

# Analysis of Temporal Stability of Soil Moisture in a Long-Term Agroecological Research Experiment



Tuesday, November 12, 2019



3:30 AM - 5:30 AM



*Henry B. Gonzalez Convention Center - Exhibit Hall 1 (1st Level)*

## Abstract

Long-term ecological experiments offer a great opportunity to conduct a more exhaustive evaluation of soil moisture dynamics. The objective of this study is to evaluate the climate-resilience of different rainfed agro-ecosystems e.g., conventional row crop (i.e., corn, soybean, wheat in rotation), no-till row crop, low-input row crop, biologically-based row crop, poplar trees, alfalfa, native early successional community, no-till grass, coniferous forest, deciduous forest, and mid-successional forest. These systems were established under a long-term ecological experiment in the temperate and humid climate of Michigan. We hypothesized that an agro-ecosystem has a higher degree of resilience if it can maintain a level of soil moisture that is above average with lower variability, especially during dry years. To perform the temporal stability analysis, we used gravimetric soil moisture data (0-25 cm) collected in the growing season on a bi-weekly basis (April to November) from 1989-2017. Long-term growing season rainfall was used to categorize dry, normal and wet years that were used thereafter in the categorical analysis of temporal stability. Results suggest that the no-till row cropping system has the highest level of above-average soil moisture during all the dry years, which highlights that agro-ecosystem's resilience to climate variability and change. Annual cropping systems maintain a higher level of above-average soil moisture than perennial systems, especially during dry years. This response may be associated with the differences in the canopy, root characteristics, soil health, and soil structure associated with annual cropping systems. Precipitation is the key variable controlling near-surface soil moisture dynamics in rainfed agro-ecosystems.

## authors

**Eeswaran Rasu**

Michigan State University

Amor V.M. Ines

Michigan State University

## Abstract Citation

---

Rasu, E., & Ines, A. V. M. (2019) Analysis of Temporal Stability of Soil Moisture in a Long-Term Agroecological Research Experiment [Abstract]. ASA, CSSA and SSSA International Annual Meetings (2019), San Antonio, TX. <https://scisoc.confex.com/scisoc/2019am/meetingapp.cgi/Paper/118753>

---

## View Related

---