# Online Appendix to "Under the Weather: Health, Schooling, and Economic Consequences of Early-Life Rainfall"

May 8, 2008

This appendix provides additional information and analyses related to the main paper.

## 1 Notes on Data

In 1993, the IFLS began tracking more than 7,000 households living in one of 13 provinces representative of 83% of the Indonesian population. The third wave includes 6,661 of the original 7,224 households interviewed in 1993 as well as an additional 3,774 "split-off" households containing 1993 IFLS1 household members no longer living within the origin household. Slightly more than half of the sample included in our analyses was born in either Western, Central, or Eastern Java (each of these provinces represents 17-20% of the sample). The remainder were born in roughly equal proportions in the remaining provinces included in the IFLS: North Sumatra, West Sumatra, South Sumatra, Lampung, Yogyakarta, South Kalimantan, Bali, West Nusa Tenggara, and South Sulawesi.[1] Individuals born in Jakarta are not included because we exclude those born in urban areas.

## 2 Construction of birthyear rainfall

In calculating "rainfall in one's year of birth", we focus on rainfall in complete wet and dry seasons (rather than in calendar years), as these should be most closely related to agricultural cycles. We

[1] A small number of individuals born outside the main IFLS survey provinces but residing there at the time of the survey (32 women and 38 men) are also included. Because of their small numbers, conducting the empirical analyses without these movers has essentially no effect on the coefficient estimates.

start by defining the months included in the wet and dry seasons in each Indonesian province.[2] Depending on the province, the wet season starts anywhere from September to December, while the dry season can start as early as March and as late as June. For example, in the province of Central Java the wet season runs from October to April, and the dry season from May to September.

Then we identify the "birth season" for each individual in the dataset, based on their reported birth month and birth province. For people born in the last month of a particular season, we let the following season be their birth season. Appendix Figure 1 helps explain the allocation of individuals to a "birth season," taking the example of individuals born in Central Java. We consider an individual's birth season to be the dry season if he or she was born between April (the month immediately prior to the start of the dry season) and August (the second-to-last month of the dry season) inclusive. We consider a individual to be born in the wet season if he or she is born between September (the month immediately prior to the wet season) and March (the second-to-last month of the wet season). The procedure is analogous for individuals born in different provinces, except that the wet and dry seasons may be defined differently.

Having defined individual birth seasons, we then define "rainfall in one's year of birth" to be the sum of rainfall in one's birth season and in the following season (total rainfall in the 12 consecutive months of an individual's first wet and dry seasons).

# 3 OLS results

Appendix Table 2 presents the OLS version of Table 2's IV results. The patterns are very similar across the two tables. Coefficients on birthyear rainfall in the IV regressions are also statistically significantly different from zero in OLS. In addition, in the OLS results birthyear rainfall also enters statistically significantly in the regressions for self-reported very good health status and for log expenditures per capita in the household. The main difference is that OLS coefficient estimates are mostly attenuated towards zero compared to the IV estimates. The coefficients on birthyear rainfall across the nine separate regressions are also jointly statistically significantly different from zero; a test for joint significance across the regressions has an F-statistic of 12.18 (p-value 0.000).

For men, as in the IV results, in no regression is the coefficient on birthyear rainfall statistically

[2] To do this, we combine information from secondary reports on the extent of the rainy season (Kishore et al., 2000) with our own analysis of mean monthly rainfall across all weather stations within each province.

significantly different from zero. Neither are the coefficients jointly statistically significant: a test for joint significance across the regressions has an F-statistic of 0.47 (p-value 0.891).

# 4 Checking for selection

It is important to consider whether selection into our sample might confound the results. Ideally, our sample would be randomly selected from the Indonesian female population born between 1953 and 1974. In fact, our sample consists of women born during this time period who survived long enough to participate in the IFLS's third survey wave in 2000. Bias could result from selective mortality between birth and 2000.

To gain a sense of the role of selection in influencing our results, we test whether rainfall shocks affect the size of female and male birth cohorts who appear in our samples at the district-birthyear-season level. Specifically, we regress the number of individuals appearing in our IFLS sample at the birthdistrict-birthyear-season level on the birthyear rainfall variable, separately for women and men. Comparably to our individual analyses, regressions include birthyear-season and district-season fixed effects, as well as district-season-specific linear time trends. To reduce the problem of birth districts entering the sample endogenously, we only include in this analysis districts that were enumeration areas of the initial wave of the IFLS in 1993.

