

# Appendix

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# 1 Data

## 1.1 Explanation

We have district-level panel data for the 11 districts (Merz) of Armenia from the years 2004 to 2023. It consists of variables from aggregated household surveys, variables on detailed agricultural output and drought-related variables. Every variable represents the average level in a particular year in a particular district.

### 1.1.1 Variable Names & Units

- In Armenian Dram (currency):
  - income: Household income
  - agric\_income: Household agriculture income
  - fdcons: Household food consumption
  - fdpurch: Household food purchases
  - exp: Household expenditures
- In Percentage:
  - poverty: Rate of households in poverty
  - urban: Rate of households living in an urban area
  - share: Share of observations of SPEI above +1
  - agric\_stress: Percentage of arable areas with a VHI (Vegetable Health Index) value below 35%
- Dummies:
  - drought\_dummy1:
  - drought\_dummy2:
- Tons (1000kg)
  - agric\_output: Gross Agriculture output
  - grains\_harvest: Tons of grains and leguminous plants harvested
  - vegetables\_harvest: Tons of vegetables harvested
  - fruits\_harvest: Tons of fruits and berries harvested
  - potatoes\_harvest: Tons of potatoes harvested
  - watermelon\_harvest: Tons of watermelons harvested
  - grapes\_harvest: Tons of grapes harvested
- Hectare (1000km2)
  - grains\_area: Hectares used for harvesting grains and leguminous plants
  - vegetables\_area: Hectares used for harvesting vegetables
  - fruits\_area: Hectares used for harvesting fruits and berries
  - potatoes\_area: Hectares used for harvesting potatoes
  - watermelon\_area: Hectares used for harvesting watermelons
  - grapes\_area: Hectares used for harvesting grapes
- Tons per hectare (1000kg / 1000km2)
  - output\_per\_field\_grains: Grains harvested divided by area
  - output\_per\_field\_vegetables: Vegetables harvested divided by area
  - output\_per\_field\_fruits: Fruits harvested divided by area
  - output\_per\_field\_potatoes: Potatoes harvested divided by area
  - output\_per\_field\_grapes: Grapes harvested divided by area
- Other:

- spei: SPEI measures deviation of the water balance from the long term mean. A value of 0 means we are at the long term mean, while +1 is a moderate drought that happens once or twice in 10 years. Note that we took the official SPEI and multiplied it by (-1) in order to adjust the coefficient sign interpretation in the regressions. Positive values indicate harsher conditions.
- temperature: CRU land-based measure of average surface temperature in celsius

## 2 Descriptive Evidence

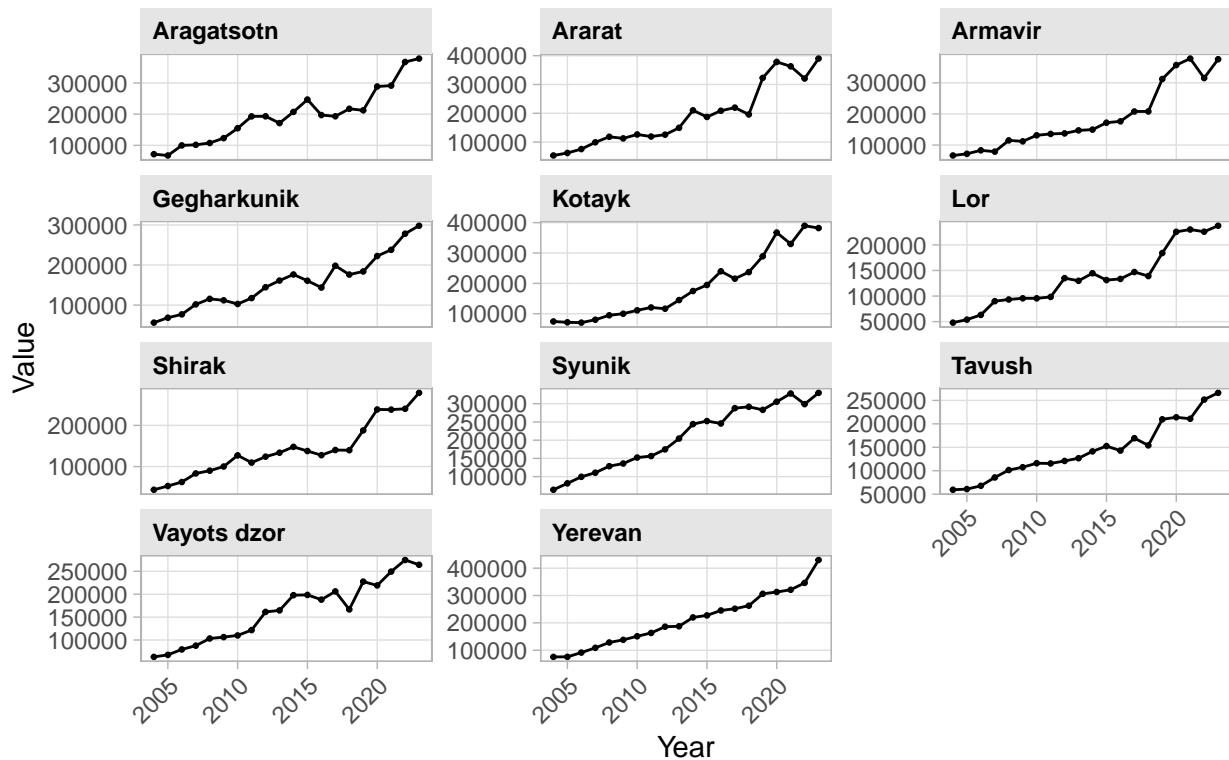
### 2.1 Summary Statistics

Table 1: Summary Statistics

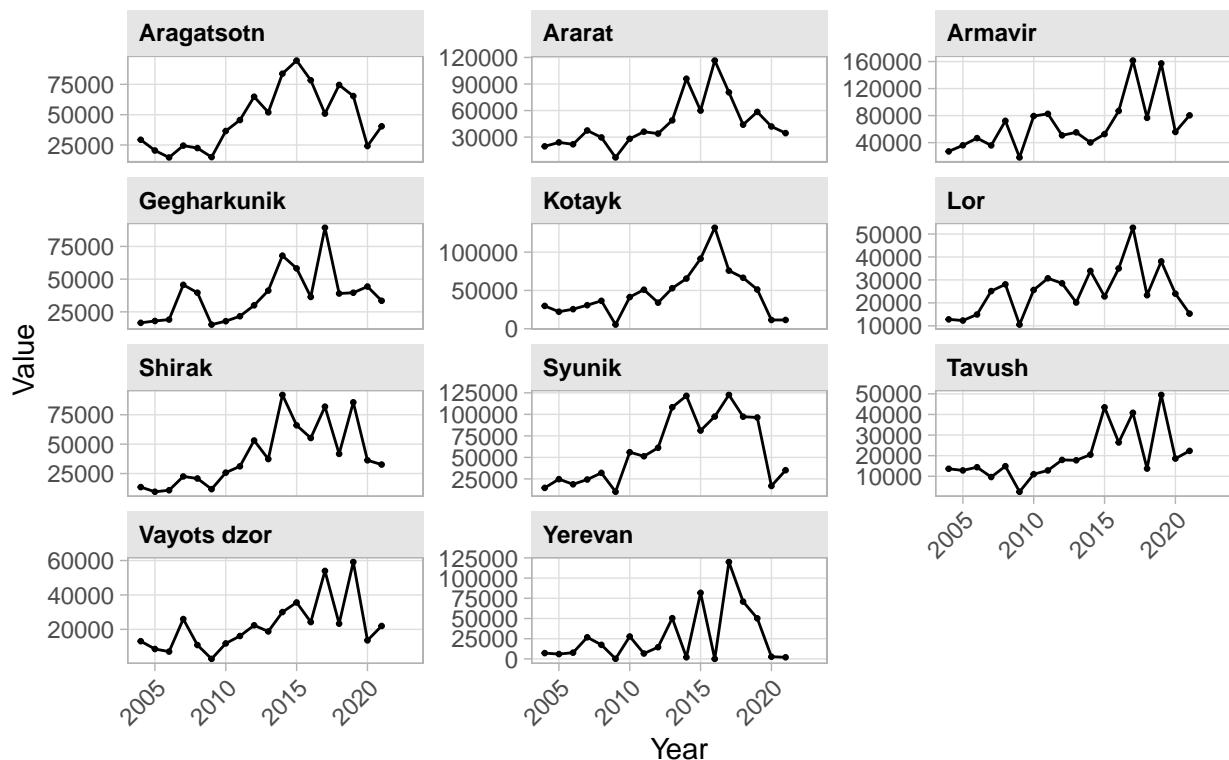
Variable	Mean	SD	Median	Min	Max
agric_income	39837.36	30467.86	30956.55	0.00	161496.48
agric_output	75.97	47.23	69.05	4.90	225.10
agric_stress	0.06	0.12	0.01	0.00	0.78
fdcons	13102.63	6403.40	12615.93	1931.74	40376.19
income	174691.18	87785.61	151666.73	43655.19	429931.04
output_per_field_fruits	6.53	4.19	5.08	0.41	18.16
output_per_field_grains	2.55	0.98	2.55	0.00	4.87
poverty	0.24	0.09	0.24	0.02	0.43
share	0.19	0.16	0.15	0.00	0.64
spei	0.06	0.51	0.05	-1.03	1.31
urban	0.59	0.22	0.50	0.31	1.00

