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The largest crop production shocks: magnitude, causes and frequency

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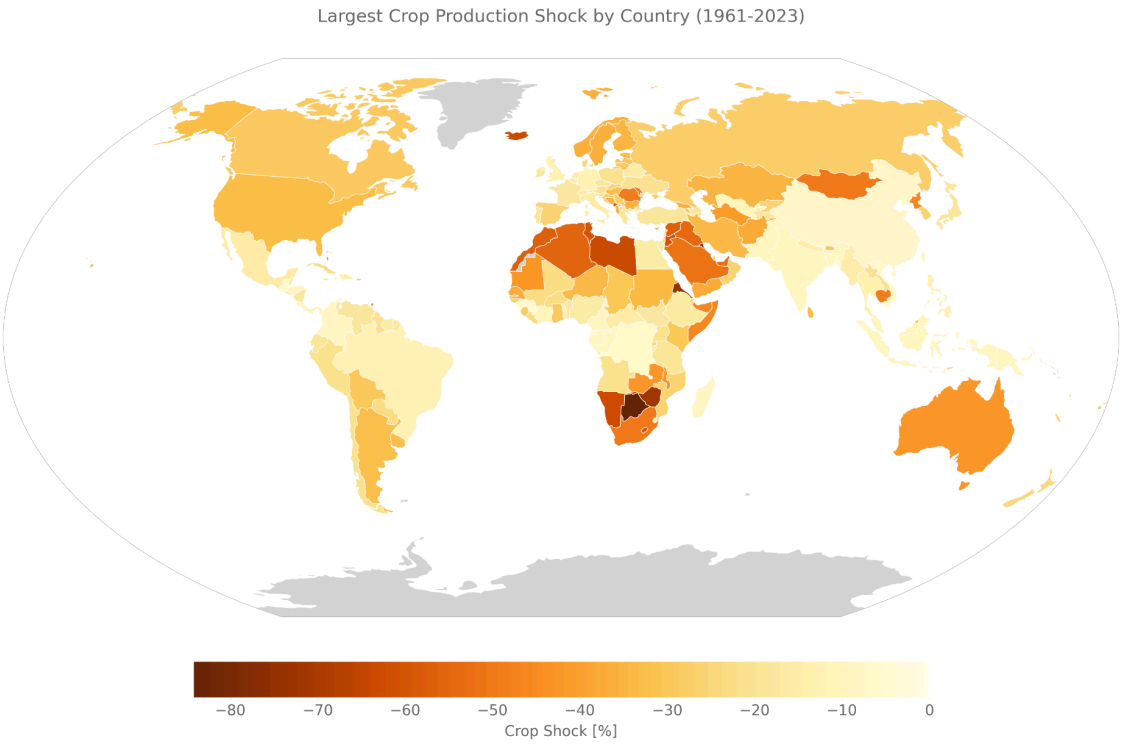

Figure S1: Largest crop production shock in all present-day countries. Darker colors indicate larger shocks. Grey indicates no data. The shocks are calculated as deviations from expected yield in a given year and are based on the combined calories from all assessed crops. This version of the figure excludes rapeseed, seed cotton and soya beans. The changes are almost not visible and can only be seen in very few countries, for example in Nicaragua.

