# Appendix for online publication

## A    Samples and descriptive statistics

Table A.1: Surveys used in the cross sectional and EHA analysis

| | |
|---|---|
| Burkina Faso | 2010 |
| Cameroon | 2005, 2011 |
| Congo DR | 2008, 2013 |
| Gabon | 2012 |
| Ghana | 2009 |
| Kenya | 2004, 2009 |
| Liberia | 2008 |
| Malawi | 2005, 2010 |
| Mali | 2007, 2012 |
| Mozambique | 2011 |
| Nigeria | 2009, 2013 |
| Rwanda | 2006, 2010 |
| Sierra Leone | 2013 |
| Tanzania | 2010 |
| Uganda | 2007, 2011 |
| Zambia | 2008 |
| Zimbabwe | 2006, 2010 |

Table A.2: Number of observations by country in the different samples

| | (1) Cross sectional | (2) Repeated | (3) EHA |
|---|---|---|---|
| Burkina Faso | 9437 | | 18241 |
| Cameroon | 6573 | 65 | 8895 |
| Congo DR | 7912 | 112 | 6702 |
| Gabon | 4089 | | 4548 |
| Ghana | 1797 | | 2497 |
| Kenya | 9181 | 49 | 16337 |
| Liberia | 3826 | | 4160 |
| Malawi | 13540 | 30 | 23406 |
| Mali | 12014 | 59 | 20606 |
| Mozambique | 5816 | | 7250 |
| Nigeria | 41315 | 124 | 76639 |
| Rwanda | 6006 | 9 | 4655 |
| Sierra Leone | 4309 | | 5012 |
| Tanzania | 5490 | | 7956 |
| Uganda | 3441 | 43 | 4295 |
| Zambia | 4227 | | 6321 |
| Zimbabwe | 10059 | 62 | 16235 |
| N (women, cells, marriage years) | 149032 | 553 | 233755 |

Number of women in the cross sectional sample, number of grid cells in the repeated cross section sample and number of marriage years in the event history sample (EHA).

Table A.3: Main variables by sample

| | (1) Cross section sample | |
| --- | --- | --- |
| | Mean | SD |
| Abuse last year | 0.25 | (0.43) |
| Drought (2.5) last season | 0.03 | (0.18) |
| Drought (2.5) next-to-last season | 0.03 | (0.18) |
| Flood (2.5) last season | 0.01 | (0.08) |
| Flood (2.5) next-to-last season | 0.02 | (0.14) |
| Drought (10) last season | 0.14 | (0.34) |
| Drought (10) next-to-last season | 0.20 | (0.40) |
| Flood (10) last season | 0.05 | (0.22) |
| Flood (10) next-to-last season | 0.11 | (0.31) |
| $N$ | 149032 | |

| | (1) Repeated cross section sample | |
| --- | --- | --- |
| | Mean | SD |
| Abuse last year | 0.27 | (0.17) |
| Drought (2.5) last season | 0.03 | (0.16) |
| Drought (2.5) next-to-last season | 0.04 | (0.20) |
| Flood (2.5) last season | 0.01 | (0.08) |
| Flood (2.5) next-to-last season | 0.02 | (0.13) |
| Drought (10) last season | 0.10 | (0.30) |
| Drought (10) next-to-last season | 0.23 | (0.42) |
| Flood (10) last season | 0.06 | (0.23) |
| Flood (10) next-to-last season | 0.10 | (0.29) |
| $N$ | 553 | |

| | (1) Event history sample | |
| --- | --- | --- |
| | Mean | SD |
| First violent episode | 0.05 | (0.23) |
| Drought (2.5) | 0.04 | (0.20) |
| Flood (2.5) | 0.05 | (0.21) |
| Drought (10) | 0.23 | (0.42) |
| Flood (10) | 0.18 | (0.38) |
| $N$ | 233755 | |

# B The effect of rainfall shocks on low household wealth

Table B.1: Cross sectional analysis of the effect of rainfall shocks on low household wealth