Results are in Appendix Table 3 for women and men separately. Coefficients on birthyear rainfall for both women and men are not statistically significantly different from zero. Point estimates are actually negative in sign, which is the opposite of what one would expect if higher birthyear rainfall led to lower mortality between birth and the survey year. This analysis therefore provides no indication that birthyear rainfall importantly affects the likelihood of inclusion in our sample.

The fact that birthyear rainfall does not affect the likelihood of inclusion in our sample helps alleviate most concerns about sample selection, as it would be very surprising if a shock affected the *characteristics* (e.g., parental characteristics) of a district-level birth cohort without also affecting the cohort's size. Nonetheless, we also check whether birthyear rainfall has an association with the small number of variables in the dataset that relate to the characteristics of the parents of the sampled individuals: completed grades of schooling and an indicator for parent currently still living.

As parents should for the most part have completed their schooling prior to their children's birth, their children's birthyear rainfall should not have any causal effect on parental years of schooling. Any observed relationship in our data would therefore be evidence of sample selection. We are also interested in the indicator for the parent still being alive as a dependent variable, as this is the only measure we have of parents' health human capital. While this variable will in part capture parental genetic characteristics and investments in parents' health made prior to their children's birth, it could also be directly affected by children's birthyear rainfall. For example, children with better birthyear rainfall could have better economic outcomes as adults and thus directly contribute to their parents' later-life health investments. Therefore, if we find statistically significant and positive relationships between children's birthyear rainfall and the parent-alive indicator, it could either reflect positive sample selection or a direct causal effect of rainfall on parental longevity. On the other hand, a finding of no relationship is consistent with the non-existence of both sample selection and a causal effect.

We run regressions that are analogous to those in Table 2, but where the outcome variables are characteristics of individuals' fathers and mothers.[3] Regression results are presented in Appendix Table 4. In both the female and male regressions, none of the coefficients on birthyear rainfall are statistically significantly different from zero, and most are quite close to zero. There is no indication that rainfall has compositional effects on local-level birth cohorts, either in terms of parental years of schooling or parental longevity.

# 5 Impacts on individuals born in urban areas

The main results of the paper focus on people born outside of urban areas (areas with greater than 50,000 population in the 1930 census), because impacts of rainfall on agricultural output should be expected to appear mainly in rural areas. For comparision, we present here regression results for those individuals in the IFLS data who *were* born in urban areas. This comparison serves as a kind of specification check: if early-life rainfall had similar impacts on later-life outcomes for people born in urban areas, then it would raise suspicions as to the validity of the original results.

In Appendix Table 5, we present regression results that are analogous to those of Table 2 in the main paper, with the only difference being that the sample is people born in districts that we define as urban areas. Sample sizes are smaller in Appendix Table 5, and so standard errors are typically larger than the corresponding standard errors in Table 2.

Generally speaking, for those born in more urban areas, the results reveal little relationship

[3] Each of these parental variables is only reported by a fraction of individuals in our sample, but we find that birthyear rainfall has no large or statistically significant effect on the likelihood of reporting any of these variables (regressions not reported).

between early-life rainfall and adult outcomes (and if anything a negative relationship for some outcomes). Of the 18 coefficient estimates in the table (9 for men and 9 for women), 16 are not statistically significantly different from zero. In most of these cases, the coefficients are smaller in magnitude or opposite in sign compared to the corresponding coefficients in Table 2. The two regressions that yield statistically significant coefficients on birthyear rainfall are the regression for ln(lung capacity) for women and days absent due to illness for men. Each of these coefficients actually implies negative effects of birthyear rainfall on later-life outcomes (higher birthyear rainfall leads to lower lung capacity for women and more days absent due to illness for men).

The results may reflect that rainfall has a negative impact on early-life environmental conditions in urban areas, via perhaps increases in water-borne diseases or in those carried by mosquitoes. It is possible that such negative health effects also occur among individuals born in the rural areas (those analyzed in the main paper), but that these negative impacts are more than offset by the positive impact of rainfall on rural household incomes. Simply put, in urban areas any positive effect of rainfall on incomes may be too small to offset the negative health impacts. Of course, this interpretation needs to be made with caution, because only two out of 18 coefficients are statistically significantly different from zero and thus the results could simply be due to sampling variation.

