Online Appendix

A Additional Results Appendix

A.1 Validating BIOCLIM Suitability Scores Predict Species Abundance

In the paper, we use the the BIOCLIM model to generate the sparrow suitability score, and then use it to define treatment and exposure to the eradication of sparrows. This relies on the assumption that the suitability score provides a strong proxy for the abundance of sparrows before the FPC. In other words, we assume that the sparrow suitability score is correlated with baseline population levels of sparrows. We cannot test this assumption holds because we lack any data on sparrow population counts, which is precisely why we use a habitat suitability model in the first place. That being said, the correlation between the reported number of sparrows killed per squared km and the sparrow suitability score (Figure 4a) does provide reassuring suggestive evidence that the suitability score is correlated with another variable that we think is proportional to baseline population levels.

Here we report additional results from a different setting where we do get to observe *both* data on population levels that were collected using a repeated scientific protocol, and use the BIOCLIM model to generate suitability scores. We use data from the Breeding Bird Survey (BBS) in the United States, from 1999 to 2019, where trained individuals travel along pre-determined routes and collect counts on different bird species. We use these counts for different bird species as inputs to the BIOCLIM habitat suitability model and generate suitability scores. To avoid a mechanical relationship between the population data and the suitability scores we exclude one state at a time, and generate suitability scores for each of the bird species using only data from outside of that state. We repeat this process for all the lower 48 states in the United States, and each of the 518 bird species in the BBS data. Because different species might have different magnitudes of abundance, we construct

z-scores for each bird species using the data from all the counties in the contiguous United States.

The standardized measures of bird population levels are strongly correlated with the out-of-sample BIOCLIM suitability scores we generate. In Figure A1, we use a local polynomial regression to summarize the relationship between BBS mean bird counts (standardized across species), and the BIOCLIM suitability scores for 3,108 counties and 518 bird species. There is a clear positive relationship where higher suitability scores are correlated with higher mean population levels. We observe this correlation for all bird species, for only the nine species in the Passer genus, to which the house sparrow belongs to, and when we focus solely on the house sparrow species.

We interpret this as strong support for the assumption that suitability scores from the BIOCLIM model provide a proxy for baseline population levels. These patterns hold even if we assume that missing county-species values are capturing true zero values for the mean population count. When we assume those are true zeros, we observe a sharp increase in mean bird counts as suitability scores increase from zero to non-zero values, and then a tapering of the correlation.

We further demonstrate that the relationship between the BIOCLIM suitability scores and abundance is not only strongly correlated, but also precisely estimated. In Table A1, we report estimation results for a regression of the standardized abundance on either the continuous suitability scores, or different quantiles of it. We cluster the standard errors at both the county and species levels. For the quantiles, we calculate them for the cases of a non-zero suitability score. This makes the omitted category in each regression the same: suitability scores of zero. The coefficients point to the same fundamental result: Higher suitability scores are precisely and meaningfully correlated with higher standardized abundance values.

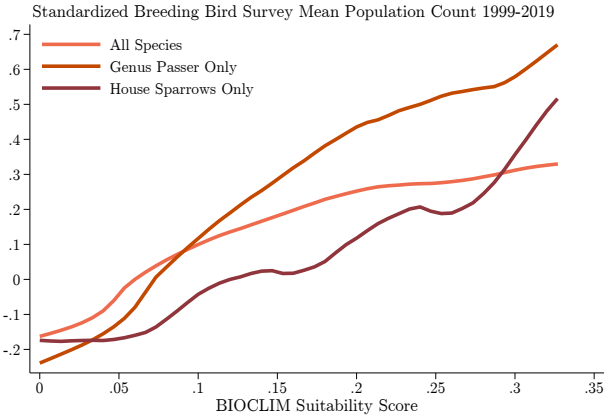
Table A1
Regression Results for the Breeding
Bird Survey & BIOCLIM Validation Exercise

	All Bird Species ($n = 518$)			Passer Genus Only ($n = 9$)		
	(1)	(2)	(3)	(4)	(5)	(6)
CSS	4.36***			5.29***		
	(0.22)			(1.04)		
Tercile (1)		0.21***			0.12	
		(0.01)			(0.06)	
Tercile (2)		0.59***			0.59***	
		(0.02)			(0.10)	
Tercile (3)		0.97***			1.04***	
		(0.03)			(0.13)	
Quintile (1)			0.15***			0.05
			(0.01)			(0.06)
Quintile (2)			0.34***			0.30**
			(0.02)			(0.09)
Quintile (3)			0.60***			0.58***
			(0.03)			(0.09)
Quintile (4)			0.85***			0.85***
			(0.03)			(0.11)
Quintile (5)			1.05***			1.18***
			(0.04)			(0.15)
R^2	0.083	0.106	0.109	0.196	0.219	0.225
N	1,596,360	1,596,360	1,596,360	27,594	27,594	27,594

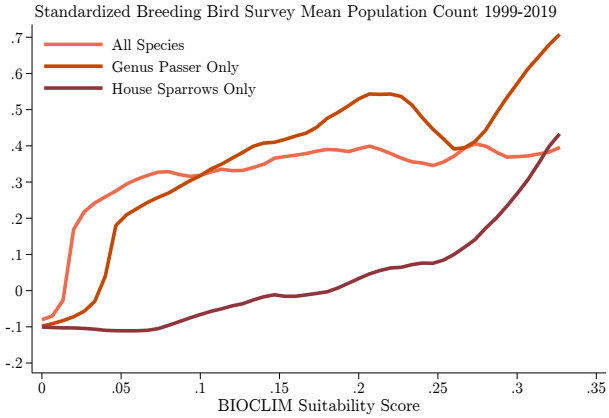
Notes: Estimation results for a regression of the standarized abundance data on either the continuous suitability score, or quantiles of the suitability score (using the out-of-sample suitability score). We winsorize the suitability score at the 99th percentile. Each regression includes county and species fixed effects. Standard errors are twoway clustered at the county and species level. Columns 1 to 3 include all bird species in the sample, and columns 4 to 6 only include species in the Passer genus, to which the house sparrow belongs to. The sample contains all counties in the contiguous United States.
* 0.10 ** 0.05 *** 0.01

Figure A1: Correlation of Bird Population Counts & BIOCLIM Suitability Scores

(a) Not Assuming Missing Values Are Zeros



(b) Assuming Missing Values Are Zeros



Notes: Local polynomial regression, averaging 518 bird species, across 3,108 counties in the lower 48 states in the United States. We truncate the suitability score at the 99th percentile. In panel (a), we treat missing values as missing, while in panel (b), we treat them as true zero population counts. While the magnitudes change, the broad pattern of positive correlation between standardized population counts and suitability scores holds. See text for more details.

A.2 Examining Data Reporting & Correlation With Sparrow Suitability

As we mention in the data section of the main text, after we drop large counties from the data, we have 492 out of the 704 counties (70%) that report at least rice or wheat in both 1954 to 1957 and 1958 to 1965. However, most counties fail to report rice or wheat data every year. Here, we examine whether the missing data patterns are correlated with the sparrow suitability score. We reports results for linear probability models where the outcomes are either: (i) non-missing value in year t for rice or wheat, (ii) ever reporting rice or wheat, or (iii) having data for either rice or wheat in both pre- and post-FPC periods. In Table A2, we report results using both the continuous sparrow suitability score and the above-median suitability dummy variable. We find that the timing of missing data is not correlated with sparrow suitability; however, high sparrow suitability counties are less likely to report rice output and are more likely to report wheat output. Finally, we fail to detect any correlation between having non-missing rice or wheat data in both pre- post-FPC periods and sparrow

suitability.

Table A2: Summarizing Rice & Wheat Data Reporting Patterns

Non-Missing	At t				Ever				Pre/Post	
	Rice		Wheat		Rice		Wheat		Rice or Wheat	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Suitability	-0.006		0.109		-0.761		0.529		-0.060	
	(0.211)		(0.181)		(0.186)		(0.186)		(0.178)	
Suitability (H)		0.003		0.015		-0.126		0.098		-0.007
		(0.039)		(0.036)		(0.038)		(0.037)		(0.035)
$\overline{Y}$	0.65	0.65	0.66	0.66	0.51	0.51	0.61	0.61	0.70	0.70
R^2	0.05	0.05	0.04	0.04	0.02	0.02	0.01	0.01	0.00	0.00
N	4,272	4,272	5,184	5,184	704	704	704	704	704	704
Clusters	356	356	432	432	704	704	704	704	704	704

Notes: Estimation results for linear probability models as a function of sparrow suitability (continuous score of above-median score). In columns 1 to 4, the outcome is whether the crop (rice or wheat) is not missing in a specific year. In columns 5 to 8, the outcome is whether the county ever has a non-missing value. In columns 9 and 10, the outcome is whether the county has non-missing data for rice *or* wheat in the pre- *and* post-FPC periods (during 1954-1957 and 1958-1965).

A.3 Examining Correlations Between Crop & Sparrow Suitabilities

In the main text, we describe how our research design compares sparrow suitable to unsuitable places using the sparrow suitability score we derive from the BIOCLIM model. Because the BIOCLIM model relies on environmental conditions that could also predict crop suitability, there is a concern that the sparrow suitability is highly correlated with, for example, rice and wheat suitability. If that is the case, then our analysis might simply capture that the more agriculturally productive regions were also those that had high sparrow suitability. If the sparrow eradication had no effect on the decline in agricultural production, then our results might be due to the correlation between sparrow and crop suitability.

To address this concern in the main analysis, we report results that control for rice and wheat suitabilities that we interact with a linear time trend. This effectively allows counties with higher or lower baseline crop suitabilities to experience different evolution of agricultural production that might be unrelated to the eradication of sparrows. In those regressions, inclusion of those controls does not meaningfully change the results. Here we provide additional analysis that documents that sparrow suitability and crop suitabilities are far from being perfectly correlated.

We use FAO GAEZ data on the crop suitability for rice, wheat, sweet potato, and all crops measured per county, and find no meaningful correlation in the data. In Figure A2, we plot four scatter plots for the four crop suitability score and sparrow suitability. Overall, there is no clear pattern that suggests a systematic relationship between crop and sparrow suitabilities. Even in cases where the linear fit exhibits a positive slope, it is driven by outlier observations in places with very high sparrow suitability. In Section A.12, we verify that the results in the main text hold even when we exclude outlier values from the sample.

In addition to the scatter plots in Figure A2, we also run a regression where the outcome is either the sparrow suitability, or one of the crop suitabilities. We regress each suitability score on a set of different weather variables such as evaporation, precipitation, available sunlight, temperature, and wind speed, all at the monthly level, as well as the share of specific soil types.[25] In Table A3, we report only the coefficients that are precisely estimated to be an important predictor for sparrow suitability.

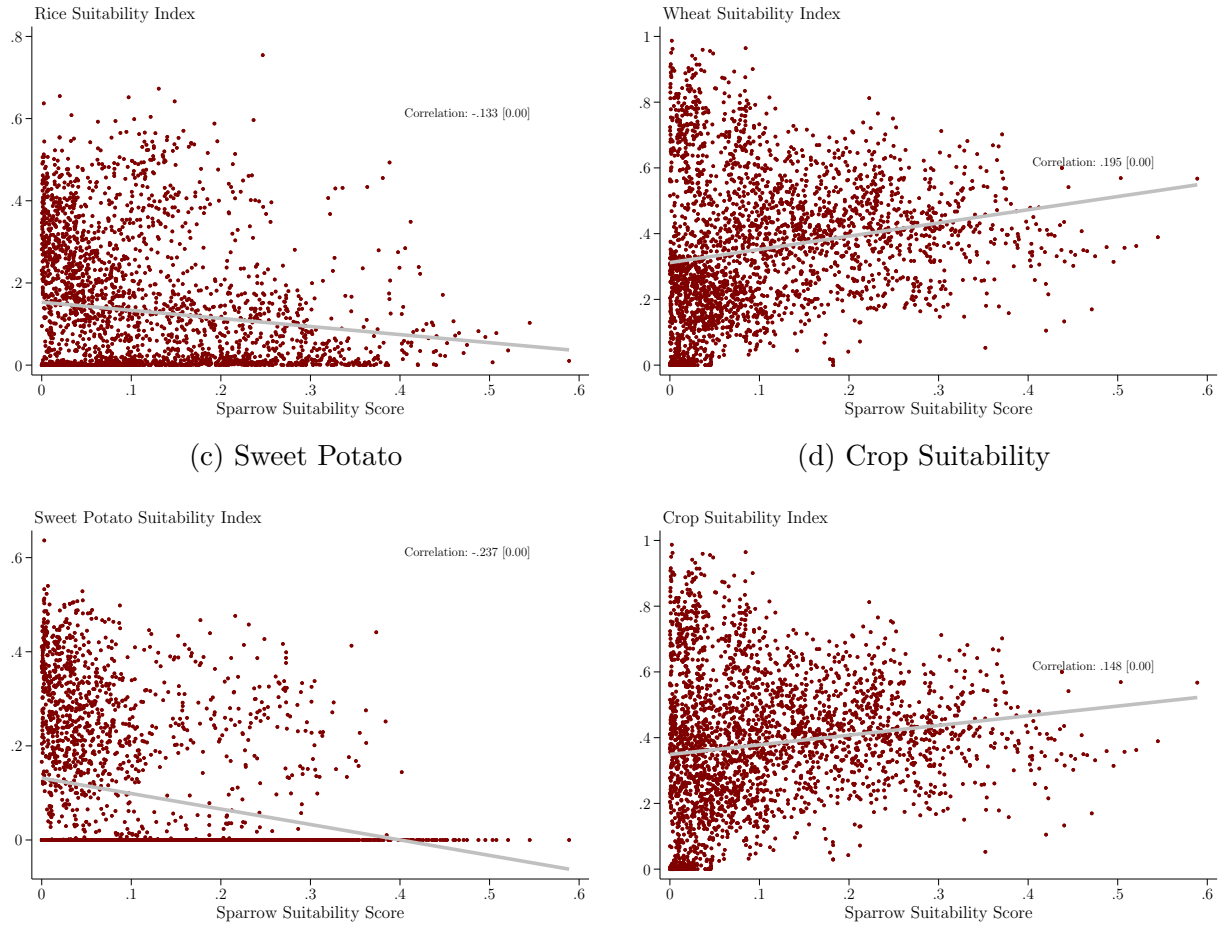
The key takeaway from this analysis, is that many of the environmental predictors of sparrow suitability fail to predict crop suitability. Some variables are important for sparrow suitability and the different crop suitabilities, however, the results do not demonstrate that the same set of environmental variables equally predict all the suitability scores. We conclude

[25] CLp and PDj are variables that capture the share of soil types "Petric Calcisols" and "Stagnic Podzoluvisols," respectively. Petric Calcisol soils have a high calcium concentration, and are considered relatively fertile. Stagnic Podzoluvisols soils have a relatively low nutrient concentration, and are considered to be mostly suitable for livestock grazing. They can be used to grow crops, but often require fertilizer inputs.

Figure A2: County-Level Correlations Between Sparrow and Crop Suitability

(a) Rice

(b) Wheat



(c) Sweet Potato

(d) Crop Suitability

Notes: This figure plots the correlation between sparrow suitability and crop suitability scores at the county level. Panel (a) reports rice suitability, Panel (b) reports wheat suitability, Panel (c) plots sweet potato suitability, and Panel (d) plots the overall crop suitability score.

that there is no strong support in the data for the notion that we are misinterpreting the effect of larger declines in counties with higher crop suitability as the effect of larger reductions in sparrows in more suitable counties.

Table A3: Determinants of Suitability (Only Sparrow Significant Predictors)

	(1)	(2)	(3)	(4)	(5)
	Sparrow	Crop	Rice	Wheat	Sweet Potato
	b/se	b/se	b/se	b/se	b/se
CLp Ratio	1.760*	0.341	0.517	0.661	-0.839
	(1.030)	(1.293)	(0.856)	(1.252)	(0.871)
PDj Ratio	-40.98*	-26.94	38.84*	-37.37	-17.30
	(21.409)	(30.535)	(20.229)	(29.564)	(20.575)
Evaporation M2	-0.0891***	0.0383	0.121***	0.0418	0.0212
	(0.022)	(0.032)	(0.021)	(0.031)	(0.021)
Evaporation M4	0.0680***	-0.0390	0.0485***	-0.0361	0.0659***
	(0.018)	(0.026)	(0.017)	(0.025)	(0.017)
Evaporation M5	-0.0555***	0.00526	0.00476	0.00374	-0.0194
	(0.015)	(0.021)	(0.014)	(0.021)	(0.014)
Evaporation M6	-0.0216**	-0.0106	0.00799	-0.00686	0.0199**
	(0.010)	(0.014)	(0.009)	(0.013)	(0.009)
Evaporation M11	0.175***	0.137***	-0.0944***	0.175***	-0.126***
	(0.036)	(0.051)	(0.034)	(0.050)	(0.035)
Evaporation M12	-0.130***	-0.127**	0.196***	-0.186***	0.251***
	(0.041)	(0.059)	(0.039)	(0.057)	(0.040)
Precipitation M1	-0.0715***	0.00677	-0.0170	-0.00005	0.0312
	(0.025)	(0.035)	(0.023)	(0.034)	(0.024)
Precipitation M2	-0.0898***	0.0538**	0.148***	0.0638**	0.0542***
	(0.019)	(0.026)	(0.017)	(0.026)	(0.018)
Precipitation M3	0.0340***	-0.0528***	-0.106***	-0.0603***	-0.0417***
	(0.012)	(0.016)	(0.011)	(0.016)	(0.011)
Precipitation M4	0.0337***	-0.0260***	-0.00596	-0.0172**	-0.0281***
	(0.006)	(0.008)	(0.005)	(0.008)	(0.005)
Precipitation M5	-0.0113**	0.00735	0.0138***	-0.00632	0.0270***
	(0.006)	(0.008)	(0.005)	(0.008)	(0.005)
Precipitation M7	0.00908***	-0.00776	0.0197***	-0.00855*	0.0108***
	(0.003)	(0.005)	(0.003)	(0.005)	(0.003)
Precipitation M8	-0.00998***	0.00576	-0.00396	0.00337	-0.00157
	(0.003)	(0.004)	(0.003)	(0.004)	(0.003)
Precipitation M9	-0.0101***	-0.0122**	-0.0212***	-0.00744	0.00164
	(0.004)	(0.005)	(0.004)	(0.005)	(0.004)
Precipitation M10	0.0154***	0.0205**	0.00460	0.00598	0.00799
	(0.006)	(0.008)	(0.005)	(0.008)	(0.005)
Precipitation M11	0.0216*	0.0619***	0.0173	0.0382**	0.00744
	(0.012)	(0.017)	(0.011)	(0.016)	(0.011)
Precipitation M12	-0.0785***	-0.00387	0.135***	0.0124	0.0678***
	(0.021)	(0.030)	(0.020)	(0.029)	(0.020)
Sunshine M2	0.0901***	-0.124***	-0.0199	-0.106***	-0.0747***
	(0.016)	(0.023)	(0.015)	(0.022)	(0.015)
Sunshine M3	-0.0822***	0.143***	0.0572***	0.127***	0.0540***
	(0.017)	(0.024)	(0.016)	(0.023)	(0.016)
Sunshine M7	-0.0209*	0.0922***	0.0253**	0.0771***	0.125***
	(0.011)	(0.016)	(0.011)	(0.016)	(0.011)
Temperature M3	-0.0563***	0.0133	0.0107	0.00404	0.0298**
	(0.014)	(0.020)	(0.014)	(0.020)	(0.014)

Temperature M6	0.0234*	0.0582***	-0.0300**	0.0571***	0.0381***
	(0.014)	(0.020)	(0.013)	(0.019)	(0.013)
Temperature M7	0.0617***	-0.142***	-0.00760	-0.113***	-0.133***
	(0.020)	(0.028)	(0.019)	(0.027)	(0.019)
Temperature M8	-0.0594***	0.190***	0.0486***	0.161***	0.132***
	(0.018)	(0.026)	(0.017)	(0.025)	(0.017)
Temperature M10	-0.0527***	0.00810	0.00110	0.0189	0.00998
	(0.015)	(0.021)	(0.014)	(0.020)	(0.014)
Temperature M11	0.0476***	0.00204	0.0326***	-0.00140	-0.000148
	(0.012)	(0.017)	(0.011)	(0.017)	(0.012)
Wind Speed M1	-0.0731***	-0.0500	-0.144***	0.0115	-0.0936***
	(0.023)	(0.033)	(0.022)	(0.032)	(0.022)
Wind Speed M2	0.0642**	0.00832	0.0540**	-0.0503	0.184***
	(0.026)	(0.037)	(0.025)	(0.036)	(0.025)
Wind Speed M3	-0.0600**	0.0141	0.0425*	0.0463	-0.172***
	(0.027)	(0.039)	(0.026)	(0.038)	(0.026)
Wind Speed M4	0.0941***	0.0342	-0.112***	0.0617	-0.0203
	(0.031)	(0.043)	(0.029)	(0.042)	(0.029)
Wind Speed M5	-0.101***	0.0160	0.0596**	-0.0317	0.152***
	(0.031)	(0.045)	(0.030)	(0.043)	(0.030)
Wind Speed M6	0.181***	-0.0323	-0.106***	0.0163	-0.113***
	(0.026)	(0.038)	(0.025)	(0.036)	(0.025)
Wind Speed M7	-0.0970***	0.0855**	0.216***	0.0575*	0.0746***
	(0.024)	(0.035)	(0.023)	(0.034)	(0.023)
Wind Speed M8	0.0562*	-0.104**	-0.182***	-0.102**	-0.0713**
	(0.031)	(0.045)	(0.030)	(0.043)	(0.030)
Wind Speed M9	-0.0619**	-0.118***	0.125***	-0.114***	-0.0143
	(0.031)	(0.044)	(0.029)	(0.043)	(0.030)
Wind Speed M11	-0.164***	0.0991**	-0.0232	0.120***	0.0202
	(0.027)	(0.038)	(0.025)	(0.037)	(0.026)
Wind Speed M12	0.127***	-0.0685	0.105***	-0.105**	-0.0310
	(0.030)	(0.042)	(0.028)	(0.041)	(0.028)
R-squared	0.720	0.856	0.887	0.874	0.866
Obs.	2847	2852	2852	2852	2852