| DV: Lowest two wealth quintiles | (1) | (2) | (3) | (4) | (5) | (6) |
| --- | --- | --- | --- | --- | --- | --- |
| Sample | All | All | All | All | All | All |
| Drought (2.5%) last season | -0.109*** | -0.098*** | -0.072*** | -0.045** | -0.029 | -0.024 |
| | (0.036) | (0.031) | (0.025) | (0.022) | (0.021) | (0.022) |
| Drought (2.5%) next-to-last season | 0.117** | 0.064** | 0.074** | 0.081*** | 0.041 | 0.045 |
| | (0.054) | (0.029) | (0.031) | (0.030) | (0.029) | (0.028) |
| Flood (2.5%) last season | 0.027 | 0.045 | 0.075*** | 0.063** | 0.049** | 0.035* |
| | (0.037) | (0.031) | (0.029) | (0.026) | (0.023) | (0.021) |
| Flood (2.5%) next-to-last season | -0.014 | 0.049* | 0.058* | 0.045* | 0.039 | 0.024 |
| | (0.041) | (0.028) | (0.031) | (0.025) | (0.026) | (0.023) |
| $R^2$ | 0.016 | 0.097 | 0.128 | 0.165 | 0.182 | 0.194 |
| Moran's I of residuals | 0.039*** | 0.017*** | 0.012*** | 0.003*** | 0.001*** | 0.001* |
| *Z-score* | *59.84* | *26.37* | *18.54* | *5.76* | *2.72* | *1.94* |
| Drought (10%) last season | -0.035 | -0.018 | -0.044** | -0.012 | 0.018 | 0.017 |
| | (0.026) | (0.020) | (0.021) | (0.020) | (0.020) | (0.019) |
| Drought (10%) next-to-last season | 0.148*** | 0.071*** | 0.001 | -0.001 | 0.008 | 0.004 |
| | (0.027) | (0.020) | (0.020) | (0.019) | (0.017) | (0.017) |
| Flood (10%) last season | -0.019 | 0.010 | 0.051** | 0.024 | -0.003 | -0.003 |
| | (0.023) | (0.021) | (0.025) | (0.020) | (0.019) | (0.018) |
| Flood (10%) next-to-last season | -0.077*** | -0.009 | -0.045* | -0.014 | -0.025 | -0.022 |
| | (0.027) | (0.019) | (0.024) | (0.020) | (0.018) | (0.017) |
| $R^2$ | 0.021 | 0.097 | 0.128 | 0.164 | 0.182 | 0.194 |
| Moran's I of residuals | 0.035*** | 0.016*** | 0.012*** | 0.004*** | 0.002*** | 0.001** |
| *Z-score* | *54.16* | *25.51* | *18.53* | *6.03* | *2.89* | *2.00* |
| Survey F.E. | yes | yes | yes | yes | yes | yes |
| Age controls | no | yes | no | no | no | no |
| Temperature controls | no | yes | no | no | no | no |
| Legrenge polynomials of degree 1 | no | no | yes | yes | yes | yes |
| Legrenge polynomials of degree 2 | no | no | no | yes | yes | yes |
| Legrenge polynomials of degree 3 | no | no | no | no | yes | yes |
| Legrenge polynomials of degree 4 | no | no | no | no | no | yes |
| N | 560,558 | 559,427 | 560,558 | 560,558 | 560,558 | 560,558 |

Standard errors clustered on the ERA-Interim grid level in brackets. * significant at 10%, ** significant at 5%, *** significant at 1%.

Table B.2: Repeated cross sectional analysis of the effect of rainfall shocks on low household wealth

| DV: Lowest two wealth quintiles Sample | (1) All | (2) All | (3) All | (4) All | (5) All | (6) All | (7) All |
|---|---|---|---|---|---|---|---|
| Drought (2.5%) last season | -0.001 | -0.001 | 0.003 | 0.002 | 0.002 | 0.004 | -0.003 |
| | (0.020) | (0.022) | (0.022) | (0.023) | (0.025) | (0.027) | (0.030) |
| Drought (2.5%) next-to-last season | 0.062** | 0.062** | 0.066** | 0.072** | 0.059** | 0.107*** | 0.099*** |
| | (0.028) | (0.029) | (0.030) | (0.032) | (0.030) | (0.035) | (0.038) |
| Flood (2.5%) last season | 0.003 | -0.004 | -0.0003 | 0.005 | -0.014 | 0.008 | -0.001 |
| | (0.018) | (0.018) | (0.018) | (0.020) | (0.019) | (0.020) | (0.021) |
| Flood (2.5%) next-to-last season | 0.013 | 0.010 | 0.006 | 0.011 | 0.021 | 0.023 | 0.028 |
| | (0.020) | (0.018) | (0.018) | (0.017) | (0.018) | (0.022) | (0.023) |
| $R^2$ | 0.005 | 0.019 | 0.045 | 0.053 | 0.118 | 0.177 | 0.227 |
| Moran's I of residuals | 0.005*** | 0.005*** | 0.005*** | 0.004*** | -0.001 | -0.002 | -0.003 |
| *Z-score* | *3.41* | *3.32* | *3.14* | *2.66* | *-0.08* | *-0.85* | *-1.07* |
| Drought (10%) last season | 0.023* | 0.028 | 0.024 | 0.027 | 0.035* | 0.033 | 0.027 |
| | (0.014) | (0.018) | (0.017) | (0.018) | (0.020) | (0.021) | (0.020) |
| Drought (10%) next-to-last season | 0.042*** | 0.051*** | 0.050*** | 0.058*** | 0.038* | 0.046** | 0.048** |
| | (0.015) | (0.016) | (0.016) | (0.020) | (0.024) | (0.024) | (0.025) |
| Flood (10%) last season | 0.026** | 0.019 | 0.022* | 0.031** | 0.023 | 0.023 | 0.020 |
| | (0.013) | (0.012) | (0.012) | (0.014) | (0.015) | (0.015) | (0.016) |
| Flood (10%) next-to-last season | -0.007 | -0.012 | -0.009 | -0.012 | -0.007 | -0.016 | -0.014 |
| | (0.013) | (0.015) | (0.015) | (0.015) | (0.018) | (0.018) | (0.018) |
| $R^2$ | 0.021 | 0.037 | 0.060 | 0.073 | 0.127 | 0.181 | 0.231 |
| Moran's I of residuals | 0.004*** | 0.005*** | 0.004*** | 0.003** | -0.001 | -0.002 | -0.003 |
| *Z-score* | *3.09* | *3.32* | *3.01* | *2.49* | *-0.35* | *-0.83* | *-1.03* |
| Grid F.E. | yes | yes | yes | yes | yes | yes | yes |
| Country trends | no | yes | yes | yes | yes | yes | yes |
| Age controls | no | no | yes | yes | no | no | no |
| Temperature controls | no | no | no | yes | no | no | no |
| Legendre polynomials of degree 1 | no | no | no | no | yes | yes | yes |
| Legendre polynomials of degree 2 | no | no | no | no | no | yes | yes |
| Legendre polynomials of degree 3 | no | no | no | no | no | no | yes |
| n (women) | 455,342 | 455,342 | 455,342 | 455,342 | 455,342 | 455,342 | 455,342 |
| N (grids) | 1,217 | 1,217 | 1,217 | 1,217 | 1,217 | 1,217 | 1,217 |

Standard errors clustered on the ERA-Interim grid level in brackets. * significant at 10%, ** significant at 5%, *** significant at 1%.