# 6 Calculation of net present value of a year of poor rainfall

To calculate the net present value (in 1963) of a year of poor rainfall for the cohort born in that year, we start with the number of women born in 1963 who are living in rural areas in the 1971 Indonesian census: 1,581,963. Our goal is to track this cohort's earnings over time, and calculate the net present value of the decline in earnings associated with 0.2 lower log rainfall. We assume that the women work from age 16 to 65 (years 1979 to 2028). Some of these women will migrate to urban areas, and so we allow earnings to vary across rural and urban areas and over time.

This cohort will become smaller in size over time due to mortality, and we assume it does so at the same rate as the overall (rural plus urban) 1963 female cohort in Indonesia. We allow the mortality rates to differ over time, calculating them between the following census years: 1971 to 1980 (when the annual mortality rate was 1872 per 100,000), 1980 to 1995 (annual mortality rate 281 per 100,000), and 1995 to 2005 (annual mortality rate 151 per 100,000). For years after 2005, because the age-specific death rates are unavailable for Indonesia, we use annual mortality rates of U.S. females in the following age groups: age 40-44, 158.6 per 100,000; age 45-49, 239.9 per 100,000; age 50-54, 347.5 per 100,000; age 55-59, 521.9 per 100,000; age 60-64, 847.6 per 100,000; age 65-69, 1322.9 per 100,000 (Source: Center for Disease Control, "National Vital Statistics Reports," Vol. 56, No. 10, April 24, 2008.) In 1979, we estimate that 1,360,062 women remained alive in this cohort, declining to 1,123,841 in 2028.

Then, in each year from 1979 to 2028, women remaining alive in this cohort need to be apportioned between rural and urban areas. Women remaining in rural areas are known directly from the 1971, 1980, 1995, and 2005 Indonesian censuses, and to obtain the numbers in intervening years we use simple linear interpolation. Taking the 1,581,963 rural women of this cohort alive in 1971 as the baseline, the percentage of these women living in rural areas declines to 66.3% in 2005. For years after 2005, we assume the percentage of these women remaining in rural areas declines at a percentage rate given by the 1980-2005 trend (-0.94% per year). So by 2028 the percentage in rural areas is estimated at 59.8%. Having calculated the number of women remaining in rural areas in each year, the number in urban areas is the difference between this number and total living cohort size in that year (estimated as described in the previous paragraph).

The next step in the calculation is to assign earnings levels for women in this rural 1963 birth cohort in each year from 1979 to 2028, allowing annual earnings to vary across rural and urban areas. First we calculate total rural and urban GDP as follows. GDP (in 2000 US$) from 1979 to 2005 is taken from the World Development Indicators (WDI) dataset, and is assumed to grow at a rate of 5% per year thereafter. We then assume that the share of labor income in GDP is 0.7 (as reported in Duflo 2001). Then we apportion this labor income into rural vs. urban by assuming that agriculture's share in GDP in the given year is equal to the rural share of labor income in GDP (agricultural share of GDP is also given by the WDI dataset through 2005, and then is assumed to decline thereafter at a rate given by the 1980-2005 trend). This gives us estimates of total labor income in rural areas vs. urban areas from 1979 to 2028. Then, for each year we divide total labor income in rural and urban areas by estimated Indonesian population in rural and urban areas, respectively. (Total population and the rural share of population from 1979-2005 are both from WDI, and both are projected through 2028 according to their respective 1980-2005 trends.) The result is estimates of rural and urban annual labor earnings over the time period. In 1979, rural and urban annual earnings were $91 and $880 respectively, while in 2028 the corresponding figures are projected to be $294 and $2024 (all figures in 2000 US$).

Combined with the cohort sizes in rural and urban areas calculated previously, this allows us to calculate total earnings for the 1963 rural female birth cohort over their entire assumed working life, 1979-2028. We then consider the impact of 0.2 lower log rainfall in the birthyear for this cohort. Our estimates indicate that rainfall lower by this amount leads to 0.22 fewer years of schooling. Duflo's (2001) midpoint estimate is that each year of schooling raises wages by 8.7%, so 0.22 fewer years of schooling would lower wages by 1.9%. We therefore multiply total earnings in each year by 1.9% to get total lost earnings associated with 0.2 lower birthyear rainfall, and discount each amount back to 1963 (using a 5% discount rate). The sum of these figures across years is the net present value of lost future wages due to 0.2 lower birthyear rainfall.