Notes: This table reports coefficient estimates from cross-sectional OLS regressions of various habitat suitability scores on a rich set of environmental covariates. Each column corresponds to a different dependent variable. This table keeps only coefficients that significantly predict sparrow suitability. For full table including all parameters used for the construction of suitability indexes, see: https://drive.google.com/file/d/1hi8uh9MOHRacRfWc2ib9HqHhH5gJ_UxE/view?usp=share_link

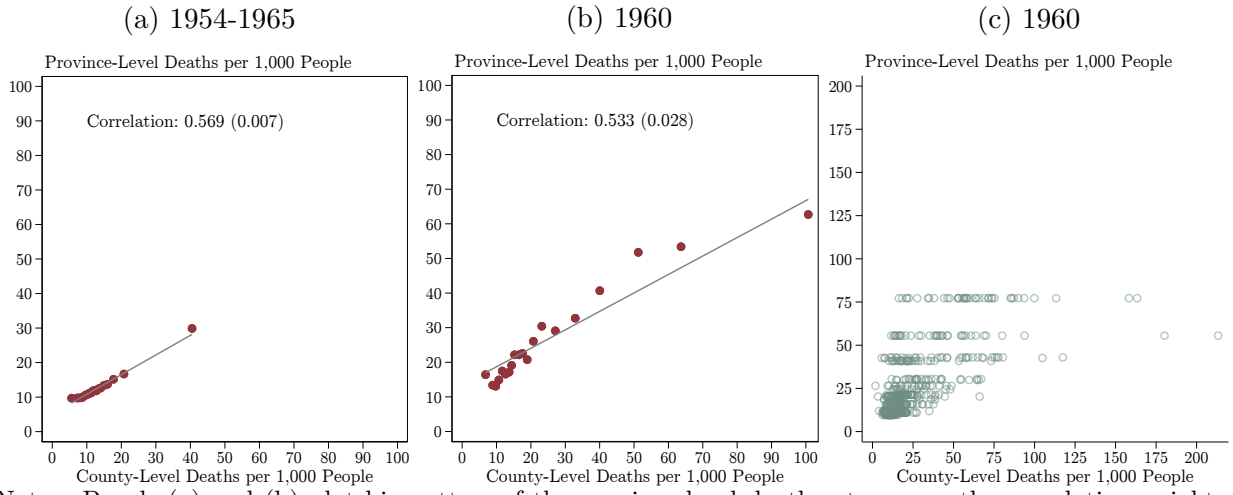
A.4 Examining Correlation Between Province & County Mortality

In the main text, we use recent data sources on mortality at the county level. We report how death rates spiked differentially in sparrow-suitable counties, above the mean increase that occurred during the Great Famine. Previous research studied mortality during this time period using province-level records from the provincial statistics. Here we compare the correlation between the province and county mortality data.

Death rates from the province-level records are highly, but not perfectly, correlated with mean population-weighted death rates that we aggregate from the county level to the province level. The main takeaway from this comparison is that death rates from the two sources are, as we would expect, strongly correlated and there do not appear to be signs of contradictions between the two administrative levels.

In Figure A3, we plot the correlation between the two province-level measures for the full span of the sample, 1945 to 1965, as well as for 1960, the peak year of mortality during the Great Famine (Panels a and b). The correlation are high, 0.569 and 0.533, and are precisely estimated. The two measures are more similar when we calculate the mean over the 1954-1965 period, but they diverge more from each other when we focus on 1960. In 1960, on average, death rates from province-level records are higher than the population-weighted mean aggregated from the county-level records. The difference is larger when the death rate from the county records is higher. For completeness, we also plot the scatter plot of province-level death rates against the individual county-level death rates (in 1960) in Panel (c). In this plot, each line of dots reflects a single province-level death rate and the dots on the line are the county-level death rates. The conversion from Panel (c) to (b) also applies population weights to obtain the province-level death rates from aggregating the county-level death rates.

Figure A3: Summarizing Correlations Between Province & County Mortality



Notes: Panels (a) and (b) plot binscatters of the province-level death rate versus the population-weighted means of county-level death rates that we aggregate to the province level, for the period of 1954-1965, and 1960 only. Panel (c) plots the full distribution of province death rates versus county death rates in 1960. Correlation numbers report the slope and standard error from a regression of province-level on county-level death rates (with no fixed effects or adjustment to standard errors).

A.5 National Trends in Grain Production & Pesticide Use

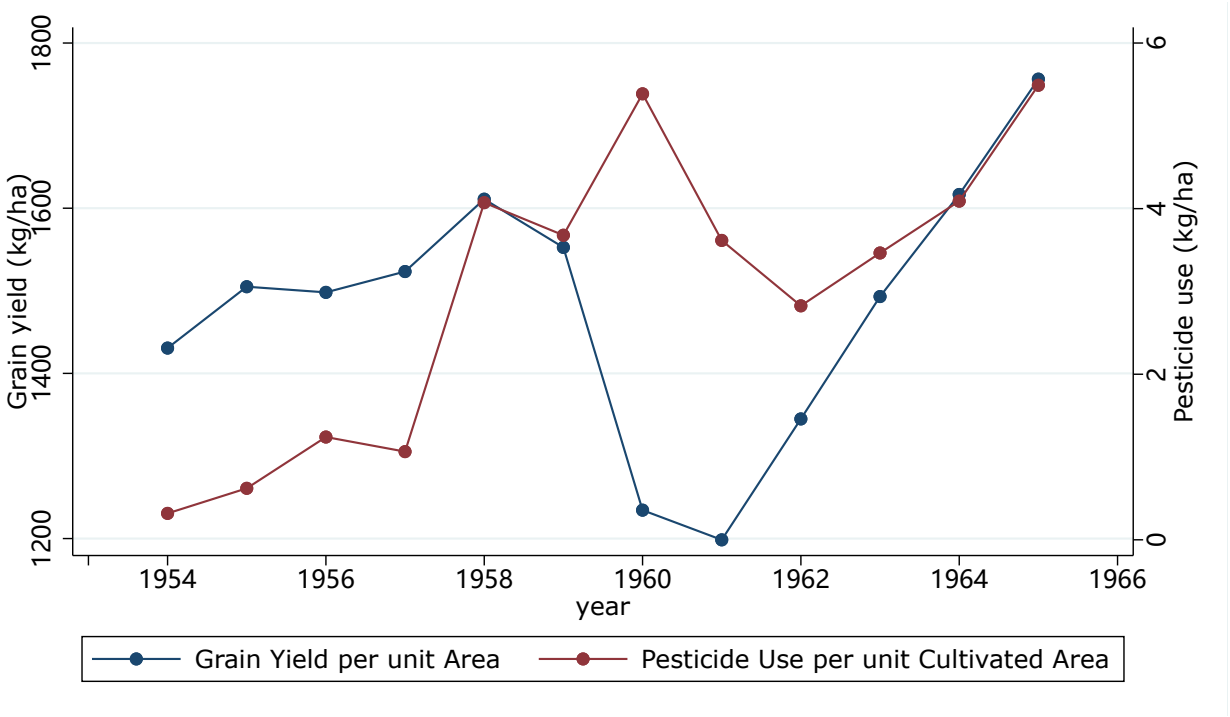
In the main text, we report how grain production and mortality were evolving around 1958 (see Figure 3. Here we report how pesticide use was evolving around 1958. In Figure A4, we plot the aggregated time series for total grain yield, as well as total pesticide use, also normalized by cultivated area. Using the total grain amount, from the provincial records, offers a comparison to the more detailed wheat and grain data from the county gazetteers. It also provides a point of reference for the pesticide use time series.

During these years, pesticide inputs were allocated as part of the central planning process, and not through a market. This means that if farmers experienced a sharp change in pest pressure they could not respond immediately by increasing their pesticide use.

The key takeaway from comparing grain yields and pesticide use over time is that we do not see a pesticide use responding to the sharp decline in yields. We observe the decline in agricultural production, where grain yields dropped from a level of close 160 kg/ha to 120 kg/ha. From 1958 to 1961—the time period when we report the largest differences in agricultural production and mortality between sparrow suitable and unsuitable counties—we

do not observe overall pesticide use increasing. This could be because the supply of pesticides was severely constrained or that the central government was unaware of the report of higher pest pressure. After 1961, the peak year of the Great Famine, we observe nearly a doubling in the amount of pesticide use, from 3 kg/ha to close to 6 kg/ha by 1965.

Figure A4: National Trends in Agricultural Production & Pesticide Use



(a) National Trend: Grain Yield and Pesticide Use

Notes: This figure plots China's aggregate grain yield per unit area and chemical pesticide usage per unit area from 1954 to 1965. The solid line (left axis) shows grain yield (kilograms of grain produced per hectare of cultivated land), and the dashed line (right axis) shows total pesticide application (kilograms of active ingredients per hectare of cultivated land). Both series are normalized by cultivated area to account for changes in planted acreage.

A.6 Examining the Scope of Spatial Correlation of the Standard Errors

In the main text, our baseline approach is to always cluster at the unit of observation—the county. While we cluster at the county level to address serial correlation of the standard errors, spatial correlation remains a concern. Here we report that the standard errors are

not sensitive to allowing them to be flexibly correlated using different distance thresholds. We begin by summarizing the centroid distances between neighboring counties. Using the observed distance distribution, we re-estimate the key regressions from the main text while allowing for spatial clustering up to different distance thresholds (Conley 1999).

The distribution of distances between counties is heavily skewed. Most counties (above 90 percent) are within 100 km of each other. In Figures A5a and A5b, we plot the full distribution and the truncated at the 99th percentile value distribution of the distances. These distance distributions suggest that most counties will have their first degree neighbor (their adjacent county) within 50 km, their second degree neighbor within 100 km, and their third degree neighbor within 150 km. Based on these values and their distributions, we evaluate how the precision of the main estimates changes when we allow for spatial clustering up to a threshold of 250 km in increments of 10 km.

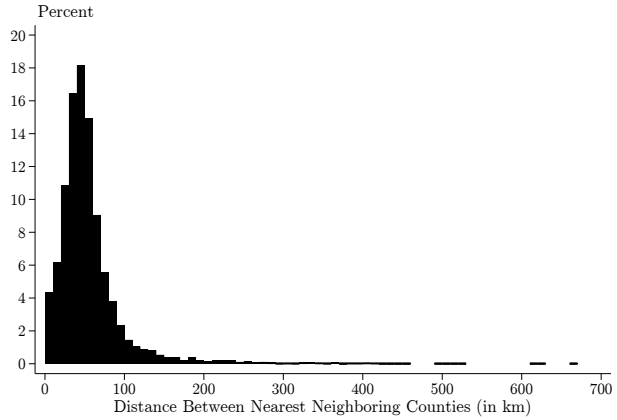
We examine how spatial clustering affects the precision of our estimation for the outcomes of rice and wheat production, sown area, sweet potato production, and the death and birth rates. For each outcome, we use the baseline models (columns 1 and 4, Panels A and B) in Tables 2, 3, and 4. To summarize the changes across six outcomes, two regression specifications (continuous suitability score and high suitability score dummy), and two coefficients per each outcome and specification (one for the 1958-1961 period and one for the 1962-1965 period), we plot the histograms of the relative changes in standard errors and p-values across 24 coefficients when spatially clustering up to 100 km (capturing the nearest neighbors of more than 90 percent of the sample) in Figures A5c and A5d.

More often than not, precision of the coefficients increases when spatially clustering the standard errors. Standard errors are often smaller, with 75.4 percent of them shrinking in value (left of the red-dashed line in Figure A5d. Even though p-values exhibit a larger spread, 71.7 percent of p-values are lower than in the case of no spatial clustering (left of the red-dashed line in Figure A5d.

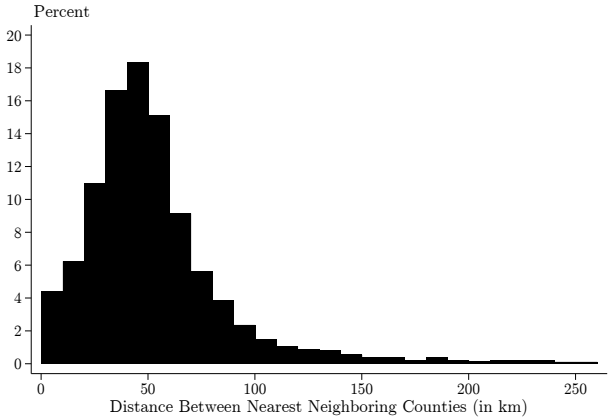
We provide more details about how the precision of each coefficient changes in Figures

Figure A5: Distance Distributions Between Counties & Relative Change to Precision When Spatially Clustering Standard Errors

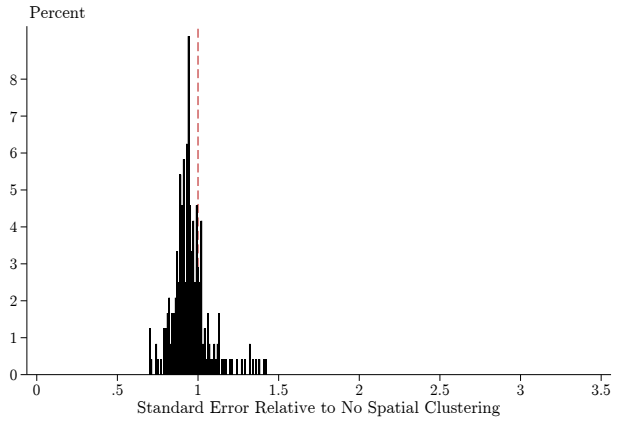
(a) County Distance Distribution



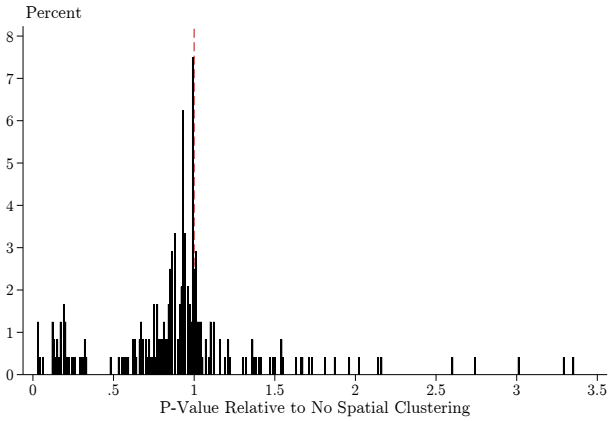
(b) Truncated County Distance Distribution



(c) Changes to Standard Errors



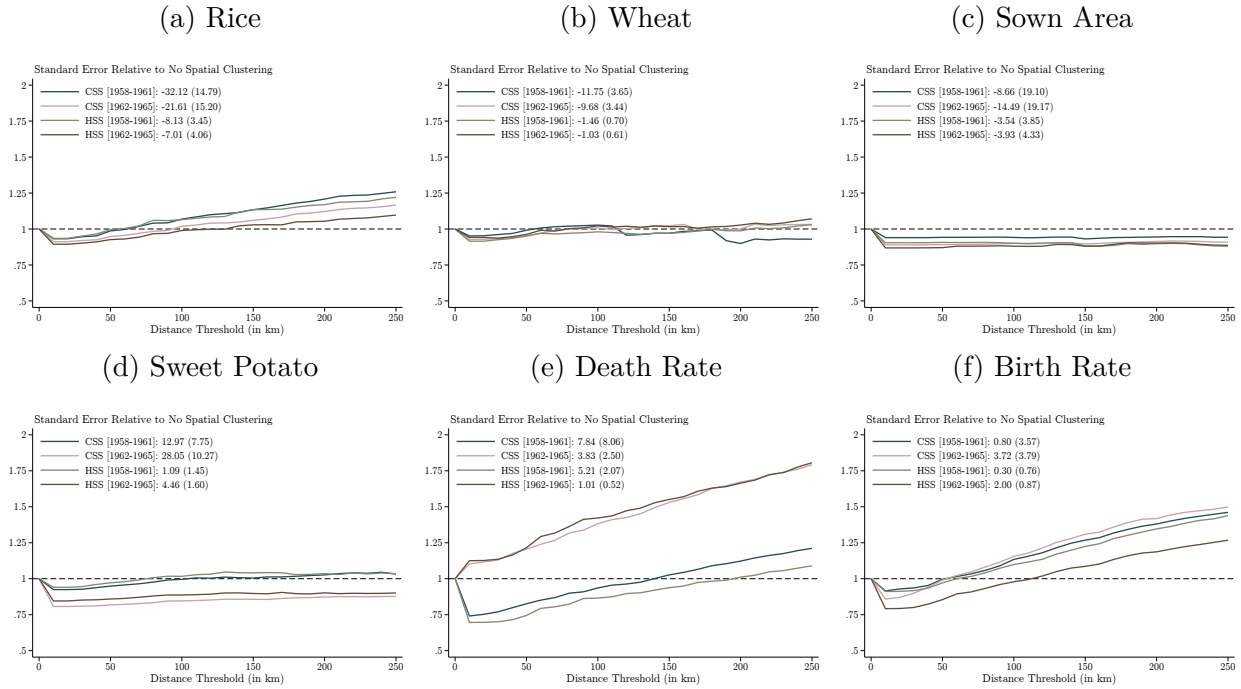
(d) Changes to P-Values



Notes: Panels (a) and (b) plot the distribution of distances between counties and their nearest neighbors. In Panel (a), we plot the distribution for the entire sample, while in Panel (b), we truncate the distribution at the 99th percentile value. In Panel (c), we plot the value distribution of standard errors, across several coefficients, when spatially clustering the standard errors up to 100 km, while normalizing each standard error by the value obtain when not spatially clustering. See text for more details. In Panel (d), we plot a similar distribution as in (c) but for p-values.

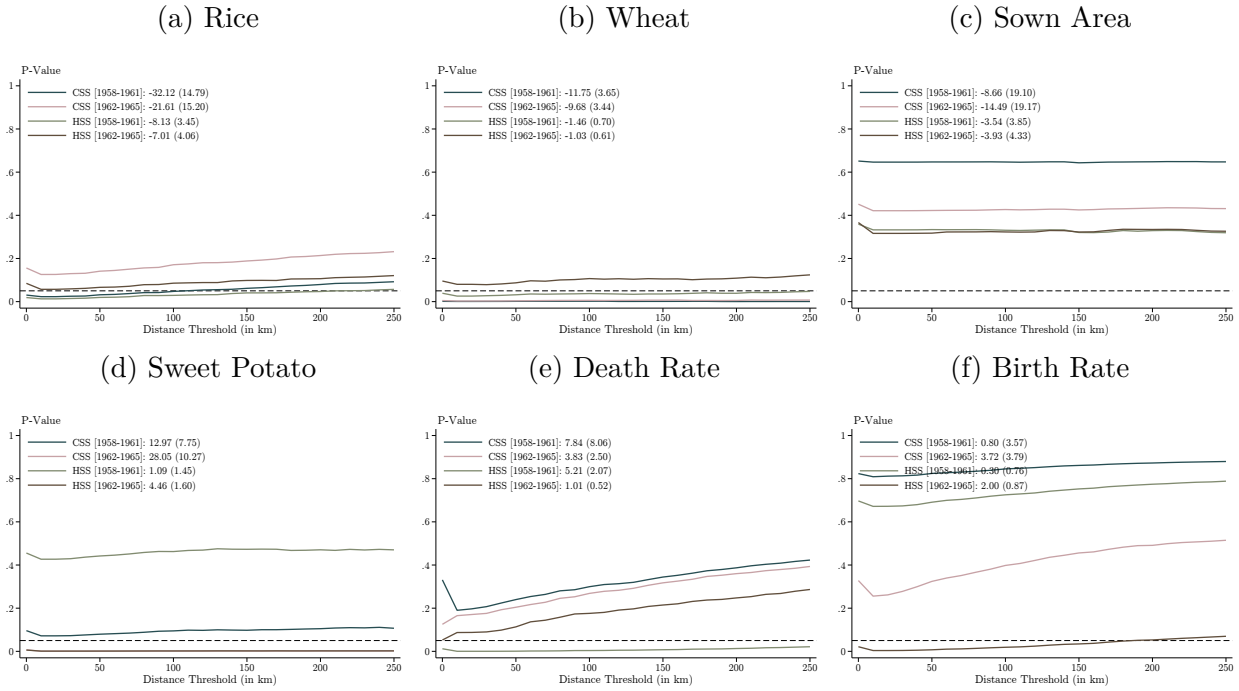
A6 and A7. In general, coefficients that are precisely estimated when we do not spatially cluster the standard errors remain precisely estimated, especially up to distance thresholds of up to 100 km. In Figure A6, we observe that clustering up to distances that allow a county to be spatially correlated with their first and second degree neighbors (see Figure A5a) tends to result in either smaller or roughly equal standard errors. In Figure A7, we report how the spatial clustering at difference thresholds affects the precision by plotting the p-values, instead of the standard error normalized by no spatial clustering. We observe that coefficients where we could reject the null hypothesis of zero difference at a 5 percent significance level remain well below that threshold. In short, spatially clustering the standard errors, especially up to distances that capture reasonable neighboring degrees such as up to 100 km, has little to no impact on the precision of the estimated coefficients.

