**Date:** February 28, 2024

**Dataset Title:** Data from: Financial incentive programs and farm diversification with cover crops: Assessing opportunities and challenges

**Dataset creators:** Alison Surdoval, Meha Jain, Haoyu Wang, and Jennifer Blesh

**Dataset contact**: jblesh@umich.edu

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**Date coverage:** 2008-2019

**Key points:**

* We tested the relationship between EQIP payments for cover crops and cover crop adoption in Michigan
* Panel fixed effects models shows that EQIP payments were strongly associated with overwintering cover crop presence at the county scale
* Results suggest that shifting more resources to EQIP and related programs would increase the area in cover crops, which are currently planted on a small fraction of cropland in the U.S.

**Research overview:** We conducted a mixed-methods study to understand how financial incentive programs impact transitions to cover cropping in Michigan. Michigan farms span a wide range of soil types, climate conditions, and cropping systems that create opportunities for cover crop adoption in the state. We tested the relationship between Environmental Quality Incentives Program (EQIP) payments for cover crops and cover crop adoption between 2008-2019, as measured by remote sensing. Panel fixed effects regressions showed that EQIP increased winter cover crop presence. Every EQIP dollar for cover crops was associated with a 0.01 hectare increase in winter cover, while each hectare enrolled in an EQIP contract for cover crops was associated with a 0.86 – 0.93 hectare increase in winter cover.

**Methods:** We compiled the following datasets for lower Michigan at the county scale from 2008-2019: area under overwintering cover crops, EQIP payments for cover crops (and all other EQIP payments), area associated with EQIP contracts for cover crops, CRP payments, crop subsidy and insurance payments, and environmental factors that affect cover crop growth (growing degree days (GDD) and precipitation). To quantify the area under successful overwintering cover crops, we produced annual maps at 30 m resolution of the main classes of agricultural landcover that are present from September to April: bare/fallow, winter wheat, alfalfa hay, low biomass cover that represented weedy fallow or unsuccessful cover crops, and high biomass cover that represented successful cover crops (e.g., cereal rye, ryegrass), which obtained appreciable biomass during the overwintering period. For our statistical analyses, we use the overwintering cover crop class as our dependent variable in all regression models. We aggregated these 30 m satellite data to the county scale for each year from 2008-2019. Full details of the project and methods can be found in: Surdoval et al. (forthcoming). Financial incentive programs and farm diversification with cover crops: Assessing opportunities and challenges. Environmental Research Letters.

**Instrument and/or software specifications:** We used the *raster* and *exactextractr* packages in R project software for all data layer creation, calculations, and extraction.

Team RC. R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL <https://www.R-project.org/>. 2021.

Hijmans R. raster: Geographic Data Analysis and Modeling. R package version 3.6-3, <<https://CRAN.R-project.org/package=raster>>. 2022.

Baston D. exactextractr: Fast Extraction from Raster Datasets using Polygons. R package version 0.9.1, <<https://CRAN.R-project.org/package=exactextractr>>. 2022.

**Description of files:** This dataset contains the data file used in: Surdoval et al. 2024. Financial incentive programs and farm diversification with cover crops: Assessing opportunities and challenges. Environmental Research Letters. There is also a corresponding metadata file.

The file “EQIP\_cc data.csv” contains data organized by county and year. These data include the area in overwintering cover crops, EQIP contracted area and payments for cover crops, and other government subsidy and insurance payments. The dataset also includes precipitation and growing degree days.

The corresponding metadata file: “EQIP\_cc data dictionary.csv” provides a detailed description of all variables in the dataset and any abbreviations used.