers in nurseries, small home gardens, constructions sites, or golf course greens then follow the same basic principles as described for large agricultural fields.

1. **Try to get a representative sample.** For example, in nurseries take 10 to 15 subsamples of growing media in containers with the same plants at the same growth stage and make a composite sample. At construction sites, a composite soil sample should be made by sampling from several places in a pile of soil.
2. **Be sure to identify the sample bag** you submit for testing and note on the information sheet for what purpose you want to use the soil or growing media. Talk to your extension agent or the soil scientist at the University of Guam if there are any special tests you may wish to request.

SOIL SAMPLE RECORD

Date Sampled	Sample Identification	Field Location	Crop to be Grown	Other Information

Notes:

Soil and Plant Testing Laboratory
College of Agriculture and Life Sciences
University of Guam
Room 216
UOG Station
Mangilao, Guam 96923
Telephone no. (671) 735-2143
Email: soillab@uog9.uog.edu

Agriculture and Natural Resources
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