Climate change and inequality: distributional effects of heatwaves and heat stress in India

Sahil Verma[1,2*], Bimal Kishore Sahoo[2] and Sunandan Ghosh[2]

[1]Department of Economics, Manipal University Jaipur, India and [2]Indian Institute of Technology Kharagpur, India

[*]Corresponding author: Sahil Verma; Email: sahilvermafatuhi14@gmail.com

ONLINE APPENDIX

Description A1

$$G_\alpha(MPCE_{real}) = \frac{1}{n}\frac{1}{p(p-1)}\sum_i\left[\left(\frac{MPCE_{real_i}}{\mu}\right)^\alpha - 1\right] \qquad \alpha \neq 0,1 \qquad \text{(A1)}$$

$$G_1(MPCE_{real}) = \frac{1}{n}\sum_i \frac{MPCE_{real_i}}{\overline{MPCE_{real}}}\log\frac{MPCE_{real_i}}{\overline{MPCE_{real}}} \qquad \alpha = 1 \qquad \text{(A2)}$$

$$E_0(c) = \frac{1}{n}\sum_i \log\frac{\overline{MPCE_{real}}}{MPCE_{real_i}} \qquad \alpha = 0 \qquad \text{(A3)}$$

The $G_\alpha(MPCE_{real})$ represent the consumption inequality using α (a real parameter) sensitivity parameter. We used α values of -1, 0, and 1, which are more sensitive to the bottom of the distribution. GE (0) is the mean logarithmic deviation, GE (1) is the Theil Index, and GE (2) is half the square of the coefficient of variation (Shorrocks, 1980).

The Atkinson's Index (*A*) is calculated as follows:

$$A(\theta) = 1 - \frac{C_{EDE(\theta)}}{\overline{MPCE_{real}}} \qquad \text{(A4)}$$

$$AI = 1 - \left[\sum_I \left(\frac{MPCE_{real_i}}{\overline{MPCE_{real}}}\right)^{1-\theta} f\left(MPCE_{real_i}\right)\right]^{\frac{1}{1-\theta}} \qquad \text{(A5)}$$

where *AI* stands for the Atkinson index. θ is a sensitivity parameter. A high value of θ gives more weight to the bottom of the distribution. We have used θ value 2 and 1.

Description A2

The temperature anomaly is calculated as follows:

$$base\ TMP_{dis,m} = \frac{1}{100}\sum TMP_{dis,m,y} \tag{A6}$$

$$TMP\ deviation_{dis,m} = TMP_{dis,,m,y} - base\ TMP_{dis,,m} \tag{A7}$$

$$TMP\ anomly\ = \sum_{m=1}^{12} \frac{TMP\ deviation}{SD} \tag{A8}$$

The base temperature is calculated using 100 years (1901–2000) of precipitation data for each district.

Description A3

Precipitation anomaly is formalised as:

$$base\ pre_{dis,,m} = \frac{1}{100}\sum pre_{dis,m,y} \tag{A9}$$

$$pre\ deviation_{dis,m} = pre_{dis,,m,y} - base\ pre_{dis,,m} \tag{A10}$$

$$pre\ anomly\ = \sum_{m=1}^{12} \frac{pre\ deviation}{SD} \tag{A11}$$

The base precipitation is calculated using 100 years (1901–2000) of precipitation data for each district.

Table A1. Correlation matrix of Log GDP and NTL for the year 2013

	Log GDP	Average masked sum (district level)	Average masked mean (district level)
Log GDP	1.00	-	-
Average masked sum (district level)	0.64	1.00	-
Average masked mean (district level)	0.65	0.81	1.00

Source: Author's calculation.

Table A2. OLS results (NTL, Average masked sum, and Average masked mean)

Log GDP	(1)	Log GDP	(2)
Log Average masked sum	0.61 (0.04)	log Average masked mean	0.52 (0.04)
Constant	5.45 (0.43)	Constant	11.64 (0.05)
N	267	N	267

Note: Standard errors in parentheses.
Source: Author's calculations.

Table A3. Heteroskedasticity test

Modified Wald test for heteroskedasticity (H0: σi2=σ2 for all i)					
	M1	M2	M3	M4	M5
chi2 (485)	782.67	758.34	758.34	751.66	804.75
Prob>chi2	0	0	0	0	0

Source: Author's calculations.