Figure A6: Changes to Standard Errors When Spatially Clustering at Different Distance Thresholds



Notes: Each panel plots the p-value for each of the outcomes we report in the tables in the main text Each line plots how the standard error of a single coefficient changes when spatially clustering across longer distance thresholds, relative to the baseline of no spatial clustering. For each coefficient, we also report (in the legend) the coefficient's value and standard error from the baseline model.

Figure A7: Changes to P-Values When Spatially Clustering at Different Distance Thresholds



Notes: Each panel plots the p-value for each of the outcomes we report in the tables in the main text. Each line plots how the p-value of a single coefficient changes when spatially clustering across longer distance thresholds. For each coefficient, we also report (in the legend) the coefficient's value and standard error from the baseline model.

A.7 Examining the Correlation Between Climate Change & Sparrow Suitability Score

In constructing the BIOCLIM suitability score, we use bioclimatic data that covers several decades. One concern is that the changes due to climate change are systematically correlated with the suitability score itself. This might bias the calculation of the sparrow suitability score. To examine the scope to which this is a concern, we use geocoded weather station data from the period of 1954 to 1965 (our main sample), and 2010 to 2022. We match each station to the county identifier using the same county borders as we use in the main analysis. In calculating the changes in temperature, we focus on the counties that produce either rice or wheat, as those are the counties in the main sample.

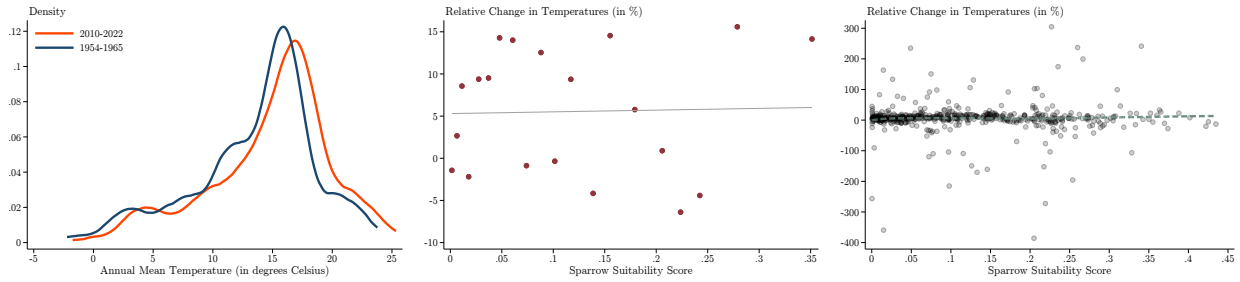
Our descriptive analysis finds that while, on average, counties have experienced a meaningful warming between the two time periods, the change in temperature is not correlated with the sparrow suitability score. In Figure A8a, we plot the kernel densities for the two temperature distributions, in 2010-2022 and 1954-1965. There is a clear shift of the temperature distribution to the right in the latter period, in agreement with climate change trends. In Figures A8b and A8c, we calculate for each county the relative change in temperature and plot it against the sparrow suitability score, truncating the relative temperature change at the 1st and 99th percentile values. Using either approach, we fail to observe a suggestive correlation between the relative change in temperature and the sparrow suitability score. We interpret these descriptive figures as evidence that climate change does not pose a risk of systematically biasing our sparrow suitability score.

A.8 Lotka-Volterra Model for Predator-Prey Dynamics

In the main text, we discuss results from a simulation of predator-prey dynamics where the crop pests are the prey and the different species that provide biological pest control are the predators. To do so, we use simple model that links the two population together: The

Figure A8: Verifying No Correlation Between Climate Change & Sparrow Suitability

(a) Temperature Distributions (b) Binscatter (c) LOWESS Smoother



Notes: Summarizing the changes in temperature distributions between 2010-2022 and 1954-1965 (Panel a), and the lack of systematic correlation between the relative temperature changes in the counties to the calculated sparrow suitability score (Panels b and c).

Lotka-Volterra model.

The mode is governed by two equations that define how the population levels of the predator and prey change over time. The predator benefits from a larger prey population, and goes extinct without any prey to feed on. The prey population constantly grows as it experiences predation pressure. At its most simple form, the model abstracts away from carrying capacities that limit the population levels of each species, but those can be easily integrated into the model. Explicitly, following the notation in Wangersky (1978), the change in prey, x, and predator, y, populations follows the following differential equtions:

$$\frac{dx}{dt} = rx - \alpha xy$$
$$\frac{dy}{dt} = \beta xy - Dy$$

Where the four parameters of the model are: (i) r, the intrinsic growth rate of the crop pests (ii) α, the predation rate of the biological control predators; (iii), β, the conversion parameter from prey to new predators; and (iv) D, the mortality rate of the biological control predators. In equilibrium, the populations are no longer changing. Setting both equations to zero and solving for the non-zero steady state values of x and y yields:

$$x^* = \frac{D}{\beta}$$
$$y^* = \frac{r}{\alpha}$$

In the simulation, we draw values from uniform distributions for the r, α, β, and D parameters on ranges of 1.01-1.1, 0.01-0.075, 0.0025-0.01, 0.025-0.25, respectively. If possible, the choice of parameters should follow either observational data or experimental data. None are available for our specific setting of China, around 1960. Instead, we follow similar choices and values used in other applications of the Lotka-Volterra model (Maurer 1984; Larsen 2012). From each simulation, we normalize the predator and prey populations relative to their steady state values. We multiply the change in the prey population of crop pests by a damage coefficient. For the crop damage coefficient, we draw from a uniform distribution ranging from 10 to 25 percent. We choose these values based on review papers that summarize different losses of agricultural production due to insects (Pimentel et al. 1991; Oerke 2006; Savary et al. 2019). In each iteration, we start from the steady state values that are a function of the four base parameters. We then perturb the system by reducing the predator population level from its steady state value by 1 or 20 percent. For each one percent increment in the magnitude of the shock, we run the simulation 100 times. At the end, we have 2,000 simulation runs that capture different potential values for the population dynamics, crop damage coefficients, and different assumptions about the magnitude of the loss in biological pest control following the eradication of the sparrows.

A.9 Results for Weighted and Unweighted Regressions

In the main text, we report results from unweighted regressions for agricultural production and operations, and results from population-weighted regressions for demographic outcomes. Each choice is sensible for the specific outcome. There is no clear reason to use population

weights for rice production, the amount of sown land, the procurement rate, etc. Similarly, when using outcomes of birth rates and death rates, and unweighted regression is highly sensitive to noise and unstable rates that can originate from counties with small population levels. The challenge remains of how to interpret the two sets of results, unweighted and weighted. Our approach effectively treats the two sets of results as separate empirical exercises that allow us to establish key facts that link the eradication of sparrows to the conditions that gave rise to the Great Famine.

For completeness, we report in Tables A4 and A5 versions of the main results in Tables 2 and 4 that switch from unweighted to population weighted for the rice and wheat results, and from population-weighted to unweighted for the death and birth rates.

Qualitatively, we recover the same sign of the effects, and at similar magnitudes. The key differences between the unweighted and population-weighted results are in the precision of the estimates. In the unweighted rice and wheat results, we have precisely estimated declines for rice when using the high suitability score dummy, but not the continuous suitability score, during the 1958-1961 period. In the case of wheat, this pattern reverses. We recover precisely estimated declines using the continuous suitability score but not the high suitability dummy during the 1958-1961 period. Because weighting agricultural production by population does not have a clear interpretation, we focus on the fact that the signs are negative—rice and wheat production declined in sparrow suitable counties during the FPC—and of similar magnitudes as in the unweighted regressions. In other words, the population-weighted results do not contradict the findings in the unweighted analysis.

For death rates and birth rates, we continue to observe higher mortality but lower fertility in the sparrow suitable counties during the 1958-1961 period. However, for that time period, the results are only precisely estimated in the case of the high suitability dummy. As in the case of the rice and wheat population-weighted regression, we recover the same signs and similar magnitudes in the unweighted demographic outcomes regressions. In other words, even when allowing unstable rates from low population counties to have the same weight as

high population counties, we still observe large increases in mortality, which are as precisely estimated as in the population-weighted regressions.

A.10 Detailed Back-of-the-Envelope Calculations

In the main text, we interpret our estimates in the context of the Great Famine by using the coefficients in a back-of-the-envelope calculation (BOEC). That calculation requires several assumptions that can influence its magnitude. In Tables A6 and A7, we provide additional calculations that rely on different assumptions. Below, we explain the main calculation and alternative specifications in greater detail.

Linking our agricultural and demographic estimates under simple linearity assumptions, we first construct a counterfactual "no-sparrow-shock" scenario for 1959–1961 yields. For each county, we project what rice and wheat output would have been in 1959–1961 by either (i) linearly extrapolating the 1954–1957 trend or (ii) applying the county's average 1954–1957 growth rate to 1958–1961. Summing across all counties gives us counterfactual national rice and wheat totals; subtracting the actual 1959–1961 outputs yields the *total observed shortfall* during the Great Famine.

To isolate the loss attributable specifically to sparrow eradication, we multiply each county's sparrow-suitability score $Suitability_c$ by the corresponding event-study coefficients β_τ for rice (or wheat) during 1959–1961. Weighting by each county's share of total crop production converts $\beta_{59-61} \times Suitability_c$ into *tons of lost output*. Summing over all counties yields approximately Rice $\text{loss}_{\text{sparrow}} = 23{,}169{,}473$ tons, Wheat $\text{loss}_{\text{sparrow}} = 3{,}844{,}525$ tons.

Dividing these estimates by baseline (1954–1957 average) suggests an 8.72% reduction in total crop yield, and dividing by the total observed shortfall shows that sparrow eradication accounts for 19.64% of agricultural loss during the Great Famine.

In parallel, our demographic regressions show that for each county c, the sum of the all-cause-death-rate coefficients during 1959–1961 (δ_{59-61}) times the county's suitability score $Suitability_c$ produces a forecasted *excess death rate* per 1,000 people. Multiplying ($\delta_{59-61}\, Suitability_c$)

Table A4
Effects on Rice and Wheat Output, Weighted by Baseline Population

	Rice Output			Wheat Output		
Panel A. Continous Suitability Score						
	(1)	(2)	(3)	(4)	(5)	(6)
CSS×1958-1961	-29.91	-39.44	-28.35	-10.29**	-11.75**	-10.91**
	(28.62)	(26.61)	(20.31)	(4.58)	(4.63)	(4.61)
CSS×1962-1965	-52.42*	-45.34*	-53.04	-10.17**	-12.21***	-10.57***
	(31.75)	(25.27)	(32.51)	(3.96)	(3.89)	(3.99)
R^2	0.91	0.91	0.91	0.86	0.87	0.87
Dep. Var. Mean	55.28	55.28	55.28	11.41	11.41	11.41
N	2,712	2,712	2,712	3,290	3,290	3,290
Clusters	336	336	336	407	407	407
Panel B. High Suitability Score						
	(1)	(2)	(3)	(4)	(5)	(6)
HSS×1958-1961	-9.29*	-12.45**	-5.57	-1.15	-1.34	-1.27
	(5.59)	(5.44)	(5.07)	(0.87)	(0.93)	(0.88)
HSS×1962-1965	-13.25	-11.76	-13.16	-2.20**	-2.54***	-2.32***
	(8.08)	(7.39)	(8.22)	(0.86)	(0.91)	(0.87)
R^2	0.91	0.91	0.91	0.86	0.87	0.87
Dep. Var. Mean	55.28	55.28	55.28	11.41	11.41	11.41
N	2,712	2,712	2,712	3,290	3,290	3,290
Clusters	336	336	336	407	407	407
Baseline Population-by-Year FE	N	Y	N	N	Y	N
Crop Suitability-by-Year FE	N	N	Y	N	N	Y

Notes: Estimation results from Equation 1 for the main sample spanning 1954 to 1965. This table corresponds to the main analysis of death rates and birth rates (see Table 4 in the paper), but here the regressions are unweighted (each county carries equal weight, instead of weighting by population). Panel A presents results using the continuous sparrow suitability score, and Panel B presents the results using the high-suitability indicator, for the two outcomes: all-cause death rate and birth rate (measured per 1,000 people). Each specification includes county and year fixed effects, with standard errors clustered by county.

Table A5
Effects on Death and Birth Rate, Unweighted

	Death Rate			Birth Rate		
Panel A. Continous Suitability Score						
	(1)	(2)	(3)	(4)	(5)	(6)
CSS×1958-1961	3.18	4.80	0.17	-0.67	-1.99	-1.39
	(6.20)	(6.24)	(5.77)	(3.34)	(3.27)	(3.38)
CSS×1962-1965	4.29**	3.82**	2.61	0.73	0.92	-0.58
	(1.89)	(1.80)	(1.87)	(3.79)	(3.82)	(3.49)
R^2	0.43	0.45	0.47	0.67	0.67	0.69
Dep. Var. Mean	14.62	14.65	14.62	31.68	31.63	31.68
N	3,733	3,699	3,733	3,688	3,654	3,688
Clusters	492	486	492	488	482	488
Panel B. High Suitability Score						
	(1)	(2)	(3)	(4)	(5)	(6)
HSS×1958-1961	4.28***	4.52***	3.36**	-0.30	-0.48	-0.45
	(1.57)	(1.58)	(1.49)	(0.72)	(0.71)	(0.73)
HSS×1962-1965	1.17***	1.13***	0.75*	1.82**	1.83**	1.39*
	(0.39)	(0.38)	(0.39)	(0.77)	(0.78)	(0.71)
R^2	0.44	0.45	0.47	0.67	0.68	0.69
Dep. Var. Mean	14.62	14.65	14.62	31.68	31.63	31.68
N	3,733	3,699	3,733	3,688	3,654	3,688
Clusters	492	486	492	488	482	488
Baseline Population-by-Year FE	N	Y	N	N	Y	N
Crop Suitability-by-Year FE	N	N	Y	N	N	Y

Notes: Estimation results from Equation 1 for the main sample spanning 1954 to 1965. This table reproduces the main rice and wheat output regressions (as in Table 2 of the main text) using population-weighted estimations. Each observation (county-year) is weighted by the county's average population in 1954–1957, to give more influence to more populous counties. Panel A uses the continuous sparrow suitability score as the treatment variable, and Panel B uses the high-suitability dummy (HSS). Within each panel, columns (1)–(3) report results for rice output under different control sets, and columns (4)–(6) report analogous results for wheat output (mirroring the specifications of Table 2). All regressions include county fixed effects and year fixed effects, and standard errors are clustered at the county level.

by the 1960 county population (divided by 1,000) and summing over all counties yields 1,954,169 excess deaths, and 397,368 fewer births. These numbers correspond to 0.307% of the national population and 6.49% of the total Famine-period death count.[26]

Appendix Tables A6 and A7 report "conservative" versus "aggressive" estimates, varying baseline point estimates and functional-form assumptions. For example, in the agricultural calculations, using both the largest and the smallest coefficients from a given regression, we perform calculations under different assumptions: (a) extrapolating pre–Great Famine levels versus trends; (b) including or excluding rice/wheat weights based on their caloric values; and (c) accounting for only the dominant crop in each county versus using the relative share of each crop. Although point estimates for sparrow-induced losses move somewhat across specifications, the fundamental conclusion holds: sparrow eradication was responsible for a substantial fraction of agricultural shortfalls and excess deaths during the Great Famine.

[26] Excess deaths $= \sum_c (\delta_{59-61}\, Suitability_c \times \text{population}_c/1{,}000)$. Analogous calculation for fertility uses fertility-rate coefficients.

Table A6: Back-of-the-Envelope Calculation: Crop

Grain Type	Calculate County Number	Most Aggressive Results			
		Extrapolate by Growth		Linear Extrapolation	
		Weighted by Calorie	Not Weighted	Weighted by Calorie	Not Weighted
Rice	By Percentage	24.12%(12.21%)		24.66%(12.21%)	
	By Dominant Crop	25.94%(13.14%)		26.53%(13.14%)	
Wheat	By Percentage	26.62%(6.52%)		12.26%(6.52%)	
	By Dominant Crop	24.54%(6.01%)		11.30%(6.01%)	
Crop	By Percentage	24.60%(10.81%)	24.57%(10.91%)	21.43%(10.81%)	21.66%(10.91%)
	By Dominant Crop	25.90%(11.38%)	25.90%(11.50%)	22.56%(11.38%)	22.83%(11.50%)

Grain Type	Calculate County Number	Most Conservative Results			
		Extrapolate by Growth		Linear Extrapolation	
		Weighted by Calorie	Not Weighted	Weighted by Calorie	Not Weighted
Rice	By Percentage	14.44%(7.31%)		14.77%(7.31%)	
	By Dominant Crop	15.53%(7.86%)		15.88%(7.86%)	
Wheat	By Percentage	15.07%(3.69%)		6.94%(3.69%)	
	By Dominant Crop	13.89%(3.40%)		6.39%(3.40%)	
Crop	By Percentage	14.61%(6.42%)	14.60%(6.48%)	12.73%(6.42%)	12.87%(6.48%)
	By Dominant Crop	15.40%(6.76%)	15.41%(6.84%)	13.41%(6.76%)	13.58%(6.84%)

Notes: This table shows the back-of-envelope calculation of the effects on crop production caused by sparrow killing. Number in each box represents the ratio of crop loss caused by sparrow killing to the total crop loss during GLF and the number in the parenthesis is the ratio to the baseline total crop production. Calculation Method: Rice(Wheat) loss caused by sparrow killing is calculated by multiplying national average sparrow suitability, number of corresponding counties and the sum of coefficients between 1959 and 1961 together. The total rice(wheat) loss is calculated by either extrapolating output before 1958 linearly or using the average growth rate between 1954 and 1957 as the potential growth rate after 1958. And the baseline total rice(wheat) production is just the average production between 1954 and 1957.

Table A7: Back-of-the-Envelope Calculation: Population

	Index	**Highest Results**	
		Weighted by Population	**Not Weighted**
Population Loss	Ratio to Total Death	6.71%	3.98%
	Ratio to Total Actual Population	.31%	.18%
	Ratio to Total Estimated Population Loss	4.67%	2.77%
	Ratio to Total Estimated Population	.29%	.17%

	Index	**Lowest Results**	
		Weighted by Population	**Not Weighted**
Population Loss	Ratio to Total Death	1.96%	1.83%
	Ratio to Total Actual Population	.09%	.08%
	Ratio to Total Estimated Population Loss	1.36%	1.27%
	Ratio to Total Estimated Population	.08%	.08%

Notes: This table shows the back-of-the-envelope calculation of the effects on population caused by sparrow killing. Provincial population loss caused by sparrow killing is calculated by multiplying the sparrow suitability of each province and the sum of the coefficients between 1959 and 1961, which is weighted by provincial population of each year. Then total population loss is obtained by adding up all the provincial population loss. The estimated population between 1959 and 1961 is calculated by using the average growth rate between 1954 and 1957 as the potential growth rate after 1958. Then the estimated population loss is the difference between estimated population and actual population.

A.11 Comparing Results from Balanced and Unbalanced Panels

In the main text, we report results that use an unbalanced panel. In Table A2, we demonstrate that the timing of the missingness of the data is not correlated with the sparrow suitability score. For completeness, in Table A8, we report annual coefficients for a truncated sample, spanning 1955 to 1962. The shorter sample allows us to retain more units in the balanced sample, while still focusing on the period of interest, 1958-1961. When restricting the sample to use data from only the counties that report the outcome of interest in each year, we leave out about half of the counties in the data. The results remain similar in magnitude and precision, except in the case of sweet potato production, where we no longer have a precisely estimated increase in cultivation and production following 1960 when farmers were allowed to grow them for personal consumption. The sweet potato sample was already about half the size of the sample for rice and wheat (about 400 counties), and balancing the sweet potato data leaves us with only 102 counties—making our analysis of this outcome in the balanced panel likely severely underpowered.

