

## **FARM: In Our Field: The dirt on Imperial Valley's soil**

By **SAM WANG** Special to his Newspaper | Posted: Thursday, May 29, 2014 12:20 am

In agriculture fields, soil is the upper layer on earth in which crops grow. We know that soils differ from location to location. The types of soils in each location are determined by many factors, such as soil parent materials, biotic and abiotic environment, and the amount of time it's been there.

In the Imperial Valley, soils are alluvial deposits from the Colorado River flood plain. The Colorado River not only brings life-supporting water to the Valley, its overflow in the past also brought us fertile soil to farm.

Soil has three major components: sand, silt, and clay. Sand is the soil particle between 0.05 to 2 millimeters in diameter. Particles that are larger than 2 mm are called gravel and stones. Silt is the middle soil particle with 0.002 to .05 mm in diameter. The particles that are smaller than 0.002 mm are called clay. The relative combination of these three components determines soil texture.

Why is it so important to know the soil texture? There is simple physics behind this. We all know that there is more empty space among the larger sand particles, allowing water to drain right through. Just think how fast water goes through the sand in beaches, which are extreme samples of sandy soils.

On the other hand, clay's small particles have a very high water and nutrient holding capacity. Clay particles also carry negative charges, which makes them perfect to hold soil nutrients with positive charges. We call these positive charged soil nutrients, cations. They include calcium, magnesium, potassium, sodium, ammonium, etc. However, when the percentage of clay is very high in the soil, it takes a long time for water to infiltrate into deeper soil profiles, creating irrigation and tillage issues.



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It is obvious that the right mixture of soil particles forms a soil texture that allows water to infiltrate into deeper soil but can hold water and nutrients in the soil at the same time. Therefore, soil texture is important to water-holding capacity, water movement, the amount and movement of soil air, irrigation, tillage, and other field operations.

In addition to silt, clay and sand, soil also includes other important life-supporting materials such as minerals, organic matter and living organisms. These components are important to how soil particles aggregate and forms soil structure. Gas and water can fill the pores of soils, providing other essential components to support plants and other lives in the soil.

It is important to remember that soils are active and dynamic, natural systems not a dead medium to grow plants. For example, an acre of soil typically contains between 10 and 100 million billion bacteria! These micro-organisms have an important role in breaking down dead plant materials and recycling nutrients for the next crop. Without them, the earth's surface would be covered by dead plants and nutrients in these plants would not be available for the next crop.

Without proper management, soil could deteriorate to the extent that it is no longer farmable, which is happening in many locations across the world. To conserve soil and to maintain the ability of the next generation to grow their food is one of the greatest challenges we are facing in this century.

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