

Abstract

Armed conflict directly threatens food security by disrupting agricultural production, yet few studies examine how war affects farm-level decision-making. Ukraine supplies approximately 10 percent of global wheat and nearly half of global sunflower oil, so disruptions to its agricultural sector pose significant risks to import-dependent economies.

In this paper, we analyze how armed conflict alters agricultural production decisions in Ukraine. We conducted field visits in 2024 and 2025, collecting ground-truth observations on crop types across 173 fields. We then combine these original field data with multi-source satellite imagery and apply a deep learning model to predict crop types for each 30-meter agricultural plot based on seasonal imagery patterns over a 35-week growing season.

In out-of-sample evaluation, the model correctly predicts crop types in 67 percent of cases on fields entirely excluded from training. We then apply the trained model to a randomly selected 1 percent sample of fields in each Ukrainian oblast for each year from 2016 to 2025, constructing a panel dataset of annual crop composition at the field level that spans the pre-war period, the invasion year, and subsequent war years. We find shifts in crop composition following the onset of the war, with disruption persisting and re-intensifying in subsequent war years.

We further examine whether recurring electricity blackouts, caused by targeted attacks on power infrastructure, affect crop choices and production scale by disrupting irrigation systems, grain storage, and on-farm machinery.