Table A4. Fixed effect (without robust and clustered SE) for the Hausman test

Dependent variable: Gini	M1	M2	M3	M4	M5
HW1	0.0810 (0.0307)				
HW1*TMP A	-0.0349 (0.0189)				
HW2		0.2334 (0.0791)			
HW2*TMP A		-0.1603 (0.0731)			
EHF			0.5069 (0.1010)		
EHF*TMP A			-0.3680 (0.0875)		
HD				0.0735 (0.0300)	
HD*TMP A				-0.0383 (0.0177)	
HS					0.2945 (0.0772)
HS*TMP A					-0.1394 (0.0277)
log (NTL_{t-1})	0.0087 (0.0034)	0.0091 (0.0035)	0.0084 (0.0034)	0.0083 (0.0034)	0.0073 (0.0034)
Precipitation	-0.0001 (0.00003)	-0.0001 (0.00003)	-0.0001 (0.00003)	-0.0001 (0.00003)	-0.0001 (0.00003)
Humidity	0.00002 (0.0002)	-0.0001 (0.0002)	-0.0001 (0.0002)	0.00003 (0.0002)	-
TMP A	-0.0072 (0.0031)	-0.0073 (0.0029)	-0.0017 (0.0033)	-0.0061 (0.0032)	-
Constant	0.2372 (0.0152)	0.2448 (0.0152)	0.2339 (0.0152)	0.2363 (0.0153)	0.2186 (0.0065)
Observations	3534	3534	3534	3534	3747
R-squared (within)	0.146	0.147	0.151	0.1458	0.1440
F statistic	40.00	40.27	41.58	39.85	49.26
Number of districts	485	485	485	485	514
District FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES

Note: Standard errors in parentheses.
Source: Author's calculations.

Table A5. Random effect (without robust and clustered SE) for the Hausman test

Dependent variable: Gini	M1	M2	M3	M4	M5
HW1	0.0494 (0.0230)				
HW1*TMP A	-0.0214 (0.0182)				
HW2		0.2092 (0.0765)			
HW2*TMP A		-0.1519 (0.0710)			
EHF			0.4598 (0.0968)		
EHF*TMP A			-0.3710 (0.0837)		
HD				0.0361 (0.0289)	
HD*TMP A				-0.0223 (0.0170)	
HS					0.0284 (0.0438)
HS*TMP A					-0.0618 (0.0228)
log (NTL_{t-1})	0.0098 (0.0016)	0.0099 (0.0016)	0.0094 (0.0016)	0.0096 (0.0016)	0.0085 (0.0048)
Precipitation	0.00002 (0.00002)	0.00003 (0.00003)	0.00003 (0.00002)	0.00002 (0.00002)	0.00002 (0.00002)
Humidity	0.0002 (0.0001)	0.0002 (0.0001)	0.0001 (0.0001)	0.0002 (0.0001)	-
TMP A	-0.0027 (0.0025)	-0.0022 (0.0022)	0.0029 (0.0026)	-0.0018 (0.0025)	-
Constant	0.2093 (0.0077)	0.2091 (0.0075)	0.2034 (0.0079)	0.2102 (0.0077)	0.2205 (0.0048)
Observations	3533	3534	3534	3534	3747
R-squared (within)	0.1390	0.1399	0.151	0.1385	0.1350
Wald chi2	543.53	549.92	566.77	542.05	558.55
Number of districts	485	485	485	485	514
District FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES

Note: Standard errors in parentheses.
Source: Author's calculations.

Table A6. Hausman test

Hausman test (H0: Difference in coefficients not systematic)					
	M1	M2	M3	M4	M5
chi2(12)	82.51	81.2	81.2	95.25	82.47
Prob > chi2	0	0	0	0	0

Source: Author's calculations.

Table A7. Agricultural intensity

Categorisation of districts	Criterion	Derived variable
Low agriculture (High industry and service sector)	If the ratio of cultivators and agricultural labourers to total labour is less than the median, the district is defined as a low-agricultural district.	Variables are defined as dummy variables, which take the value 1 if the district meets the criteria and 0 otherwise.
High agriculture (low industry and service sector)	If the ratio of cultivator and agricultural labour to total labour is more than the median, then the district is defined as high agriculture.	

