**Mineral one element technique**

**Knowing** the soil condition is important if a farmer is to expect high yields and profits.

A good way to learn of any nutrient deficiency of the soil for lowland rice is through the Minus-One Element (MOE) technique. The MOE technique is a simple and practical way of assessing nutrient deficiencies in rice fields. This technique is based on the principle that plants will show a physical reaction to limiting nutrients.

**Adaptability**

When the MOE technology was used, it was learned that soils in PhilRice Batac and Mariano Marcos State University sites were deficient in nitrogen (N) and phosphorus (P) while the soils in Lagayan, Abra were deficient in N, P, sulfur (S) and zinc (Zn). The same project also gave results which showed the potential of MOE technology applied to upland soils and to crops other than rice.

**Effectiveness**

Without proper soil nutrient diagnosis, farmers are likely to apply the wrong rates and types of fertilizers. It is therefore important to know the soil's nutrient content, so that only the limiting nutrients in the right proportion based on crops' needs are applied. Otherwise, plant growth and yield might be affected.

**Explanation**

The MOE technique is easy to follow. After training, farmers or extension staff can do it in the field, and can expect results in four to five weeks. The procedure and materials are contained in a handy kit where seven fertilizer formulations are found. These formulations are minus nitrogen (N), minus phosphorous (P) + Urea, minus potassium (K) + Urea, minus sulfur (S) + Urea, minus zinc (Zn) + Urea, minus copper (Cu) + Urea, and complete fertilizer + Urea. Also found inside the kit are seven black plastic bags, seven wire ties, and the instruction booklet.

The first step in applying the technology is to collect soil samples from the farm. Undecomposed organic debris should be removed. The soil samples should be submerged for two weeks in water. Then, the soil samples are placed in plastic pots. The fertilizer formulations are applied. The rice plants are transplanted into the pots and cared for as needed (Fig. 1). The growth of the rice plants is recorded at 14 to 45 days after transplanting (Fig. 2).

![Caring for the pots of rice plants.](image)

**Cooperating agency for this topic:**

Philippine Council for Agriculture, Forestry and Natural Resources Research and Development, Los Banos, Laguna, Philippines 4030

Fax: (63 49) 536 0016

E-mail: pcarrd@dost.gov.ph

**Food and Fertilizer Technology Center (FFTC)**

14 Wenchow St., Taipei, Taiwan ROC

Tel.: (886 2) 2362 6239  Fax: (886 2) 2362 0478

E-mail: fftc@agnet.org  Website: www.fftc.agnet.org

**FFTC: An international information center for small-scale farmers in Asia**
The growth of the plants in the pots receiving minus certain elements (such as minus N) should be compared to that of plants receiving the "complete" nutrient formulation. If the growth of minus N pots, for example, is about 75 percent of plants given the complete fertilizer, then the soil is deficient in nitrogen.

To be certain which element is deficient, the biomass produced at 45 days can also be evaluated. If the weight of any of the pot tests is less than 80 percent of the "complete", the nutrient represented by the label on the pot is deficient.

Once the farmer knows which element is deficient, he can then apply the missing nutrient using the recommended rates. Farmers do not need to apply elements found to be sufficient in the soil. The MOE kit provides the farmer with all the information he needs, and a good solution to his fertilizer problems.

Fig. 2. Grower assessing the growth of the rice plants after 45 days