The net present value in 1963 is $77.3 million (in 2000 US dollars). This amount equals 0.4% of Indonesia's GDP in 1963. This number suggests that if some way could have been found to shield female infants born in that year from suffering the nutritional deprivation and other negative effects of low rainfall, it would have been worth spending 0.4% of Indonesian GDP at that time to do so.

An additional use of this $77.3 million estimate is to divide it by the number of infants born in 1963. It is not known how many infants were born in 1963, but we can start with the 1,581,963 rural females reported in the 1971 census and forecast backwards using relevant infant and child mortality rates to estimate the initial 1963 birth cohort size.[4] On this basis we estimate that 1,817,350 rural female infants were born in 1963. Dividing the $77.3 million cost estimate by this number obtains a figure of $43 per female infant born in rural Indonesia in 1963. This number represents the highest amount it would have been cost-effective to spend on each female infant born in rural areas on an intervention that shielded them from the impacts of log rainfall 0.2 lower than the norm. This amount is non-trivial, amounting to 21.8% of Indonesian per capita GDP in 1963.

[4]For backcasting the 1971 population (of 8-year-olds) to the 1969 population (of 6-year-olds), we use the annual mortality rate of 1871 per 100,000 we estimated for this cohort using the 1971 and 1980 censuses. Then, we backcast this 1969 population of 6-year-olds to the number of births in 1963 using the under-5 mortality rate (96 per 1,000) from the 1987 Indonesian Demographic and Health Survey (DHS) (reported in E. Bos and F. Saadah, "Indonesia: Childhood Mortality Trends," East Asia and Pacific Region Watching Brief, World Bank, Issue 4, July 1999, p. 1-6.).

**Appendix Table 1: Relationship between birthyear/birthdistrict rainfall and rainfall in 2nd- to 5th-closest rainfall stations**

Fixed effects estimates (first stage of Table 2's IV regression).

Dependent variable: Rainfall in birthyear and birthdistrict (deviation of log rainfall in birth district from log of 1953-1999 district mean rainfall)

| | Women | Men |
|---|---|---|
| Birthyear/birthdistrict rainfall, 2nd-closest station | 0.138 | 0.120 |
| | (0.024)*** | (0.023)*** |
| Birthyear/birthdistrict rainfall, 3rd-closest station | 0.144 | 0.158 |
| | (0.039)*** | (0.035)*** |
| Birthyear/birthdistrict rainfall, 4th-closest station | 0.088 | 0.081 |
| | (0.053) | (0.044)* |
| Birthyear/birthdistrict rainfall, 5th-closest station | 0.125 | 0.158 |
| | (0.025)*** | (0.039)*** |
| Number of observations | 4,615 | 4,277 |
| R-squared | 0.59 | 0.59 |
| F-statistic: Joint significance of all four rainfall variables | 31.61 | 28.80 |
| P-value | 0.000 | 0.000 |

Number of observations in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%
NOTES-- Sample is individuals born outside of urban areas between 1953 and 1974 inclusive, observed in year 2000. "Urban areas" are cities with 50,000 or more inhabitants in 1930. Each column presents regression coefficients from a separate regression. Standard errors clustered by province of birth. Dependent variable, birthyear rainfall, is deviation of log rainfall in birth district from log of 1953-1999 district mean rainfall, as measured at the rainfall station closest to the birth district. Rainfall variables on the right-hand-side of the regression are defined similarly, but are as measured in the 2nd- through 5th-closest rainfall stations to the birth district. All regressions include fixed effects for birthyear-season, birthdistrict-season, and birthdistrict-season-specific linear time trends.

**<u>Appendix Table 2</u>: Effect of birthyear rainfall on adult outcomes, individuals born 1953-1974**

Fixed effects estimates (OLS version of Table 2's IV results). Coefficients (std. errors) in regression of outcome on rainfall in individual's birthyear and birth district.