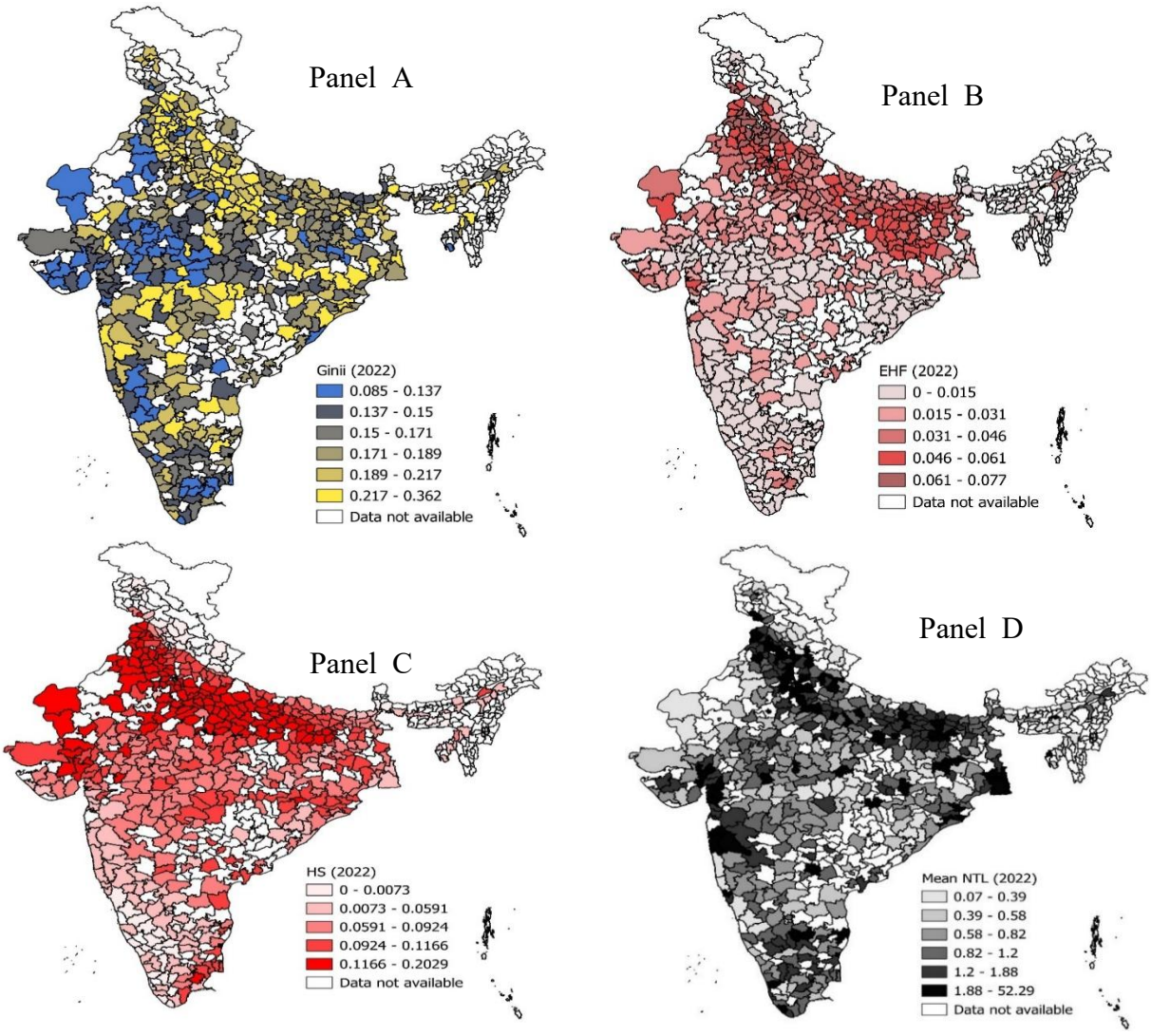
Source: Author's representation.