## 2.2 Raw Data Graphs

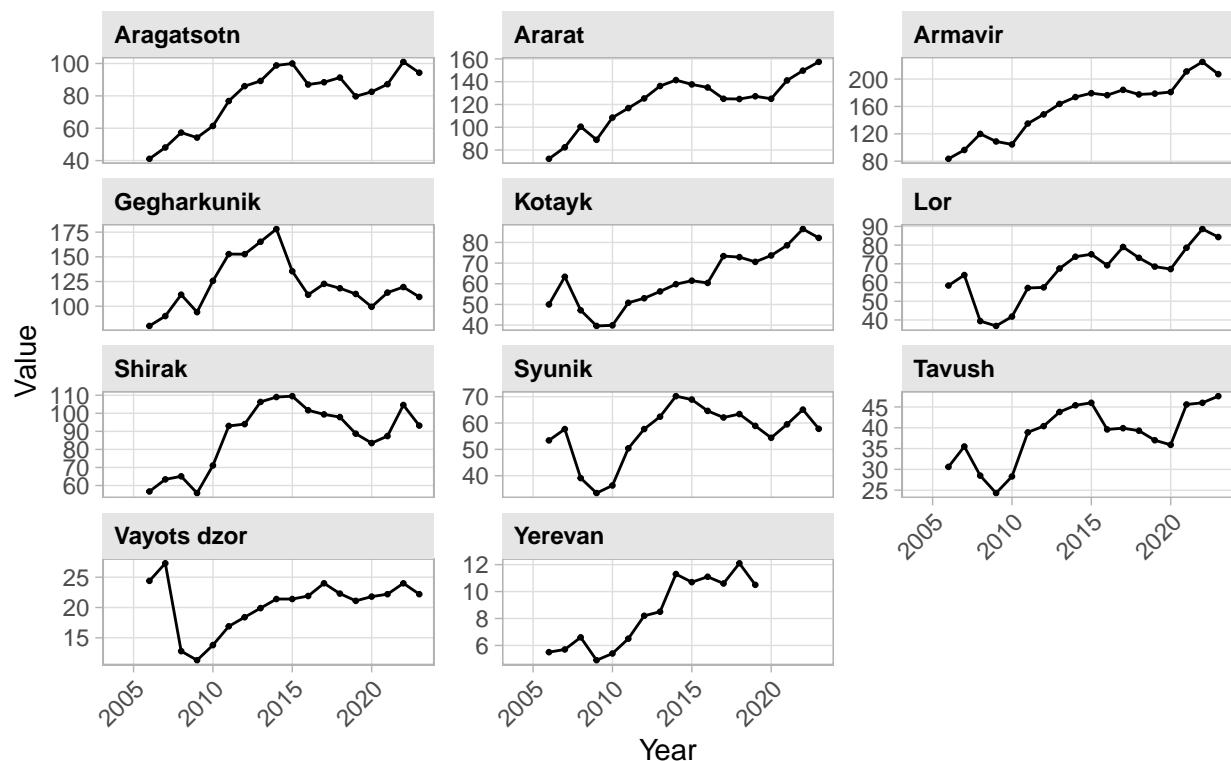
**Evolution of: Household Income**



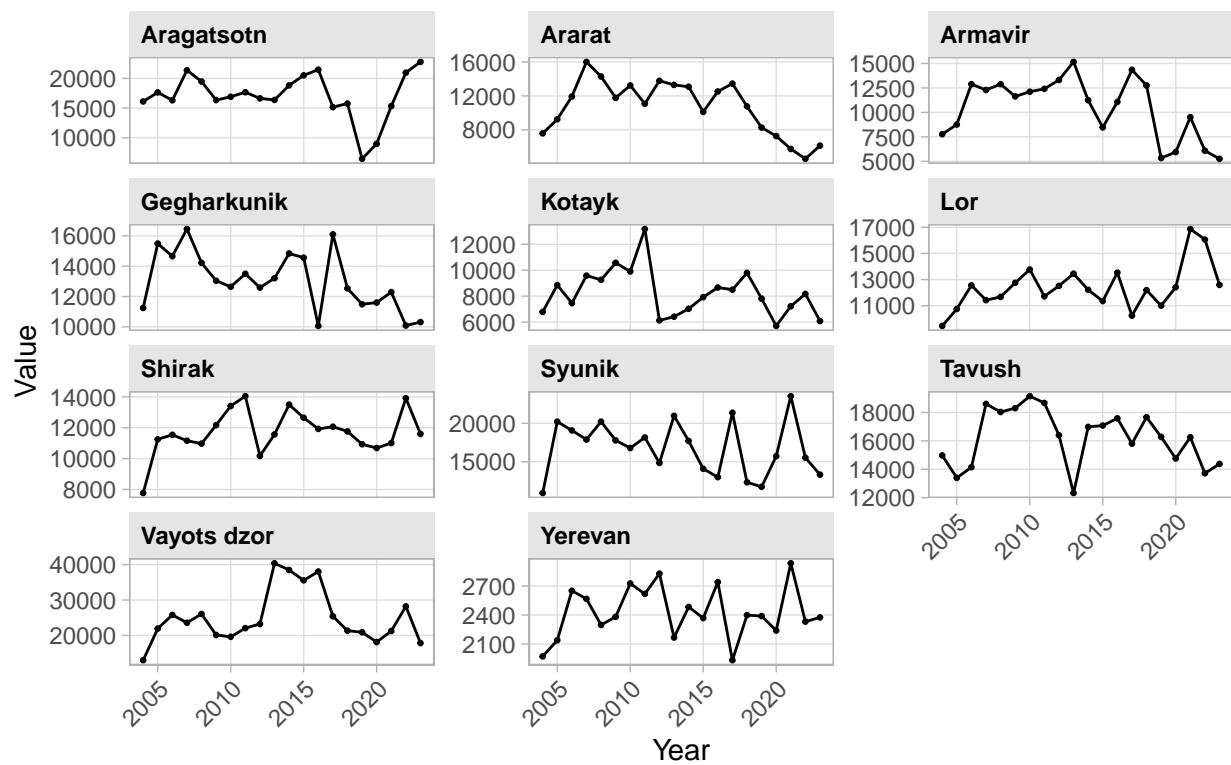
**Evolution of: Household Agricultural Income**