For the population outcomes of mortality and fertility, we similarly lose about half of the counties when we balance the sample, but recover the same pattern of higher death rates and lower birth rates in sparrow suitable counties, especially in 1960. The one notable difference between the unbalanced and balanced results is that when we use the continuous suitability score, the coefficient for the death rate in 1960 is no longer precisely estimated. However, the coefficient for death rate in 1960, when using the high suitability dummy, remains precisely estimated. In short, balancing the data lowers the precision of a small number of coefficients, yet we still recover the same signs and magnitude of the effects.

Table A8
Effects on Agriculture with Balanced Sample

	Rice		Wheat		Sweet Potato		Procurement Rate	
Panel A. Continous Suitability Score								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
CSS×1955	-5.15	16.69	5.28	8.12	-1.07	-5.58	0.03	-0.05
	(24.45)	(21.05)	(5.53)	(5.40)	(6.64)	(5.61)	(0.04)	(0.04)
CSS×1956	-40.09	-10.07	9.83*	10.94***	-8.78	-13.63**	0.08*	0.01
	(26.88)	(10.29)	(5.22)	(4.03)	(7.06)	(5.48)	(0.05)	(0.04)
CSS×1958	-30.44	-8.10	-0.61	4.35	12.33	11.45	0.14**	0.11*
	(23.70)	(20.68)	(5.38)	(5.25)	(10.10)	(10.84)	(0.06)	(0.06)
CSS×1959	-41.06*	-27.80	-5.54	-3.69	-4.35	-3.49	0.16**	0.11
	(22.40)	(18.94)	(4.76)	(4.52)	(10.55)	(11.94)	(0.07)	(0.08)
CSS×1960	-56.96**	-54.78**	-6.14	-5.33	8.11	14.71	0.10	0.04
	(25.68)	(26.35)	(5.80)	(5.93)	(8.25)	(9.97)	(0.07)	(0.07)
CSS×1961	-74.64**	-62.19**	-20.08***	-19.12**	19.09**	20.87	-0.17***	-0.22***
	(33.05)	(30.60)	(7.60)	(8.66)	(9.53)	(12.84)	(0.06)	(0.06)
CSS×1962	-77.32**	-56.09**	-12.38***	-9.82**	8.43	12.06	-0.00	-0.07
	(32.05)	(23.56)	(4.74)	(4.96)	(6.93)	(8.75)	(0.05)	(0.06)
R^2	0.88	0.95	0.91	0.90	0.88	0.89	0.76	0.73
Dep. Var. Mean	56.33	56.70	12.86	13.69	17.13	18.00	0.27	0.26
N	2,324	1,832	2,713	2,128	1,051	816	2,248	1,608
Clusters	396	229	458	266	184	102	391	201
Panel B. High Suitability Score								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
HSS×1955	-2.12	7.02**	1.01	1.28	0.92	-0.83	-0.00	-0.02**
	(8.08)	(3.08)	(1.00)	(1.01)	(1.57)	(1.08)	(0.01)	(0.01)
HSS×1956	-13.00	-0.77	0.70	0.89	-1.36	-2.42**	0.01	-0.01
	(11.37)	(2.55)	(1.26)	(1.14)	(1.35)	(1.10)	(0.01)	(0.01)
HSS×1958	-10.52	-1.55	0.55	1.15	0.95	0.75	0.01	0.00
	(8.11)	(3.25)	(0.86)	(0.80)	(1.76)	(1.90)	(0.01)	(0.01)
HSS×1959	-14.61*	-7.17*	-1.05	-0.80	-2.64	-3.10	0.03**	0.03*
	(8.25)	(4.10)	(0.85)	(0.78)	(2.34)	(2.60)	(0.01)	(0.01)
HSS×1960	-14.51**	-9.23*	-0.94	-1.03	-0.07	1.19	0.01	0.00
	(7.36)	(5.15)	(0.97)	(1.00)	(1.82)	(1.97)	(0.01)	(0.02)
HSS×1961	-20.45*	-10.83*	-2.74**	-2.50**	3.59**	3.04	-0.04***	-0.05***
	(11.26)	(5.94)	(1.11)	(1.24)	(1.72)	(2.15)	(0.01)	(0.01)
HSS×1962	-21.13*	-9.47**	-1.31	-1.09	1.91	1.48	-0.01	-0.02
	(11.95)	(4.52)	(0.86)	(0.90)	(1.21)	(1.60)	(0.01)	(0.01)
R^2	0.88	0.95	0.91	0.90	0.88	0.89	0.76	0.73
Dep. Var. Mean	56.33	56.70	12.86	13.69	17.13	18.00	0.27	0.26
N	2,324	1,832	2,713	2,128	1,051	816	2,248	1,608
Clusters	396	229	458	266	184	102	391	201
Balanced	N	Y	N	Y	N	Y	N	Y

Notes: Estimation results from Equation 1 for the main sample spanning 1955 to 1962. This table re-estimates the effects of sparrow eradication on agricultural outcomes using a balanced panel of counties. All regressions include county fixed effects and year fixed effects. Standard errors clustered at the county level.

Table A9
Effects on Population with Balanced Sample

	Mortality		Fertility	
Panel A. Continous Suitability Score				
	(1)	(2)	(3)	(4)
CSS×1955	-2.03	-0.78	-1.48	-7.12
	(4.14)	(2.80)	(6.03)	(6.77)
CSS×1956	0.33	3.19	7.56	4.88
	(4.22)	(4.26)	(4.88)	(4.50)
CSS×1958	2.85	-2.22	6.59	4.28
	(5.22)	(5.66)	(4.77)	(4.88)
CSS×1959	3.75	-4.03	5.16	4.97
	(11.45)	(13.39)	(4.66)	(5.30)
CSS×1960	32.71*	29.68	-18.06***	-20.69***
	(17.06)	(18.24)	(5.24)	(5.56)
CSS×1961	-12.94**	-12.32*	4.52	0.92
	(5.78)	(6.90)	(5.37)	(6.53)
CSS×1962	-2.58	-1.35	7.80	10.73*
	(2.88)	(3.27)	(5.74)	(6.06)
R^2	0.51	0.47	0.65	0.62
Dep. Var. Mean	16.00	16.87	27.21	26.00
N	2,431	1,608	2,389	1,480
Clusters	436	201	430	185
Panel B. High Suitability Score				
	(1)	(2)	(3)	(4)
HSS×1955	0.82	-0.00	0.49	-1.38
	(1.26)	(0.64)	(1.55)	(1.88)
HSS×1956	0.85	0.30	1.52	0.36
	(1.31)	(1.05)	(1.10)	(1.07)
HSS×1958	2.36	0.71	1.96*	0.86
	(1.47)	(1.49)	(1.07)	(1.13)
HSS×1959	8.01**	6.37	1.55	1.23
	(3.44)	(3.91)	(1.05)	(1.21)
HSS×1960	13.05***	9.35**	-4.21***	-4.86***
	(4.22)	(3.92)	(1.19)	(1.39)
HSS×1961	-0.56	-1.39	1.55	0.06
	(1.88)	(2.15)	(1.20)	(1.53)
HSS×1962	-0.77	-0.15	3.60**	3.64***
	(0.62)	(0.72)	(1.52)	(1.34)
R^2	0.52	0.48	0.66	0.63
Dep. Var. Mean	16.00	16.87	27.21	26.00
N	2,431	1,608	2,389	1,480
Clusters	436	201	430	185
Balanced	N	Y	N	Y

Notes: Same as in Table A8, but using death and birth rates as outcomes. Observations are population-weighted.

A.12 Additional Sensitivity Checks for the Main Regressions

We report here a set of additional regression results. First, we report the same event-study specification as in Equation (1) for the main outcomes we report in the paper, only we change the sample by truncating it at different cutoffs. In each table, for each outcome, we also include the full sample to allow for easier comparison. Then, we truncate at percentile values of 1 and 99, 2.5 and 97.5, or 5 and 95. The change in the number of counties is small as we use higher cutoff values—anywhere from about 20 to 30 counties, depending on the outcome. As was the case with some of the robustness checks we discussed earlier, we continue to recover the same sign for the main effects, at similar magnitudes, but at times, with lower precision when using the continuous suitability score, but less so when using the high suitability dummy. The truncated regression results are reported in Tables A10 and A11. We report those results for the agricultural outcomes, but not the population outcomes, because we are mostly worried about the inclusion of outliers in the agricultural data.

Next, we provide detailed regression results for the event-study analysis where we include more controls, and more stringent temporal fixed effects and/or time trends. These results expand on the variation we cover in the main text. Throughout this set of estimation results, as we include more controls such as weather controls, variables that proxy for the GLF intensity, steel production growth, and baseline population interacted with year fixed effects, we end up with a smaller sample. For example, in the case of rice output, including all of the additional controls reduces the number of counties in the sample from 421 to 260. As we add more control variables, and include more stringent time controls, we are reducing the residual variation that is left to isolate the effect of sparrow suitability, and sacrificing statistical power as we shrink the number of counties by more than a third. These results are reported in Tables A12-A25.

Table A10
Effects on Agriculture with Winsorized Sample

	Rice				Wheat				Sweet Potato				Procurement Rate			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
CSS×1954	-39.69	-31.57*	-29.73*	-14.39	2.45	5.71	4.42	3.79	-9.86	-13.52*	-16.46**	-12.49	-0.02	-0.03	-0.04	-0.02
	(24.66)	(18.33)	(16.35)	(10.06)	(5.10)	(5.07)	(3.47)	(3.33)	(8.33)	(8.01)	(8.08)	(7.74)	(0.05)	(0.05)	(0.04)	(0.04)
CSS×1955	-7.51	0.10	-21.88	-2.84	5.59	5.85*	6.26**	3.63	-3.41	-3.81	0.09	1.09	0.03	-0.00	-0.00	-0.02
	(24.52)	(18.86)	(13.56)	(9.74)	(5.30)	(2.99)	(2.98)	(2.74)	(6.72)	(6.51)	(5.70)	(5.77)	(0.04)	(0.04)	(0.04)	(0.04)
CSS×1956	-44.61*	-22.33**	-16.02*	-0.87	8.58*	13.32***	13.43***	7.81**	-9.26	-7.77	-3.13	-1.33	0.08*	0.05	0.06	0.04
	(26.78)	(9.52)	(8.74)	(7.63)	(5.04)	(3.73)	(3.77)	(3.02)	(7.16)	(6.61)	(6.05)	(6.09)	(0.05)	(0.04)	(0.04)	(0.04)
CSS×1958	-32.53	-19.80	-28.45*	-9.43	-0.69	3.83	-0.54	-0.27	11.14	19.53***	18.20**	21.38***	0.14***	0.18***	0.21***	0.21***
	(24.02)	(17.62)	(15.68)	(8.11)	(5.24)	(4.70)	(2.71)	(2.79)	(9.53)	(7.18)	(7.44)	(7.59)	(0.06)	(0.05)	(0.04)	(0.04)
CSS×1959	-43.36*	-32.58**	-35.52**	-16.60	-5.40	-1.43	-2.15	-3.78	-6.06	0.26	1.54	3.94	0.17**	0.17***	0.19***	0.14**
	(22.55)	(16.01)	(14.38)	(10.20)	(4.62)	(3.68)	(2.69)	(2.62)	(10.27)	(6.29)	(6.15)	(6.38)	(0.07)	(0.07)	(0.06)	(0.06)
CSS×1960	-59.23**	-59.51***	-60.93***	-40.40***	-6.01	-2.62	1.16	1.20	5.93	4.95	2.72	3.73	0.11*	0.11*	0.13**	0.12**
	(25.77)	(21.44)	(19.28)	(13.04)	(5.72)	(4.70)	(3.18)	(2.91)	(8.33)	(8.18)	(7.36)	(7.01)	(0.06)	(0.06)	(0.06)	(0.05)
CSS×1961	-76.33**	-62.52**	-66.85***	-39.77**	-19.37**	-15.58**	-9.87*	-11.64***	18.15*	11.60	11.00	4.38	-0.16***	-0.18***	-0.14***	-0.08
	(33.51)	(25.90)	(24.22)	(16.82)	(7.68)	(7.08)	(5.80)	(3.20)	(9.21)	(8.82)	(8.47)	(7.05)	(0.06)	(0.06)	(0.05)	(0.05)
CSS×1962	-85.63***	-63.61***	-62.43***	-32.44***	-13.57***	-10.71***	-5.33	-5.10**	7.65	4.57	2.97	3.98	-0.00	-0.03	-0.03	-0.03
	(32.75)	(19.20)	(17.66)	(11.54)	(4.79)	(3.65)	(3.38)	(2.46)	(6.58)	(5.52)	(5.53)	(5.57)	(0.05)	(0.04)	(0.04)	(0.04)
CSS×1963	-23.83	-11.18	-21.02	-2.28	-10.57***	-6.63**	-5.77**	-4.77**	14.39	4.07	4.39	6.55	-0.01	-0.04	-0.05	-0.06
	(25.77)	(17.24)	(14.28)	(11.18)	(3.85)	(2.66)	(2.72)	(2.39)	(11.97)	(6.11)	(6.09)	(6.12)	(0.05)	(0.05)	(0.04)	(0.04)
CSS×1964	-30.49	-5.61	-33.78**	-15.39*	-6.22	-4.34	-8.02**	-10.88***	36.78***	24.34***	24.78***	24.00***	-0.13***	-0.17***	-0.15***	-0.17***
	(25.27)	(14.21)	(14.35)	(9.24)	(7.79)	(7.34)	(3.55)	(2.42)	(13.84)	(8.32)	(8.11)	(7.80)	(0.05)	(0.05)	(0.04)	(0.04)
CSS×1965	-29.00	-17.82	-50.52***	-30.95***	4.93	7.26*	7.35**	3.10	31.87***	28.25***	24.74***	23.15***	-0.04	-0.05	-0.04	-0.04
	(22.57)	(19.59)	(14.10)	(8.69)	(4.68)	(3.77)	(3.39)	(2.55)	(9.28)	(7.84)	(5.71)	(5.57)	(0.04)	(0.04)	(0.04)	(0.04)
R^2	0.89	0.90	0.89	0.90	0.90	0.87	0.88	0.89	0.86	0.89	0.89	0.89	0.75	0.75	0.75	0.73
Dep. Var. Mean	59.54	52.09	47.76	44.15	13.22	11.95	10.90	9.86	17.02	16.33	15.50	14.40	0.25	0.25	0.25	0.25
N	3,473	3,403	3,297	3,117	4,081	3,996	3,874	3,656	1,588	1,557	1,505	1,424	3,388	3,320	3,214	3,042
Clusters	421	416	408	395	495	489	482	462	206	204	199	193	440	440	435	426
Winsorized	0-100	1-99	2.5-97.5	5-95	0-100	1-99	2.5-97.5	5-95	0-100	1-99	2.5-97.5	5-95	0-100	1-99	2.5-97.5	5-95

Notes: Estimation results from Equation 1 for the main sample spanning 1954 to 1965. This table checks the robustness of the agricultural impact estimates by progressively trimming outliers in the data. We focus on four key outcomes—rice output, wheat output, sweet potato output, and grain procurement rate—and re-estimate the sparrow effect under different winsorization thresholds for these variables. In columns (1)–(4), the data are winsorized at 0

Table A11
Effects on Agriculture with Winsorized Sample

	Rice				Wheat				Sweet Potato				Procurement Rate			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
HSS×1954	-14.61*	-8.53**	-7.40**	-4.85*	0.43	0.71	0.70	0.12	-2.75	-2.73*	-3.27**	-2.89*	-0.01	-0.01	-0.02	-0.01
	(8.40)	(3.76)	(3.47)	(2.66)	(1.04)	(0.97)	(0.62)	(0.55)	(1.79)	(1.52)	(1.53)	(1.50)	(0.01)	(0.01)	(0.01)	(0.01)
HSS×1955	-2.58	2.54	-0.80	1.93	1.19	1.67**	1.42**	0.41	0.34	-0.30	0.44	0.44	0.00	-0.01	-0.01	-0.01
	(7.93)	(2.99)	(2.38)	(2.02)	(0.97)	(0.83)	(0.63)	(0.48)	(1.32)	(1.16)	(1.08)	(1.08)	(0.01)	(0.01)	(0.01)	(0.01)
HSS×1956	-13.76	-3.88*	-2.34	0.10	0.64	2.02**	1.74**	0.99	-1.29	-1.14	-0.21	-0.21	0.01	0.00	0.00	0.00
	(11.25)	(2.15)	(2.17)	(1.71)	(1.21)	(0.82)	(0.78)	(0.62)	(1.35)	(1.28)	(1.16)	(1.13)	(0.01)	(0.01)	(0.01)	(0.01)
HSS×1958	-10.68	-3.77	-5.12**	-2.79*	0.61	1.28*	0.72	0.33	0.77	2.66*	2.46*	3.17**	0.01	0.02**	0.03***	0.03***
	(7.90)	(2.66)	(2.60)	(1.62)	(0.84)	(0.71)	(0.52)	(0.52)	(1.69)	(1.35)	(1.38)	(1.40)	(0.01)	(0.01)	(0.01)	(0.01)
HSS×1959	-14.73*	-8.05**	-8.75***	-5.78**	-0.97	-0.29	-0.00	-0.27	-3.00	-1.31	-1.04	-0.56	0.03***	0.03**	0.04***	0.03***
	(8.12)	(3.36)	(3.11)	(2.43)	(0.82)	(0.67)	(0.60)	(0.59)	(2.33)	(1.56)	(1.46)	(1.45)	(0.01)	(0.01)	(0.01)	(0.01)
HSS×1960	-14.79**	-11.17***	-11.33***	-9.78***	-0.79	-0.24	0.47	0.48	-0.48	0.17	-0.38	-0.11	0.01	0.01	0.01	0.01
	(7.21)	(4.10)	(3.53)	(3.16)	(0.95)	(0.81)	(0.60)	(0.55)	(2.05)	(1.63)	(1.49)	(1.30)	(0.01)	(0.01)	(0.01)	(0.01)
HSS×1961	-20.62*	-11.85**	-12.13***	-9.45**	-2.63**	-2.45***	-1.82**	-1.68**	3.39**	2.13	1.88	0.73	-0.04***	-0.04***	-0.03***	-0.02**
	(11.23)	(4.93)	(4.26)	(3.66)	(1.13)	(0.93)	(0.82)	(0.66)	(1.69)	(1.61)	(1.47)	(1.34)	(0.01)	(0.01)	(0.01)	(0.01)
HSS×1962	-23.23*	-12.65***	-11.53***	-7.97***	-1.44*	-1.27*	-0.61	-0.64	1.75	1.26	0.95	1.50	-0.01	-0.01	-0.01	-0.01
	(11.96)	(3.82)	(3.05)	(2.43)	(0.85)	(0.69)	(0.68)	(0.51)	(1.19)	(1.04)	(1.07)	(1.05)	(0.01)	(0.01)	(0.01)	(0.01)
HSS×1963	-8.73	-1.09	-3.19	-0.10	-1.68**	-0.92	-0.97*	-0.66	0.91	0.07	0.27	0.92	-0.01	-0.02	-0.02*	-0.02**
	(9.75)	(4.19)	(3.47)	(2.47)	(0.76)	(0.60)	(0.57)	(0.49)	(1.94)	(1.36)	(1.37)	(1.34)	(0.01)	(0.01)	(0.01)	(0.01)
HSS×1964	-13.22	-3.28	-6.25*	-3.83*	-0.86	-0.79	-1.30*	-1.69***	5.36**	3.75**	4.10**	3.72**	-0.03***	-0.03***	-0.03***	-0.03***
	(10.19)	(3.57)	(3.25)	(2.29)	(1.13)	(0.98)	(0.70)	(0.52)	(2.21)	(1.68)	(1.69)	(1.54)	(0.01)	(0.01)	(0.01)	(0.01)
HSS×1965	-10.45*	-6.87*	-11.02***	-7.80***	1.45	1.78**	1.95***	1.05**	5.95***	5.04***	4.52***	4.31***	-0.02	-0.02*	-0.02*	-0.02*
	(5.70)	(3.60)	(3.22)	(2.00)	(1.03)	(0.77)	(0.67)	(0.48)	(1.61)	(1.32)	(1.18)	(1.18)	(0.01)	(0.01)	(0.01)	(0.01)
R^2	0.89	0.90	0.89	0.90	0.90	0.87	0.88	0.89	0.86	0.89	0.89	0.89	0.75	0.75	0.75	0.73
Dep. Var. Mean	59.54	52.09	47.76	44.15	13.22	11.95	10.90	9.86	17.02	16.33	15.50	14.40	0.25	0.25	0.25	0.25
N	3,473	3,403	3,297	3,117	4,081	3,996	3,874	3,656	1,588	1,557	1,505	1,424	3,388	3,320	3,214	3,042
Clusters	421	416	408	395	495	489	482	462	206	204	199	193	440	440	435	426
Winsorized	0-100	1-99	2.5-97.5	5-95	0-100	1-99	2.5-97.5	5-95	0-100	1-99	2.5-97.5	5-95	0-100	1-99	2.5-97.5	5-95

Notes: Estimation results from Equation 1 for the main sample spanning 1954 to 1965. This table is the counterpart to Table A8, presenting the results for the high sparrow-suitability indicator in more detail (separated for clarity). It contains the same analyses of rice, wheat, sweet potato, and procurement outcomes under various winsorization levels, but here each coefficient represents the effect of being an above-median sparrow suitability county (HSS), rather than a one-unit increase in the suitability score. All regressions include county and year fixed effects with county-clustered errors.