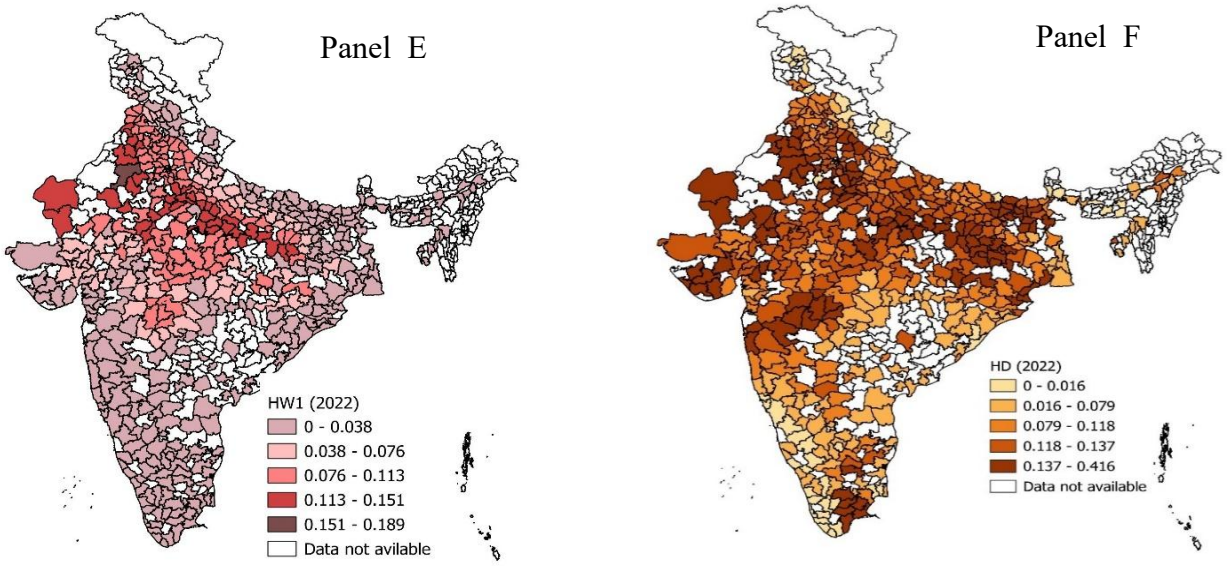
Table A8. Summary statistics of variables

Variable	N	Mean	Std. dev.	Min	Max
Gini	4,280	0.1998	0.0502	0.0610	0.5000
HW1	4,281	0.0525	0.0474	0.0000	0.4918
HW2	4,281	0.0182	0.0262	0.0000	0.1890
EHF	4,281	0.0222	0.0183	0.0000	0.0849
HD	4,281	0.0766	0.0582	0.0000	0.5546
HS	4,281	0.0776	0.0424	0.0000	0.2041
TMP A	4,281	1.0430	0.5413	-0.1380	2.8128
NTL	4,281	1.5892	4.4977	0.0292	60.3872
Precipitation	4,281	105.4716	60.9215	8.5572	558.5000
Humidity	4,281	60.0578	12.1326	29.3343	90.2937

Source: Author's calculation.

Figure A1. District-wise heatwave and hot days in 2022.





Source: Author's representation.

Table A9. Fixed effect with Conley standard error (distance cutoff 100 km)

Dependent variable: Gini	M1	M2	M3	M4	M5
HW1	0.0799 (0.0297)				
HW1*TMP A	-0.0347 (0.0185)				
HW2		0.2277 (0.0710)			
HW2*TMP A		-0.1573 (0.0686)			
EHF			0.5070 (0.1079)		
EHF*TMP A			-0.3691 (0.1029)		
HD				0.0724 (0.0302)	
HD*TMP A				-0.0381 (0.0181)	
HS					0.2934 (0.0725)
HS*TMP A					-0.1354 (0.0302)
log (NTL_{t-1})	0.0092 (0.0034)	0.0097 (0.0034)	0.0090 (0.0034)	0.0088 (0.0034)	0.0078 (0.0034)
Precipitation	-0.0001 (0.00003)	-0.0001 (0.00003)	-0.0001 (0.00003)	-0.0001 (0.00003)	-0.0001 (0.00003)
Humidity	0.00004 (0.0002)	-0.00005 (0.0002)	-0.00006 (0.0003)	0.00004 (0.0002)	-
TMP A	-0.0063 (0.003)	-0.0064 (0.0032)	-0.0009 (0.0037)	-0.0052 (0.0035)	-
District FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
Observations	3543	3543	3,543	3543	3758
R-squared (within)	0.6265	0.6268	0.6287	0.6263	0.6198
Adj. R-squared	0.5661	0.5665	0.5686	0.5659	0.5587

Note: Standard errors in parentheses.
Source: Author's calculations.

Table A10. Fixed effect with Conley standard error (distance cutoff 50 km)