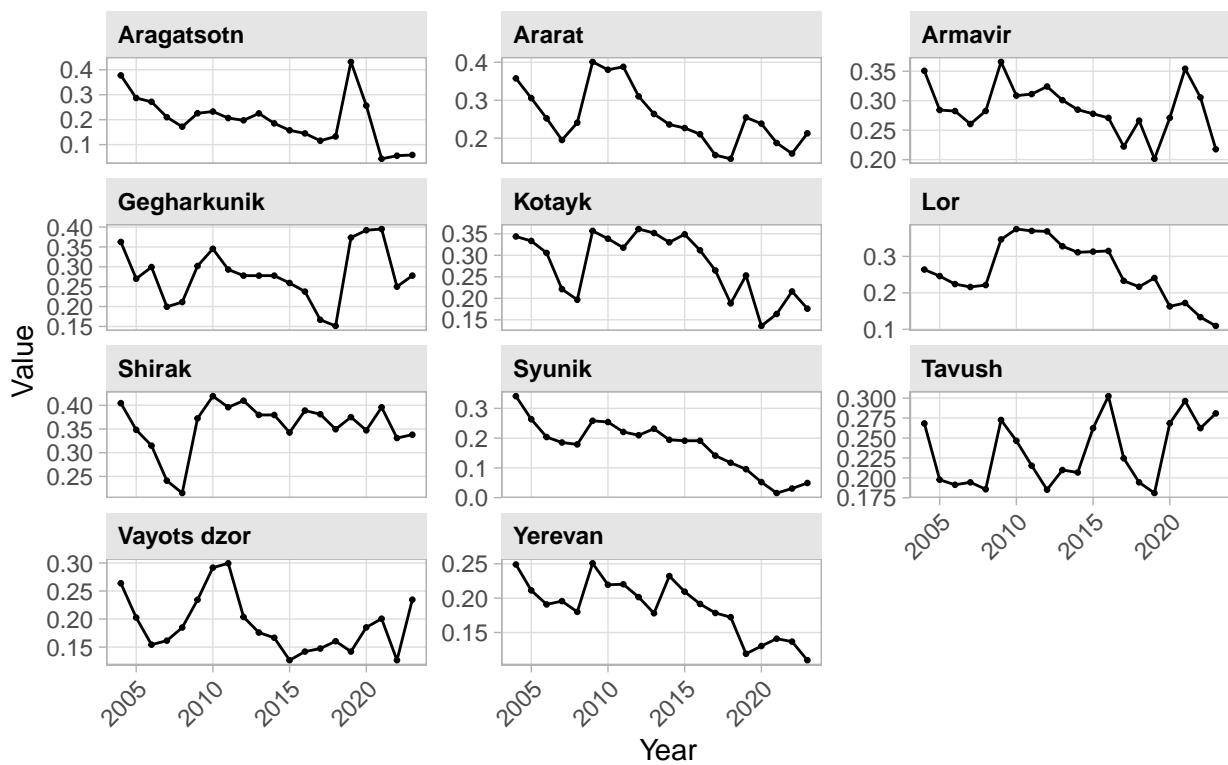
### Evolution of: Gross Agricultural Output



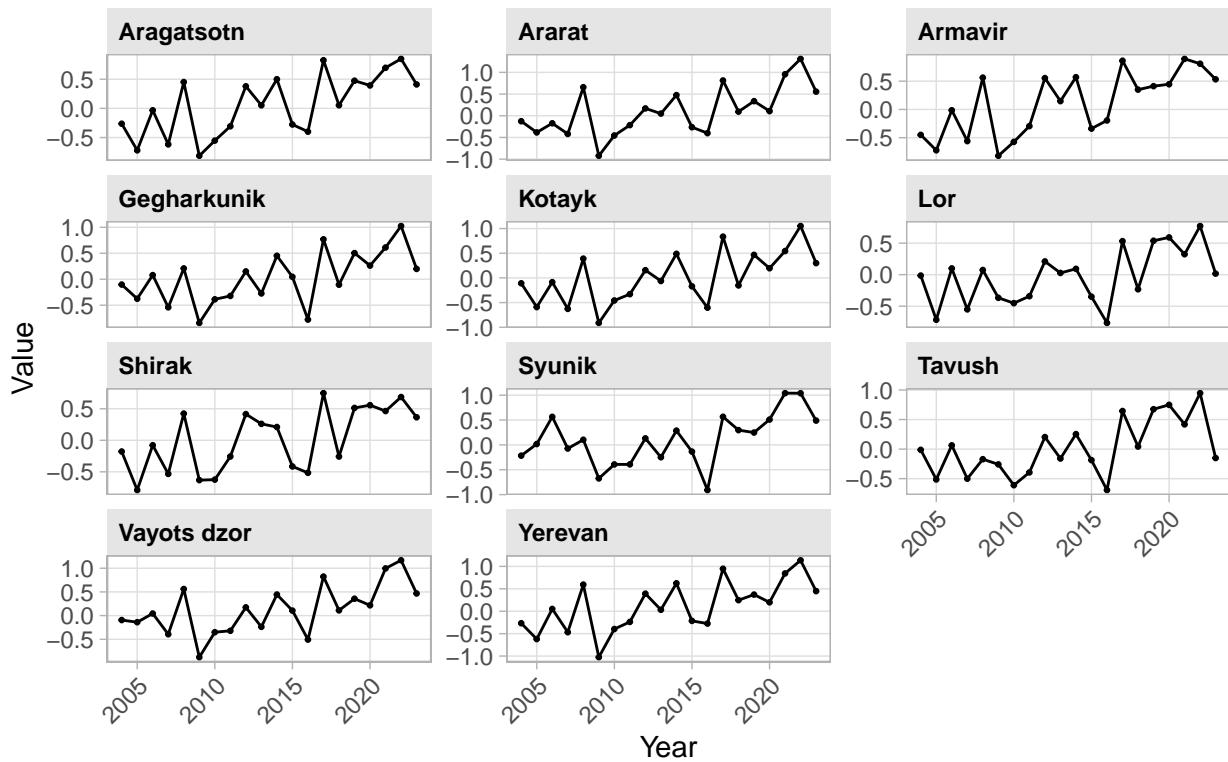
### Evolution of: Household food Consumption



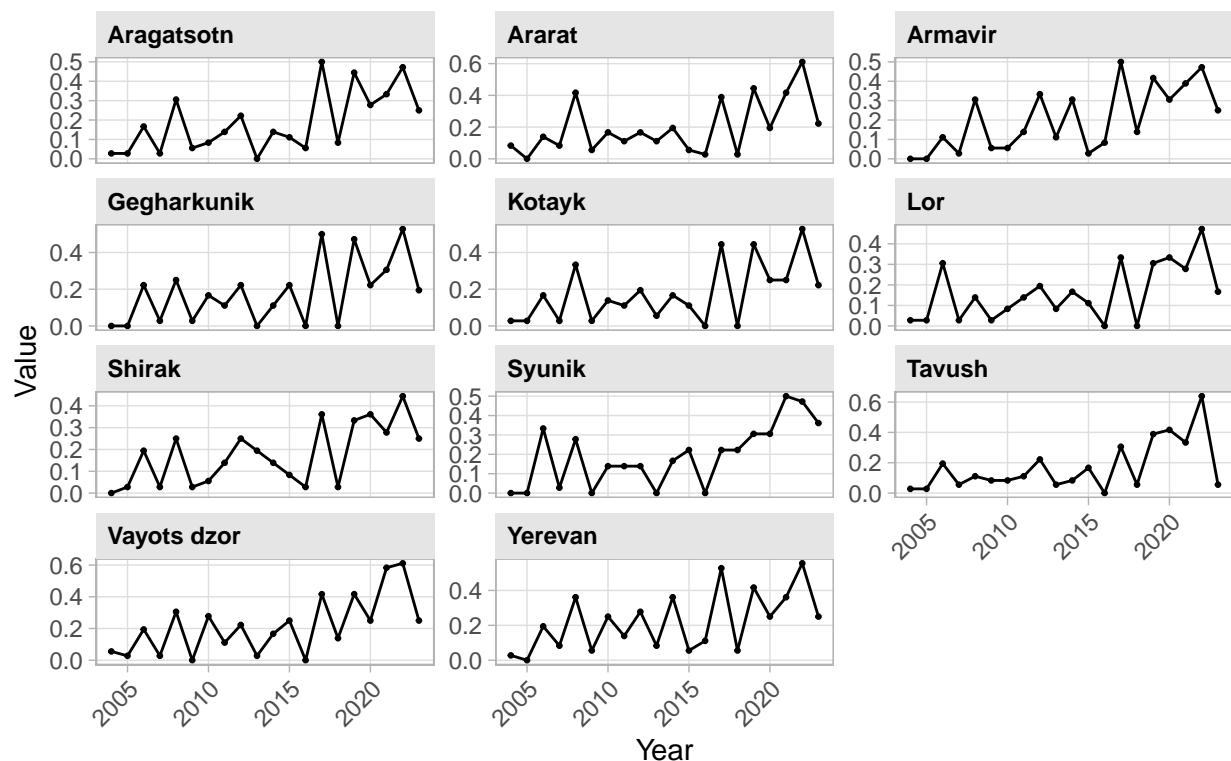
### Evolution of: Rate of households in poverty