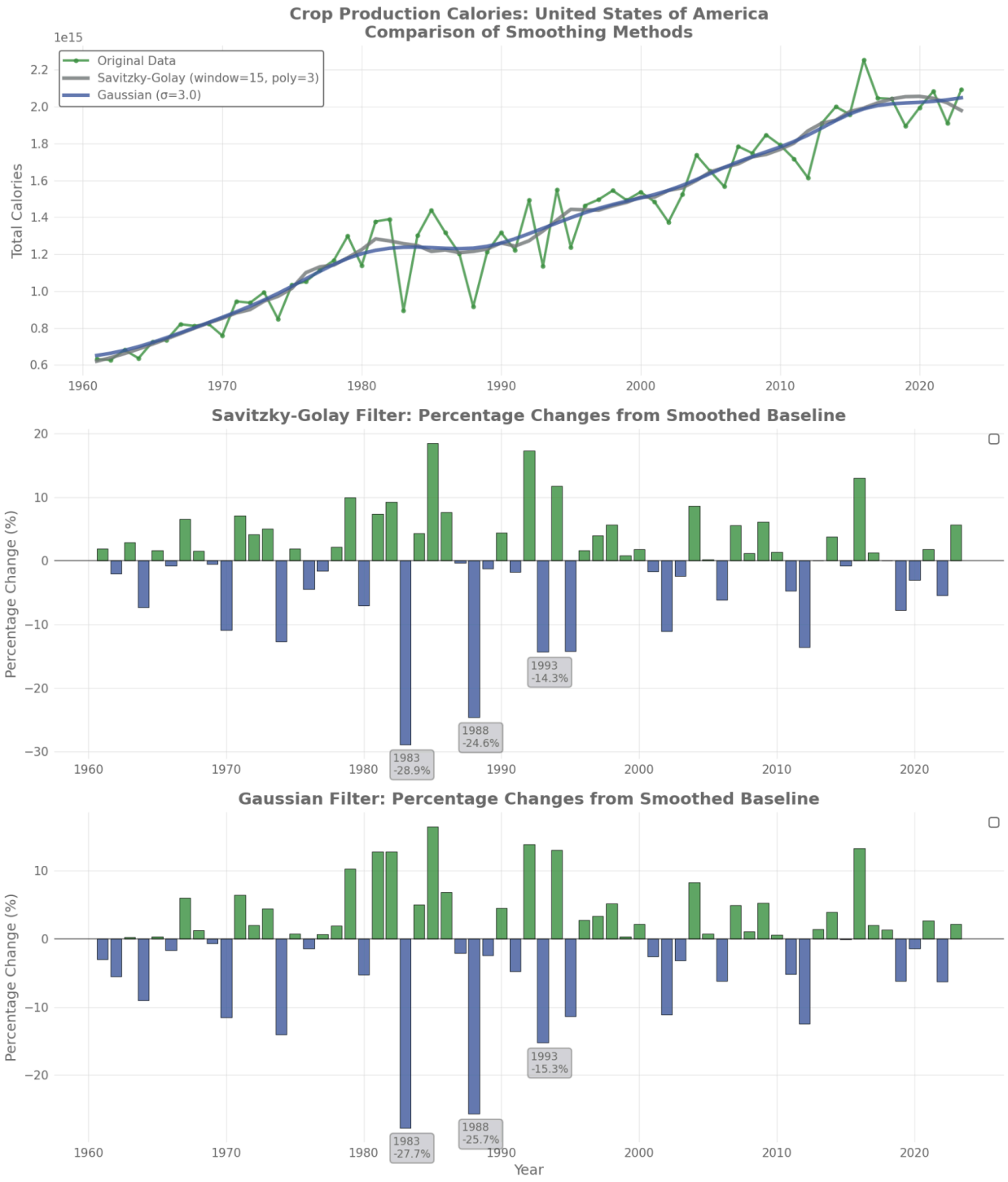

Figure S2: **Example comparison of Gaussian Filter and Savitzky-Golay Filter using crop calorie production in the United States (1961-2023). Upper plot shows original calorie data in green and smoothed trendline calculated with Savitzky-Golay filter in grey. The middle plot shows the size of the crop production shock calculated with Savitzky-Golay Filter. The lower plot shows the size of the crop production shock calculated with Gaussian Filter. Green represents more**

calories produced than expected, red represents less calories produced than expected. The three largest shocks are labelled with the year and size of the shock.