Dependent variable: Gini	M1	M2	M3	M4	M5
HW1	0.0799 (0.0272)				
HW1*TMP A	-0.0347 (0.0170)				
HW2		0.2277 (0.0675)			
HW2*TMP A		-0.1573 (0.0657)			
EHF			0.5070 (0.0946)		
EHF*TMP A			-0.3691 (0.0885)		
HD				0.0724 (0.0275)	
HD*TMP A				-0.0381 (0.0165)	
HS					0.2934 (0.0659)
HS*TMP A					-0.1354 (0.0264)
log (NTL_{t-1})	0.0092 (0.0033)	0.0097 (0.0034)	0.0090 (0.0033)	0.0088 (0.0033)	0.0078 (0.0033)
Precipitation	-0.0001 (0.00003)	-0.0001 (0.00003)	-0.0001 (0.00003)	-0.0001 (0.00003)	-0.0001 (0.00003)
Humidity	0.00004 (0.0002)	-0.00005 (0.0002)	-0.00006 (0.0002)	0.00005 (0.0002)	-
TMP A	-0.0063 (0.0031)	-0.0064 (0.0028)	-0.0009 (0.0032)	-0.0052 (0.0031)	-
District FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
Observations	3543	3543	3,543	3543	3758
R-squared (within)	0.6265	0.6268	0.6287	0.6263	0.6198
Adj. R-squared	0.5661	0.5665	0.5686	0.5659	0.5587

Note: Standard errors in parentheses.
Source: Author's calculations.

Table A11. Extreme heat and inequality using GE (1)

Dependent variable: GE (1)	M1	M2	M3	M4	M5
HW1	0.0623 (0.0222)				
HW1*TMP A	-0.0262 (0.0129)				
HW2		0.1708 (0.0607)			
HW2*TMP A		-0.1117 (0.0564)			
EHF			0.3761 (0.0804)		
EHF*TMP A			-0.2734 (0.0706)		
HD				0.0601 (0.0225)	
HD*TMP A				-0.0303 (0.0131)	
HS					0.2042 (0.0506)
HS*TMP A					-0.1120 (0.0206)
TMP A	-0.0075 (0.0021)	-0.0077 (0.0020)	-0.0034 (0.0022)	-0.0067 (0.0022)	-
NTL_{t-1}	0.0042 (0.0040)	0.0046 (0.0040)	0.0040 (0.0039)	0.0039 (0.0040)	0.0039 (0.0038)
Precipitation	-0.0001 (0.00002)	-0.0001 (0.00002)	-0.0001 (0.00002)	-0.0001 (0.00002)	-0.0001 (0.00002)
Humidity	0.00001 (0.0002)	-0.00006 (0.0002)	-0.00006 (0.0002)	0.00002 (0.0002)	-
Constant	0.1009 (0.0139)	0.1068 (0.0141)	0.0986 (0.0137)	0.1000 (0.0139)	0.0867 (0.0048)
Observations	3535	3535	3535	3535	3748
R-squared (within)	0.1184	0.1190	0.1225	0.1181	0.1163
Number of districts	485	485	485	485	485
F	15.76	15.69	16.41	15.96	19.42
District FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES

Note: The results are from two-way panel fixed effect regression model. District clustered standard errors in parentheses.
Source: Author's calculation.

Table A12. Extreme heat and inequality using GE (0)

Dependent variable: GE (0)	M1	M2	M3	M4	M5
HW1	0.0556 (0.0208)				
HW1*TMP A	-0.0227 (0.0119)				
HW2		0.1467 (0.0557)			
HW2*TMP A		-0.0932 (0.0514)			
EHF			0.3263 (0.0740)		
EHF*TMP A			-0.2343 (0.0641)		
HD				0.0519 (0.0211)	
HD*TMP A				-0.0258 (0.0120)	
HS					0.1888 (0.0479)
HS*TMP A					-0.0950 (0.0192)
TMP A	-0.0061 (0.0021)	-0.0063 (0.0019)	-0.0026 (0.0021)	-0.0054 (0.0022)	-
NTL_{t-1}	0.0048 (0.0036)	0.0051 (0.0036)	0.0046 (0.0035)	0.0045 (0.0036)	0.0042 (0.0035)
Precipitation	-0.0001 (0.00002)	-0.0001 (0.00002)	-0.0001 (0.00002)	-0.0001 (0.00002)	-0.0001 (0.00002)
Humidity	0.0001 (0.0002)	0.00004 (0.0002)	0.00004 (0.0002)	0.0001 (0.0002)	-
Constant	0.0898 (0.0136)	0.0950 (0.0138)	0.0878 (0.0135)	0.0891 (0.0136)	0.0820 (0.0045)
Observations	3535	3535	3535	3535	3748
R-squared (within)	0.1193	0.1198	0.1227	0.1189	0.120
F	16.05	15.98	16.77	16.21	19.43
Number of districts	485	485	485	485	514
District FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES

Notes: The results are from two-way panel fixed effect regression model. District clustered standard errors in parentheses.
Source: Author's calculation.