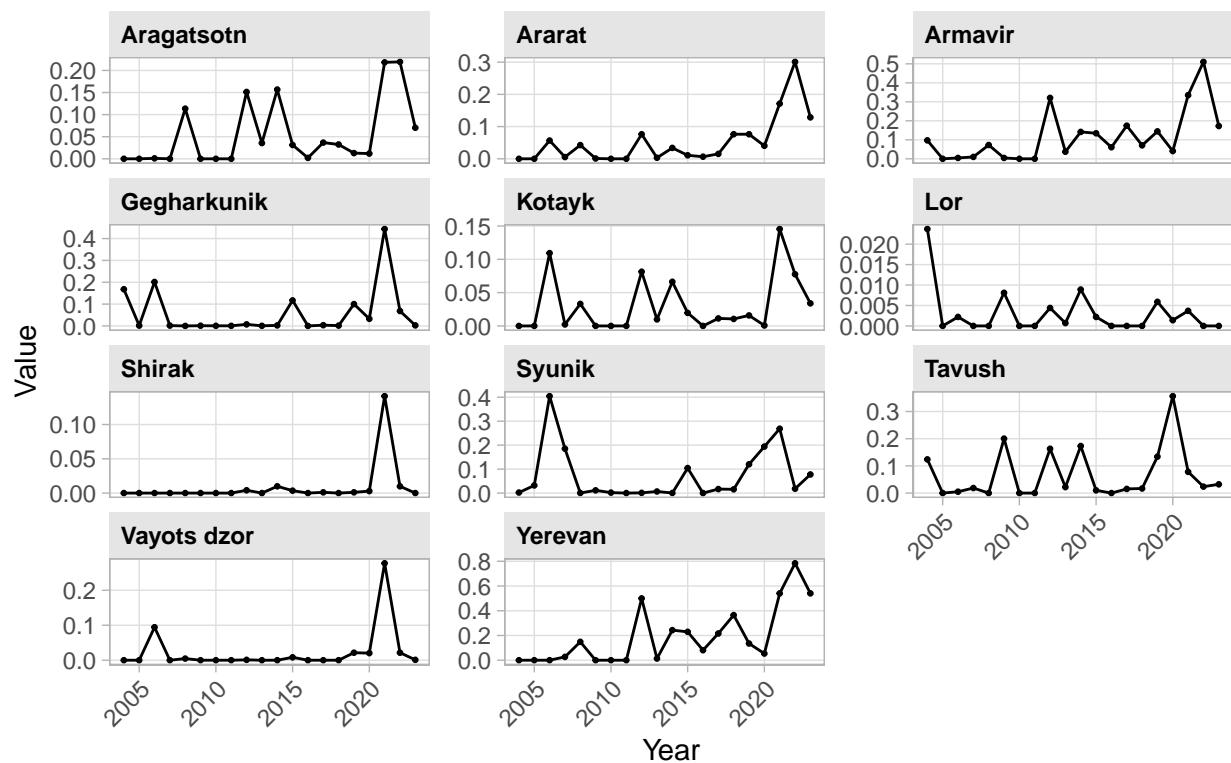
### Evolution of: SPEI (Drought Index)



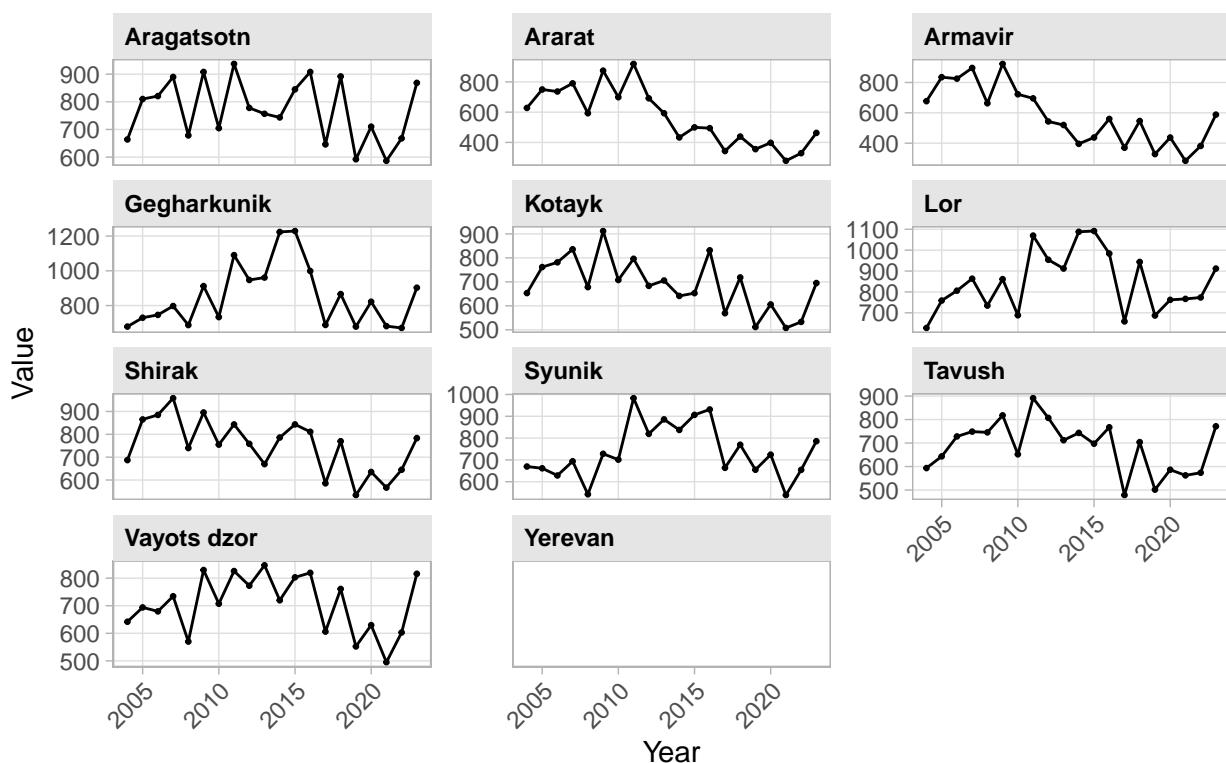
### Evolution of: Share of observations of SPEI above +1