Table A12
Effects on Rice Output, Detailed

	Rice Output										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
CSS×1954	-39.69	-48.90*	-52.11*	-20.54	-125.43**	-22.47	-51.96*	-40.45*	9.93	-39.70	16.32
	(24.66)	(26.77)	(28.33)	(21.37)	(54.35)	(24.75)	(29.36)	(23.35)	(49.15)	(42.91)	(59.90)
CSS×1955	-7.51	-15.89	-7.09	1.72	8.49	9.37	-10.36	-6.14	24.16	-10.14	25.98
	(24.52)	(26.81)	(27.35)	(23.82)	(56.61)	(26.07)	(29.31)	(24.30)	(46.92)	(45.11)	(57.57)
CSS×1956	-44.61*	-47.87*	-52.84	-29.30	-69.87	-45.01	-51.33	-41.28	10.53	-44.32	5.24
	(26.78)	(27.85)	(32.52)	(25.00)	(50.99)	(34.31)	(32.86)	(26.29)	(38.83)	(51.60)	(39.93)
CSS×1958	-32.53	-26.74	-35.55	-1.91	-63.83	-15.72	-40.20	-33.37	27.90	-3.29	24.32
	(24.02)	(23.11)	(27.46)	(19.88)	(45.87)	(25.07)	(28.59)	(24.12)	(35.10)	(36.50)	(31.22)
CSS×1959	-43.36*	-32.58	-31.09	-29.86	-78.30**	-19.74	-56.05**	-41.26*	-33.36	-39.35	-51.40*
	(22.55)	(22.63)	(25.82)	(19.45)	(37.87)	(25.68)	(26.08)	(22.69)	(32.24)	(35.28)	(27.75)
CSS×1960	-59.23**	-45.56	-42.98	-46.35**	-107.27**	-24.94	-74.57***	-58.94**	-58.00**	-54.51**	-80.17***
	(25.77)	(28.81)	(29.97)	(18.55)	(41.84)	(28.76)	(26.97)	(25.84)	(27.14)	(26.34)	(26.02)
CSS×1961	-76.33**	-58.11	-63.30*	-58.61**	-127.89***	-46.62	-93.52***	-77.10**	-89.63**	-77.67*	-103.85***
	(33.51)	(36.94)	(38.00)	(28.32)	(48.31)	(38.20)	(35.89)	(33.65)	(43.26)	(43.81)	(37.33)
CSS×1962	-85.63***	-59.82*	-83.34**	-62.71**	-132.61**	-64.03	-104.83***	-84.65***	-62.18	-69.53	-82.68**
	(32.75)	(36.07)	(38.46)	(28.63)	(52.75)	(38.85)	(39.17)	(32.04)	(44.13)	(45.81)	(36.62)
CSS×1963	-23.83	4.49	-8.79	-16.65	-69.78	-5.60	-29.30	-25.08	9.77	3.27	0.75
	(25.77)	(26.73)	(29.33)	(25.78)	(42.31)	(32.56)	(31.41)	(24.27)	(38.75)	(33.48)	(35.96)
CSS×1964	-30.49	0.94	-22.43	-31.42	-68.04	-34.97	-34.74	-33.66	-29.76	-24.24	-39.71
	(25.27)	(23.15)	(28.73)	(25.64)	(42.43)	(31.68)	(31.29)	(25.05)	(39.43)	(33.32)	(35.00)
CSS×1965	-29.00	13.53	-21.76	-48.56***	-53.47	-46.22**	-21.24	-30.66	-50.02*	-28.59	-59.43*
	(22.57)	(22.69)	(20.38)	(16.65)	(36.42)	(19.97)	(23.91)	(22.86)	(25.51)	(18.61)	(33.70)
Baseline Population-by-Year FE	N	N	N	Y	N	N	N	N	Y	Y	Y
Steel Production Growth	N	N	N	N	Y	N	N	N	Y	N	Y
GLF Variables	N	N	N	N	N	Y	N	N	Y	Y	Y
Crop Suitability	N	N	N	N	N	N	Y	N	Y	Y	Y
Yearly Weather	N	N	N	N	N	N	N	Y	Y	Y	Y
Year FE	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y
Region-by-Year FE	N	N	Y	N	N	N	N	N	N	N	N
Provincial Linear Trends	N	Y	N	N	N	N	N	N	N	Y	Y
R^2	0.89	0.89	0.89	0.90	0.88	0.89	0.89	0.89	0.89	0.91	0.89
Dep. Var. Mean	59.54339	59.54339	59.54339	55.28177	61.30209	61.0959	59.54339	59.54339	58.39933	54.61808	58.39933
N	3,473	3,473	3,473	2,712	2,180	3,050	3,473	3,473	1,720	2,565	1,720
Clusters	421	421	421	336	319	379	421	421	260	321	260

Notes: Estimation results from Equation 1 for the main sample spanning 1954 to 1965. This table conducts a series of robustness checks for the impact of sparrow eradication on rice output. Using the continuous sparrow suitability measure as the treatment, columns (1)–(11) report estimates from variants of our baseline regression with different sets of controls and fixed effects included (as indicated in the bottom panel of the table). In column (1), we include only county and year fixed effects (the baseline specification); by column (4) we add baseline population-by-year fixed effects; by column (7) we add controls for other GLF policies (e.g., steel production targets, commune dining, etc.); by column (10) we incorporate region-by-year fixed effects or provincial trends, and so on. All regressions include county fixed effects throughout (year fixed effects are omitted in those specifications where year-by-other interactions serve a similar purpose). Standard errors are clustered at the county level.

Table A13
Effects on Rice Output, Detailed

	Rice Output										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
HSS×1954	-14.61*	-17.74**	-17.98*	-15.94*	-38.41**	-15.39	-14.11*	-14.72*	-20.61	-20.52*	-23.54*
	(8.40)	(8.59)	(9.99)	(9.41)	(17.06)	(10.08)	(8.20)	(8.03)	(12.59)	(11.61)	(13.18)
HSS×1955	-2.58	-4.70	-3.28	-5.02	-4.63	-1.50	-2.19	-2.28	-5.49	-6.96	-7.58
	(7.93)	(8.07)	(9.54)	(9.24)	(16.12)	(9.51)	(7.91)	(7.78)	(14.27)	(12.09)	(14.30)
HSS×1956	-13.76	-14.68	-16.61	-13.78	-26.20	-16.20	-13.09	-13.12	-11.77	-16.24	-14.96
	(11.25)	(11.38)	(13.68)	(13.03)	(23.38)	(14.06)	(10.90)	(11.08)	(17.72)	(16.82)	(17.67)
HSS×1958	-10.68	-9.02	-12.16	-8.50	-21.73	-10.83	-10.42	-10.70	-6.49	-7.82	-6.56
	(7.90)	(7.91)	(9.64)	(8.94)	(16.41)	(9.69)	(7.87)	(7.98)	(13.62)	(11.88)	(13.38)
HSS×1959	-14.73*	-11.60	-12.70	-16.62*	-26.86*	-12.06	-14.17*	-14.22*	-13.71	-12.32	-14.87
	(8.12)	(8.15)	(9.74)	(9.02)	(16.09)	(9.88)	(7.97)	(8.07)	(13.88)	(11.53)	(13.29)
HSS×1960	-14.79**	-10.54	-11.55	-17.87**	-30.11**	-10.73	-14.08**	-14.66**	-17.50	-12.88	-17.89
	(7.21)	(7.44)	(8.84)	(7.41)	(15.00)	(8.91)	(6.94)	(7.21)	(11.25)	(9.06)	(11.03)
HSS×1961	-20.62*	-15.03	-18.07	-24.71**	-38.74*	-17.61	-19.27*	-20.71*	-26.79	-20.14	-24.17
	(11.23)	(11.47)	(13.51)	(12.35)	(20.09)	(13.74)	(10.73)	(11.32)	(18.54)	(15.69)	(18.19)
HSS×1962	-23.23*	-15.82	-23.99	-22.63*	-39.18*	-22.45	-23.17*	-23.06*	-21.39	-17.35	-18.15
	(11.96)	(12.13)	(14.82)	(13.19)	(21.80)	(14.70)	(11.85)	(11.79)	(18.88)	(16.39)	(18.48)
HSS×1963	-8.73	-0.65	-7.16	-12.56	-23.01	-7.06	-8.76	-8.99	-10.02	-4.62	-3.31
	(9.75)	(9.58)	(11.68)	(11.18)	(18.27)	(12.09)	(9.71)	(9.42)	(13.94)	(12.83)	(13.72)
HSS×1964	-13.22	-3.46	-13.90	-17.77	-26.06	-15.20	-13.13	-13.72	-21.63	-11.46	-12.54
	(10.19)	(9.83)	(12.36)	(11.72)	(19.11)	(12.61)	(10.04)	(9.99)	(14.97)	(13.26)	(14.98)
HSS×1965	-10.45*	1.23	-9.53	-14.88**	-19.60	-12.30*	-9.49	-10.73*	-16.50*	-5.51	-7.77
	(5.70)	(5.00)	(6.05)	(6.01)	(12.17)	(6.75)	(5.77)	(5.67)	(8.77)	(6.18)	(9.29)
Baseline Population-by-Year FE	N	N	N	Y	N	N	N	N	Y	Y	Y
Steel Production Growth	N	N	N	N	Y	N	N	N	Y	N	Y
GLF Variables	N	N	N	N	N	Y	N	N	Y	Y	Y
Crop Suitability	N	N	N	N	N	N	Y	N	Y	Y	Y
Yearly Weather	N	N	N	N	N	N	N	Y	Y	Y	Y
Year FE	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y
Region-by-Year FE	N	N	Y	N	N	N	N	N	N	N	N
Provincial Linear Trends	N	Y	N	N	N	N	N	N	N	Y	Y
R^2	0.89	0.89	0.90	0.90	0.88	0.89	0.90	0.89	0.89	0.91	0.89
Dep. Var. Mean	59.54339	59.54339	59.54339	55.28177	61.30209	61.0959	59.54339	59.54339	58.39933	54.61808	58.39933
N	3,473	3,473	3,473	2,712	2,180	3,050	3,473	3,473	1,720	2,565	1,720
Clusters	421	421	421	336	319	379	421	421	260	321	260

Notes: Estimation results from Equation 1 for the main sample spanning 1954 to 1965. This table repeats the above robustness exercise for rice output using the high-suitability indicator as the treatment variable. It corresponds to Table A10, but instead of the continuous score we interact the high-suitability county dummy with the year indicators. The eleven columns include the same sequence of control combinations (baseline population controls, GLF policy variables, weather, region trends, etc.). Every specification includes county fixed effects (and, except where intentionally omitted, year fixed effects), with standard errors clustered by county.

Table A14
Effects on Wheat Output, Detailed

	Wheat Output										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
CSS×1954	2.45	0.32	4.62	2.75	-0.75	7.69**	1.67	3.41	6.34	4.73	8.41
	(5.10)	(4.93)	(5.87)	(3.86)	(7.56)	(3.87)	(4.90)	(5.15)	(5.96)	(4.50)	(5.88)
CSS×1955	5.59	3.97	3.67	2.26	6.43	1.30	5.30	5.62	-4.27	-5.16	-2.02
	(5.30)	(5.07)	(4.98)	(4.10)	(8.96)	(4.11)	(5.32)	(5.49)	(7.17)	(4.64)	(7.11)
CSS×1956	8.58*	7.63	4.92	8.59	7.74	9.97*	7.94	9.21*	6.24	4.68	5.10
	(5.04)	(5.02)	(4.69)	(5.84)	(6.81)	(5.47)	(5.20)	(5.11)	(9.31)	(6.76)	(9.46)
CSS×1958	-0.69	-0.62	-3.28	1.31	-4.86	-1.38	0.06	0.45	-2.63	1.00	-3.82
	(5.24)	(5.32)	(4.61)	(5.79)	(7.85)	(5.73)	(5.23)	(5.25)	(9.13)	(6.50)	(9.20)
CSS×1959	-5.40	-4.99	-5.25	-5.79	-7.61	-7.07	-5.83	-5.83	-10.25*	-8.91**	-10.89**
	(4.62)	(4.89)	(4.31)	(3.88)	(6.33)	(4.39)	(4.60)	(4.60)	(5.26)	(4.00)	(5.53)
CSS×1960	-6.01	-5.19	-4.18	-5.65	-8.67	-5.60	-5.15	-5.95	-11.22*	-9.31*	-12.16**
	(5.72)	(6.13)	(5.73)	(5.22)	(6.94)	(5.04)	(5.60)	(5.72)	(5.93)	(5.37)	(6.00)
CSS×1961	-19.37**	-18.17**	-16.48**	-13.25*	-22.85**	-17.64**	-18.34**	-19.03**	-7.08	-11.26	-8.53
	(7.68)	(7.77)	(7.73)	(7.06)	(9.12)	(8.89)	(7.62)	(7.73)	(9.07)	(7.69)	(9.36)
CSS×1962	-13.57***	-11.97**	-13.73***	-12.71***	-15.95***	-14.70***	-12.99***	-13.03***	-11.88*	-13.40***	-13.61**
	(4.79)	(5.20)	(4.79)	(4.70)	(5.66)	(5.24)	(4.75)	(4.78)	(6.07)	(5.14)	(6.38)
CSS×1963	-10.57***	-8.52*	-9.51***	-10.52***	-12.72**	-9.99**	-10.45***	-9.22**	-8.48	-6.88	-11.28*
	(3.85)	(4.82)	(3.37)	(3.94)	(5.20)	(4.21)	(3.85)	(3.83)	(5.87)	(4.69)	(6.42)
CSS×1964	-6.22	-3.74	-5.44	-3.84	-9.03	-0.57	-5.85	-4.68	8.55	8.38	4.65
	(7.79)	(8.36)	(8.82)	(8.69)	(9.36)	(9.02)	(7.80)	(7.94)	(13.24)	(10.84)	(13.23)
CSS×1965	4.93	7.04	5.55	2.34	1.79	8.00*	2.77	5.48	-1.72	2.08	-4.64
	(4.68)	(5.58)	(4.62)	(4.51)	(6.10)	(4.77)	(4.92)	(4.77)	(6.91)	(5.63)	(7.37)
Baseline Population-by-Year FE	N	N	N	Y	N	N	N	N	Y	Y	Y
Steel Production Growth	N	N	N	N	Y	N	N	N	Y	N	Y
GLF Variables	N	N	N	N	N	Y	N	N	Y	Y	Y
Crop Suitability	N	N	N	N	N	N	Y	N	Y	Y	Y
Yearly Weather	N	N	N	N	N	N	N	Y	Y	Y	Y
Year FE	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y
Region-by-Year FE	N	N	Y	N	N	N	N	N	N	N	N
Provincial Linear Trends	N	Y	N	N	N	N	N	N	N	Y	Y
R^2	0.90	0.90	0.91	0.88	0.89	0.90	0.90	0.90	0.86	0.89	0.86
Dep. Var. Mean	13.21826	13.21826	13.21826	11.41211	13.61061	12.91032	13.21826	13.21826	11.60349	11.41411	11.60349
N	4,081	4,081	4,081	3,290	2,856	3,720	4,081	4,081	2,248	3,177	2,248
Clusters	495	495	495	407	394	458	495	495	322	394	322

Notes: Estimation results from Equation 1 for the main sample spanning 1954 to 1965. This table is analogous to Table A10 but for wheat output as the dependent variable. We use the continuous sparrow suitability score and estimate its interaction effects on wheat output across 1958–1965 under various specifications. Columns (1)–(11) introduce the same sets of additional controls stepwise (county fixed effects in all, and progressively adding population-by-year FE, crop suitability controls, weather controls, etc., as indicated in the table). Standard errors are clustered at the county level.

Table A15
Effects on Wheat Output, Detailed

	Wheat Output										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
HSS×1954	0.43	-0.04	0.89	0.52	-0.42	1.70*	0.27	0.64	0.97	1.07	1.23
	(1.04)	(1.02)	(1.20)	(0.78)	(1.55)	(0.90)	(1.02)	(1.07)	(1.21)	(1.00)	(1.19)
HSS×1955	1.19	0.85	0.79	1.47	0.71	0.94	1.11	1.14	0.31	0.24	0.67
	(0.97)	(1.01)	(0.92)	(1.00)	(1.51)	(0.96)	(0.96)	(1.00)	(1.80)	(1.04)	(1.80)
HSS×1956	0.64	0.44	-0.28	0.49	0.62	0.84	0.50	0.75	-0.22	-0.52	-0.50
	(1.21)	(1.23)	(1.20)	(1.48)	(1.99)	(1.30)	(1.26)	(1.23)	(3.02)	(1.81)	(3.06)
HSS×1958	0.61	0.65	0.14	0.88	-0.11	0.62	0.76	0.79	0.09	0.76	-0.05
	(0.84)	(0.85)	(0.75)	(0.89)	(1.37)	(0.89)	(0.83)	(0.83)	(1.50)	(0.95)	(1.48)
HSS×1959	-0.97	-0.83	-0.82	-0.24	-1.72	-0.94	-1.08	-1.11	-1.15	-0.68	-1.00
	(0.82)	(0.84)	(0.80)	(0.77)	(1.25)	(0.90)	(0.81)	(0.82)	(1.20)	(0.80)	(1.26)
HSS×1960	-0.79	-0.52	-0.57	-0.39	-1.74	-0.45	-0.68	-0.79	-2.23*	-1.10	-2.30*
	(0.95)	(1.00)	(0.92)	(0.90)	(1.34)	(0.84)	(0.92)	(0.95)	(1.34)	(0.87)	(1.30)
HSS×1961	-2.63**	-2.27*	-1.96*	-2.26**	-3.72**	-2.51*	-2.45**	-2.61**	-1.45	-1.79	-1.52
	(1.13)	(1.16)	(1.10)	(1.13)	(1.54)	(1.34)	(1.11)	(1.14)	(1.58)	(1.24)	(1.63)
HSS×1962	-1.44*	-0.96	-1.26	-1.89**	-1.86	-1.60*	-1.33	-1.36	-1.79	-1.83**	-1.90
	(0.85)	(0.91)	(0.85)	(0.88)	(1.18)	(0.93)	(0.84)	(0.85)	(1.25)	(0.92)	(1.29)
HSS×1963	-1.68**	-1.07	-1.34*	-2.05**	-2.18*	-1.33*	-1.68**	-1.42*	-1.75	-1.10	-2.08
	(0.76)	(0.88)	(0.71)	(0.79)	(1.13)	(0.81)	(0.76)	(0.76)	(1.34)	(0.90)	(1.43)
HSS×1964	-0.86	-0.14	-0.77	-1.38	-1.29	0.26	-0.81	-0.62	1.16	1.14	0.70
	(1.13)	(1.15)	(1.17)	(1.12)	(1.59)	(1.31)	(1.11)	(1.13)	(1.81)	(1.28)	(1.68)
HSS×1965	1.45	2.15**	1.65	0.69	1.14	2.65**	0.92	1.55	0.25	1.13	-0.04
	(1.03)	(1.07)	(1.08)	(1.11)	(1.44)	(1.13)	(1.12)	(1.04)	(2.10)	(1.45)	(2.26)
Baseline Population-by-Year FE	N	N	N	Y	N	N	N	N	Y	Y	Y
Steel Production Growth	N	N	N	N	Y	N	N	N	Y	N	Y
GLF Variables	N	N	N	N	N	Y	N	N	Y	Y	Y
Crop Suitability	N	N	N	N	N	N	Y	N	Y	Y	Y
Yearly Weather	N	N	N	N	N	N	N	Y	Y	Y	Y
Year FE	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y
Region-by-Year FE	N	N	Y	N	N	N	N	N	N	N	N
Provincial Linear Trends	N	Y	N	N	N	N	N	N	N	Y	Y
R^2	0.90	0.90	0.90	0.88	0.89	0.90	0.90	0.90	0.86	0.88	0.86
Dep. Var. Mean	13.21826	13.21826	13.21826	11.41211	13.61061	12.91032	13.21826	13.21826	11.60349	11.41411	11.60349
N	4,081	4,081	4,081	3,290	2,856	3,720	4,081	4,081	2,248	3,177	2,248
Clusters	495	495	495	407	394	458	495	495	322	394	322

Notes: Estimation results from Equation 1 for the main sample spanning 1954 to 1965. This table provides the detailed wheat output results using the high-suitability dummy as the treatment, complementing Table A12. It runs the same eleven regression specifications (columns (1)–(11)) with various fixed effects and controls. All regressions include county fixed effects, and standard errors are clustered by county.

