

SOIL SAMPLING AND PREPARATION FOR LABORATORY ANALYSIS



AQUACULTURE DEPARTMENT
Southeast Asian Fisheries Development Center
Tigbauan, Iloilo, Philippines

The SOUTHEAST ASIAN FISHERIES DEVELOPMENT CENTER is a regional treaty organization founded in 1967 among six nations, namely, Malaysia, Philippines, Singapore, Thailand, Vietnam, and Japan. It was founded under the aegis of the Ministerial Conference on the Economic Development of Southeast Asia.

Created in response to the global food crisis, SEAFDEC has five major functions: train fisheries technicians of Southeast Asian countries; study fisheries techniques; develop fishing grounds, investigate fisheries resources and oceanography; collect and analyze fisheries information; and provide member countries with results of studies.

The AQUACULTURE DEPARTMENT (AQD) is one of three departments of SEAFDEC. The two others are the Marine Fisheries Training Department in Thailand and the Marine Fisheries Research Department in Singapore.

The establishment of the Aquaculture Department was approved during the fourth SEAFDEC Council Meeting in Manila on January 18-22, 1971. The first Chief of AQD was appointed during the Sixth Council Meeting held in Kuala Lumpur on July 8, 1973.

AQD operates in accordance with the rules and regulations approved by the Governing Council of Directors which consists of representatives from member-countries. Under its Revised Plan of Operation and Program of Work, the Department is enjoined to: promote and undertake aquaculture research that is relevant and appropriate for the region; develop human resources for aquaculture development; disseminate and exchange information in aquaculture and allied sciences; and undertake such other activities as may be determined by the Council of the Center.

SOIL SAMPLING AND PREPARATION FOR
LABORATORY ANALYSIS

Editors

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PREFACE

Soil is an important factor in the productivity of a fish-pond. The nature of the soil in the pond bottom determines the quality of the pond water. Research has shown that growth and survival of fish, prawns, and shrimps are affected by the quality of pond water. Unless pond soil is properly analyzed and treated, high productivity cannot be attained.

Aware of this important aspect of the aquaculture system, SEAFDEC AQD has endeavored to come up with this Aquaculture Technology Module No. 5 entitled *Soil Sampling and Preparation For Laboratory Analysis*, as a guide for fishfarmers, pond technicians, teachers and extension workers. Efforts were made to simplify the text with illustrations accompanying each step so the readers could easily follow the procedure. It is hoped that this extension material will be useful to fishfarmers.

A handwritten signature in black ink, appearing to read 'A. Santiago, Jr.', with a large, stylized flourish at the end.

ALFREDO C.SANTIAGO, JR.
Chief
SEAFDEC Aquaculture Department

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SOIL SAMPLING AND PREPARATION FOR LABORATORY ANALYSIS

INTRODUCTION

Soil is an important factor which determines the productivity of a fishpond. It has the capacity to absorb and release the nutrients needed for the growth of natural food organisms. The quality of the culture water is dependent on the pond bottom soil. A fishfarmer, therefore, should consider the soil of his prospective fishpond during site selection. The soil should be sampled and analyzed to determine its suitability for aquaculture. Aside from this, soil of operating fishponds should be analyzed and properly treated at intervals between culture periods to assure high productivity of the pond.

The sampling of soil intended for laboratory analysis is done by taking several small quantities from a given area. The samples are submitted to a laboratory center to identify the type and quality of the soil, and to determine the right amount of nutrients that may be needed for the favorable growth of desirable plant and animal organisms.

Rationale

The growth and survival of fish, prawns and shrimps depends on the quality of pond water. The nature of pond bottom soil affects the pond water quality. A prospective fishpond site therefore should have its soil properly checked to gather information on its physical and chemical composition that will help the fishfarmer to:

- a. anticipate soil problems such as the acidity or alkalinity of the soil (pH);
- b. know the kind and amount of fertilizer needed;

- c. know the kind of development and management input such as reclaiming extremely acidic soils (acid sulfate soils), flushing of the ponds, or length of time to condition the pond bottom;
- d. know the type and quality of soil that can be used as substrate of the pond in order to shorten the conditioning period; and
- e. determine the species suitable for cultivation in the area.

Soil sampling should be undertaken not only during site selection but also during intervals between culture periods or at least once a year. This is necessary for the following reasons:

- a. to determine the level of nutrients so that fertilization regime is adjusted;
- b. to anticipate problems that may contribute to a decline in productivity such as: over fertilization or presence of substances like pesticides and other chemicals that settle in the pond bottom during the course of water exchange; and
- c. to know if reconditioning of the pond is necessary especially when pond bottom is excavated during repair of dikes.

Objectives

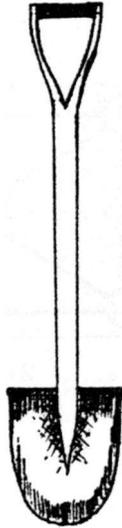
This module is intended as a guide for fishfarmers, pond technicians, teachers, and extension workers to enable them to:

1. gather correct soil samples by following the procedure stated;
2. properly dry the soil samples;
3. give correct information required by the Soil Laboratory Centers; and
4. send soil samples properly for analysis to the nearest Soil Laboratory Center in the area.