| | Women | Men |
|---|---|---|
| Self-rep. health status very good (indic.) | 0.035 | 0.012 |
| | (0.014)** | (0.016) |
| | [4,613] | [4,270] |
| Self-rep. health status poor/very poor (indic.) | -0.044 | 0.009 |
| | (0.008)*** | (0.029) |
| | [4,613] | [4,270] |
| Ln (lung capacity) | 0.030 | 0.008 |
| | (0.020) | (0.016) |
| | [4,454] | [3,907] |
| Height (cm.) | 0.688 | -0.082 |
| | (0.353)* | (0.566) |
| | [4,495] | [3,924] |
| Days absent due to illness (last 4 weeks) | -0.319 | -0.084 |
| | (0.240) | (0.276) |
| | [4,611] | [4,267] |
| Completed grades of schooling | 0.640 | 0.007 |
| | (0.367)* | (0.490) |
| | [4,598] | [4,259] |
| Ln (expenditures per cap. in hh) | 0.269 | -0.119 |
| | (0.074)*** | (0.092) |
| | [4,615] | [4,277] |
| Asset index | 0.466 | -0.049 |
| | (0.111)*** | (0.117) |
| | [4,613] | [4,276] |
| Ln (annual earnings) | 0.278 | -0.066 |
| | (0.176) | (0.103) |
| | [2,210] | [3,828] |

Number of observations in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%
NOTES-- Sample is individuals born outside of urban areas between 1953 and 1974 inclusive, observed in year 2000. Each coefficient (standard error) is from a separate regression of the dependent variable on birthyear rainfall (deviation of log rainfall in birth district from log of 1953-1999 district mean rainfall). Standard errors clustered by province of birth. All regressions include fixed effects for birthyear-season, birthdistrict-season, and birthdistrict-season-specific linear time trends. Asset index is first principal component of five asset variables (log total value of household assets and indicators for ownership of television, refrigerator, private toilet, and stove).

**<u>Appendix Table 3</u>: Impact of rainfall shock on number of individuals in IFLS sample**
(Instrumental variables estimates)

<u>Dependent variable</u>: Number of individuals in sample in a district-year-season cell

| | Women | Men |
|---|---|---|
| Deviation of log rainfall from norm | -0.354 | -0.060 |
| | (0.221) | (0.166) |
| Birthyear-season fixed effects | Y | Y |
| Birthdistrict-season fixed effects | Y | Y |
| Birthdistrict-season-specific linear time trends | Y | Y |
| Num. of obs. | 5,412 | 5,412 |

* significant at 10%; ** significant at 5%; *** significant at 1%
NOTES-- Unit of observation is a birthdistrict-birthyear-birthseason cell (e.g. birthdistrict 1201 for birthyear 1970 in the wet season) between 1953 and 1974 for birthdistricts (kabupatens) of IFLS1 (1993) enumeration areas. As in previous tables, cities with greater than 50,000 population in 1930 are excluded. Dependent variable is number of individuals observed in our IFLS3 sample born in that cell. Standard errors clustered by province of birth. Instrumental variables for year/district rainfall are rainfall measured at 2nd- through 5th-closest rainfall stations to the district.

**<u>Appendix Table 4</u>: Effect of birthyear rainfall on *parental* characteristics, individuals born 1953-1974**
(Instrumental variables estimates)

Coefficients (std. errors) in regression of outcome on *child's* birthyear rainfall.

| | Women | Men |
|---|---|---|
| Mother's characteristics | | |
| Completed grades of schooling | 0.204 | 0.132 |
| | (1.136) | (0.947) |
| | [2,447] | [2,258] |
| Currently alive (indicator) | 0.084 | 0.029 |
| | (0.083) | (0.108) |
| | [4,542] | [4,039] |
| Father's characteristics | | |
| Completed grades of schooling | 0.273 | 0.166 |
| | (1.172) | (1.309) |
| | [2,810] | [2,621] |
| Currently alive (indicator) | 0.010 | -0.093 |
| | (0.080) | (0.169) |
| | [4,541] | [4,040] |

Number of observations in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%
NOTES-- Sample is individuals born between 1953 and 1974 inclusive, observed in year 2000. Each coefficient (standard error) is from a separate regression of the dependent variable on child's birthyear rainfall (deviation of log rainfall from log of 1953-1999 district mean rainfall). Standard errors clustered by province of birth. All regressions include fixed effects for birthyear-season, birthdistrict-season, and birthdistrict-season-specific linear time trends. Instrumental variables for birthyear/birthdistrict rainfall are rainfall measured at 2nd- through 5th-closest rainfall stations to the respondent's birth district.

