

Without soil data, crop insurance pricing is a bust

March 16 2016, by Matt Hayes

Farmers depend on insurance to cope with the enormous risk and cost it takes to coax crops from the ground. Unpredictable weather and rampaging pests all figure into the insurance rates farmers pay for economic protection, but there's one crucial aspect that insurance doesn't account for: the quality of the soil farmers depend on for almost everything they do.

First authorized by Congress in the 1930s to protect farmers ravaged by the Dust Bowl and Great Depression, Federal Crop Insurance from the U.S. Department of Agriculture (USDA) is today the cornerstone program to combat agricultural risk, says Joshua Woodard, assistant professor in the Dyson School of Applied Economics and Management in Cornell's College of Agriculture and Life Sciences and founder of [Ag-Analytics.Org](#).

But, Woodard says, by not integrating [soil](#) data into the calculations that determine [insurance](#) premium costs, the federal agency's rates are rife with errors that lead to inefficiencies.

Farm-level insurance analyses conducted by Woodard determined that soil type has a significant impact on crop yield risk not reflected in the ratings the USDA uses to determine premiums. By not capturing soil quality, the government's actuarial models are imprecise and inefficient, he argues in a [series of papers facilitated under the AGree Initiative](#).

"We developed the needed models to integrate this information and

found that the pricing differentials caused by the government's failure to handle soil information leads to large errors," he says. "This is quite a glaring gap for the U.S. government agency charged with administering an otherwise very useful and critical policy. The soil data we used could easily and feasibly be scaled nationally."

Priced, regulated and administered by the USDA, the program is of utmost importance to domestic agricultural policy, Woodard says. But he argues the USDA's lumbering rating system has not kept pace with technological innovations.

The effective deployment of big data could make [crop insurance](#) more efficient if the government used extant soil information in pricing, Woodard argues. Since 2009, the USDA's Risk Management Agency has collected field boundaries associated with each policy. By matching that insurance information with precise soil data, he says actuaries could develop precise soil-specific rates associated with the land under each policy. The agency has demurred in sharing that information with researchers partly out of privacy concerns, he says. But researchers cannot put forward operational program modification proposals without having access to those data.

"The big data revolution has led to an increased interest in exploring opportunities to employ high-resolution data in large-scale policy applications to improve sustainability of the agricultural system, which previously were impractical or impossible," he says.

The ability to condition rates on soil information potentially would lead to greater program efficiencies, predictable underwriting returns, taxpayer savings and better environmental outcomes, according to Woodard.

"Federal Crop Insurance as a policy has made many inroads into helping

farmers manage risk, and it is well-accepted that such markets would likely not exist in the absence of government support due to systemic risk; however, the government arguably should not be in charge of actually setting premiums for the program," he says.

Provided by Cornell University

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