Climate Shock & Domestic Violence

Herman Sahni

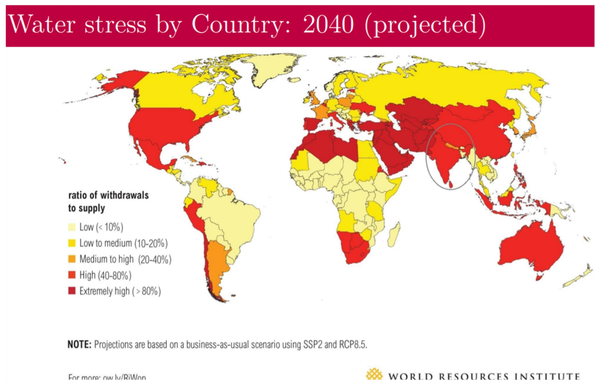
Department of Finance and Analytics
Baldwin Wallace University Berea, Ohio 44017

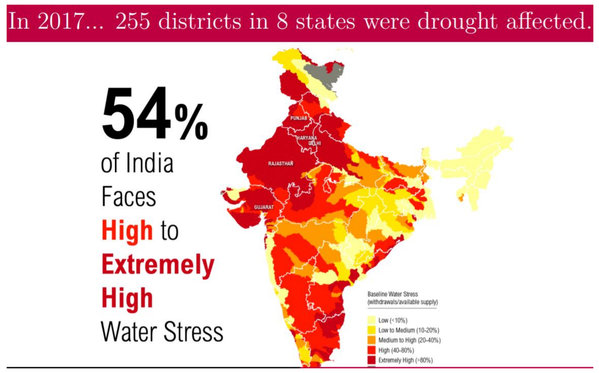
Coauthor:

Esha Sinha,

Lexical Intelligence
and
Office of Director, National Institute of Health

Presented at
American Economic Association 2021





Introduction

In this paper, we study the causal relationship between rainfall shock and domestic violence. In 2016, as many as 266 districts in India were drought affected.

More than 100 districts faced water shortages, for the third year in a row. Ground water depletion has reached astronomical levels with more than 54 percent of India's population facing "high" to "extremely high" water stress. Such extreme water stress can be directly attributed to the scarce rainfall, which adversely impacts agricultural production and rising food prices.

Families whose main sustenance comes from agriculture (henceforth known as "agro-households") face the most challenges: an increase in economic stress and a rise in violence toward women.

Data and methods

Data source:

- India Human Development Survey IHDS II (2011)
- Demographic and Health Surveys DHS IV (2014)
- India Meteorological Department
- India Central Ground Water Board
- Indian Census

Estimation:

$$V_{ijk} = \alpha + \beta_1 R_k + \beta_2 G_k + \delta X_{ijk} + \omega H_{jk} + \eta D_k + \gamma_k + \epsilon_{ijk} \quad \textit{,where}$$

- V_{ijk}: violence experienced by women i in household j in district k. (binary variable)
- R_k: rainfall shock in district k.
- G_k: groundwater shock in district k.
  R_k and G_k takes a positive shock (+1) if yearly rainfall / groundwater level is above 80% of the previous 100-year long-run distribution. Similarly, negative shock if below 20%. Zero, otherwise.
- X_{ijk}, H_{jk}, and D_k denote a vector of all individual level variables, household level variables, and district level variables, respectively. The variables include the survey respondent's *age at marriage, gender mix of children, education, employment, spouse's education and employment status, household's wealth, family gender norms (i.e., attitudes in the household towards gender equality), alternative sources of income,* and *religious and ethnic affiliation*.

Results

Effect of Rainfall/Groundwater Shock on Domestic Violence

	Dependent Variable: **Domestic Violence** *Logit Regression*					
	Agro-households				Non Agro-households	
Variable	$\frac{dy}{dx}$	se	$\frac{dy}{dx}$	se	$\frac{dy}{dx}$	se
Individual variables:						
Age at marriage	−0.002	(0.002)	−0.002	(0.002)	−0.003**	(0.002)
Employed?	0.014	(0.012)	0.015	(0.012)	−0.003	(0.010)
Years of education	−0.001	(0.001)	−0.001	(0.001)	−0.003**	(0.001)
Owns property/land?	0.016	(0.018)	0.016	(0.018)	0.025	(0.021)
Household variables:						
Men eat first?	0.048**	(0.020)	0.048**	(0.020)	−0.003	(0.012)
Number of household members employed by rural income guarantee scheme			−0.007	(0.014)		
District variables:						
Rainfall Shock	−0.137***	(0.026)	−0.136***	(0.026)	0.319**	(0.099)
Groundwater Shock	−1.098***	(0.062)	−1.098***	(0.062)	0.134	(0.160)
Sex ratio	−0.016***	(0.003)	−0.016***	(0.003)	0.005***	(0.001)
N	22,378		22,378		17,145	

