The ECHO Asia Impact Center operates under ECHO, a non-profit Christian organization whose mission is to promote sustainability through training, education, and consultation. ECHO focuses on helping people develop skills to improve their own communities, with an emphasis on sustainable agriculture and natural resource management. The center is staffed by development workers, researchers, and business persons related to the following topics:

- Micro-hydro generation of electricity
- Small-scale livestock production
- An introduction to Asian perennial vegetables
- Books on soil biology
- Microbiology
- Water treatment
- Biogas production
- Food security
- Sustainable energy

Soil quality, also known as soil health, is the capacity of the soil to function – how well it fills the roles we expect of it. One of the most basic and important roles of soil is to serve as a store of water. Soil quality reflects the soil’s ability to provide structural support, soil aeration, and water and solute movement. This is crucial for crop production and the health of the ecosystem. Soil health can be improved through various practices, including soil testing and management, organic matter addition, and proper drainage.

**Sample Procedure**

1. Add 150 ml (5.1 US oz.) of water and shake vigorously for at least 60 seconds. Let container sit for about 1 week. Layers in the soil will start to show up before then but they are not fully settled out yet. Rotate the jar 90° and measure again, repeating until there is no more settling. The top layer that settles out will be clay, followed by silt and sand. The depth to the top of the clay layer is recorded.

2. Weigh the dried soil and calculate soil moisture and bulk density according to equations below.

3. Additionally, the USDA's Agricultural Manufacturing Consultant can be contacted at kirbylrogers@gmail.com.

Marcia Croft, farm manager, has used this system for more than 10 years that the farmers have used this system. Some of the Lao soy farmers have not used extra fertilizers of any kind, although others have supplemented their crops with additional nutrients. In the areas where we introduced soybeans, some hill tribes had historically planted soybeans for their own consumption, often using the beans as a protein source. Soybeans can be a valuable crop for farmers, as they are easily value-added at either a household or industrial level.

Soybeans also enhance soil tilth, causing the soil to be much more workable. They can be eaten, but should not be used for seed as the fungus affects germination. Any purple seeds must be discarded. However, I hope someday to produce Lao cooking oil and soy sauce from these beans. Soybeans create their own nitrogen source in a symbiotic relationship with Rhizobium japonicum, a nitrogen-fixing bacterium. In the nitrogen-limiting system, this nitrogen-producing ability has uses related to fertilization rates and crop yields. Rhizobium japonicum is found in most leguminous crops, including soybeans. The bacteria live in root nodules and release nitrogen into the soil, which is then taken up by the plant. This process is important for maintaining soil fertility and reducing the need for synthetic fertilizers.

The correct rate of planting is important to ensure proper growth and yield. Soybeans should be planted in rows 8-12 inches apart, depending on the variety and local conditions. These tests can help you gain a better understanding of some of the components, mainly physical properties such as water retention and bulk density.