Table B.3: Repeated cross sectional analysis of the effect of rainfall shocks on very low household wealth

| DV: Lowest wealth quintile<br>Sample | (1)<br>All | (2)<br>All | (3)<br>All | (4)<br>All | (5)<br>All | (6)<br>All | (7)<br>All |
|---|---|---|---|---|---|---|---|
| Drought (2.5%) last season | -0.027 | -0.023 | -0.021 | -0.011 | -0.022 | -0.019 | -0.027 |
| | (0.018) | (0.020) | (0.020) | (0.020) | (0.021) | (0.022) | (0.024) |
| Drought (2.5%) next-to-last season | 0.057** | 0.061** | 0.064*** | 0.053** | 0.055** | 0.099*** | 0.106*** |
| | (0.023) | (0.024) | (0.025) | (0.025) | (0.024) | (0.028) | (0.030) |
| Flood (2.5%) last season | 0.013 | 0.010 | 0.010 | 0.021 | 0.005 | 0.016 | 0.015 |
| | (0.011) | (0.012) | (0.012) | (0.013) | (0.014) | (0.015) | (0.015) |
| Flood (2.5%) next-to-last season | 0.000 | 0.0021 | 0.001 | -0.001 | 0.014 | 0.019 | 0.023 |
| | (0.015) | (0.015) | (0.014) | (0.016) | (0.015) | (0.016) | (0.017) |
| Drought (2.5%) last season | 0.005 | 0.011 | 0.007 | 0.015 | 0.013 | 0.014 | 0.007 |
| | (0.010) | (0.014) | (0.013) | (0.014) | (0.015) | (0.015) | (0.015) |
| Drought (2.5%) next-to-last season | 0.037*** | 0.049*** | 0.050*** | 0.042*** | 0.043** | 0.054*** | 0.058*** |
| | (0.012) | (0.013) | (0.013) | (0.014) | (0.017) | (0.019) | (0.021) |
| Flood (2.5%) last season | 0.007 | 0.003 | 0.004 | 0.014 | 0.009 | 0.007 | 0.004 |
| | (0.011) | (0.011) | (0.011) | (0.011) | (0.013) | (0.013) | (0.014) |
| Flood (2.5%) next-to-last season | -0.004 | -0.005 | -0.003 | -0.005 | 0.005 | 0.001 | 0.006 |
| | (0.009) | (0.010) | (0.010) | (0.010) | (0.012) | (0.013) | (0.014) |
| Grid F.E. | yes | yes | yes | yes | yes | yes | yes |
| Country trends | no | yes | yes | yes | yes | yes | yes |
| Age controls | no | no | yes | yes | no | no | no |
| Temperature controls | no | no | no | yes | no | no | no |
| Legendre polynomials of degree 1 | no | no | no | no | yes | yes | yes |
| Legendre polynomials of degree 2 | no | no | no | no | no | yes | yes |
| Legendre polynomials of degree 3 | no | no | no | no | no | no | yes |
| n (women) | 455,342 | 455,342 | 455,342 | 455,342 | 455,342 | 455,342 | 455,342 |
| N (grids) | 1,217 | 1,217 | 1,217 | 1,217 | 1,217 | 1,217 | 1,217 |

Standard errors clustered on the ERA-Interim grid level in brackets. * significant at 10%, ** significant at 5%, *** significant at 1%.

# C    Robustness check: Various samples of married women

In the main analysis, we have argued for limiting the sample in the duration analysis to women who have been married less than 10 years. The reason is that women who have been married for a longer period show larger signs of heaping when asked about years since the first violent episode, e.g. there is a surplus of women who state a period which can be divided by 5 and 10. Results in this section show that similar results may be obtained if also including women who have been married for exactly 10 years (Table C.1), and with all married women (excluding marriage years before 1980) in Table C.2.

Table C.1: Duration analysis of the effect of weather shocks on first incidence of violence in marriage, up to and including women married for 10 years