Table A13. Extreme heat and inequality using GE (-1)

Dependent variable: GE (-1)	M1	M2	M3	M4	M5
HW1	0.0616 (0.02479)				
HW1*TMP A	-0.0258 (0.0137)				
HW2		0.1293 (0.0696)			
HW2*TMP A		-0.0738 (0.0634)			
EHF			0.3728 (0.0933)		
EHF*TMP A			-0.2493 (0.0748)		
HD				0.0537 (0.0244)	
HD*TMP A				-0.0273 (0.0136)	
HS					0.2281 (0.0713)
HS*TMP A					-0.0939 (0.0278)
TMP A	-0.0048 (0.0035)	-0.0053 (0.0031)	-0.0012 (0.0034)	-0.0040 (0.0035)	-
NTL_{t-1}	0.0042 (0.0046)	0.0046 (0.0046)	0.0040 (0.0046)	0.0039 (0.0046)	0.0031 (0.0046)
Precipitation	-0.0001 (0.00003)	-0.0001 (0.00003)	-0.0001 (0.00003)	-0.0001 (0.00003)	-0.0001 (0.00003)
Humidity	0.0005 (0.0004)	0.0004 (0.0004)	0.0004 (0.0004)	0.0005 (0.0004)	-
Constant	0.0711 (0.0288)	0.0766 (0.0287)	0.0684 (0.0291)	0.0706 (0.0284)	0.0838 (0.0069)
Observations	3535	3535	3535	3535	3748
R-squared (within)	0.0578	0.0578	0.0598	0.0575	0.0503
F	14.26	14.05	14.74	14.33	16.11
Number of districts	485	485	485	485	485
District FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES

Notes: The results are from two-way panel fixed effect regression model. District clustered standard errors in parentheses.
Source: Author's calculation.

Table A14. Extreme heat and inequality using Atkinson Index [A (1)]

Dependent variable: A (1)	M1	M2	M3	M4	M5
HW1	0.0507 (0.0192)				
HW1*TMP A	-0.0210 (0.0110)				
HW2		0.1355 (0.0503)			
HW2*TMP A		-0.0872 (0.0465)			
EHF			0.3027 (0.0676)		
EHF*TMP A			-0.2190 (0.0588)		
HD				0.0471 (0.0194)	
HD*TMP A				-0.0237 (0.0111)	
HS					0.1738 (0.0436)
HS*TMP A					-0.0882 (0.0171)
TMP A	-0.0055 (0.0019)	-0.0057 (0.0017)	-0.0022 (0.0019)	-0.0048 (0.0019)	-
NTL_{t-1}	0.0047 (0.0032)	0.0050 (0.0032)	0.0045 (0.0032)	0.0044 (0.0032)	0.0040 (0.0031)
Precipitation	-0.0001 (0.00002)	-0.0001 (0.00002)	-0.0001 (0.00002)	-0.0001 (0.00002)	-0.0001 (0.00002)
Humidity	0.0001 (0.0002)	0.00002 (0.0002)	0.00001 (0.0002)	0.0001 (0.0002)	-
Constant	0.0865 (0.0119)	0.0913 (0.0121)	0.0847 (0.0118)	0.0859 (0.0119)	0.0783 (0.0041)
Observations	3535	3535	3535	3535	3748
R-squared (within)	0.1275	0.1280	0.1312	0.1271	0.1220
F	16.66	16.58	17.39	16.82	20.24
Number of districts	485	485	485	485	514
District FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES

Notes: The results are from two-way panel fixed effect regression model. District clustered standard errors in parentheses.
Source: Author's calculation.

Table A15. Extreme heat and inequality using Atkinson Index [A (2)]

Dependent variable: A (2)	M1	M2	M3	M4	M5
HW1	0.0898 (0.0321)				
HW1*TMP A	-0.0388 (0.0188)				
HW2		0.2425 (0.0829)			
HW2*TMP A		-0.1633 (0.0773)			
EHF			0.5596 (0.1140)		
EHF*TMP A			-0.4094 (0.1006)		
HD				0.0841 (0.0326)	
HD*TMP A				-0.0437 (0.0190)	
HS					0.3096 (0.0731)
HS*TMP A					-0.1603 (0.0279)
TMP A	-0.0097 (0.0030)	-0.0010 (0.0027)	-0.0036 (0.0031)	-0.0084 (0.0032)	-
NTL_{t-1}	0.0074 (0.0056)	0.0080 (0.0056)	0.0071 (0.0055)	0.0070 (0.0055)	0.0067 (0.0054)
Precipitation	-0.0001 (0.00003)	-0.0001 (0.00003)	-0.0001 (0.00003)	-0.0002 (0.00003)	-0.0001 (0.00003)
Humidity	-0.00003 (0.0003)	-0.0001 (0.0003)	-0.0001 (0.0003)	-0.00003 (0.0003)	-
Constant	0.1669 (0.0192)	0.1751 (0.0195)	0.1633 (0.0189)	0.1657 (0.0192)	0.1432 (0.0068)
Observations	3535	3535	3535	3535	3784
R-squared (within)	0.1377	0.1382	0.1426	0.1373	0.1369
F	17.72	17.68	18.50	17.93	21.98
Number of districts	485	485	485	485	485
District FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES