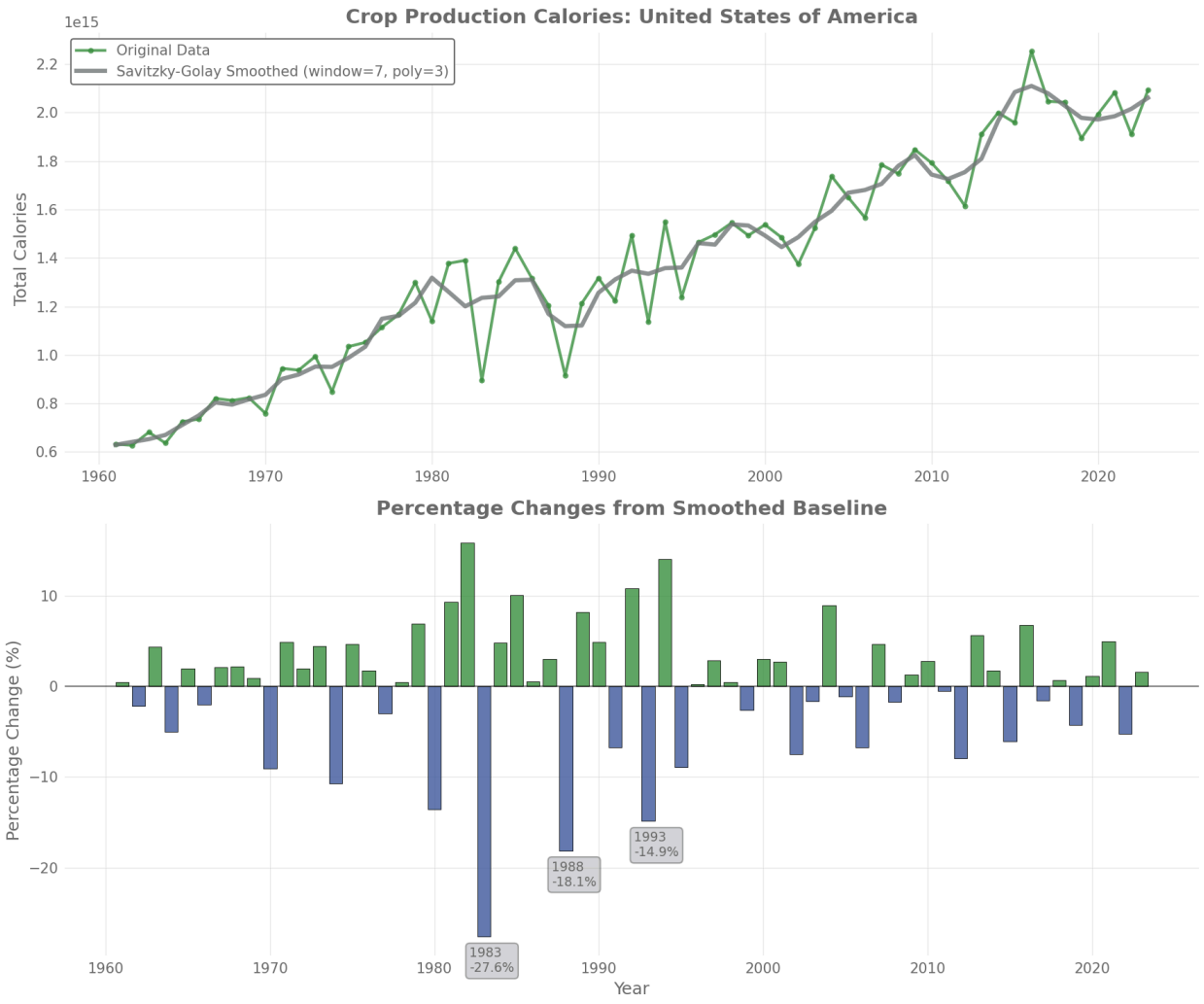

Figure S3: Example of crop calorie production in the United States (1961-2023), but with a calculation window of 7 years in contrast to the 15 years used in the main analysis. Upper plot shows original calorie data in green and smoothed trendline calculated with Savitzky-Golay filter in grey. The lower plot shows the size of the crop production shock calculated with our method. Green represents more calories produced than expected, red represents less calories produced than expected. The three largest shocks are labelled with the year and size of the shock.