| DV: First violent episode<br>Sample | (1)<br>1-10y | (2)<br>1-10y | (3)<br>1-10y | (4)<br>1-10y | (5)<br>1-10y |
|---|---|---|---|---|---|
| Drought (2.5%) | 0.898* | 0.869** | 0.862** | 0.877** | 0.868** |
| | (0.053) | (0.053) | (0.053) | (0.053) | (0.052) |
| Flood (2.5%) | 1.046 | 1.035 | 1.060 | 1.017 | 1.005 |
| | (0.059) | (0.046) | (0.049) | (0.046) | (0.047) |
| Pseudo R2 | 0.026 | 0.033 | 0.031 | 0.034 | 0.035 |
| Drought (10%) | 1.015 | 1.003 | 0.995 | 1.007 | 1.009 |
| | (0.031) | (0.032) | (0.033) | (0.032) | (0.031) |
| Flood (10%) | 1.010 | 0.999 | 1.012 | 0.991 | 0.987 |
| | (0.031) | (0.030) | (0.032) | (0.031) | (0.030) |
| Pseudo R2 | 0.026 | 0.033 | 0.031 | 0.034 | 0.035 |
| Grid F.E. | yes | yes | yes | yes | yes |
| Piecewise constants | yes | yes | yes | yes | yes |
| Age at marriage (grouped) | yes | yes | yes | yes | yes |
| Survey-specific time trends | no | yes | yes | yes | yes |
| Temperature controls | no | no | yes | no | no |
| Legendre polynomials of degree 1 | no | no | no | yes | yes |
| Legendre polynomials of degree 2 | no | no | no | no | yes |
| n (marriage-years at risk) | 276,040 | 276,040 | 259,996 | 276,040 | 276,040 |
| N (women) | 55,243 | 55,243 | 53,543 | 55,243 | 55,243 |

Droughts and floods refer to rainfall below the threshold in rainy seasons terminating during the relevant marriage year or the year before. The age of marriage variable is grouped in five year intervals. Standard errors clustered on the ERA-Interim grid level in brackets. * significant at 10%, ** significant at 5%, *** significant at 1%.

Table C.2: Duration analysis of the effect of weather shocks on first incidence of violence in marriage, all women

| DV: First violent episode | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Sample | all | all | all | all |
| Drought (2.5%) | 0.898* | 0.869** | 0.862** | 0.877** |
| | (0.053) | (0.053) | (0.053) | (0.053) |
| Flood (2.5%) | 1.046 | 1.035 | 1.060 | 1.017 |
| | (0.059) | (0.046) | (0.049) | (0.046) |
| Drought (10%) | 1.021 | 1.016 | 1.010 | 1.022 |
| | (0.023) | (0.020) | (0.024) | (0.021) |
| Flood (10%) | 1.024 | 0.974 | 0.973 | 0.977 |
| | (0.022) | (0.020) | (0.022) | (0.021) |
| Grid F.E. | yes | yes | yes | yes |
| Piecewise constants | yes | yes | yes | yes |
| Age at marriage (grouped) | yes | yes | yes | yes |
| Survey-specific time trends | no | yes | yes | yes |
| Temperature controls | no | no | yes | no |
| Legendre polynomials of degree 1 | no | no | no | yes |
| n (marriage-years at risk) | 862,099 | 862,099 | 738,679 | 862,099 |
| N (women) | 93,519 | 93,519 | 89,421 | 93,519 |

Droughts and floods refer to rainfall below the threshold in rainy seasons terminating during the relevant marriage year or the year before. The age of marriage variable is grouped in five year intervals. Marriage years before 1980 are censured. Standard errors clustered on the ERA-Interim grid level in brackets. * significant at 10%, ** significant at 5%, *** significant at 1%.

# D  Robustness check: Effect of violence by father towards mother

As a robustness check, we use whether the respondent's father was violent against her mother as outcome variable, which is highly correlated with intimate partner violence but not plausibly affected by current rainfall. 24% of the women answer affirmatively on the question and these women are 122% more likely to have been abused by their partners (from 23 to 51 percentage points). The models with the least spatial autocorrelation are found in columns 6 and 7. We see that many of the models without spatial controls display strongly significant correlations with droughts and floods. These are fewer and less strong in the cases where polynomials enter the regressions, although not completely

absent.

Table D.1: Repeated cross sectional analysis of the effect of rainfall shocks on low household wealth