Table A16
Effects on Sweet Potato Output, Detailed

	Sweet Potato Output										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
CSS×1954	-9.86	-5.11	-8.24	-2.74	-43.67**	-16.86*	-10.90	-9.52	-16.95	-3.82	-13.51
	(8.33)	(9.87)	(9.14)	(5.16)	(20.57)	(9.25)	(8.35)	(9.18)	(11.61)	(11.91)	(13.24)
CSS×1955	-3.41	-0.58	-3.60	2.84	-21.14	-8.37	-1.66	-3.61	-9.02	-8.89	-6.82
	(6.72)	(6.52)	(7.02)	(5.61)	(16.77)	(7.24)	(6.51)	(6.93)	(9.40)	(7.92)	(10.39)
CSS×1956	-9.26	-5.94	-7.68	0.25	-16.23	-8.39	-4.13	-9.12	-8.67	-3.69	-5.43
	(7.16)	(8.09)	(8.15)	(5.63)	(14.09)	(7.65)	(6.63)	(7.22)	(13.96)	(8.36)	(13.48)
CSS×1958	11.14	8.82	9.65	11.25*	7.07	5.10	12.68	11.88	-0.72	5.12	3.60
	(9.53)	(9.85)	(11.21)	(6.41)	(18.45)	(10.06)	(9.12)	(9.42)	(10.38)	(7.97)	(9.21)
CSS×1959	-6.06	-11.02	-5.21	-11.15*	-7.41	-7.44	-13.29	-6.70	-5.55	-12.67	0.71
	(10.27)	(11.16)	(11.69)	(6.64)	(14.12)	(10.97)	(11.49)	(10.53)	(8.32)	(8.02)	(9.77)
CSS×1960	5.93	-1.21	9.21	-9.36	-8.33	4.98	1.84	5.62	-9.37	-14.22	-5.17
	(8.33)	(9.90)	(9.24)	(8.67)	(11.49)	(9.03)	(8.91)	(8.31)	(10.68)	(10.18)	(11.19)
CSS×1961	18.15*	8.26	22.77**	3.81	7.25	16.82*	7.08	18.14*	-2.10	-5.30	-4.82
	(9.21)	(11.16)	(10.69)	(8.17)	(13.23)	(9.26)	(9.50)	(9.42)	(8.08)	(8.43)	(10.05)
CSS×1962	7.65	-4.92	7.56	1.45	1.98	3.21	1.83	7.87	-14.52*	-13.00*	-14.83
	(6.58)	(8.15)	(6.89)	(4.89)	(8.91)	(5.34)	(5.91)	(6.43)	(8.36)	(6.87)	(9.80)
CSS×1963	14.39	-0.27	14.68	-0.88	18.64	6.59	13.86	13.50	-9.10	-13.71	-12.23
	(11.97)	(13.86)	(13.89)	(5.64)	(17.87)	(11.68)	(9.91)	(11.88)	(12.38)	(9.13)	(11.87)
CSS×1964	36.78***	18.82	39.11***	17.61***	39.68**	30.67**	26.78**	35.87***	15.72*	5.90	6.19
	(13.84)	(15.21)	(14.76)	(6.30)	(19.97)	(12.50)	(12.00)	(13.68)	(9.30)	(8.16)	(10.98)
CSS×1965	31.87***	10.23	32.80***	22.20***	29.55**	21.42***	23.04***	32.62***	4.43	-0.11	-11.57
	(9.28)	(11.87)	(10.72)	(5.12)	(13.98)	(7.17)	(7.49)	(9.29)	(8.30)	(9.29)	(15.01)
Baseline Population-by-Year FE	N	N	N	Y	N	N	N	N	Y	Y	Y
Steel Production Growth	N	N	N	N	Y	N	N	N	Y	N	Y
GLF Variables	N	N	N	N	N	Y	N	N	Y	Y	Y
Crop Suitability	N	N	N	N	N	N	Y	N	Y	Y	Y
Yearly Weather	N	N	N	N	N	N	N	Y	Y	Y	Y
Year FE	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y
Region-by-Year FE	N	N	Y	N	N	N	N	N	N	N	N
Provincial Linear Trends	N	Y	N	N	N	N	N	N	N	Y	Y
R^2	0.86	0.86	0.87	0.88	0.84	0.87	0.86	0.86	0.88	0.89	0.88
Dep. Var. Mean	17.02351	17.02351	17.20693	14.10802	15.35498	15.90042	17.02351	17.02351	12.33827	12.73427	12.33827
N	1,588	1,588	1,571	1,219	872	1,421	1,588	1,588	690	1,114	690
Clusters	206	206	206	164	142	188	206	206	116	153	116

Notes: Estimation results from Equation 1 for the main sample spanning 1954 to 1965. This table is analogous to Table A10 but for sweet potato output as the dependent variable. We use the continuous sparrow suitability score and estimate its interaction effects on sweet potato output across 1958–1965 under various specifications. Columns (1)–(11) introduce the same sets of additional controls stepwise (county fixed effects in all, and progressively adding population-by-year FE, crop suitability controls, weather controls, etc., as indicated in the table). Standard errors are clustered at the county level.

Table A17
Effects on Sweet Potato Output, Detailed

	Sweet Potato Output										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
HSS×1954	-2.75	-1.99	-2.53	-2.40	-6.41**	-3.69*	-3.11*	-2.57	-2.89	-2.84*	-3.02
	(1.79)	(1.77)	(2.10)	(1.68)	(3.03)	(1.87)	(1.62)	(1.85)	(2.99)	(1.52)	(3.10)
HSS×1955	0.34	0.78	0.52	0.90	-1.82	-0.47	0.66	0.23	-1.23	-1.26	-1.26
	(1.32)	(1.23)	(1.33)	(1.39)	(2.43)	(1.40)	(1.32)	(1.40)	(2.23)	(1.41)	(2.26)
HSS×1956	-1.29	-0.91	-0.87	0.19	-3.10	-1.36	-0.46	-1.41	-0.68	-0.57	-0.50
	(1.35)	(1.37)	(1.50)	(1.18)	(2.35)	(1.43)	(1.18)	(1.40)	(2.67)	(1.41)	(2.53)
HSS×1958	0.77	0.43	0.38	0.99	-1.57	-0.65	0.81	0.94	-1.28	-0.09	-0.29
	(1.69)	(1.74)	(1.76)	(1.37)	(2.97)	(1.71)	(1.53)	(1.68)	(2.19)	(1.59)	(1.99)
HSS×1959	-3.00	-3.72	-3.29	-3.84**	-4.21	-2.13	-4.58*	-3.13	-2.64	-2.60	-0.68
	(2.33)	(2.54)	(2.73)	(1.80)	(3.55)	(2.51)	(2.65)	(2.44)	(1.82)	(1.82)	(1.73)
HSS×1960	-0.48	-1.63	-0.23	-3.83	-4.04	0.24	-1.53	-0.67	-3.12	-3.66	-1.60
	(2.05)	(2.25)	(2.07)	(2.43)	(2.84)	(2.09)	(2.19)	(2.04)	(2.83)	(2.48)	(2.54)
HSS×1961	3.39**	1.79	4.05**	0.41	0.98	4.21**	1.23	3.36*	0.67	0.35	1.78
	(1.69)	(1.91)	(1.80)	(1.34)	(2.59)	(1.71)	(1.76)	(1.75)	(1.63)	(1.42)	(1.82)
HSS×1962	1.75	-0.22	1.66	0.09	0.53	1.42	0.66	1.61	-2.89	-1.26	-1.09
	(1.19)	(1.32)	(1.22)	(0.99)	(2.13)	(1.08)	(1.12)	(1.15)	(1.98)	(1.28)	(2.01)
HSS×1963	0.91	-1.40	0.62	-1.37	0.88	-0.58	0.47	0.60	-3.91	-2.82	-2.47
	(1.94)	(2.11)	(2.25)	(1.38)	(3.03)	(2.01)	(1.45)	(1.94)	(2.84)	(1.80)	(2.67)
HSS×1964	5.36**	2.51	5.64**	3.02*	5.92	4.63**	3.24	5.08**	3.94	2.19	4.45
	(2.21)	(2.19)	(2.44)	(1.73)	(3.72)	(2.19)	(1.97)	(2.17)	(3.16)	(2.06)	(2.97)
HSS×1965	5.95***	2.60	6.08***	4.53***	5.89**	4.28***	4.20***	6.05***	2.19	1.98	1.62
	(1.61)	(1.67)	(1.82)	(1.32)	(2.89)	(1.34)	(1.33)	(1.61)	(1.98)	(1.32)	(2.06)
Baseline Population-by-Year FE	N	N	N	Y	N	N	N	N	Y	Y	Y
Steel Production Growth	N	N	N	N	Y	N	N	N	Y	N	Y
GLF Variables	N	N	N	N	N	Y	N	N	Y	Y	Y
Crop Suitability	N	N	N	N	N	N	Y	N	Y	Y	Y
Yearly Weather	N	N	N	N	N	N	N	Y	Y	Y	Y
Year FE	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y
Region-by-Year FE	N	N	Y	N	N	N	N	N	N	N	N
Provincial Linear Trends	N	Y	N	N	N	N	N	N	N	Y	Y
R^2	0.86	0.86	0.86	0.88	0.84	0.87	0.86	0.86	0.88	0.89	0.89
Dep. Var. Mean	17.02351	17.02351	17.20693	14.10802	15.35498	15.90042	17.02351	17.02351	12.33827	12.73427	12.33827
N	1,588	1,588	1,571	1,219	872	1,421	1,588	1,588	690	1,114	690
Clusters	206	206	206	164	142	188	206	206	116	153	116

Notes: Estimation results from Equation 1 for the main sample spanning 1954 to 1965. This table provides the detailed sweet potato output results using the high-suitability dummy as the treatment, complementing Table A14. It runs the same eleven regression specifications (columns (1)–(11)) with various fixed effects and controls. All regressions include county fixed effects, and standard errors are clustered by county.

Table A18
Effects on Procurement Rate, Detailed

	Procurement Rate										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
CSS×1954	-0.02	-0.05	-0.11**	-0.02	0.04	-0.03	-0.01	-0.02	0.02	-0.06	-0.04
	(0.05)	(0.05)	(0.05)	(0.05)	(0.07)	(0.05)	(0.05)	(0.05)	(0.07)	(0.05)	(0.07)
CSS×1955	0.03	0.01	-0.01	0.04	0.10*	0.02	0.04	0.04	0.12**	0.04	0.08
	(0.04)	(0.04)	(0.04)	(0.04)	(0.06)	(0.04)	(0.04)	(0.04)	(0.06)	(0.05)	(0.06)
CSS×1956	0.08*	0.07	-0.01	0.09*	0.15**	0.05	0.09*	0.10**	0.18**	0.07	0.18**
	(0.05)	(0.05)	(0.05)	(0.05)	(0.07)	(0.05)	(0.05)	(0.04)	(0.08)	(0.05)	(0.08)
CSS×1958	0.14***	0.15***	0.16***	0.12**	0.10	0.17***	0.13**	0.16***	0.12	0.19***	0.11
	(0.06)	(0.06)	(0.05)	(0.06)	(0.07)	(0.05)	(0.06)	(0.06)	(0.07)	(0.06)	(0.07)
CSS×1959	0.17**	0.18**	0.08	0.19**	0.27***	0.18**	0.17**	0.16**	0.20**	0.14*	0.12
	(0.07)	(0.07)	(0.07)	(0.08)	(0.09)	(0.07)	(0.07)	(0.07)	(0.10)	(0.09)	(0.10)
CSS×1960	0.11*	0.14**	0.13*	0.09	0.19***	0.13**	0.12*	0.11*	0.18**	0.14**	0.15*
	(0.06)	(0.06)	(0.07)	(0.07)	(0.07)	(0.06)	(0.07)	(0.06)	(0.08)	(0.07)	(0.08)
CSS×1961	-0.16***	-0.13**	-0.20***	-0.17***	-0.07	-0.12**	-0.16***	-0.17***	-0.02	-0.09	-0.04
	(0.06)	(0.06)	(0.06)	(0.06)	(0.07)	(0.06)	(0.06)	(0.06)	(0.07)	(0.07)	(0.08)
CSS×1962	-0.00	0.04	-0.07	0.00	0.08	-0.01	0.02	0.01	0.09	0.05	0.09
	(0.05)	(0.05)	(0.05)	(0.05)	(0.06)	(0.04)	(0.05)	(0.05)	(0.06)	(0.05)	(0.07)
CSS×1963	-0.01	0.05	-0.07	0.02	0.06	-0.03	0.01	0.01	0.04	0.06	0.06
	(0.05)	(0.05)	(0.05)	(0.05)	(0.06)	(0.05)	(0.05)	(0.05)	(0.07)	(0.06)	(0.07)
CSS×1964	-0.13***	-0.06	-0.18***	-0.12**	-0.07	-0.13***	-0.12**	-0.13***	-0.14*	-0.08	-0.10
	(0.05)	(0.05)	(0.05)	(0.05)	(0.06)	(0.05)	(0.05)	(0.05)	(0.07)	(0.06)	(0.08)
CSS×1965	-0.04	0.03	-0.09**	-0.04	0.03	-0.04	-0.02	-0.03	-0.04	0.01	0.04
	(0.04)	(0.05)	(0.05)	(0.05)	(0.06)	(0.04)	(0.04)	(0.04)	(0.06)	(0.05)	(0.07)
Baseline Population-by-Year FE	N	N	N	Y	N	N	N	N	Y	Y	Y
Steel Production Growth	N	N	N	N	Y	N	N	N	Y	N	Y
GLF Variables	N	N	N	N	N	Y	N	N	Y	Y	Y
Crop Suitability	N	N	N	N	N	N	Y	N	Y	Y	Y
Yearly Weather	N	N	N	N	N	N	N	Y	Y	Y	Y
Year FE	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y
Region-by-Year FE	N	N	Y	N	N	N	N	N	N	N	N
Provincial Linear Trends	N	Y	N	N	N	N	N	N	N	Y	Y
R^2	0.75	0.77	0.78	0.75	0.78	0.76	0.76	0.76	0.80	0.77	0.81
Dep. Var. Mean	.2518229	.2518229	.2518229	.2515824	.2579992	.2515055	.2518229	.2518229	.2570676	.2507721	.2570676
N	3,388	3,388	3,388	3,043	2,292	3,235	3,388	3,388	2,125	2,965	2,125
Clusters	440	440	440	403	347	420	440	440	323	390	323

Notes: Estimation results from Equation 1 for the main sample spanning 1954 to 1965. The procurement rate is defined as the fraction of grain output procured by the state (a value between 0 and 1). The analysis uses county-level data from 1954–1965 with county fixed effects and year fixed effects included in every regression. Standard errors are clustered at the county level.

Table A19
Effects on Procurement Rate, Detailed

	Procurement Rate										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
HSS×1954	-0.01	-0.02*	-0.03***	-0.02	0.00	-0.02	-0.01	-0.01	-0.00	-0.03**	-0.02
	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.02)
HSS×1955	0.00	-0.00	-0.01	-0.00	0.02	-0.00	0.00	0.00	0.02	-0.00	0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
HSS×1956	0.01	0.01	-0.01	0.01	0.02	0.00	0.01	0.01	0.03	0.00	0.02
	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.02)
HSS×1958	0.01	0.01	0.02**	0.01	0.02	0.02*	0.01	0.01	0.02	0.02	0.02
	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)
HSS×1959	0.03***	0.04***	0.02	0.04***	0.05***	0.04***	0.04***	0.03**	0.04**	0.03**	0.02
	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)
HSS×1960	0.01	0.02	0.01	0.01	0.02	0.01	0.01	0.01	0.02	0.01	0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.02)
HSS×1961	-0.04***	-0.03**	-0.04***	-0.04***	-0.02*	-0.03**	-0.04***	-0.04***	-0.02	-0.02	-0.02
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.02)
HSS×1962	-0.01	0.00	-0.02**	-0.01	0.00	-0.01	-0.00	-0.01	0.01	0.01	0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
HSS×1963	-0.01	0.00	-0.02*	-0.01	-0.00	-0.02	-0.01	-0.01	-0.00	0.01	0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.02)
HSS×1964	-0.03***	-0.01	-0.03***	-0.03**	-0.02	-0.03***	-0.02**	-0.03***	-0.03**	-0.01	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.02)
HSS×1965	-0.02	0.00	-0.03**	-0.01	-0.01	-0.02*	-0.01	-0.02*	-0.01	0.00	0.02
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
Baseline Population-by-Year FE	N	N	N	Y	N	N	N	N	Y	Y	Y
Steel Production Growth	N	N	N	N	Y	N	N	N	Y	N	Y
GLF Variables	N	N	N	N	N	Y	N	N	Y	Y	Y
Crop Suitability	N	N	N	N	N	N	Y	N	Y	Y	Y
Yearly Weather	N	N	N	N	N	N	N	Y	Y	Y	Y
Year FE	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y
Region-by-Year FE	N	N	Y	N	N	N	N	N	N	N	N
Provincial Linear Trends	N	Y	N	N	N	N	N	N	N	Y	Y
R^2	0.75	0.76	0.78	0.75	0.78	0.76	0.76	0.75	0.80	0.77	0.81
Dep. Var. Mean	.2518229	.2518229	.2518229	.2515824	.2579992	.2515055	.2518229	.2518229	.2570676	.2507721	.2570676
N	3,388	3,388	3,388	3,043	2,292	3,235	3,388	3,388	2,125	2,965	2,125
Clusters	440	440	440	403	347	420	440	440	323	390	323

Notes: Estimation results from Equation 1 for the main sample spanning 1954 to 1965. HSS equals 1 for counties with sparrow suitability above the median. The dependent variable is the grain procurement rate (share of output requisitioned by the state). Each regression includes county fixed effects. Standard errors are clustered at the county level.

Table A20
Effects on Sown Area, Detailed

	Sown Area										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
CSS×1954	6.23	6.02	7.84	4.40	4.89	7.77	6.63	5.16	-0.23	14.07	9.46
	(6.98)	(7.51)	(7.90)	(7.26)	(10.20)	(7.22)	(6.86)	(7.06)	(15.24)	(8.66)	(14.68)
CSS×1955	-3.27	-3.12	3.12	-4.19	-4.32	-1.79	-2.60	-2.30	-4.75	2.15	0.72
	(6.57)	(6.39)	(7.56)	(6.56)	(8.77)	(6.93)	(6.49)	(6.62)	(11.74)	(7.56)	(10.24)
CSS×1956	-5.74	-8.08	2.66	-7.58	-15.52**	-6.54	-5.16	-4.50	-24.66**	-8.86	-27.19***
	(5.67)	(5.42)	(7.66)	(6.11)	(7.44)	(6.71)	(5.48)	(5.82)	(10.56)	(9.39)	(9.85)
CSS×1958	3.49	0.12	-4.07	0.49	3.52	-0.47	3.71	3.03	-4.67	-11.32*	-12.48
	(6.70)	(6.71)	(8.36)	(6.32)	(10.50)	(7.36)	(6.67)	(6.73)	(10.07)	(6.87)	(9.18)
CSS×1959	10.99	8.17	-3.47	2.70	11.90	10.35	11.30	11.59	-1.31	-10.68	-12.83
	(8.58)	(8.45)	(10.13)	(7.30)	(12.67)	(9.84)	(8.54)	(8.62)	(12.86)	(8.92)	(12.04)
CSS×1960	18.67**	15.71*	1.50	15.73*	20.86	16.49*	18.76**	18.92**	6.96	5.13	-6.82
	(9.09)	(8.80)	(10.02)	(9.19)	(13.92)	(9.68)	(8.81)	(9.17)	(13.54)	(9.08)	(13.42)
CSS×1961	19.69**	17.47*	1.51	14.40	17.00	20.73*	19.89**	19.93**	11.18	10.78	-6.68
	(9.75)	(9.58)	(11.13)	(9.15)	(14.00)	(10.62)	(9.58)	(9.73)	(14.01)	(9.93)	(14.41)
CSS×1962	17.15**	14.92*	-0.98	11.74	17.28	18.26**	17.57**	18.34**	9.70	5.97	-11.46
	(8.36)	(8.91)	(9.22)	(7.97)	(12.70)	(9.12)	(8.29)	(8.36)	(12.87)	(9.25)	(14.27)
CSS×1963	13.95*	11.93	-5.25	8.49	14.35	14.61	14.42*	14.04*	2.78	1.17	-17.74
	(8.12)	(8.77)	(9.51)	(7.21)	(12.34)	(8.96)	(8.02)	(8.21)	(11.71)	(7.84)	(12.36)
CSS×1964	9.01	6.11	-9.17	3.02	8.67	9.09	9.16	7.84	-0.64	-10.26	-26.60**
	(9.02)	(9.97)	(10.16)	(7.60)	(13.39)	(10.17)	(8.91)	(9.04)	(12.17)	(8.44)	(13.13)
CSS×1965	4.18	-0.08	-10.65	0.16	4.55	6.20	4.50	4.36	1.43	-10.77	-29.82**
	(8.47)	(10.61)	(9.99)	(7.56)	(12.86)	(9.63)	(8.39)	(8.44)	(12.13)	(10.00)	(14.99)
Baseline Population-by-Year FE	N	N	N	Y	N	N	N	N	Y	Y	Y
Steel Production Growth	N	N	N	N	Y	N	N	N	Y	N	Y
GLF Variables	N	N	N	N	N	Y	N	N	Y	Y	Y
Crop Suitability	N	N	N	N	N	N	Y	N	Y	Y	Y
Yearly Weather	N	N	N	N	N	N	N	Y	Y	Y	Y
Year FE	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y
Region-by-Year FE	N	N	Y	N	N	N	N	N	N	N	N
Provincial Linear Trends	N	Y	N	N	N	N	N	N	N	Y	Y
R^2	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Dep. Var. Mean	85.15309	85.15309	85.15309	82.88842	86.95354	84.07194	85.15309	85.15309	86.19418	81.38529	86.19418
N	3,741	3,741	3,741	3,345	2,563	3,549	3,741	3,741	2,368	3,233	2,368
Clusters	459	459	459	417	368	438	459	459	343	405	343

Estimation results from Equation 1 for the year-specific effects on total crop sown area, using the continuous sparrow suitability score (CSS) interacted with year dummies. The regressions use the main sample of counties from 1954–1965, including county fixed effects and year fixed effects throughout. Standard errors are clustered by county.

