

New models better predict field working days

January 29 2016



Wet spring conditions make planting difficult. New models developed by U of I researchers improve prediction of field working days. Credit: Adam Davis

Farmers and crop insurers depend on seasonal predictions of weather and soil workability to select appropriate cultivars, make decisions about

planting and harvest dates, forecast yield, and determine risk. However, climate change-induced weather variability is making it harder to predict workable conditions for crop production systems. University of Illinois researchers developed new models that improve the ability to forecast field working days, even under changing climatic conditions.

"On any given day, a farmer is going to know very precisely whether the soil is going to be workable," says U of I ecologist Adam Davis. "What we're trying to do is take that 'farmer sense' and convert it into something measurable and predictable."

Field working day prediction models are primarily useful in risk assessment.

"These models examine the relationship between management timing and factors such as changing climate, machinery selection, or simply year-to-year weather variability. An unbiased model is required to appropriately quantify these risks."

One of the models, which was based on 52 years of Illinois soil moisture data and weekly field working day data, eliminated systematic prediction biases at the state level and significantly reduced them at the crop reporting district level. This [model](#) could be applied to regions outside Illinois, since USDA working day reports are available for most other states.

The errors that existed in earlier field working day predictions occurred most frequently in April and May, an interval that previous predictions suggested would be favorable for planting. In recent years, however, April and May have been substantially wetter compared with the 30-year average.

"Going forward, if there are going to be more really wet days in mid-

April through mid-May, that's going to greatly reduce the chances of timely corn planting. If you reduce the chance of timely planting, you're suddenly looking at more of an overlap between the anthesis-silking interval of corn and drought periods in the summer," Davis notes.

Climate models predict warmer, wetter springs and drier, hotter summers. Since publishing this study, the team has integrated future climate scenarios like these into their field working day models. This will eventually allow them to make more specific recommendations to Illinois farmers, extension specialists, and risk managers.

More information: Bradley J. Tomasek et al. Optimization of Agricultural Field Workability Predictions for Improved Risk Management, *Agronomy Journal* (2015). [DOI: 10.2134/agronj14.0393](https://doi.org/10.2134/agronj14.0393)

Provided by University of Illinois at Urbana-Champaign

Citation: New models better predict field working days (2016, January 29) retrieved 19 April 2024 from <https://phys.org/news/2016-01-field-days.html>

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