| DV: Father beat mother<br>VARIABLES | (1)<br>FBM | (2)<br>FBM | (3)<br>FBM | (4)<br>FBM | (5)<br>FBM | (6)<br>FBM | (7)<br>FBM |
|---|---|---|---|---|---|---|---|
| Drought (2.5%) last season | 0.021 | 0.013 | 0.016 | 0.026 | 0.029 | 0.037 | 0.036 |
| | (0.027) | (0.027) | (0.028) | (0.031) | (0.027) | (0.031) | (0.032) |
| Flood (2.5%) last season | -0.022 | -0.019 | -0.023 | -0.024 | -0.014 | -0.012 | 0.004 |
| | (0.014) | (0.015) | (0.015) | (0.018) | (0.019) | (0.020) | (0.025) |
| Drought (2.5%) next-to-last season | -0.150*** | -0.142*** | -0.185*** | -0.189*** | -0.226*** | -0.190*** | -0.130 |
| | (0.056) | (0.039) | (0.053) | (0.054) | (0.045) | (0.057) | (0.092) |
| Flood (2.5%) next-to-last season | -0.039 | -0.040 | -0.039 | -0.046* | -0.051** | -0.045 | -0.051* |
| | (0.042) | (0.035) | (0.038) | (0.028) | (0.026) | (0.032) | (0.027) |
| $R^2$ | 0.017 | 0.033 | 0.062 | 0.148 | 0.140 | 0.268 | 0.373 |
| Moran's I of residuals | 0.022*** | 0.018*** | 0.017*** | 0.013*** | 0.010** | 0.000 | -0.007 |
| *Z-score* | *4.65* | *3.78* | *3.63* | *2.83* | *2.26* | *0.51* | *-0.87* |
| Drought (10%) last season | 0.002 | -0.013 | -0.012 | 0.001 | 0.001 | -0.002 | 0.004 |
| | (0.010) | (0.012) | (0.013) | (0.015) | (0.014) | (0.017) | (0.017) |
| Flood (10%) last season | -0.010 | -0.002 | -0.004 | -0.021 | -0.006 | 0.004 | -0.001 |
| | (0.008) | (0.010) | (0.009) | (0.013) | (0.015) | (0.018) | (0.018) |
| Drought (10%) next-to-last season | 0.010 | 0.022 | 0.020 | 0.020 | 0.013 | 0.005 | 0.016 |
| | (0.016) | (0.017) | (0.017) | (0.020) | (0.025) | (0.032) | (0.032) |
| Flood (10%) next-to-last season | -0.014 | -0.014 | -0.017 | -0.013 | 0.001 | -0.003 | -0.013 |
| | (0.018) | (0.018) | (0.017) | (0.020) | (0.022) | (0.021) | (0.022) |
| $R^2$ | 0.008 | 0.031 | 0.057 | 0.144 | 0.121 | 0.250 | 0.361 |
| Moran's I of residuals | 0.023*** | 0.018*** | 0.017*** | 0.011** | 0.008** | 0.000 | -0.008 |
| *Z-score* | *4.76* | *3.90* | *3.71* | *2.53* | *1.99* | *0.50* | *-0.99* |
| Survey F.E. | no | yes | yes | yes | yes | yes | yes |
| Age controls | no | no | yes | yes | no | no | no |
| Temperature controls | no | no | no | yes | no | no | no |
| Legendre polynomials of degree 1 | no | no | no | no | yes | yes | yes |
| Legendre polynomials of degree 2 | no | no | no | no | no | yes | yes |
| Legendre polynomials of degree 3 | no | no | no | no | no | no | yes |
| N | 154,316 | 154,316 | 154,316 | 154,316 | 154,316 | 154,316 | 154,316 |

Standard errors clustered on the ERA-Interim grid level in brackets. * significant at 10%, ** significant at 5%, *** significant at 1%.

# E    Rural sample

We here investigate whether droughts have an effect on intimate partner violence in rural areas, as it has been argued that the effect of rainfall on household income is stronger in these households (Kudamatsu et al., 2012). Columns 6 and 7 in Table E.2 show that there is no impact of severe droughts on intimate partner violence, and that milder droughts at the 10th and 15th percentile may lead to less intimate partner violence.

When studying how droughts impact wealth levels in the rural sample, we are able to tackle spatial autocorrelation using 3rd order Legendre polynomials, unlike what was the case when using the whole sample. We also see that the coefficients from the next-to-last season drought events have the expected sign, that is, droughts increase the share in the lowest wealth quintiles in rural areas. There is a significant impact of experiencing a season in the driest 2.5% of the distribution, and a weakly significant effect using the 15% cut-off. This strengthens the interpretation of droughts as negative income shocks in this sample.

From Table E.4, we see from column 5 that there is no effect of droughts on intimate partner violence the year before the interview, using the repeated cross-sections.

Table E.5 shows that the effect of droughts on wealth in rural areas is similar to that in the total population using the repeated cross-section, with only slightly higher estimates. A drought in the next-to-last season causes a significant increase in the share in the lowest two quintiles of the distribution if the drought is at the 2.5% level or 15% level (as seen in column 6), which is the specification which performs best in terms of spatial autocorrelation. Drought have weakly significant effects at if within the 5% and 10% driest seasons.

Finally, we ran the duration model on the rural sample. As shown in Table E.6, this confirms the finding of there not being any relationship between droughts and intimate partner violence. Note that the significant negative results in the larger sample are also not present, although point estimates still indicate odds ratios smaller than unity.

Table E.2: Cross sectional analysis of the effect of rainfall shocks on intimate partner violence, rural sample