Table A21
Effects on Sown Area, Detailed

	Sown Area										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
HSS×1954	1.58	1.19	2.41	1.11	3.43	2.36	1.74	1.36	2.29	2.97*	2.63
	(1.76)	(1.66)	(2.10)	(1.67)	(3.05)	(1.75)	(1.75)	(1.77)	(2.52)	(1.65)	(2.35)
HSS×1955	-0.90	-1.04	0.71	-1.09	0.74	-0.26	-0.72	-0.62	1.47	0.34	1.30
	(1.55)	(1.45)	(1.68)	(1.53)	(2.50)	(1.65)	(1.55)	(1.57)	(2.98)	(1.67)	(2.45)
HSS×1956	1.95	1.35	4.57**	1.78	3.14	2.35	2.22	2.32	0.58	2.10	-0.47
	(1.69)	(1.57)	(2.08)	(1.75)	(2.55)	(1.85)	(1.68)	(1.71)	(2.17)	(2.35)	(2.04)
HSS×1958	0.79	0.28	-0.56	0.61	0.11	-0.29	0.84	0.78	-0.45	-1.71	-1.50
	(1.45)	(1.44)	(1.76)	(1.43)	(2.16)	(1.58)	(1.45)	(1.47)	(2.34)	(1.66)	(2.17)
HSS×1959	0.42	0.11	-2.60	-0.78	-0.08	0.60	0.52	0.54	-1.57	-2.88	-2.70
	(2.09)	(2.03)	(2.58)	(1.78)	(2.92)	(2.36)	(2.09)	(2.07)	(3.18)	(2.30)	(2.99)
HSS×1960	0.72	0.48	-3.13	0.60	1.50	0.52	0.71	0.74	0.38	-0.61	-0.86
	(1.91)	(1.83)	(2.17)	(1.88)	(2.49)	(1.86)	(1.89)	(1.92)	(2.53)	(1.74)	(2.34)
HSS×1961	2.40	2.14	-1.14	1.60	2.42	3.15*	2.42	2.40	2.51	1.70	0.84
	(1.86)	(1.81)	(2.13)	(1.75)	(2.56)	(1.88)	(1.84)	(1.83)	(2.57)	(1.74)	(2.50)
HSS×1962	2.12	2.02	-1.35	1.24	2.73	2.56	2.23	2.34	2.56	1.29	0.91
	(1.78)	(1.78)	(2.05)	(1.72)	(2.67)	(1.84)	(1.78)	(1.77)	(2.74)	(1.78)	(2.75)
HSS×1963	0.74	0.74	-3.07	0.07	0.99	1.19	0.81	0.77	0.43	0.00	-0.70
	(1.86)	(1.77)	(2.17)	(1.66)	(2.70)	(1.93)	(1.86)	(1.88)	(2.80)	(1.58)	(2.31)
HSS×1964	-0.05	-0.00	-3.33	-1.00	0.07	0.31	-0.02	-0.34	-0.46	-1.95	-1.79
	(1.84)	(1.84)	(2.04)	(1.61)	(2.65)	(1.91)	(1.83)	(1.83)	(2.66)	(1.64)	(2.53)
HSS×1965	-0.07	-0.73	-3.00	-0.93	0.10	0.56	0.03	-0.04	0.81	-1.64	-2.33
	(1.74)	(1.96)	(2.02)	(1.64)	(2.64)	(1.88)	(1.74)	(1.72)	(2.81)	(1.87)	(2.94)
Baseline Population-by-Year FE	N	N	N	Y	N	N	N	N	Y	Y	Y
Steel Production Growth	N	N	N	N	Y	N	N	N	Y	N	Y
GLF Variables	N	N	N	N	N	Y	N	N	Y	Y	Y
Crop Suitability	N	N	N	N	N	N	Y	N	Y	Y	Y
Yearly Weather	N	N	N	N	N	N	N	Y	Y	Y	Y
Year FE	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y
Region-by-Year FE	N	N	Y	N	N	N	N	N	N	N	N
Provincial Linear Trends	N	Y	N	N	N	N	N	N	N	Y	Y
R^2	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Dep. Var. Mean	85.15309	85.15309	85.15309	82.88842	86.95354	84.07194	85.15309	85.15309	86.19418	81.38529	86.19418
N	3,741	3,741	3,741	3,345	2,563	3,549	3,741	3,741	2,368	3,233	2,368
Clusters	459	459	459	417	368	438	459	459	343	405	343

Notes: Estimation results from Equation 1 for the main sample spanning 1954 to 1965. HSS equals 1 for counties with sparrow suitability above the median. Each regression includes county fixed effects. Standard errors are clustered at the county level.

Table A22
Effects on Mortality, Detailed

	Mortality										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
CSS×1954	3.72	2.69	1.54	4.54	-2.18	9.34**	9.31*	5.67	3.58	7.38	6.77
	(3.86)	(3.65)	(4.41)	(3.66)	(3.56)	(4.22)	(5.49)	(4.17)	(6.28)	(4.55)	(7.73)
CSS×1955	-1.84	-1.10	2.17	-0.79	-5.24	1.12	-0.53	-4.24	-6.26	1.67	-3.38
	(3.57)	(3.51)	(4.75)	(3.98)	(4.37)	(3.30)	(3.52)	(3.72)	(4.55)	(3.92)	(5.08)
CSS×1956	1.13	1.13	-0.82	2.63	-13.20***	2.49	0.93	3.48	-11.08***	4.17	-7.01
	(3.80)	(3.91)	(4.93)	(3.83)	(4.37)	(3.14)	(3.79)	(4.26)	(4.23)	(3.84)	(4.48)
CSS×1958	2.56	2.67	-0.16	4.05	-2.89	-9.12*	1.34	6.95	-6.77	-7.48	-7.52
	(4.92)	(5.02)	(4.84)	(5.17)	(4.68)	(4.72)	(4.78)	(5.53)	(7.13)	(5.03)	(7.30)
CSS×1959	4.12	4.12	6.81	5.14	-4.17	-22.76*	0.54	2.22	10.65*	-24.06**	7.20
	(11.26)	(11.26)	(11.17)	(12.03)	(6.13)	(11.77)	(11.11)	(11.14)	(5.42)	(12.19)	(5.89)
CSS×1960	33.42*	33.45**	35.65	37.09**	19.02	-11.89	23.69	34.27**	26.11*	-7.76	22.08
	(17.03)	(16.97)	(22.63)	(18.26)	(12.08)	(15.88)	(16.25)	(16.70)	(14.93)	(15.84)	(14.38)
CSS×1961	-13.06**	-12.84**	-14.15**	-12.58**	-7.08	-19.44***	-13.75**	-16.19***	-1.74	-19.86***	-6.41
	(5.65)	(5.45)	(6.05)	(5.57)	(4.65)	(6.32)	(5.57)	(6.25)	(5.66)	(5.96)	(6.18)
CSS×1962	-1.61	-1.80	-0.58	-2.36	12.40**	-1.06	-1.67	2.22	8.39*	-1.16	3.05
	(2.70)	(2.73)	(3.19)	(2.61)	(5.09)	(2.49)	(2.76)	(3.05)	(4.60)	(2.63)	(5.56)
CSS×1963	9.66***	9.88**	11.84**	10.18**	6.66	8.62**	9.38**	21.81***	5.65	11.69**	0.38
	(3.69)	(3.83)	(5.16)	(3.99)	(4.12)	(3.70)	(3.72)	(5.02)	(5.21)	(4.93)	(6.13)
CSS×1964	7.31*	7.57*	11.81**	7.18*	-0.35	6.48*	7.74**	17.75***	2.41	5.78	-4.92
	(3.83)	(3.88)	(5.56)	(4.08)	(3.65)	(3.88)	(3.92)	(5.68)	(4.84)	(5.15)	(5.94)
CSS×1965	5.35**	4.91*	6.73**	3.98*	7.21**	4.66*	5.15**	4.45	4.11	4.85	-5.15
	(2.41)	(2.88)	(2.69)	(2.34)	(3.22)	(2.51)	(2.37)	(3.02)	(3.42)	(3.41)	(4.76)
Baseline Population-by-Year FE	N	N	N	Y	N	N	N	N	Y	Y	Y
Steel Production Growth	N	N	N	N	Y	N	N	N	Y	N	Y
GLF Variables	N	N	N	N	N	Y	N	N	Y	Y	Y
Crop Suitability	N	N	N	N	N	N	Y	N	Y	Y	Y
Yearly Weather	N	N	N	N	N	N	N	Y	Y	Y	Y
Year FE	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y
Region-by-Year FE	N	N	Y	N	N	N	N	N	N	N	N
Provincial Linear Trends	N	Y	N	N	N	N	N	N	N	Y	Y
R^2	0.46	0.46	0.60	0.46	0.63	0.56	0.48	0.47	0.65	0.57	0.66
Dep. Var. Mean	14.6542	14.6542	14.6542	14.6542	13.15465	14.24117	14.6542	14.6542	13.15465	14.24117	13.15465
N	3,699	3,699	3,699	3,699	2,524	3,550	3,699	3,699	2,524	3,550	2,524
Clusters	486	486	486	486	388	470	486	486	388	470	388

Notes: Estimation results from Equation 1 for the main sample spanning 1954 to 1965.This regression using the continuous sparrow suitability score (CSS) interacted with year dummies. Each regression includes county fixed effects. Standard errors are clustered at the county level.

Table A23
Effects on Mortality, Detailed

	Mortality										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
HSS×1954	0.36	-0.13	0.09	0.55	0.25	3.09**	1.80	0.61	3.36*	2.30**	4.61**
	(1.12)	(1.01)	(1.15)	(1.11)	(1.15)	(1.23)	(1.59)	(1.13)	(1.99)	(1.08)	(2.29)
HSS×1955	0.53	0.79	1.90*	0.74	0.17	1.88**	0.87	0.46	-0.15	2.23**	0.90
	(0.99)	(1.01)	(1.07)	(1.07)	(1.21)	(0.91)	(0.98)	(1.00)	(1.18)	(1.02)	(1.28)
HSS×1956	0.58	0.74	0.67	0.91	-2.32**	1.43	0.72	0.99	-2.15**	1.97*	-1.03
	(1.06)	(1.11)	(1.38)	(1.09)	(0.99)	(0.87)	(1.05)	(1.10)	(1.07)	(1.01)	(1.19)
HSS×1958	1.99	2.09	1.35	2.25	-0.05	-0.95	1.93	2.26*	-1.79	-0.74	-1.85
	(1.30)	(1.34)	(1.36)	(1.39)	(1.38)	(1.22)	(1.29)	(1.31)	(2.12)	(1.35)	(2.16)
HSS×1959	7.67**	7.73**	8.01**	8.34**	-0.25	-2.74	7.09**	7.64**	2.98**	-2.71	2.29
	(3.39)	(3.40)	(3.39)	(3.70)	(1.24)	(2.20)	(3.34)	(3.36)	(1.44)	(2.29)	(1.68)
HSS×1960	13.14***	13.25***	14.31**	14.32***	5.17**	1.75	11.64***	13.19***	6.24*	2.89	5.25
	(4.20)	(4.24)	(5.56)	(4.85)	(2.32)	(3.97)	(4.20)	(4.13)	(3.24)	(4.62)	(3.41)
HSS×1961	-0.92	-0.85	-1.78	-0.78	-1.37	-1.88	-0.95	-1.47	-0.40	-1.66	-1.33
	(1.77)	(1.79)	(1.99)	(1.92)	(1.25)	(1.65)	(1.77)	(1.91)	(1.41)	(1.95)	(1.54)
HSS×1962	-0.57	-0.47	-0.57	-0.62	2.30**	-0.23	-0.54	0.10	1.60	0.02	0.61
	(0.58)	(0.58)	(0.70)	(0.56)	(1.13)	(0.53)	(0.58)	(0.60)	(0.98)	(0.58)	(1.13)
HSS×1963	2.48***	2.53***	3.13***	2.61***	1.61	2.55***	2.53***	4.53***	1.02	3.20***	0.07
	(0.85)	(0.95)	(1.01)	(0.94)	(1.09)	(0.82)	(0.85)	(0.93)	(1.07)	(1.08)	(1.19)
HSS×1964	2.52***	2.54**	3.83***	2.51**	1.00	2.82***	2.71***	4.29***	1.63	2.82**	0.19
	(0.92)	(1.05)	(1.09)	(1.00)	(1.12)	(0.89)	(0.91)	(1.04)	(1.24)	(1.17)	(1.43)
HSS×1965	1.42**	1.50**	1.69**	1.16**	2.20***	1.37**	1.49***	1.16*	1.56**	1.73**	0.01
	(0.57)	(0.75)	(0.66)	(0.57)	(0.81)	(0.54)	(0.57)	(0.68)	(0.74)	(0.79)	(0.84)
Baseline Population-by-Year FE	N	N	N	Y	N	N	N	N	Y	Y	Y
Steel Production Growth	N	N	N	N	Y	N	N	N	Y	N	Y
GLF Variables	N	N	N	N	N	Y	N	N	Y	Y	Y
Crop Suitability	N	N	N	N	N	N	Y	N	Y	Y	Y
Yearly Weather	N	N	N	N	N	N	N	Y	Y	Y	Y
Year FE	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y
Region-by-Year FE	N	N	Y	N	N	N	N	N	N	N	N
Provincial Linear Trends	N	Y	N	N	N	N	N	N	N	Y	Y
R^2	0.47	0.48	0.62	0.48	0.63	0.56	0.49	0.48	0.65	0.57	0.66
Dep. Var. Mean	14.6542	14.6542	14.6542	14.6542	13.15465	14.24117	14.6542	14.6542	13.15465	14.24117	13.15465
N	3,699	3,699	3,699	3,699	2,524	3,550	3,699	3,699	2,524	3,550	2,524
Clusters	486	486	486	486	388	470	486	486	388	470	388

Notes: Estimation results from Equation 1 for the main sample spanning 1954 to 1965. HSS equals 1 for counties with sparrow suitability above the median. Each regression includes county fixed effects. Standard errors are clustered at the county level.

Table A24
Effects on Fertility, Detailed

	Fertility										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
CSS×1954	-10.83*	-15.58***	5.69	-11.84*	-20.13***	1.20	-0.59	-13.29**	-0.99	-6.83	-13.68
	(6.13)	(5.99)	(6.64)	(6.18)	(7.38)	(6.08)	(5.13)	(6.49)	(10.69)	(6.04)	(11.47)
CSS×1955	-1.28	-2.16	8.70	-3.90	-3.23	3.86	1.80	-1.31	1.08	-5.39	1.64
	(5.86)	(5.92)	(5.61)	(5.94)	(7.34)	(5.88)	(5.42)	(6.07)	(7.50)	(6.63)	(7.85)
CSS×1956	7.73	6.44	9.36	7.93*	8.65	5.49	8.44*	4.95	3.33	1.11	-0.56
	(4.90)	(4.82)	(5.73)	(4.77)	(6.44)	(4.80)	(5.00)	(5.19)	(6.61)	(5.01)	(6.68)
CSS×1958	6.44	7.12	9.95	5.48	9.67	9.76*	7.24	3.50	13.06*	9.26	13.23*
	(4.83)	(4.87)	(6.10)	(4.83)	(7.43)	(5.65)	(4.89)	(5.05)	(7.58)	(5.68)	(7.41)
CSS×1959	5.81	7.00	5.78	4.80	15.11**	11.44**	7.73	7.14	1.08	11.98**	2.00
	(4.79)	(5.03)	(5.42)	(4.69)	(6.33)	(5.48)	(4.74)	(4.74)	(5.79)	(5.48)	(5.93)
CSS×1960	-17.02***	-14.80**	-11.58**	-19.78***	-4.36	1.08	-12.98**	-19.67***	-7.38	-0.61	-6.19
	(5.34)	(5.98)	(4.74)	(5.34)	(5.54)	(5.51)	(5.04)	(5.46)	(5.41)	(5.38)	(5.84)
CSS×1961	5.04	8.53	9.38*	3.70	4.27	11.96**	6.49	4.16	8.75	17.64***	9.87*
	(5.51)	(6.09)	(5.37)	(5.48)	(5.98)	(5.75)	(5.48)	(5.62)	(5.48)	(5.85)	(5.97)
CSS×1962	7.42	10.99*	8.61	6.27	-5.09	5.65	6.96	2.58	-10.99	7.64	-9.99
	(5.69)	(6.33)	(7.45)	(5.54)	(6.12)	(6.47)	(5.63)	(5.79)	(6.90)	(7.28)	(7.73)
CSS×1963	-1.11	3.81	4.06	-2.31	6.64	-4.68	-1.06	-9.21*	1.85	-1.82	3.61
	(5.31)	(5.38)	(5.53)	(5.14)	(5.95)	(4.98)	(5.35)	(5.39)	(6.78)	(5.53)	(6.86)
CSS×1964	3.19	9.38	9.57**	1.30	9.82**	2.59	2.52	-1.18	13.26**	10.78*	17.21**
	(5.01)	(5.83)	(4.75)	(5.12)	(4.76)	(5.21)	(5.12)	(5.24)	(5.19)	(6.23)	(6.76)
CSS×1965	1.69	6.58	3.84	1.26	-0.70	-0.86	0.86	-3.11	4.45	3.18	4.93
	(4.75)	(6.25)	(4.19)	(4.94)	(5.26)	(5.06)	(4.80)	(5.29)	(5.93)	(7.04)	(8.51)
Baseline Population-by-Year FE	N	N	N	Y	N	N	N	N	Y	Y	Y
Steel Production Growth	N	N	N	N	Y	N	N	N	Y	N	Y
GLF Variables	N	N	N	N	N	Y	N	N	Y	Y	Y
Crop Suitability	N	N	N	N	N	N	Y	N	Y	Y	Y
Yearly Weather	N	N	N	N	N	N	N	Y	Y	Y	Y
Year FE	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y
Region-by-Year FE	N	N	Y	N	N	N	N	N	N	N	N
Provincial Linear Trends	N	Y	N	N	N	N	N	N	N	Y	Y
R^2	0.68	0.72	0.76	0.69	0.75	0.71	0.70	0.69	0.78	0.74	0.79
Dep. Var. Mean	31.61839	31.61839	31.61839	31.61839	32.02254	31.69093	31.61839	31.61839	32.02254	31.69093	32.02254
N	3,649	3,649	3,649	3,649	2,503	3,500	3,649	3,649	2,503	3,500	2,503
Clusters	482	482	482	482	388	466	482	482	388	466	388

Notes: Estimation results from Equation 1 for year-specific effects on fertility (birth rates), using the continuous sparrow suitability score (CSS) interacted with year indicators. Each regression includes county fixed effects. Standard errors are clustered at the county level.