Notes: The results are from two-way panel fixed effect regression model. District clustered standard errors in parentheses.
Source: Author's calculation.

Table A16. Extreme heat and inequality control for precipitation anomaly

Dependent variable: Gini	M1	M2	M3	M4	M5
HW1	0.0721 (0.0301)				
HW1*TMP A	-0.0304 (0.0173)				
HW2		0.2308 (0.0765)			
HW2*TMP A		-0.1720 (0.0708)			
EHF			0.5161 (0.1036)		
EHF*TMP A			-0.3814 (0.0901)		
HD				0.0656 (0.0309)	
HD*TMP A				-0.0349 (0.0176)	
HS					0.3058 (0.0681)
HS*TMP A					-0.1578 (0.0278)
TMP A	-0.0085 (0.0030)	-0.0082 (0.0028)	-0.0026 (0.0032)	-0.0075 (0.0031)	-
NTL_{t-1}	0.0082 (0.0050)	0.0085 (0.0050)	0.0080 (0.0050)	0.0078 (0.0050)	0.0070 (0.0049)
Precipitation anomaly	-0.0152 (0.0054)	-0.0151 (0.005)	-0.0140 (0.0054)	-0.0159 (0.0054)	-0.0155 (0.0049)
Humidity	0.0001 (0.0003)	0.00004 (0.0003)	0.00002 (0.0003)	0.0001 (0.0003)	-
Constant	0.2266 (0.0172)	0.2334 (0.0172)	0.2243 (0.0168)	0.2257 (0.0172)	0.2160 (0.0061)
Observations	3534	3534	3534	3534	3,534
R-squared	0.1443	0.1452	0.1499	0.1439	0.1437
F-statistic	16.22	16.53	17.34	16.39	21.35
Number of districts	485	485	485	485	485
District FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES

Notes: The results are from two-way panel fixed effect regression model. District clustered standard errors in parentheses.
Source: Author's calculation.

Table A17. Extreme Heat and inequality control for mean SPI

Dependent variable: Gini Index	M1	M2	M3	M4	M5
HW1	0.0822 (0.0307)				
HW1*TMP A	-0.0350 (0.0184)				
HW1		0.2532 (0.0769)			
HW1*TMP A		-0.1924 (0.0716)			
EHF			0.5630 (0.1045)		
EHF*TMP A			-0.4229 (0.0910)		
HD				0.0772 (0.0315)	
HD*TMP A				-0.0391 (0.0186)	
HS					0.3227 (0.0691)
HS*TMP A					-0.1389 (0.0260)
TMP A	-0.0055 (0.0030)	-0.0052 (0.0026)	0.0008 (0.0030)	-0.0044 (0.0031)	-
NTL_{t-1}	0.0083 (0.0050)	0.0086 (0.0050)	0.0081 (0.0050)	0.0078 (0.0050)	0.0069 (0.0049)
Mean SPI	0.0058 (0.0024)	0.0056 (0.0023)	0.0065 (0.0022)	0.0061 (0.0024)	0.0059 (0.0022)
Humidity	0.0001 (0.0003)	-0.00003 (0.0003)	-0.00005 (0.0003)	0.0001 (0.0003)	-
Constant	0.2157 (0.0176)	0.2235 (0.0175)	0.2131 (0.0171)	0.2140 (0.0177)	0.2016 (0.0059)
Observations	3534	3534	3534	3,534	3747
R-squared	0.1433	0.1442	0.1498	0.1429	0.1426
F-statistic	15.95	16.12	17.19	16.09	21.10
Number of Districts	485	485	485	485	514
District FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES

Notes: The results are from two-way panel fixed effect regression model. District clustered standard errors in parentheses.
Source: Author's calculation.