| DV: Experienced intimate partner violence last year Sample | (1) Rural | (2) Rural | (3) Rural | (4) Rural | (5) Rural | (6) Rural | (7) Rural |
|---|---|---|---|---|---|---|---|
| Drought (2.5%) last season | 0.050** | 0.078*** | 0.077*** | 0.040* | 0.031 | 0.031 | 0.012 |
| | (0.022) | (0.024) | (0.024) | (0.022) | (0.022) | (0.022) | (0.022) |
| Flood (2.5%) last season | 0.163*** | 0.037 | 0.037 | 0.029 | 0.019 | -0.010 | -0.015 |
| | (0.029) | (0.049) | (0.049) | (0.035) | (0.031) | (0.034) | (0.031) |
| Drought (2.5%) next-to-last season | -0.093*** | 0.002 | 0.001 | 0.016 | 0.031* | 0.021 | 0.006 |
| | (0.025) | (0.021) | (0.021) | (0.018) | (0.017) | (0.019) | (0.018) |
| Flood (2.5%) next-to-last season | 0.093* | 0.055* | 0.054* | 0.036 | -0.009 | -0.027 | -0.022 |
| | (0.049) | (0.032) | (0.032) | (0.034) | (0.027) | (0.022) | (0.028) |
| $R^2$ | 0.004 | 0.068 | 0.071 | 0.081 | 0.095 | 0.104 | 0.110 |
| Moran's I of residuals | 0.133*** | 0.025*** | 0.025*** | 0.018*** | 0.004*** | 0.000 | -0.002 |
| *Z-score* | *121.75* | *23.01* | *23.01* | *16.52* | *4.11* | *0.11* | *-1.27* |
| Drought (10%) last season | 0.016 | 0.033** | 0.033** | 0.007 | -0.006 | -0.003 | -0.007 |
| | (0.014) | (0.016) | (0.016) | (0.013) | (0.010) | (0.010) | (0.010) |
| Flood (10%) last season | 0.062*** | 0.011 | 0.012 | -0.002 | -0.034** | -0.034** | -0.037** |
| | (0.024) | (0.014) | (0.014) | (0.013) | (0.015) | (0.014) | (0.015) |
| Drought (10%) next-to-last season | -0.117*** | -0.028** | -0.028** | -0.018 | -0.027** | -0.031*** | -0.033*** |
| | (0.014) | (0.013) | (0.013) | (0.012) | (0.011) | (0.012) | (0.012) |
| Flood (10%) next-to-last season | 0.017 | 0.009 | 0.009 | -0.013 | -0.022* | -0.017 | -0.019 |
| | (0.019) | (0.016) | (0.016) | (0.013) | (0.013) | (0.012) | (0.012) |
| $R^2$ | 0.013 | 0.068 | 0.070 | 0.081 | 0.096 | 0.105 | 0.110 |
| Moran's I of residuals | 0.107*** | 0.025*** | 0.025*** | 0.018*** | 0.004*** | 0.000 | -0.002 |
| *Z-score* | *97.95* | *23.26* | *23.26* | *16.93* | *3.85* | *0.11* | *-1.29* |
| Survey F.E. | no | yes | yes | yes | yes | yes | yes |
| Age controls | no | no | yes | yes | no | no | no |
| Temperature controls | no | no | no | yes | no | no | no |
| Legendre polynomials of degree 1 | no | no | no | no | yes | yes | yes |
| Legendre polynomials of degree 2 | no | no | no | no | no | yes | yes |
| Legendre polynomials of degree 3 | no | no | no | no | no | no | yes |
| N | 103,945 | 103,945 | 103,937 | 103,937 | 103,945 | 103,945 | 103,945 |

Standard errors clustered on the ERA-Interim grid level in brackets. * significant at 10%, ** significant at 5%, *** significant at 1%.

Table E.3: Cross sectional analysis of the effect of rainfall shocks on low household wealth, rural sample

| DV: Lowest two wealth quintiles | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| Sample | Rural | Rural | Rural | Rural | Rural | Rural | Rural |
| Drought (2.5%) last season | -0.060** | -0.090*** | -0.089*** | -0.069*** | -0.042 | -0.027 | -0.013 |
| | (0.030) | (0.031) | (0.031) | (0.027) | (0.025) | (0.022) | (0.022) |
| Flood (2.5%) last season | 0.004 | 0.011 | 0.011 | 0.013 | 0.066*** | 0.028 | 0.015 |
| | (0.025) | (0.029) | (0.029) | (0.025) | (0.025) | (0.022) | (0.022) |
| Drought (2.5%) next-to-last season | 0.109*** | 0.120*** | 0.120*** | 0.044 | 0.070*** | 0.082*** | 0.058** |
| | (0.035) | (0.035) | (0.035) | (0.029) | (0.027) | (0.027) | (0.026) |
| Flood (2.5%) next-to-last season | -0.072 | -0.053 | -0.053 | 0.011 | 0.046 | 0.035 | 0.028 |
| | (0.047) | (0.047) | (0.047) | (0.033) | (0.031) | (0.025) | (0.026) |
| $R^2$ | 0.002 | 0.032 | 0.033 | 0.093 | 0.126 | 0.153 | 0.166 |
| Moran's I of residuals | 0.057*** | 0.049*** | 0.049*** | 0.018*** | 0.011*** | 0.001*** | -0.001 |
| *Z-score* | *83.50* | *71.32* | *71.35* | *26.01* | *15.82* | *2.60* | *-0.37* |
| Drought (10%) last season | 0.010 | -0.029 | -0.029 | -0.012 | -0.026 | -0.016 | 0.004 |
| | (0.019) | (0.022) | (0.022) | (0.017) | (0.018) | (0.017) | (0.016) |
| Flood (10%) last season | 0.023 | -0.022 | -0.022 | -0.002 | 0.055*** | 0.034* | 0.012 |
| | (0.029) | (0.021) | (0.021) | (0.019) | (0.021) | (0.019) | (0.016) |
| Drought (10%) next-to-last season | 0.092*** | 0.171*** | 0.170*** | 0.085*** | 0.011 | 0.017 | 0.012 |
| | (0.021) | (0.027) | (0.027) | (0.018) | (0.019) | (0.018) | (0.018) |
| Flood (10%) next-to-last season | -0.068*** | -0.040* | -0.040* | 0.013 | 0.003 | 0.001 | -0.015 |
| | (0.020) | (0.022) | (0.022) | (0.018) | (0.017) | (0.016) | (0.015) |
| $R^2$ | 0.007 | 0.038 | 0.039 | 0.094 | 0.126 | 0.153 | 0.166 |
| Moran's I of residuals | 0.052*** | 0.044*** | 0.044*** | 0.017*** | 0.011*** | 0.001*** | -0.001 |
| *Z-score* | *75.89* | *65.16* | *65.21* | *25.01* | *15.89* | *2.67* | *-0.42* |
| Survey F.E. | no | yes | yes | yes | yes | yes | yes |
| Age controls | no | no | yes | yes | no | no | no |
| Temperature controls | no | no | no | yes | no | no | no |
| Legendre polynomials of degree 1 | no | no | no | no | yes | yes | yes |
| Legendre polynomials of degree 2 | no | no | no | no | no | yes | yes |
| Legendre polynomials of degree 3 | no | no | no | no | no | no | yes |
| N | 369,380 | 369,380 | 368,605 | 368,605 | 369,380 | 369,380 | 369,380 |

Standard errors clustered on the ERA-Interim grid level in brackets. * significant at 10%, ** significant at 5%, *** significant at 1%.