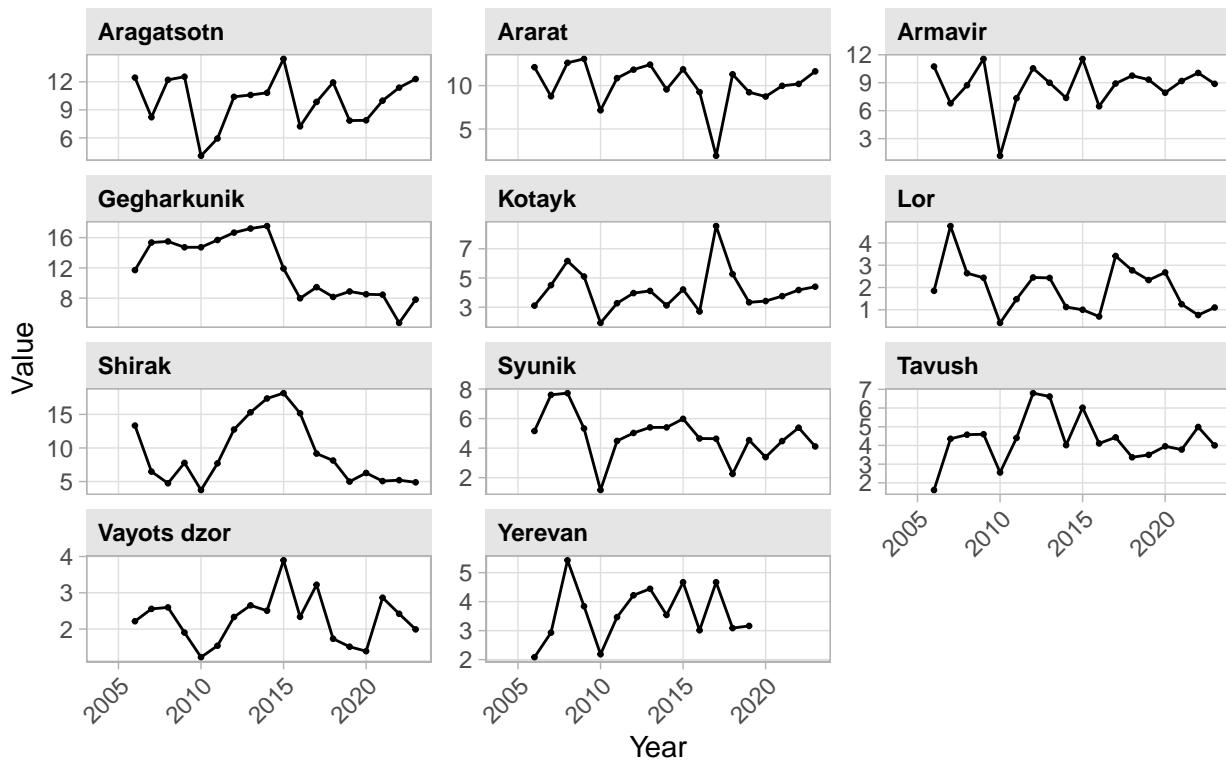
### Evolution of: Agricultural Stress



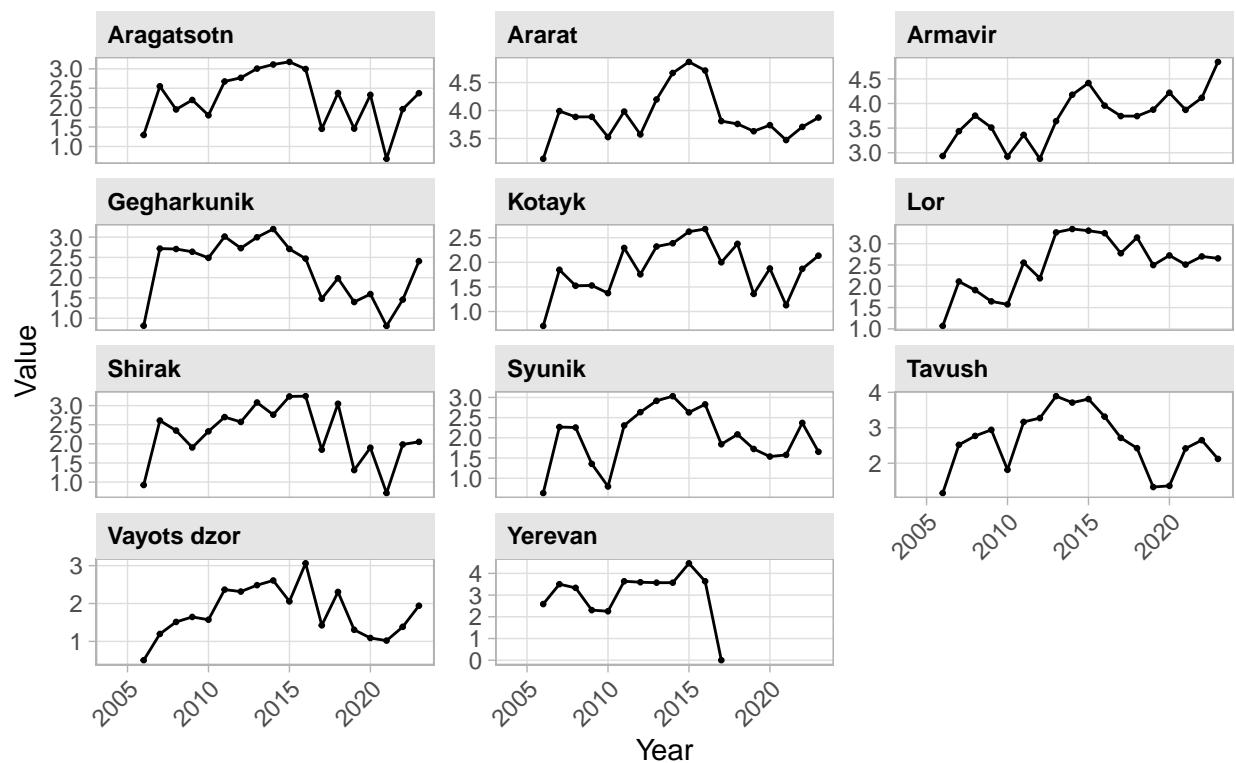
### Evolution of: Total Rainfall



### Evolution of: Fruits Yield

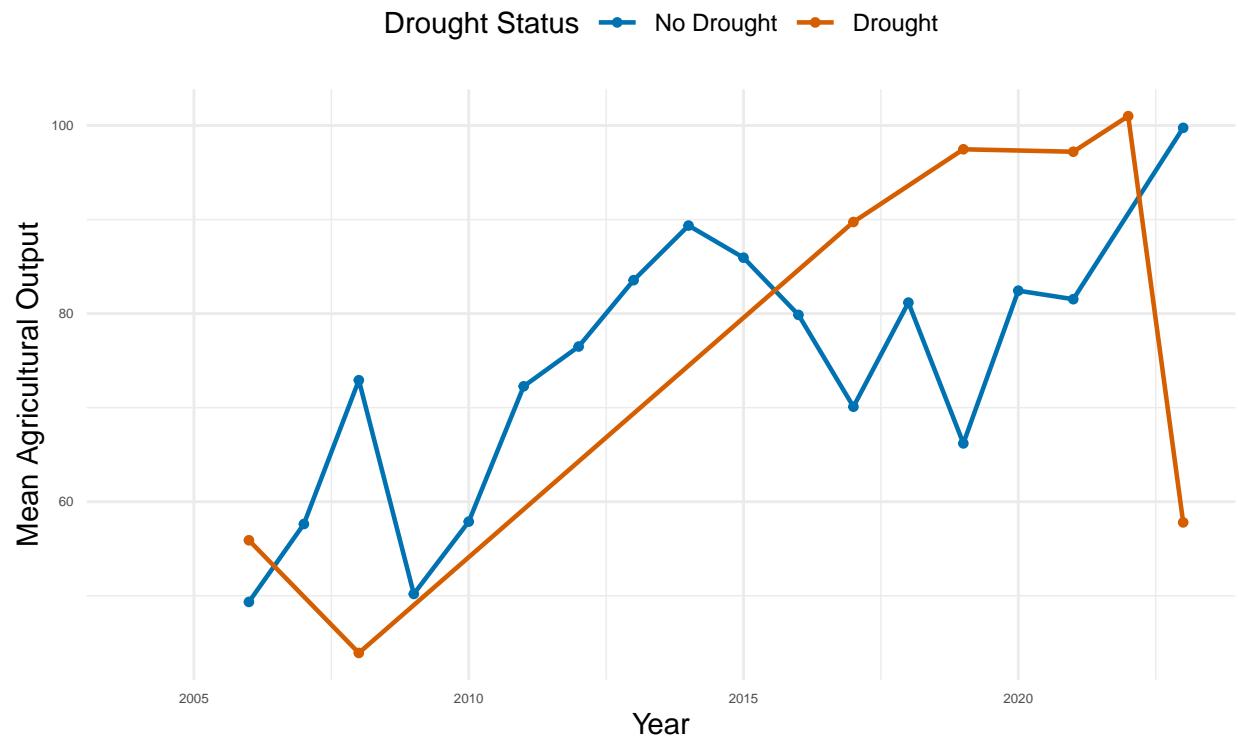


### Evolution of: Grains Yield



## 2.3 Graphs with Drought Dummy

### Impact of Drought on Agricultural Output



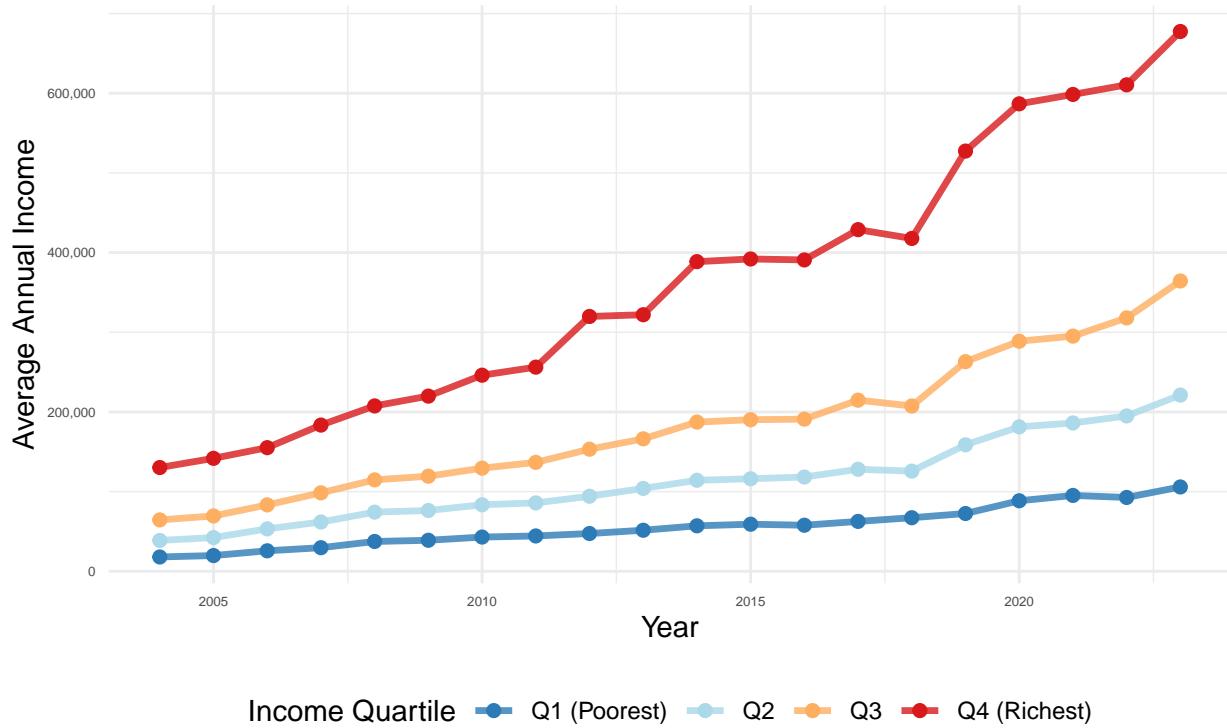
*Note: This graph should be interpreted with caution as the number of districts is very low, meaning that any kind of visible relationship is very likely due to confounding.*



## 2.4 Graphs with Drought Dummy and Quartiles

### Average Income by Income Quartile Over Time

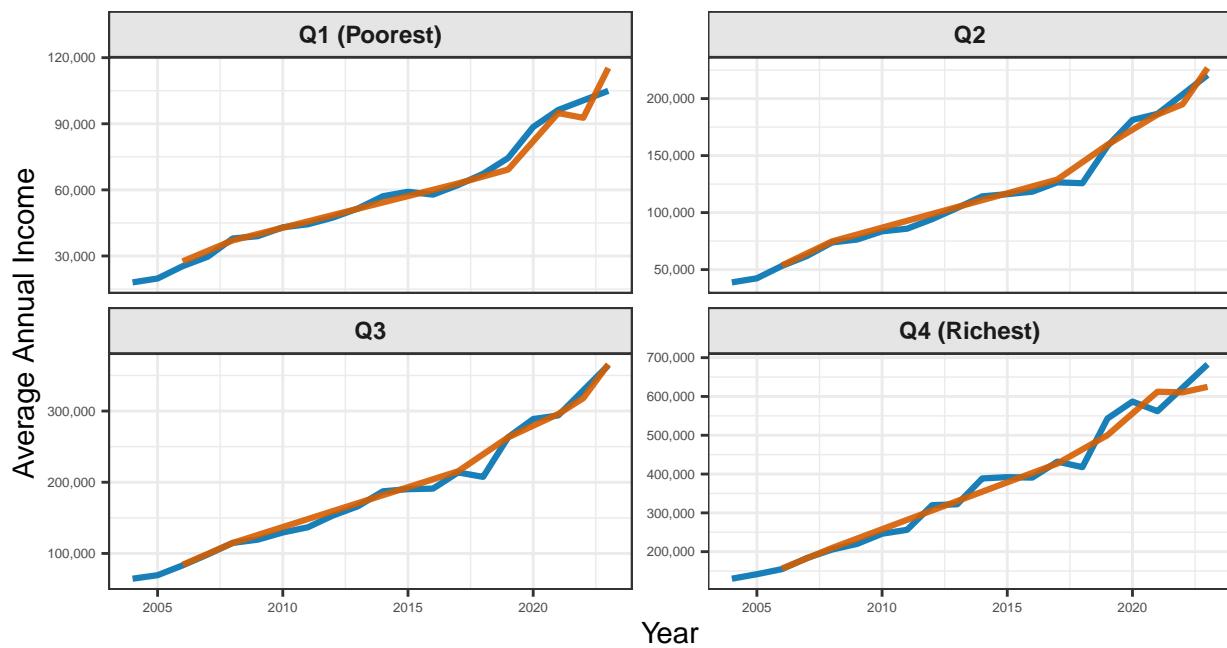
Averaged across all districts



### Impact of Drought Events on Income, by Income Quartile

Average income trends faceted by income group

Drought Status — No Drought Event (Blue) — Drought Event (Orange)



### 3 TWFE Regressions

#### 3.1 Data

##### 3.1.1 Variable Units

- Armenian Dram (currency):
  - Income
  - Agriculture income
  - Food consumption
- Tons (1000kg)
  - Agriculture output
  - Grains harvest
  - Vegetables harvest
  - Fruits harvest
  - Potatoes harvest
- Tons per hectare (1000kg / 1000km<sup>2</sup>)
  - Grains output per field
  - Vegetables output per field
  - Fruits output per field
  - Potatoes output per field

## Dependent variables are in logs.

#### 3.2 Regressions

##### 3.2.1 Equation

All our regressions resemble the following equations, where  $Y_{dt}$  represents the chosen outcome variable for district  $d$  at time  $t$ ,  $\lambda_d$  represents the district-specific fixed effect,  $\gamma_t$  represents the time-specific fixed effect,  $X_{dt}$  is the chosen explanatory variable,  $\beta$  is the effect of said variable on the outcome, and  $\epsilon_{dt}$  is the error.