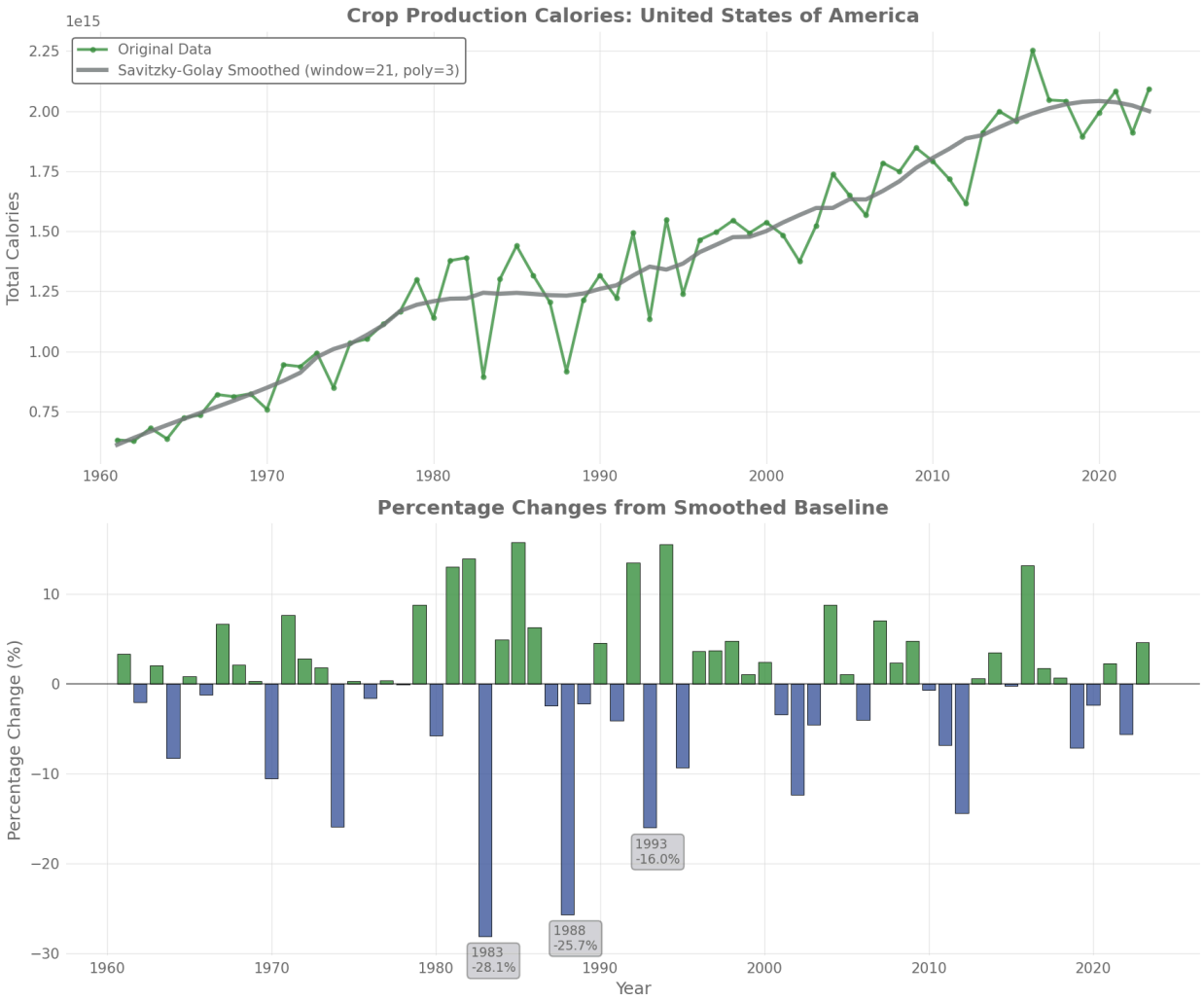

Figure S4: Example of crop calorie production in the United States (1961-2023), but with a calculation window of 21 years in contrast to the 15 years used in the main analysis. Upper plot shows original calorie data in green and smoothed trendline calculated with Savitzky-Golay filter in grey. The lower plot shows the size of the crop production shock calculated with our method. Green represents more calories produced than expected, red represents less calories produced than expected. The three largest shocks are labelled with the year and size of the shock.