1. Materials needed



stainless steel or metal soil sampler



spade



trowel



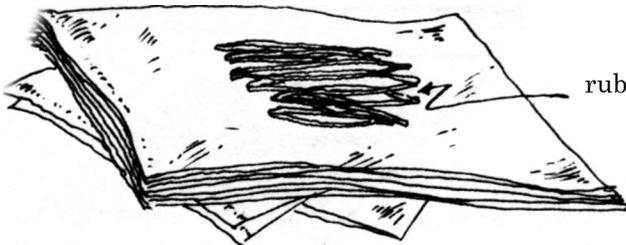
plastic pail for mixing samples
(about 15 liters capacity)



notebook (for note taking)



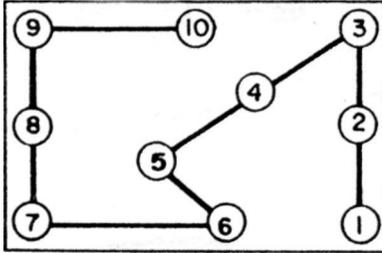
pentel pen (for labelling)



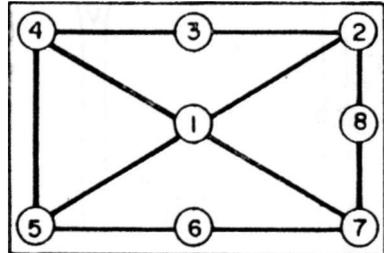
rubber bands

plastic bag (size: 5" x 8")

2. Sample the area using either of the two ways of soil sampling:



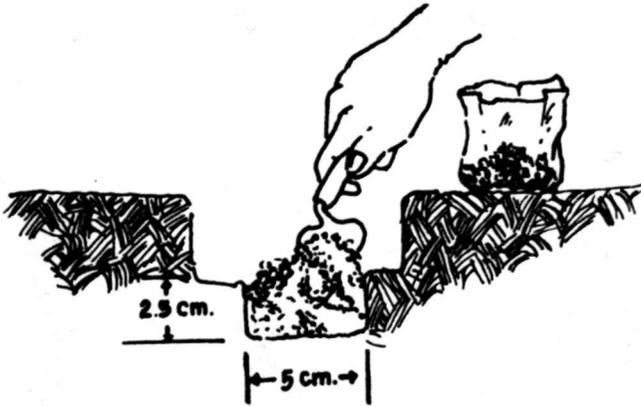
1) S method



2) X method

3. Clear area for sampling
- remove or scrape away stones, rubbish or trash from the surface to expose the soil before sampling.
 - soil samples should be collected away from fences, roads, building sites, straw or manure piles, and other abnormal occurrences in the field.
4. Push the soil sampler or dig into the soil following either the S or X methods to a depth of 15 cm.

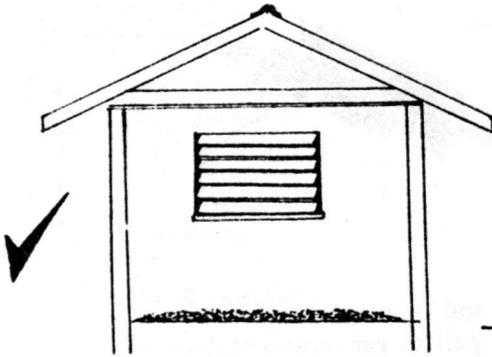
5. With the use of spade or trowel get samples of soil at the specified depth, about 2.5 cm thick and 5 cm wide.



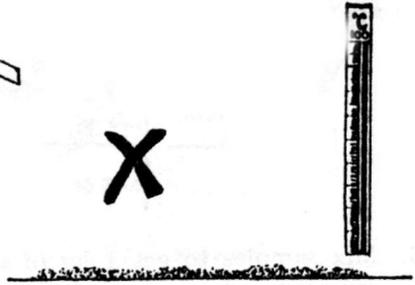
6. Mix samples to get 1 kg of soil representing the area sampled and mix in a plastic pail to get representative sample of the plot.
7. Air-dry the samples. Here's how to do it:
 - a. spread the soil sample on top of a paper board preferably on a coarse blotting paper (plain white) with its corresponding label.
 - b. spread thinly.
 - c. remove bits of materials such as stones, shells, wood, roots, etc.
 - d. dry the soil samples.
 - e. let the sample stay to dry for 3-5 days and inspect whether the samples have already dried. To speed up the drying process, break the samples into small pieces.