$$Y_{dt} = \alpha + \lambda_d + \gamma_t + \beta X_{dt} + \epsilon_{dt}$$

$$Y_{dt} = \alpha + \lambda_d + \gamma_t + \beta_1 X_{dt} + \beta_2 X_{d,t-1} + \epsilon_{dt}$$

$$Y_{dt} = \alpha + \lambda_d + \gamma_t + \beta_1 X_{dt} + \beta_2 X_{d,t-1} + \beta_3 X_{d,t-2} + \epsilon_{dt}$$

### 3.3 Dependent Variable: Household Income

#### 3.3.1 Regressed on: Drought Index (SPEI)

Dependent Variable:	Household Income		
Model:	(1)	(2)	(3)
<i>Variables</i>			
SPEI	0.0260 (0.0266)	0.0263 (0.0252)	0.0254 (0.0264)
SPEI (Lag 1)		-0.0201 (0.0505)	-0.0199 (0.0496)
SPEI (Lag 2)			-0.0174 (0.0522)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (20)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	220	220	220
R <sup>2</sup>	0.95771	0.95775	0.95778
Within R <sup>2</sup>	0.00175	0.00273	0.00344

*Clustered (District) standard-errors in parentheses*  
*Signif. Codes: \*\*\*: 0.01, \*\*: 0.05, \*: 0.1*

#### 3.3.2 Regressed on: SPEI Intense Share

Dependent Variable:	Household Income		
Model:	(1)	(2)	(3)
<i>Variables</i>			
SPEI Share	-0.1165 (0.0908)	-0.1618 (0.1105)	-0.1685 (0.1155)
SPEI Share (Lag 1)		-0.2229 (0.1517)	-0.2596 (0.1846)
SPEI Share (Lag 2)			-0.2104 (0.1685)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (20)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	220	220	220
R <sup>2</sup>	0.95781	0.95839	0.95888
Within R <sup>2</sup>	0.00413	0.01776	0.02941