**<u>Appendix Table 5</u>: Effect of birthyear rainfall on adult outcomes, individuals born in urban areas, 1953-1974**

Instrumental variables estimates. Coefficients (std. errors) in regression of outcome on rainfall in individual's birthyear and birth district. Instrumental variables for birthyear/birthdistrict rainfall are rainfall measured at 2nd- through 5th-closest rainfall stations to respondent's birth district.

| | Women | Men |
|---|---|---|
| Self-rep. health status very good (indic.) | 0.123 | -0.115 |
| | (0.099) | (0.078) |
| | [1,239] | [1,264] |
| Self-rep. health status poor/very poor (indic.) | 0.090 | 0.106 |
| | (0.154) | (0.134) |
| | [1,239] | [1,264] |
| Ln (lung capacity) | -0.067 | 0.008 |
| | (0.034)* | (0.089) |
| | [1,195] | [1,130] |
| Height (cm.) | -1.165 | 3.054 |
| | (1.660) | (2.017) |
| | [1,207] | [1,132] |
| Days absent due to illness (last 4 weeks) | 0.669 | 3.075 |
| | (0.688) | (1.505)* |
| | [1,240] | [1,261] |
| Completed grades of schooling | 0.958 | -1.441 |
| | (1.274) | (1.947) |
| | [1,240] | [1,260] |
| Ln (expenditures per cap. in hh) | -0.193 | -0.329 |
| | (0.284) | (0.189) |
| | [1,240] | [1,264] |
| Asset index | -0.773 | 0.166 |
| | (0.497) | (0.353) |
| | [1,240] | [1,264] |
| Ln (annual earnings) | 0.202 | -0.612 |
| | (0.333) | (0.344) |
| | [631] | [1,142] |

Number of observations in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%
NOTES-- Sample is individuals born in urban areas between 1953 and 1974 inclusive, observed in year 2000. "Urban areas" are cities with 50,000 or more inhabitants in 1930. Each coefficient (standard error) is from a separate regression of the dependent variable on birthyear rainfall (deviation of log rainfall in birth district from log of 1953-1999 district mean rainfall). Standard errors clustered by province of birth. All regressions include fixed effects for birthyear-season, birthdistrict-season, and birthdistrict-season-specific linear time trends. Asset index is first principal component of five asset variables (log total value of household assets and indicators for ownership of television, refrigerator, private toilet, and stove).

**Appendix Table 6: Effect of rainfall across climate regions, women born 1953-1974**

Instrumental variables estimates. Birthyear rainfall (and interactions with region dummies) instrumented with rainfall measured at 2nd- through 5th-closest rainfall stations to respondent's birth district (and interactions with region dummies).

| Dependent variable: | Self-rep. health status very good (indic.) | Self-rep. health status poor/very poor (indic.) | Height (cm.) | Completed grades of schooling | Asset index |
|---|---|---|---|---|---|
| Coefficient on rainfall in: | | | | | |
| North Sumatra | 0.432 | -0.187 | 7.826 | 2.670 | 0.707 |
| (wettest places) | (0.042)*** | (0.070)** | (1.269)*** | (0.595)*** | (0.447) |
| Kalimantan, Sulawesi, and points east | 0.105 | -0.176 | 5.570 | 3.682 | 0.739 |
| (medium wet places) | (0.089) | (0.115) | (1.780)*** | (1.037)*** | (0.280)** |
| South Sumatra, Java | 0.091 | -0.107 | 2.213 | 0.539 | 0.694 |
| (medium wet places) | (0.067) | (0.056)* | (0.759)*** | (0.645) | (0.255)** |
| Bali, NTB, NTT | 0.086 | -0.209 | 1.160 | 2.200 | 0.435 |
| (dryest places) | (0.044)* | (0.058)*** | (0.522)** | (0.818)** | (0.210)* |
| Num. of obs. | 4,613 | 4,613 | 4,495 | 4,598 | 4,613 |

* significant at 10%; ** significant at 5%; *** significant at 1%

NOTES-- Each column presents coefficients (standard errors) from a separate regression of the dependent variable on birthyear rainfall (deviation of log rainfall from log of 1953-1999 district mean rainfall) interacted with an indicator for a different geographic region. All regressions include fixed effects for birthyear-season, birthdistrict-season, and birthdistrict-season-specific linear time trends. See Table 2 for notes on sample composition and variable definitions.

**<u>Appendix Figure 1</u>: Defining rainfall in one's birth year (Central Java example)**