

Dry Subsoil Threatens To Hurt Next Year's Crop Performance



(Top) MU soil scientist Randy Miles examines the wall of a soil pit where subsoil contains much less moisture than in a normal year. Dry subsoil could hurt 2012 crop yields.

(Right) At depths of 4 feet, subsoil like this clay mix normally contains a water table, but sits dry this fall. Miles said 16-18 inches of drizzly rain are needed this winter to replenish subsoil moisture to normal.

Photos by Jessica Salmond/MU Cooperative Media Group



COLUMBIA, MO.

It may not look it, but many Missouri fields are hiding a deep, dry secret. University of Missouri soil scientist Randy Miles said dried-out subsoil at depths of 3 feet or more could trouble next year's crops in Missouri even if there is plenty of moisture in the topsoil.

"For crops like corn it's not uncommon for roots to extend down 5-6 feet, and it's the soil moisture there that sustains the crop in the latter part of the growing season," Miles said. "When we have this deficit of moisture at that depth, we may not get grain fill to the extent of the plant's potential to perform."

This moisture shortfall isn't likely to change soon.

Miles estimates that Missouri farms need 16-18 inches of rainfall to replenish soil moisture enough to ensure a good crop next year. That's more than double normal winter precipitation, and would mean upwards of 13 feet of snowfall.

"People think that if we get a few good rains that the problem is solved," said Miles. "Those rains will only put moisture into the first few inches of soil. We'll need extraordinarily persistent rains for the moisture to get down 5 feet where the roots of mature plants live. It could take many weeks and months for water entering the soil surface to move into the 3-5 foot depth of the soil profile."

In October, the USDA designated 101 Missouri counties as natural disaster areas due to drought. This showed a recognition of crop losses caused by lack of rain and excessive heat during July and August.

Although U.S. farmers harvested the fourth-largest corn crop ever in 2011, the bushels per acre planted didn't quite measure up. Missouri's average corn yields dropped to 115 bushels per acre, compared to last year's 123

bushels, according to November crop reports from the USDA. Soybean yields received a similar hit, falling 4.5 bushels from last year's average of 41.5 bushels per acre. National averages told a similar story, with corn yields falling 6.1 bushels from 2010 and soybeans continuing the downward march to 2.2 bushels per acre lower.

"Missouri has more than 5 million acres of soybeans, so even though those 4 bushels per acre doesn't sound like much, it adds up to about \$300 million in lost value this year," said Mike Collins, director of plant sciences with MU's College of Agriculture, Food and Natural Resources.

This shortfall hinted at the difference subsoil moisture can make. Crops depend on subsoil moisture, especially during hot, dry periods from June to August. When rain stopped falling in June, corn felt drought stress during critical silking periods, ears struggled to fill out fully and some soybeans in their pods looked more like BB's than beans.

Crop farmers weren't the only ones affected by the heat and drought. Cattle farmers saw pastures dry up early, forcing many to start feeding hay far earlier than normal.

Winter rain and snow can recharge the soil, building up its bank of available moisture. However, this winter's moisture will probably only mask problems that will trouble crops next summer.

"I expect to see next year's crops be more dependent on current rainfall," Collins said. "If we don't get timely rain, I think we'll see crops shut down much quicker than we did this year." Δ