Fig. S1



Relation between volumetric water content (VWC) and daily temperature range (DTR) along irrigation practices at 0 cm and 15 cm soil depth. The data points are scaled and normalized to minimize the noise.

Fig. S2

A graph of different types of nitrogen

Description automatically generated

Relationship between (a) Total nitrogen and soil organic matter content along the management practices, crop residue and fertilization (b) total phosphorus and organic matter content across management practices, tillage and irrigation. None-Low indicates zero to small amount of residue added and Medium-High indicates medium to high amount of residue was added. The regression lines were generated from the predicted values of mixed effect model, estimated through post hoc analysis.

Fig. S3

**A diagram of a number of different colored dots

Description automatically generated**

Principal component analysis (PCA) biplot showing the availability of different elemental nutrients. The PCA scores are group by residue and no till management practices. The shape of the dots indicates different tillage management and color indicates residue retention levels. PC1 and PC2 explain about 60% of the variation in the nutrient data.

Fig. S4

A diagram of water content

Description automatically generated

Relationship between microbial biomass carbon estimated using chloroform fumigation extraction technique and soil moisture content for agricultural systems across tillage and residue management practices. None-Low indicates zero to small amount of residue added and Medium-High indicates medium to high amount of residue was added. The shapes of the dots indicate tillage methods while the colors of the dot indicate residue retention level. The regression lines were generated from the predicted values of mixed effect model, estimated through post hoc analysis.