Climate Change Impacts Agroexplorer

About

This website is produced by the Applied Hydroclimatology Group at Dartmouth College. The tool is designed to allow users to explore a variety of possible climate futures with respect to agricultural production and adaptation. Crop yield data were generated using the SIMPLE crop model (Zhao et al., 2019). The model incorporates the effects of temperature (low and high extremes), drought stress, and atmospheric CO_2 concentration on crop yields.

Variables

View - Visualize crop or climate variables
Time Period - Years averaged: mid-century (2035-2064), end-of-century (2070-2099)
Climate Model - Global climate model used to create temperature and precipitation projections
Emissions Pathway - Anthropogenic greenhouse gas emissions scenario
Crop Variable - Measures of agricultural production and management
Planting Date - Day the crop is sown in spring
Time to Maturity - Amount of time needed for crop maturation
Heat Tolerance - Ability of crops to grow despite high maximum temperatures
Irrigation - Spatial extent of supplemental water applied to crop
Climate Variable - Measures of climate

Data Sources

Climate data were sourced from Daymet Version 4 (Thornton et al., 2020) and future climate was calculated using projections from five Coupled Model Intercomparison Project Phase 6 (CMIP6) global climate models meant to sample a range of future climates (warm and wet, warm and dry, hot and wet, hot and dry, average), under moderate and high greenhouse gas emissions scenarios (Shared Socioeconomic Pathways 245 and 585). Soils data were sourced from the Global Soil Dataset for Earth System Modeling (Shangguan et al., 2014).

References

Shangguan, W., Dai, Y., Duan, Q., Liu, B. and Yuan, H., 2014. A Global Soil Data Set for Earth System Modeling. *Journal of Advances in Modeling Earth Systems*, 6: 249-263.

Thornton, M.M., R. Shrestha, Y. Wei, P.E. Thornton, S. Kao, and B.E. Wilson. 2020. Daymet: Daily Surface Weather Data on a 1-km Grid for North America, Version 4. ORNL DAAC, Oak Ridge, Tennessee, USA. https://doi.org/10.3334/ORNLDAAC/1840.

Zhao, C., Liu, B., Xiao, L., Hoogenboom, G., Boote, K.J., Kassie, B.T., Pavan, W., Shelia, V., Kim, K.S., Hernandez-Ochoa, I.M. and Wallach, D., 2019. A SIMPLE crop model. *European Journal of Agronomy*, 104: 97-106.