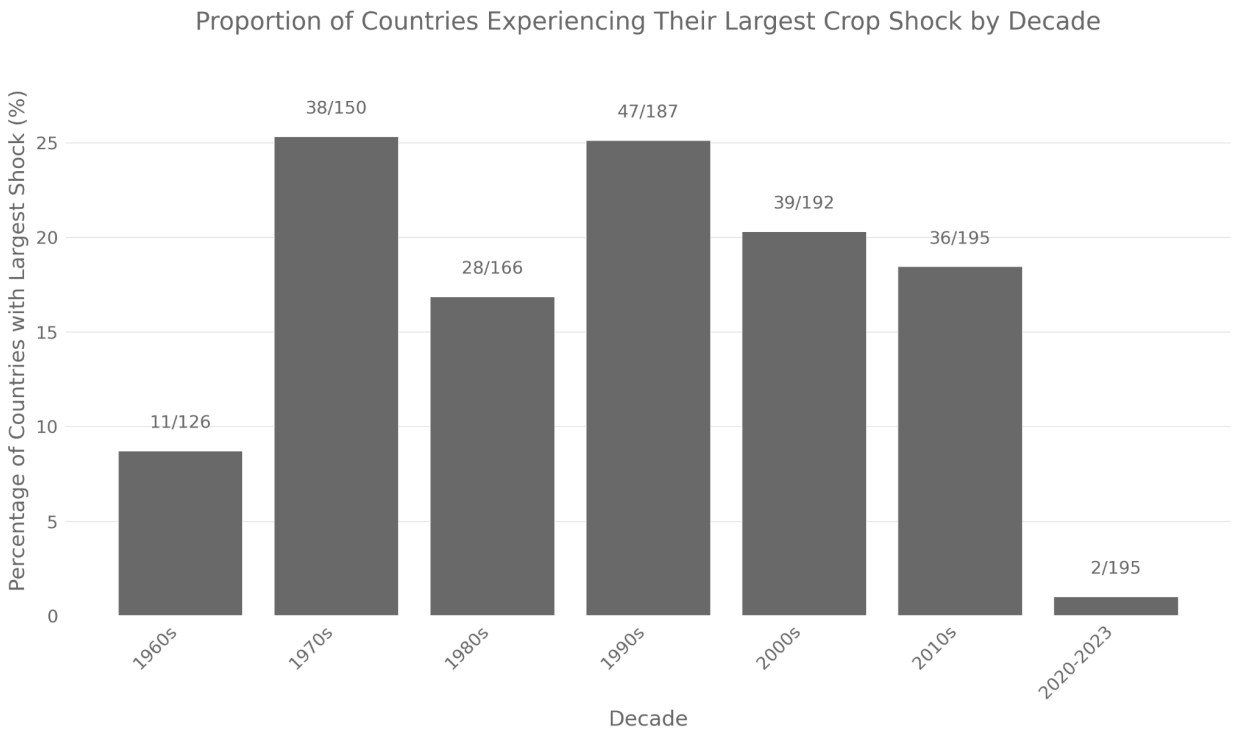

Figure S5: Proportion of countries experiencing a crop production shock in a given decade, with the denominator being the average number of countries that existed throughout the years of this decade.

Figure S6: Number of shocks detected if the data selected goes from 1971 to 2013. This selection is to verify that the low shock detection in the first and last bucket in the original data from 1961 to 2023 is random and not due to our method.