Table E.4: Repeated cross sectional analysis of the effect of rainfall shocks on intimate partner violence, rural sample

| DV: Experienced intimate partner violence last year | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| Sample | Rural | Rural | Rural | Rural | Rural | Rural | Rural |
| Drought (2.5%) last season | -0.028 | -0.019 | -0.025 | -0.030 | 0.013 | 0.033 | 0.013 |
|  | (0.033) | (0.039) | (0.038) | (0.037) | (0.034) | (0.039) | (0.039) |
| Flood (2.5%) last season | 0.002 | 0.015 | 0.009 | 0.016 | 0.063 | 0.007 | -0.002 |
|  | (0.093) | (0.062) | (0.069) | (0.069) | (0.064) | (0.069) | (0.072) |
| Drought (2.5%) next-to-last season | -0.019 | -0.026 | -0.017 | -0.002 | -0.009 | 0.009 | 0.011 |
|  | (0.027) | (0.027) | (0.028) | (0.032) | (0.034) | (0.037) | (0.039) |
| Flood (2.5%) next-to-last season | -0.051 | 0.001 | -0.001 | 0.032 | 0.004 | -0.027 | -0.072 |
|  | (0.050) | (0.044) | (0.040) | (0.044) | (0.045) | (0.043) | (0.047) |
| R² | 0.007 | 0.291 | 0.306 | 0.335 | 0.395 | 0.472 | 0.531 |
| Moran's I of residuals | 0.039*** | 0.011*** | 0.010*** | 0.004 | -0.002 | -0.006 | -0.009* |
| *Z-score* | *9.81* | *3.22* | *2.92* | *1.49* | *0.10* | *-0.96* | *-1.78* |
| Drought (10%) last season | -0.022 | -0.008 | -0.006 | -0.007 | 0.005 | 0.029 | 0.006 |
|  | (0.015) | (0.019) | (0.019) | (0.020) | (0.022) | (0.027) | (0.028) |
| Flood (10%) last season | -0.037 | -0.036 | -0.039 | -0.037 | -0.011 | -0.031 | -0.019 |
|  | (0.033) | (0.025) | (0.025) | (0.025) | (0.028) | (0.032) | (0.034) |
| Drought (10%) next-to-last season | -0.020 | -0.029* | -0.029* | -0.018 | -0.039 | -0.048* | -0.049* |
|  | (0.014) | (0.017) | (0.017) | (0.019) | (0.025) | (0.026) | (0.028) |
| Flood (10%) next-to-last season | -0.040 | 0.002 | 0.001 | -0.0005 | 0.015 | 0.004 | -0.013 |
|  | (0.028) | (0.022) | (0.021) | (0.023) | (0.024) | (0.028) | (0.026) |
| R² | 0.021 | 0.297 | 0.313 | 0.338 | 0.397 | 0.477 | 0.531 |
| Moran's I of residuals | 0.039*** | 0.011*** | 0.009*** | 0.004 | -0.002 | -0.007 | -0.009* |
| *Z-score* | *9.98* | *3.01* | *2.70* | *1.45* | *0.02* | *-1.14* | *-1.81* |
| Grid F.E. | yes | yes | yes | yes | yes | yes | yes |
| Country trends | no | yes | yes | yes | yes | yes | yes |
| Age controls | no | no | yes | yes | no | no | no |
| Temperature controls | no | no | no | yes | no | no | no |
| Legendre polynomials of degree 1 | no | no | no | no | yes | yes | yes |
| Legendre polynomials of degree 2 | no | no | no | no | no | yes | yes |
| Legendre polynomials of degree 3 | no | no | no | no | no | no | yes |
| n (women) | 104,207 | 104,207 | 104,207 | 104,207 | 104,207 | 104,207 | 104,207 |
| N (grids) | 510 | 510 | 510 | 510 | 510 | 510 | 510 |

Standard errors clustered on the ERA-Interim grid level in brackets. * significant at 10%, ** significant at 5%, *** significant at 1%.