Table A25
Effects on Fertility, Detailed

	Fertility										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
HSS×1954	-2.76*	-3.51**	0.15	-2.95*	-4.09**	-0.02	-0.67	-3.23**	-3.81	-2.19	-5.58**
	(1.54)	(1.57)	(1.73)	(1.52)	(1.86)	(1.79)	(1.32)	(1.64)	(2.36)	(1.66)	(2.75)
HSS×1955	0.72	0.20	2.37	0.34	-0.10	2.04	1.30	0.30	0.13	-0.22	0.60
	(1.51)	(1.49)	(1.67)	(1.50)	(2.31)	(1.73)	(1.39)	(1.54)	(2.58)	(1.83)	(2.41)
HSS×1956	1.69	1.37	1.66	1.81*	2.18	1.32	1.81*	0.78	0.13	0.16	-0.61
	(1.08)	(1.07)	(1.21)	(1.08)	(1.69)	(1.09)	(1.08)	(1.12)	(1.66)	(1.12)	(1.57)
HSS×1958	2.13**	2.01*	3.38***	1.96*	4.48***	3.27***	2.29**	1.68	5.09***	2.84**	4.88***
	(1.06)	(1.06)	(1.27)	(1.10)	(1.73)	(1.21)	(1.06)	(1.10)	(1.73)	(1.28)	(1.70)
HSS×1959	1.84*	1.83*	2.31*	1.70	5.47***	3.74***	2.24**	2.07*	2.27	3.39***	2.26
	(1.07)	(1.11)	(1.19)	(1.10)	(1.44)	(1.10)	(1.01)	(1.06)	(1.55)	(1.12)	(1.67)
HSS×1960	-3.79***	-3.65***	-2.75**	-4.40***	1.09	0.15	-3.09***	-4.32***	-0.21	-0.90	-0.52
	(1.19)	(1.32)	(1.14)	(1.31)	(1.47)	(1.10)	(1.12)	(1.25)	(1.58)	(1.30)	(1.73)
HSS×1961	1.85	2.23	3.13**	1.61	2.83*	3.53***	2.14*	1.69	3.44**	4.13***	2.93*
	(1.22)	(1.37)	(1.26)	(1.24)	(1.53)	(1.26)	(1.19)	(1.26)	(1.53)	(1.40)	(1.65)
HSS×1962	3.67**	4.01**	4.68***	3.52**	2.06	3.44*	3.67**	2.67*	0.23	3.17	-0.55
	(1.50)	(1.62)	(1.60)	(1.51)	(1.78)	(1.76)	(1.50)	(1.54)	(2.05)	(1.93)	(2.19)
HSS×1963	1.17	1.82	1.72	1.02	2.46*	-0.23	1.18	-0.58	0.72	-0.51	-0.17
	(1.35)	(1.30)	(1.25)	(1.44)	(1.47)	(1.24)	(1.37)	(1.39)	(1.77)	(1.41)	(1.85)
HSS×1964	2.32*	3.19**	2.93**	2.04	2.47*	1.26	2.20	1.52	2.37	2.02	1.90
	(1.40)	(1.34)	(1.29)	(1.49)	(1.45)	(1.35)	(1.41)	(1.42)	(1.58)	(1.40)	(1.75)
HSS×1965	1.81*	2.30**	1.93**	1.82*	0.92	0.88	1.78*	0.89	1.21	0.70	-0.36
	(0.98)	(1.10)	(0.96)	(1.04)	(1.24)	(0.99)	(0.98)	(1.06)	(1.34)	(1.25)	(1.67)
Baseline Population-by-Year FE	N	N	N	Y	N	N	N	N	Y	Y	Y
Steel Production Growth	N	N	N	N	Y	N	N	N	Y	N	Y
GLF Variables	N	N	N	N	N	Y	N	N	Y	Y	Y
Crop Suitability	N	N	N	N	N	N	Y	N	Y	Y	Y
Yearly Weather	N	N	N	N	N	N	N	Y	Y	Y	Y
Year FE	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y
Region-by-Year FE	N	N	Y	N	N	N	N	N	N	N	N
Provincial Linear Trends	N	Y	N	N	N	N	N	N	N	Y	Y
R^2	0.69	0.72	0.77	0.69	0.76	0.71	0.70	0.69	0.78	0.74	0.79
Dep. Var. Mean	31.61839	31.61839	31.61839	31.61839	32.02254	31.69093	31.61839	31.61839	32.02254	31.69093	32.02254
N	3,649	3,649	3,649	3,649	2,503	3,500	3,649	3,649	2,503	3,500	2,503
Clusters	482	482	482	482	388	466	482	482	388	466	388

Notes: Estimation results from Equation 1 for the main sample spanning 1954 to 1965.HSS equals 1 for counties with sparrow suitability above the median. Each regression includes county fixed effects. Standard errors are clustered at the county level.

A Data Appendix

This section provides details on our data sources and variable construction.

A.1 County Level

Sparrow Suitability Score
Estimated by the habitat suitability model BIOCLIM: Eyal to fill in.

Crop Data from Gazetteers

The county-level crop output data is collected from county gazetteers. County gazetteers were published in the 1990s and compiled from historical archives into one archive. To collect crop-level data, we collect data from two sections, "Economy" and "Agriculture". The "Economy" section typically provides the aggregate statistics on the total cultivated area, gross output of grain crops, and gross output of cash crop by year. The "Agriculture" section provides annual panel data of more granular crop-level cultivated area and crop output. In total, we find XXX counties provide detailed crop-level
Crop Data from Province/Prefecture Statistics
The agricultural output data comes from 81 decrypted government documents and one published statistical compilation. We collected these documents from provincial libraries in China, university libraries in mainland China and Hong Kong, the Chinese full-text book search engine "Duxiu" and the largest second-hand or antique book trading platform in China, the "Kongfuzi" website. Complete agricultural statistical data compiled by provincial agricultural bureaus or statistical bureaus are available for 22 provinces and 1,699 counties. In areas without provincial-level statistical data, we used statistical compilations from prefecture-level cities, including county-level statistical data. We found statistical data compilations for 47 prefecture-level cities and 406 counties.

Here are the sources of agricultural output data for each county which are arranged by province, and the number before the province name represents the administrative code of that province.

11 Beijing Municipality
Beijing Municipal Bureau of Statistics & Beijing Rural Sample Survey Team. (1987). *Statistical data on grain production in Beijing Municipality, 1949-1986.*

12 Tianjin Municipality
Tianjin Agricultural and Forestry Bureau. (1977). *Statistical data on agricultural production in Tianjin Municipality, 1949-1976.*

13 Hebei Province
Hebei Provincial Agricultural Bureau & Chengde Area Administration Agricultural Bureau. (1980). *Statistical data on agricultural history in Chengde Area, 1949-1978.*

Hebei Provincial Agricultural Bureau & Shijiazhuang Area Administration Agricultural Bureau. (1980). *Statistical data on agricultural history in Shijiazhuang Area, 1949-1978.*

Hebei Provincial Agricultural Bureau & Baoding Area Administration Agricultural Bureau. (1980). *Statistical data on agricultural history in Baoding Area, 1949-1978.*

Hebei Provincial Agricultural Bureau & Cangzhou Area Administration Agricultural Bureau. (1980). *Statistical data on agricultural history in Cangzhou Area, 1949-1978.*

Hebei Provincial Agricultural Bureau & Handan Area Administration Agricultural Bureau. (1980). *Statistical data on agricultural history in Handan Area, 1949-1978.*

Handan Area Administration Agricultural Bureau. (1980). *Statistical data on agricultural history in Hengshui Area, 1949-1978.*

Langfang Area Administration Statistics Bureau. (1980). *Statistical data on national economic statistics in Langfang Area, 1949-1979.*

Qinhuangdao City Statistics Bureau. (1985). *Statistical data on national economic statistics in Qinhuangdao City, 1949-1984.*

Tangshan Area Administration Agricultural Bureau. (1980). *Statistical data compilation on national economic statistics in Tangshan Area, 1949-1979.*

Xingtai Area Revolutionary Committee Statistics Bureau. (1976). *Statistical data on national economic statistics in Xingtai Area, 1949-1975.*

Hebei Province Zhangjiakou Special Zone Office Statistics Bureau. (1965). *Statistical data compilation on national economic and socio-cultural statistics in Zhangjiakou Special Zone, 1949-1964.*

14 Shanxi Province

Shanxi Provincial Agriculture Department. (1982). *Statistical data on agricultural production in Shanxi Province, 1949-1979.*

15 Inner Mongolia Autonomous Region

Inner Mongolia Autonomous Region Statistics Bureau. (1983). *Statistical data on agricultural and animal husbandry production (Volumes 1-4).*

21 Liaoning Province

Andong City Statistics Bureau. (1964). *Statistical data on national economic statistics in Andong Area, 1949-1962.*

Benxi City Statistics Bureau. (1975). *Statistical data compilation on national economic statistics in Benxi Area, 1949-1971.*

Dalian City Statistics Bureau. (1981). *Statistical data compilation on agricultural statistics in Dalian City, 1949-1978*.

Shenyang City Statistics Bureau. (1979). *Statistical data on thirty years of national economic statistics in Shenyang City*.

Jinxian City Statistics Bureau. (1991). *Statistical data compilation on statistics in Jinxian City, 1949-1990*.

22 Jilin Province
Jilin Publishing Group Co., Ltd. (2011). *Compilation of 60 years of agricultural development data in Jilin, 1949-2009*.

23 Heilongjiang Province
Heilongjiang Provincial Agricultural Bureau. (1979). *Compilation of 30 years of agricultural statistics in Heilongjiang Province, 1949-1978*.

31 Shanghai Municipality
None

32 Jiangsu Province
Jiangsu Provincial Revolutionary Committee Agricultural Bureau. (1976). *Statistical data on agricultural statistics in Jiangsu Province, 1949-1975 (Volumes 1-2)*.

33 Zhejiang Province
Hangzhou Municipal Agricultural Bureau. (1974). Statistical data on agricultural statistics in Hangzhou Area, 1949-1973. Hangzhou Municipal Statistics Bureau Hangzhou Municipal Agricultural Bureau. (1988). *Statistical data on rural statistics in Hangzhou, 1949-1987*.

Lishui Area Planning Commission. (1979). *Statistical data on national economic statistics in Lishui Area, 1949-1978*.

Jiaxing Area Planning Commission. (1980). *Statistical data on thirty years of agricultural and economic statistics in Jiaxing Area, 1949-1979*.

Jinhua City Agricultural Planning Office. (1986). *Statistical data on agricultural statistics in Jinhua City, 1949-1985*.

Huzhou City Statistics Bureau. (1985). *Thirty-five years of national economic statistics on advancing Huzhou, 1949-1984*.

Wenzhou City Statistics Bureau. (1989). *Forty years of great achievements in economic and social development in vibrant Wenzhou, 1949-1988*.

Zhoushan City Statistics Bureau. (1989). *Forty years of Zhoushan, 1949-1988.*

Taizhou Area Statistics Bureau. (1994). *Advancing Taizhou, 1949-1990.*

Shaoxing City Statistics Bureau. (1989). *Statistical data compilation of Shaoxing City, 1949-1988.*

Ningbo City Library. (1980). *Statistical data on national economic statistics in Ningbo City, 1949-1979.*

Quzhou City Statistics Bureau, Zhejiang Province. (1989). *Forty years of Quzhou, 1949-1988.*

34 Anhui Province

Anhui Provincial Department of Agriculture. (1981). *Statistical data on agricultural statistics in Anhui Province, 1949-1979.*

35 Fujian Province

Putian Area Statistics Bureau Putian Area Agricultural Bureau. (1980). *Statistical data on national economic statistics in Putian Area, 1949-1978.*

Longxi Area Planning Commission. (1979). *Summary of national economic statistics in Longxi Area, 1949-1978.*

Fujian Province Fuzhou City Agricultural Bureau. (1979). *Thirty years of agricultural statistics in Fuzhou Area, 1949-1978.*

Xiamen City Statistics Bureau. (1979). *Statistical data on national economic statistics in Xiamen Area.*

Ningde Area Planning Commission & Ningde Area Agricultural Bureau. (1980). *Statistical data on national economic statistics (agriculture, forestry, and water) in Ningde Area, 1949-1978.*

36 Jiangxi Province

Jiangxi Provincial Department of Agriculture, Animal Husbandry, and Fisheries. (1989). *Compilation of agricultural statistics in Jiangxi Province's counties and cities, 1949-1965.*

Jiangxi Provincial Department of Agriculture, Animal Husbandry, and Fisheries. (1989). *Compilation of agricultural statistics in Jiangxi Province's counties and cities, 1966-1970.*

Jiangxi Provincial Department of Agriculture, Animal Husbandry, and Fisheries. (1989). *Compilation of agricultural statistics in Jiangxi Province's counties and cities, 1971-1975.*

Jiangxi Provincial Department of Agriculture, Animal Husbandry, and Fisheries. (1989).

Compilation of agricultural statistics in Jiangxi Province's counties and cities, 1976-1979.

37 Shandong Province
Shandong Provincial Revolutionary Committee Statistical Bureau. (1979). *Statistical data on agricultural statistics in Shandong Province, 1949-1970 (Volumes 1-2).*

Shandong Provincial Revolutionary Committee Statistical Bureau. (1979). *Statistical data on agricultural statistics in Shandong Province, 1971-1980 (Volumes 1-2).*

41 Henan Province
Henan Provincial Department of Agriculture, Henan Provincial Bureau of Statistics. (1981). *Statistical data on agricultural statistics in Henan Province, 1949-1979 (Volumes 2-11).*

42 Hubei Province
Hubei Provincial Revolutionary Committee Agricultural Bureau. (1973). *Statistical data on agricultural statistics in Hubei Province, 1949-1972 (Volume 1).*

Hubei Provincial Department of Agriculture. (1980). *Statistical data on agricultural statistics in Hubei Province, 1949-1978.*

43 Hunan Province
Hunan Provincial Bureau of Statistics. (1978). *Statistical data on national economic statistics in Hunan Province, 1949-1975 (Agriculture, Volumes 2-5).*

44 Guangdong Province
Guangdong Provincial Bureau of Statistics. (1982). *Statistical data on agricultural statistics in Guangdong Province, 1949-1981 (by county and city).*

45 Guangxi Zhuang Autonomous Region
Guangxi Zhuang Autonomous Region Bureau of Statistics. (1985). *Statistical data on national economic statistics in Guangxi Zhuang Autonomous Region, 1949-1980 (Agriculture, Volumes 2 and 3).*

Wuzhou Area Planning Commission. (1976). *Statistical data on agricultural statistics in Wuzhou Area, 1949-1975.*

Nanning Area Planning Commission. (1971). *Statistical data on national economic statistics in Nanning Area, Guangxi Zhuang Autonomous Region, 1949-1970 (Volumes 1-2).*

Yulin Area Administrative Office Statistical Bureau. (1986). *Statistical Yearbook of Yulin Area, 1949-1985.*

Liuzhou Area Administrative Office Statistical Bureau, Guangxi Zhuang Autonomous Region. (1991). *Statistical historical data on agricultural statistics in Liuzhou Area, 1950-1990.*

46 Hainan Province
Guangdong Provincial Bureau of Statistics. (1982). *Statistical data on agricultural statistics in Guangdong Province, 1949-1981 (by county and city).*

In 1982, Hainan was still part of Guangdong Province.

50 Chongqing Municipality, 51 Sichuan Province
Wenjiang Area Agricultural Bureau. (1980). *Statistical data on agricultural statistics in Wenjiang Area, Sichuan Province, 1949-1979.*

Leshan City Agricultural Bureau. (1988). *Historical statistical data on agricultural statistics in Leshan City, 1949-1986.*

Chengdu City Agricultural and Animal Husbandry Bureau. (1988). *Statistical data on agricultural statistics in Chengdu City, Sichuan Province, 1949-1987.*

Ya'an Area Bureau of Statistics, Ya'an Area Agricultural Bureau. (1979). *Statistical data on thirty years of agricultural statistics in Ya'an Area, Sichuan Province, 1949-1978.*

Wanxian Area Bureau of Statistics, Wanxian Area Agricultural Bureau. (1980). *Historical statistical data on agricultural statistics in Wanxian Area, Sichuan Province, 1949-1979.*

Deyang City Agricultural and Animal. (Year). *Compilation of historical agricultural statistical data in Deyang City, 1949-1986.*

52 Guizhou Province
Guizhou Provincial Department of Agriculture, Guizhou Provincial Bureau of Statistics. (1980). *Statistical data on agricultural statistics in Guizhou Province, 1949-1979 (Volumes 1-4).*

53 Yunnan Province
Yunnan Provincial Bureau of Statistics, Yunnan Provincial Department of Agriculture. (1981). *Compilation of thirty years of agricultural statistics in Yunnan Province, 1949-1978.*

61 Shaanxi Province
Shaanxi Provincial Department of Agriculture & Shaanxi Provincial Bureau of Statistics. (1982). *Compilation of agricultural statistical data in Shaanxi Province, 1949-1980.*

62 Gansu Province
(1980). *Statistical data on national economic statistics in Gansu Province, 1949-1978 (Agriculture, Volumes 1-3).*

63 Qinghai Province
Qinghai Provincial Bureau of Statistics. (1986). *Statistical data on agricultural statistics in Qinghai Province, 1949-1985.*

64 Ningxia Hui Autonomous Region

Ningxia Hui Autonomous Region Department of Agriculture. (1989). *Historical statistical data on agricultural statistics in Ningxia Hui Autonomous Region, 1949-1988.*

Ningxia Hui Autonomous Region Bureau of Statistics. (1966). *Statistical data on national economic statistics in Ningxia Hui Autonomous Region, 1949-1965 (Agriculture section).*

65 Xinjiang Uyghur Autonomous Region

Xinjiang Uyghur Autonomous Region Bureau of Statistics & Xinjiang Uyghur Autonomous Region Department of Agriculture. (1980). *Statistical data on agricultural production in Xinjiang Uyghur Autonomous Region, 1949-1978 (Volumes 1-2).*

Pesticide Use

The sales volume of chemical pesticides in each county mainly comes from the county-level cooperative supply and marketing society records and the commercial section of the county records. Chemical pesticides, as important agricultural production materials, are primarily managed and distributed by cooperative supply and marketing societies in various regions during the sample period. For example, the cooperative supply and marketing society records of Chaling County and the commercial section of the Zhaozhou County records - the third section on cooperative supply and marketing societies, document the annual sales volume of pesticides in the respective regions. In addition, county-level national economic statistical data, such as the Compilation of National Economic Statistical Data of Deqing County from 1949 to 1979, also include various indicators of regional economy, including pesticide sales volume.

Quantity of Sparrows Killed

The quantity of sparrow killing in each county comes from the hygiene records of each county or the hygiene section of the county records. Since the founding of the People's Republic of China, the "Four Pests Campaign" (including the "New Four Pests" after the replacement of sparrows with cockroaches since 1961) has been under the responsibility of the Patriotic Health Campaign Committees at the central and regional levels. The hygiene records in various regions may document various major hygiene campaigns and related data over the years. For example, the hygiene records of Zhuanglang County and the hygiene and sports section of Xishui County records - the twenty-second section, provide information on the quantity of sparrows killed.

Crop Procurement, Population, Fertility and Mortality

Data from "Kasahara, H. & Li, B. (2020). Grain Exports and the Causes of China's Great Famine, 1959-1961: County-Level Evidence. *Journal of Development Economics*, 146, 102513".

Agricultural Population

From gazetteers. Fill in by Yang.

A.2 Province Level

Sparrow Suitability Score
Aggregated from the county level : Eyal to fill in.

Quantity of Sparrows Killed
The data on the quantity of sparrow killings in each province comes from the main provincial newspapers, such as the Beijing Daily, which is the official organ of the Beijing Municipal Party Committee. The "Four Pest Campaign" was a significant event in the agricultural sector during the Great Leap Forward period, and most party newspapers provide detailed tracking records of the process and the number of sparrows killed.

Pesticide and Fertilizer Use
The data on the sales volume of chemical pesticides in each province is derived from provincial-level cooperative society publications, agricultural statistical data, or national economic statistical data, such as the "Cooperative Society Publication of Liaoning Province" and the "Agricultural Economic Statistical Data of Zhejiang Province, 1949-1985".

Population and Mortality
Data from "Meng X., Qian N. and Yared P. (2015). The Institutional Causes of Famine in China, 1959-61. *The Review of Economic Studies*, 82(4), 2015, p. 1568-1611".

Agricultural Output
Data from National Bureau of Statistics of China.

Price Data for Crop Unified Procurement and Sales
Ministry of Commerce of the People's Republic of China. (1981). *Compilation of National Grain Price Statistics 1950-1980.*
Planning Bureau of the Ministry of Agriculture of the People's Republic of China. (1980). *Compilation of National Agricultural Product Price Statistics, 1950-1979.*

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Maurer, B A. 1984. "Interference and exploitation in bird communities." *The Wilson Journal of Ornithology* 96:380–395.

Oerke, E-C. 2006. "Crop losses to pests." *The Journal of agricultural science* 144 (01): 31–43.

Pimentel, David, Lori McLaughlin, Andrew Zepp, Benyamin Lakitan, Tamara Kraus, Peter Kleinman, Fabius Vancini, et al. 1991. "Environmental and Economic Effects of Reducing Pesticide Use." *Bioscience* 41 (6): 402–409.

Savary, Serge, Laetitia Willocquet, Sarah Jane Pethybridge, Paul Esker, Neil McRoberts, and Andy Nelson. 2019. "The global burden of pathogens and pests on major food crops." *Nature ecology & evolution* 3 (3): 430–439.

Wangersky, Peter J. 1978. "Lotka-Volterra Population Models." *Annual Review of Ecology and Systematics* 9:189–218.