Table A18. Extreme heat and inequality control for SPI dummy

Dependent variable: Gini	M1	M2	M3	M4	M5
HW1	0.0780 (0.0305)				
HW1*TMP A	-0.0312 (0.0177)				
HW2		0.2461 (0.0769)			
HW2*TMP A		-0.1869 (0.0716)			
EHF			0.5557 (0.104)		
EHF*TMP A			-0.4174 (0.0913)		
HD				0.0731 (0.0313)	
HD*TMP A				-0.0356 (0.0180)	
HS					0.3335 (0.0694)
HS*TMP A					-0.1390 (0.0261)
TMP A	-0.0058 (0.0029)	-0.0052 (0.0026)	0.0007 (0.003)	-0.0047 (0.0031)	-
NTL_{t-1}	0.0080 (0.0050)	0.0084 (0.0050)	0.0078 (0.0050)	0.0076 (0.0050)	0.0067 (0.0049)
SPI_10	0.0026 (0.0012)	0.0026 (0.0012)	0.0030 (0.0012)	0.0028 (0.0012)	0.0031 (0.0011)
Humidity	0.0001 (0.0003)	-0.00004 (0.0003)	-0.00005 (0.0003)	0.0001 (0.0003)	-
Constant	0.2196 (0.0173)	0.2269 (0.0173)	0.2171 (0.0169)	0.2182 (0.0174)	0.2037 (0.0055)
Observations	3534	3534	3534	3534	3747
R-squared (within)	0.1430	0.1437	0.1493	0.1425	0.1426
Number of districts	485	485	485	485	514
F	15.85	16.04	17.02	16.01	21.07
District FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES

Notes: The results are from two-way panel fixed effect regression model. District clustered standard errors in parentheses.
Source: Author's calculation.

Table A19. Dynamic panel regression model

Dependent Variable: Gini	M1	M2	M3	M4	M5
HW1	0.0780 (0.0284)				
HW1*TMP A	-0.0283 (0.0156)				
HW2		0.2093 (0.0683)			
HW2*TMP A		-0.1004 (0.0623)			
EHF			0.3986 (0.0873)		
EHF*TMP A			-0.2512 (0.0799)		
HD				0.0564 (0.0281)	
HD*TMP A				-0.0217 (0.0148)	
HS					0.0428 (0.0246)
HS*TMP A					-0.0288 (0.0158)
$Gini_{t-1}$	0.5939 (0.0764)	0.5976 (0.0767)	0.5983 (0.0764)	0.5910 (0.0761)	0.5859 (0.0809)
NTL_{t-1}	0.0045 (0.0012)	0.0048 (0.0062)	0.0041 (0.0012)	0.0045 (0.0012)	0.0039 (0.0011)
Precipitation	0.00004 (0.00002)	0.00004 (0.00002)	0.00004 (0.00002)	0.00004 (0.00002)	0.00004 (0.00002)
Humidity	0.0001 (0.0001)	0.0002 (0.0001)	0.0001 (0.0001)	0.0008 (0.0001)	-
TMP A	-0.0010 (0.0018)	-0.0011 (0.0015)	0.0028 (0.0018)	-0.0008 (0.0019)	-
Constant	0.0657 (0.0153)	0.0629 (0.0151)	0.0600 (0.0152)	0.0680 (0.0152)	0.0687 (0.0150)
Observations	3533	3533	3533	3533	3746
Number of districts	485	485	485	485	514
Year FE	Yes	Yes	Yes	Yes	Yes
Wald	94611.5	97540.5	95039.9	94003.7	100482

Note: Standard errors in parentheses.
Source: Author's calculation.

Table A20. Arellano-Bond test for AR in first differences

	M1		M2		M3		M4		M5	
AR	z	Pr > z	z	Pr > z	z	Pr > z	z	Pr > z	z	Pr > z
AR (1)	-6.90	0.000	-6.88	0.000	-6.91	0.000	-6.89	0.000	-5.56	0.000
AR (2)	0.44	0.658	0.38	0.702	0.56	0.573	0.32	0.749	0.86	0.393

Source: Author's calculation.

Table A21. Sargan and Hansen test of overid. Restrictions

	M1		M2		M3		M4		M5	
	chi2	Pr > chi2	chi2	Pr > chi2	chi2	Pr > chi2	chi2	Pr > chi2	chi2	Pr > chi2
Sargan test	2.60	0.272	2.37	0.306	2.09	0.352	2.27	0.321	2.67	0.263
Hansen test	2.77	0.251	2.49	0.288	2.23	0.328	2.40	0.302	2.73	0.256

Source: Author's calculation.