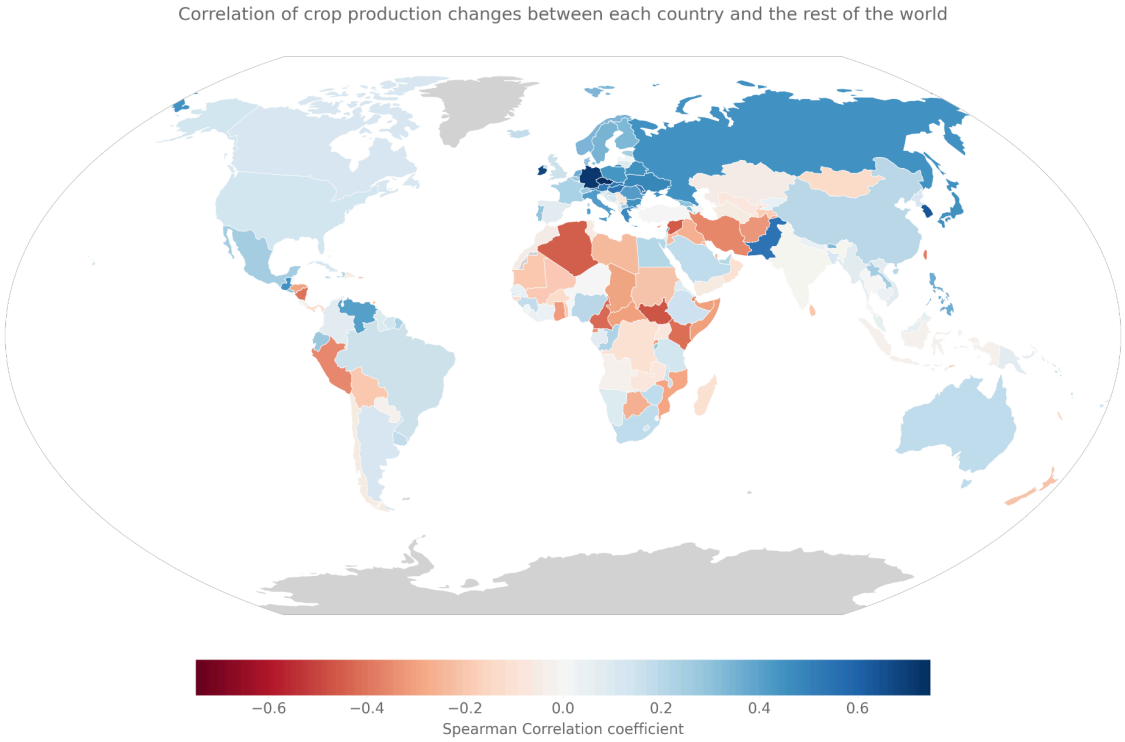

Figure S7: Figure 8: Correlation of crop production changes between each country and the rest of the world for the years 2003-2023. A positive correlation (blue) means a country's crop production tends to move in the same direction as global production. A negative correlation (red) means the country's production tends to move opposite to global trends.

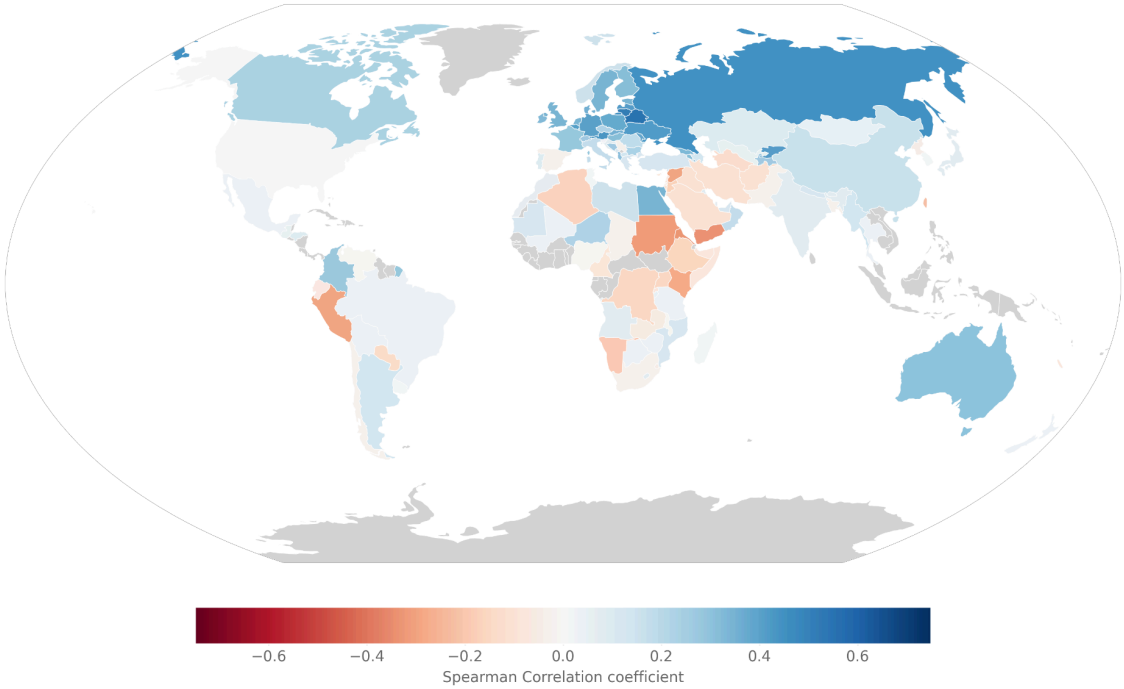

Figure S8: Figure 8: Correlation of only wheat production changes between each country and the rest of the world for the years 2003-2023. A positive correlation (blue) means a country's crop production tends to move in the same direction as global production. A negative correlation (red) means the country's production tends to move opposite to global trends. Light grey indicates no data.