Table E.5: Repeated cross sectional analysis of the effect of rainfall shocks on low household wealth, rural sample

| DV: Lowest two wealth quintiles<br>Sample | (1)<br>All | (2)<br>All | (3)<br>All | (4)<br>All | (5)<br>All | (6)<br>All | (7)<br>All |
|---|---|---|---|---|---|---|---|
| Drought (2.5%) last season | -0.003 | -0.010 | -0.009 | -0.009 | 0.011 | 0.011 | -0.0003 |
| | (0.034) | (0.034) | (0.035) | (0.034) | (0.037) | (0.038) | (0.041) |
| Flood (2.5%) last season | -0.018 | -0.025 | -0.021 | -0.019 | -0.028 | -0.013 | -0.008 |
| | (0.022) | (0.023) | (0.023) | (0.026) | (0.024) | (0.024) | (0.026) |
| Drought (2.5%) next-to-last season | 0.043 | 0.051 | 0.050 | 0.039 | 0.043 | 0.094** | 0.091* |
| | (0.038) | (0.039) | (0.040) | (0.042) | (0.043) | (0.048) | (0.052) |
| Flood (2.5%) next-to-last season | -0.002 | -0.008 | -0.011 | -0.001 | 0.025 | 0.025 | 0.032 |
| | (0.021) | (0.021) | (0.023) | (0.022) | (0.022) | (0.027) | (0.028) |
| $R^2$ | 0.002 | 0.023 | 0.039 | 0.056 | 0.162 | 0.232 | 0.277 |
| Moran's I of residuals | 0.007*** | 0.008*** | 0.008*** | 0.004*** | 0.001 | -0.001 | -0.001 |
| *Z-score* | *4.26* | *4.56* | *4.53* | *2.66* | *1.27* | *-0.09* | *-0.18* |
| Drought (10%) last season | 0.023 | 0.019 | 0.015 | 0.014 | 0.023 | 0.014 | 0.009 |
| | (0.023) | (0.027) | (0.025) | (0.026) | (0.027) | (0.029) | (0.029) |
| Flood (10%) last season | 0.024 | 0.016 | 0.020 | 0.024 | 0.026 | 0.021 | 0.018 |
| | (0.014) | (0.015) | (0.015) | (0.017) | (0.018) | (0.016) | (0.017) |
| Drought (10%) next-to-last season | 0.040** | 0.058*** | 0.060*** | 0.065*** | 0.047* | 0.058* | 0.056* |
| | (0.020) | (0.022) | (0.021) | (0.022) | (0.026) | (0.032) | (0.033) |
| Flood (10%) next-to-last season | -0.019 | -0.028 | -0.028 | -0.032 | -0.022 | -0.028 | -0.028 |
| | (0.018) | (0.022) | (0.021) | (0.022) | (0.023) | (0.022) | (0.022) |
| $R^2$ | 0.015 | 0.039 | 0.056 | 0.073 | 0.170 | 0.236 | 0.281 |
| Moran's I of residuals | 0.007*** | 0.007*** | 0.007*** | 0.003** | 0.001 | -0.001 | -0.001 |
| *Z-score* | *4.17* | *4.31* | *4.27* | *2.49* | *0.88* | *-0.11* | *-0.29* |
| Grid F.E. | yes | yes | yes | yes | yes | yes | yes |
| Country trends | no | yes | yes | yes | yes | yes | yes |
| Age controls | no | no | yes | yes | no | no | no |
| Temperature controls | no | no | no | yes | no | no | no |
| Legendre polynomials of degree 1 | no | no | no | no | yes | yes | yes |
| Legendre polynomials of degree 2 | no | no | no | no | no | yes | yes |
| Legendre polynomials of degree 3 | no | no | no | no | no | no | yes |
| n (women) | 455,342 | 455,342 | 455,342 | 455,342 | 455,342 | 455,342 | 455,342 |
| N (grids) | 1,123 | 1,123 | 1,123 | 1,123 | 1,123 | 1,123 | 1,123 |

Standard errors clustered on the ERA-Interim grid level in brackets. * significant at 10%, ** significant at 5%, *** significant at 1%.

Table E.6: Duration analysis of the effect of weather shocks on first incidence of intimate partner violence in marriage, rural sample

| DV: First violent episode | (1) | (2) | (3) | (4) |
| Sample | Rural | Rural | Rural | Rural |
|---|---|---|---|---|
| Drought (2.5%) | 0.932 | 0.888 | 0.896 | 0.896 |
| | (0.076) | (0.073) | (0.078) | (0.077) |
| Flood (2.5%) | 1.039 | 1.028 | 1.059 | 1.018 |
| | (0.067) | (0.058) | (0.061) | (0.059) |
| $R^2$ | 0.023 | 0.029 | 0.026 | 0.030 |
| Drought (10%) | 0.992 | 0.976 | 0.975 | 0.988 |
| | (0.038) | (0.040) | (0.043) | (0.041) |
| Flood (10%) | 1.047 | 1.039 | 1.060 | 1.032 |
| | (0.040) | (0.038) | (0.041) | (0.040) |
| $R^2$ | 0.023 | 0.029 | 0.026 | 0.030 |
| Grid F.E. | yes | yes | yes | yes |
| Piecewise constants | yes | yes | yes | yes |
| Age at marriage (grouped) | yes | yes | yes | yes |
| Survey-specific time trends | no | yes | yes | yes |
| Temperature controls | no | no | yes | no |
| Legendre polynomials of degree 1 | no | no | no | yes |
| n (marriage-years at risk) | 152,750 | 152,750 | 143,944 | 152,750 |
| N (women) | 32,874 | 32,874 | 32,874 | 32,874 |

Droughts and floods refer to rainfall below the threshold in rainy seasons terminating during the relevant marriage year or the year before. The age of marriage variable is grouped in five year intervals. Standard errors clustered on the ERA-Interim grid level in brackets. * significant at 10%, ** significant at 5%, *** significant at 1%.