Note.– Each column represent marginal effects. All regressions incorporate district fixed effects and sampling weights to ensure that our sample reflects the population. The standard errors in parenthesis are robust and clustered at the district level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Source.– IHDS 2011-2012, IMD, CGWB.

For Agro-households:

- Women living in a district with a positive rainfall shock are 26 percentage points *less likely* to report domestic violence when compared to women living in district with droughts.
- The estimate remains the same even after adjusting for the government initiative scheme to provide rural income in the event of drought.

Robustness:

- Results are similar when using a different data source – DHS. For rural households, the women in districts with positive rainfall shock report 32 percentage points less domestic violence than women living in drought-stricken districts.
- Results are similar under alternate specifications of domestic violence – (a) sexual violence, (b) severe violence, (c) verbal abuse.
- Results are similar for alternate cutoffs that determine positive sock and negative shock – 70/30, 90/10.
- To check whether the effect capture a single rainfall event or multiple years of rainfall shocks, we test for serial correlation of rainfall events. However, we find no significant evidence of serial correlation across years.
- We also check for spatial correlation – that is, if there is significant within-district variation in rainfall then a district measure of rainfall is not representative for many women in our sample. However, we find that this type of very local variation is unlikely to be biasing our results.
- Similarly, we find no serial correlation for ground water levels.

Effect of Rainfall/Groundwater Shock on Income

	OLS Regression					
Dependent variable →	ln(Agro Income)		ln(Wage Income)		ln(Other Income)	
	coeff	se	coeff	se	coeff	se
Rainfall Shock	0.247***	(0.042)	0.004	(0.085)	−0.044	(0.047)
Groundwater Shock	0.079*	(0.037)	−0.051	(0.078)	−0.029	(0.042)
N	19,407		19,407		19,407	

Note.– All regressions incorporate sampling weights to ensure that our sample reflects the population. The standard errors in parenthesis are robust and clustered at the district level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Source.– IHDS 2011-2012, IMD, CGWB.

- We find that positive rainfall shock is associated with higher income in agro-households.
- There is no effect for non agro-households.

Conclusions

Source: https://youareinspiration4me.com/2018/01/26/excuse-ladies-really-respect/

Literature cited

Blakeslee, D., Fishman, R., and Srinivasan, V. (2020). Way Down in the Hole: Adaptation to Long-Term Water Loss in Rural India. American Economic Review 110(1):200-224.

Corno, L., N. Hildebrandt, and A, Voena. (2020). Age of Marriage, Weather Shocks, and the Direction of Marriage Payments. Econometrica 88(3):879-915.

Kumar, S., Molitor, R. and Vollmer, S. (2014). Children of drought: Rainfall shocks and early child health in rural India. Political Economy - Development: Health eJournal.

Sekhri, S. (2014). Wells, Water, and Welfare: The Impact of Access to Groundwater on Rural Poverty and Conflict. American Economic Journal 6(3):76-102.

Sekhri, S. and Hossain, M. (2019). Water in Scarcity, Women in Peril.

Sekhri, S. and Storeygard, A. (2014). Dowry deaths: consumption smoothing in response to climate variability in India. Journal of Development Economics 111(1):212-223.

Shah, M. and Steinberg, B. M. (2015). Drought of Opportunities: Contemporaneous and Long-Term Impacts of Rainfall Shocks on Human Capital, Journal of Political Economy 125(2):527-561.

Acknowledgments

We thank the participants at the **2021 American Economic Association** and **2018 Population Association of America** meetings. We are also grateful for the support from **Boesel Program Support Fund**, School of Business.

For further information

Please contact *HSAHNI@BW.EDU*.

This poster also available at hermansahni.com/docs/dv.pdf