*Clustered (District) standard-errors in parentheses*  
*Signif. Codes: \*\*\*: 0.01, \*\*: 0.05, \*: 0.1*

### 3.3.3 Regressed on: Agricultural Stress

Dependent Variable:	Household Income		
Model:	(1)	(2)	(3)
<i>Variables</i>			
Agric. Stress	-0.0047 (0.0666)	-0.0222 (0.0622)	-0.0228 (0.0612)
Agric. Stress (Lag 1)		0.0717 (0.0819)	0.0743 (0.0736)
Agric. Stress (Lag 2)			-0.0202 (0.1024)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (20)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	220	220	220
R <sup>2</sup>	0.95764	0.95776	0.95777
Within R <sup>2</sup>	$1.42 \times 10^{-5}$	0.00285	0.00300

*Clustered (District) standard-errors in parentheses*

*Signif. Codes: \*\*\*: 0.01, \*\*: 0.05, \*: 0.1*

### 3.3.4 Regressed on: Temperature

Dependent Variable:	Household Income		
Model:	(1)	(2)	(3)
<i>Variables</i>			
Temp.	0.0971 (0.0676)	0.0944 (0.0684)	0.0955 (0.0698)
Temp. (Lag 1)		0.0133 (0.0326)	-0.0002 (0.0205)
Temp. (Lag 2)			0.0150 (0.0230)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (20)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	220	220	220
R <sup>2</sup>	0.95785	0.95791	0.95798
Within R <sup>2</sup>	0.00499	0.00633	0.00809

*Clustered (District) standard-errors in parentheses*

*Signif. Codes: \*\*\*: 0.01, \*\*: 0.05, \*: 0.1*

### 3.4 Dependent Variable: Household Agricultural Income

#### 3.4.1 Regressed on: Drought Index (SPEI)

Model:	(1)	(2)	(3)
<i>Variables</i>			
SPEI	0.2773 (0.2633)	0.2786 (0.2720)	0.2814 (0.2893)
SPEI (Lag 1)		0.0586 (0.2790)	0.0572 (0.2737)
SPEI (Lag 2)			0.0400 (0.2727)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	197	197	197
R <sup>2</sup>	0.71669	0.71680	0.71685
Within R <sup>2</sup>	0.00952	0.00992	0.01009

*Clustered (District) standard-errors in parentheses*

*Signif. Codes:* \*\*\*: 0.01, \*\*: 0.05, \*: 0.1

#### 3.4.2 Regressed on: SPEI Intense Share

Model:	(1)	(2)	(3)
<i>Variables</i>			
SPEI Share	-0.3389 (0.4318)	-0.3282 (0.4687)	-0.3893 (0.4920)
SPEI Share (Lag 1)		0.0552 (0.7967)	-0.1080 (0.8750)
SPEI Share (Lag 2)			-0.8570* (0.4538)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	197	197	197
R <sup>2</sup>	0.71444	0.71445	0.71667
Within R <sup>2</sup>	0.00166	0.00170	0.00946

*Clustered (District) standard-errors in parentheses*

*Signif. Codes:* \*\*\*: 0.01, \*\*: 0.05, \*: 0.1

### 3.4.3 Regressed on: Agricultural Stress

Dependent Variable:	Household Agricultural Income		
Model:	(1)	(2)	(3)
<i>Variables</i>			
Agric. Stress	-0.1955 (0.5152)	-0.2022 (0.5525)	-0.1393 (0.6256)
Agric. Stress (Lag 1)		1.055 (0.9886)	1.193 (0.9930)
Agric. Stress (Lag 2)			-1.510 (0.8763)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	197	197	197
R <sup>2</sup>	0.71419	0.71963	0.72936
Within R <sup>2</sup>	0.00080	0.01981	0.05383

*Clustered (District) standard-errors in parentheses*

*Signif. Codes:* \*\*\*: 0.01, \*\*: 0.05, \*: 0.1

### 3.4.4 Regressed on: Temperature

Dependent Variable:	Household Agricultural Income		
Model:	(1)	(2)	(3)
<i>Variables</i>			
Temp.	0.1293 (0.2379)	0.1306 (0.2456)	0.1360 (0.2339)
Temp. (Lag 1)		-0.0064 (0.0712)	0.1104* (0.0564)
Temp. (Lag 2)			-0.1301** (0.0544)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	197	197	197
R <sup>2</sup>	0.71409	0.71410	0.71610
Within R <sup>2</sup>	0.00045	0.00047	0.00748

*Clustered (District) standard-errors in parentheses*

*Signif. Codes:* \*\*\*: 0.01, \*\*: 0.05, \*: 0.1

### 3.5 Dependent Variable: Gross Agricultural Output

#### 3.5.1 Regressed on: Drought Index (SPEI)

Dependent Variable:	Gross Agricultural Output		
Model:	(1)	(2)	(3)
<i>Variables</i>			
SPEI	0.0578 (0.0556)	0.0597 (0.0519)	0.0666 (0.0544)
SPEI (Lag 1)		0.0986 (0.0580)	0.0994* (0.0545)
SPEI (Lag 2)			0.1435* (0.0744)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	194	194	194
R <sup>2</sup>	0.97508	0.97550	0.97640
Within R <sup>2</sup>	0.00561	0.02268	0.05855

*Clustered (District) standard-errors in parentheses*  
*Signif. Codes: \*\*\*: 0.01, \*\*: 0.05, \*: 0.1*

#### 3.5.2 Regressed on: SPEI Intense Share

Dependent Variable:	Gross Agricultural Output		
Model:	(1)	(2)	(3)
<i>Variables</i>			
SPEI Share	0.1182 (0.1120)	0.1643 (0.1325)	0.1763 (0.1352)
SPEI Share (Lag 1)		0.2021 (0.1329)	0.2415 (0.1372)
SPEI Share (Lag 2)			0.1923 (0.1527)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	194	194	194
R <sup>2</sup>	0.97502	0.97522	0.97540
Within R <sup>2</sup>	0.00316	0.01144	0.01864

*Clustered (District) standard-errors in parentheses*  
*Signif. Codes: \*\*\*: 0.01, \*\*: 0.05, \*: 0.1*

### 3.5.3 Regressed on: Agricultural Stress

Dependent Variable:	Gross Agricultural Output		
Model:	(1)	(2)	(3)
<i>Variables</i>			
Agric. Stress	0.3104 (0.1892)	0.2930 (0.1719)	0.2932 (0.1746)
Agric. Stress (Lag 1)		0.2321 (0.1415)	0.2317 (0.1351)
Agric. Stress (Lag 2)			0.0070 (0.1898)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	194	194	194
R <sup>2</sup>	0.97572	0.97617	0.97617
Within R <sup>2</sup>	0.03148	0.04908	0.04909

*Clustered (District) standard-errors in parentheses*  
*Signif. Codes: \*\*\*: 0.01, \*\*: 0.05, \*: 0.1*

### 3.5.4 Regressed on: Temperature

Dependent Variable:	Gross Agricultural Output		
Model:	(1)	(2)	(3)
<i>Variables</i>			
Temp.	0.0568 (0.0720)	0.0550 (0.0775)	0.1154* (0.0588)
Temp. (Lag 1)		-0.0235 (0.1200)	0.0049 (0.1205)
Temp. (Lag 2)			0.2403*** (0.0733)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	194	194	194
R <sup>2</sup>	0.97497	0.97497	0.97548
Within R <sup>2</sup>	0.00120	0.00140	0.02182

*Clustered (District) standard-errors in parentheses*  
*Signif. Codes: \*\*\*: 0.01, \*\*: 0.05, \*: 0.1*

### 3.6 Dependent Variable: Household food Consumption

#### 3.6.1 Regressed on: Drought Index (SPEI)

Dependent Variable:	Household food Consumption		
Model:	(1)	(2)	(3)
<i>Variables</i>			
SPEI	0.0400 (0.0943)	0.0407 (0.0950)	0.0393 (0.0952)
SPEI (Lag 1)		-0.0648 (0.0517)	-0.0645 (0.0522)
SPEI (Lag 2)			-0.0296 (0.1102)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (20)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	220	220	220
R <sup>2</sup>	0.90580	0.90611	0.90617
Within R <sup>2</sup>	0.00133	0.00465	0.00531