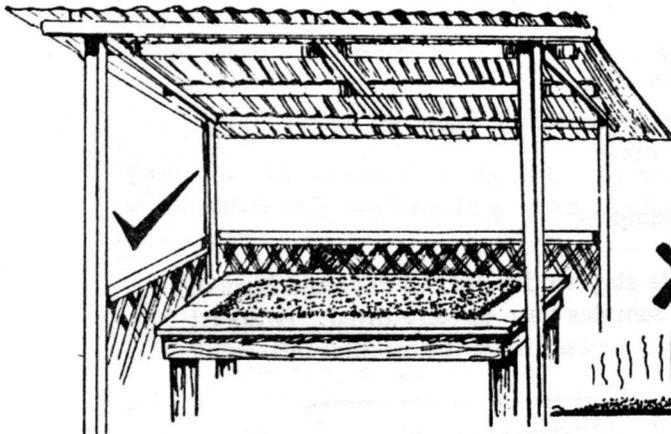
HOW TO DRY SOIL SAMPLES



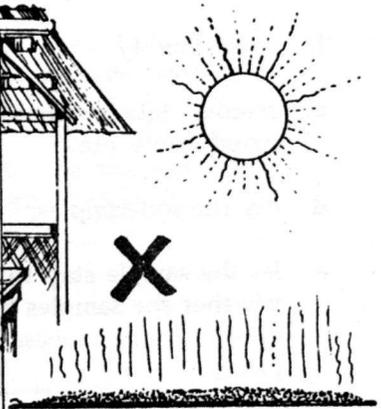
Room Temperature



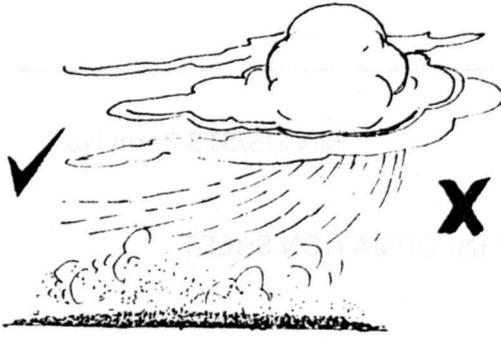
High Temperature



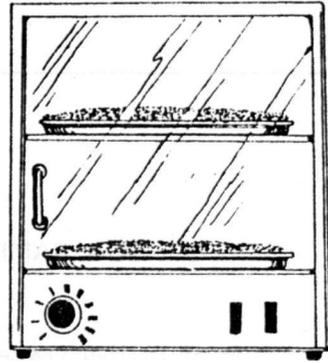
On Top of a Table Indoor



Sun Drying



Air Drying



Oven Drying

Dry

1. room temperature
2. indoor
3. free air circulation

Do not Dry

1. in too dusty or open area
2. under direct sun light
3. in high temperature (in oven)

8. Put the sample in a plastic bag. It should have a label with the following information:

MA SIS/STS Form No.1

SOIL SAMPLE INFORMATION SHEET

Name of Farmer/Owner: _____

Address: _____

Submitted by: _____

Address: _____

Site of Farms _____
(Sitio) (Bgy.) (Town) (Province)

Tenant/Worker/Other ID Marks _____

Area represented (Has.) _____

Topography: Plain Rolling Hilly

Soil Type: _____

APPROVAL AND LABORATORY CHECK DATE:

PAID SAMPLE: O.R. NO.: _____

Lab. No. _____ Date: _____

Date Received: _____

Date Promised: _____

Date Started: _____

Date Reported: _____

Purpose for Soil Analysis _____

9. Bring or send the samples to the laboratory:
 - a. place the dried soil in a labelled plastic bag;
 - b. pack the soil samples properly before sending to a laboratory for analysis.

CAUTION: Samples should not be exposed to direct sunlight or high temperature for too long. It should be spread for air-drying as soon as possible or within 24 hours from sampling.

Don't forget to put the date of sampling in the soil sample information sheet. Samples should be prepared and submitted to the laboratory within one week after sampling.

SOIL LABORATORY CENTERS

The following is a list of the regional and provincial/district offices of the Soil Laboratory Center of the Ministry of Agriculture and Food where you can take your soil samples for analysis:

<i>Regional Office No.</i>	<i>Location</i>	<i>Provincial/District Office</i>
1	Baguio City	Batac, Ilocos Norte Dagupan City San Fernando, La Union Vigan, Ilocos Sur
2	Tuguegarao, Cagayan	Iligan, Isabela
3	San Fernando, Pampanga	Cabanatuan City Iba, Zambales Tarlac, Tarlac
4	Manila	Batangas City Calapan, Mindoro Or. Pagbilao, Quezon UP Los Banos
5	Legaspi City	Naga City
6	Iloilo City	Bacolod City
7	Cebu City	Dumaguete City Tagbilaran, Bohol
8	Tacloban City	Catarman, N. Samar
9	Zamboanga City	—
10	Cagayan de Oro City	Butuan, Mis. Or.
11	Davao City	General Santos City
12	Cotabato City	Cabacan, Cotabato

(List obtained from Regional Office No. 6, Iloilo City as of November 1983).

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- Soil Laboratory Center. 1982. Soil Sampling. Ministry of Agriculture. Mimeographed.

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THE EDITORS



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