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Going beyond the plot: Accelerating innovation in agriculture

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Ensuring adequate food production in systems that protect environmental quality and conserve natural resources requires acceleration in the rate of crop yield gains on existing farmland. Meeting this challenge will be difficult without a robust spatial framework that facilitates rapid evaluation and adoption of currently available and emerging technologies. We present here a global spatial framework to delineate 'technology extrapolation domains' (TED) based on key climate and soil factors that govern crop yields and yield stability in rain fed crop production. The TED framework was robust at capturing major spatial trends in crop yield and variability as evaluated for the data-rich US Corn Belt region. Three applications of the TED framework were described. First, we showed how the TED framework can be used for ex-ante and ex-post evaluation of testing sites for agricultural technologies. Second, we showed how the TED framework can be applied to contextualized farmer survey data and identify causes of yield gaps, using soybean in the North-Central USA region as a study case. Finally, the spatial framework was shown to facilitate comparison of cropping system across regions with analog climate and soil, providing a foundation to explore opportunities to modify current crop sequences. Results highlights that the proposed spatial framework has potential to amplify the return on investments in agricultural research and development and contribute to research prioritization and impact assessment.