*Clustered (District) standard-errors in parentheses*  
*Signif. Codes: \*\*\*: 0.01, \*\*: 0.05, \*: 0.1*

#### 3.6.2 Regressed on: SPEI Intense Share

Dependent Variable:	Household food Consumption		
Model:	(1)	(2)	(3)
<i>Variables</i>			
SPEI Share	-0.0860 (0.1944)	-0.1811 (0.2304)	-0.1932 (0.2334)
SPEI Share (Lag 1)		-0.4673 (0.2695)	-0.5340* (0.2667)
SPEI Share (Lag 2)			-0.3819 (0.3588)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (20)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	220	220	220
R <sup>2</sup>	0.90574	0.90757	0.90875
Within R <sup>2</sup>	0.00073	0.02016	0.03261

*Clustered (District) standard-errors in parentheses*  
*Signif. Codes: \*\*\*: 0.01, \*\*: 0.05, \*: 0.1*

### 3.6.3 Regressed on: Agricultural Stress

Dependent Variable:	Household food Consumption		
Model:	(1)	(2)	(3)
<i>Variables</i>			
Agric. Stress	-0.0214 (0.2026)	0.0082 (0.1772)	0.0074 (0.1811)
Agric. Stress (Lag 1)		-0.1217 (0.1475)	-0.1182 (0.1280)
Agric. Stress (Lag 2)			-0.0270 (0.1968)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (20)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	220	220	220
R <sup>2</sup>	0.90568	0.90593	0.90594
Within R <sup>2</sup>	$9.36 \times 10^{-5}$	0.00274	0.00283

*Clustered (District) standard-errors in parentheses*

*Signif. Codes:* \*\*\*: 0.01, \*\*: 0.05, \*: 0.1

### 3.6.4 Regressed on: Temperature

Dependent Variable:	Household food Consumption		
Model:	(1)	(2)	(3)
<i>Variables</i>			
Temp.	0.0666 (0.2338)	0.0762 (0.2367)	0.0787 (0.2407)
Temp. (Lag 1)		-0.0469 (0.0307)	-0.0776** (0.0302)
Temp. (Lag 2)			0.0341 (0.0259)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (20)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	220	220	220
R <sup>2</sup>	0.90574	0.90626	0.90654
Within R <sup>2</sup>	0.00076	0.00621	0.00917

*Clustered (District) standard-errors in parentheses*

*Signif. Codes:* \*\*\*: 0.01, \*\*: 0.05, \*: 0.1

### 3.7 Dependent Variable: Grains Harvest

#### 3.7.1 Regressed on: Drought Index (SPEI)

Dependent Variable:	Grains Harvest		
Model:	(1)	(2)	(3)
<i>Variables</i>			
SPEI	-0.4503*** (0.1064)	-0.4573*** (0.1065)	-0.4691*** (0.1071)
SPEI (Lag 1)		-0.2992** (0.1010)	-0.3025** (0.1207)
SPEI (Lag 2)			-0.2425* (0.1214)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	191	191	191
R <sup>2</sup>	0.94570	0.94719	0.94817
Within R <sup>2</sup>	0.05653	0.08245	0.09939

*Clustered (District) standard-errors in parentheses*

*Signif. Codes: \*\*\*: 0.01, \*\*: 0.05, \*: 0.1*

#### 3.7.2 Regressed on: SPEI Intense Share

Dependent Variable:	Grains Harvest		
Model:	(1)	(2)	(3)
<i>Variables</i>			
SPEI Share	-0.7772** (0.2690)	-0.9705*** (0.2807)	-1.008*** (0.2698)
SPEI Share (Lag 1)		-0.8358** (0.3403)	-1.012** (0.3457)
SPEI Share (Lag 2)			-0.9098** (0.4027)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	191	191	191
R <sup>2</sup>	0.94375	0.94509	0.94660
Within R <sup>2</sup>	0.02257	0.04590	0.07212

*Clustered (District) standard-errors in parentheses*

*Signif. Codes: \*\*\*: 0.01, \*\*: 0.05, \*: 0.1*

### 3.7.3 Regressed on: Agricultural Stress

Model:	Dependent Variable: Grains Harvest		
	(1)	(2)	(3)
<i>Variables</i>			
Agric. Stress	-1.178*** (0.3036)	-1.127*** (0.2822)	-1.148*** (0.2822)
Agric. Stress (Lag 1)		-0.8049* (0.4269)	-0.7895* (0.4338)
Agric. Stress (Lag 2)			-0.5241 (0.4429)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	191	191	191
R <sup>2</sup>	0.94656	0.94848	0.94914
Within R <sup>2</sup>	0.07144	0.10475	0.11627

*Clustered (District) standard-errors in parentheses*

*Signif. Codes:* \*\*\*: 0.01, \*\*: 0.05, \*: 0.1

### 3.7.4 Regressed on: Temperature

Model:	Dependent Variable: Grains Harvest		
	(1)	(2)	(3)
<i>Variables</i>			
Temp.	-0.1116 (0.2034)	-0.1260 (0.2061)	-0.2292 (0.2332)
Temp. (Lag 1)		-0.1923 (0.3123)	-0.2413 (0.3223)
Temp. (Lag 2)			-0.4141 (0.2432)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	191	191	191
R <sup>2</sup>	0.94249	0.94262	0.94320
Within R <sup>2</sup>	0.00077	0.00298	0.01312

*Clustered (District) standard-errors in parentheses*

*Signif. Codes:* \*\*\*: 0.01, \*\*: 0.05, \*: 0.1

### 3.8 Dependent Variable: Vegetables Harvest

#### 3.8.1 Regressed on: Drought Index (SPEI)

Dependent Variable:	Vegetables Harvest		
Model:	(1)	(2)	(3)
<i>Variables</i>			
SPEI	-0.1150 (0.0697)	-0.1191 (0.0697)	-0.1240 (0.0725)
SPEI (Lag 1)		-0.2078 (0.1572)	-0.2084 (0.1617)
SPEI (Lag 2)			-0.1035 (0.0929)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	194	194	194
R <sup>2</sup>	0.95674	0.95738	0.95753
Within R <sup>2</sup>	0.00428	0.01891	0.02251
<i>Clustered (District) standard-errors in parentheses</i>			
<i>Signif. Codes: ***: 0.01, **: 0.05, *: 0.1</i>			

#### 3.8.2 Regressed on: SPEI Intense Share

Dependent Variable:	Vegetables Harvest		
Model:	(1)	(2)	(3)
<i>Variables</i>			
SPEI Share	-0.1733 (0.1950)	-0.2713 (0.1901)	-0.2927 (0.1953)
SPEI Share (Lag 1)		-0.4297 (0.3137)	-0.5002 (0.3758)
SPEI Share (Lag 2)			-0.3438 (0.2918)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	194	194	194
R <sup>2</sup>	0.95661	0.95693	0.95712
Within R <sup>2</sup>	0.00131	0.00854	0.01298
<i>Clustered (District) standard-errors in parentheses</i>			
<i>Signif. Codes: ***: 0.01, **: 0.05, *: 0.1</i>			

### 3.8.3 Regressed on: Agricultural Stress

Dependent Variable:	Vegetables Harvest		
Model:	(1)	(2)	(3)
<i>Variables</i>			
Agric. Stress	-0.4713 (0.4783)	-0.4391 (0.4584)	-0.4430 (0.4604)
Agric. Stress (Lag 1)		-0.4302 (0.5232)	-0.4229 (0.5081)
Agric. Stress (Lag 2)			-0.1363 (0.3874)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	194	194	194
R <sup>2</sup>	0.95716	0.95767	0.95771
Within R <sup>2</sup>	0.01401	0.02568	0.02661

*Clustered (District) standard-errors in parentheses*

*Signif. Codes: \*\*\*: 0.01, \*\*: 0.05, \*: 0.1*

### 3.8.4 Regressed on: Temperature

Dependent Variable:	Vegetables Harvest		
Model:	(1)	(2)	(3)
<i>Variables</i>			
Temp.	-0.1386 (0.1596)	-0.1443 (0.1766)	-0.1537 (0.2011)
Temp. (Lag 1)		-0.0755 (0.2847)	-0.0799 (0.3077)
Temp. (Lag 2)			-0.0372 (0.2512)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	194	194	194
R <sup>2</sup>	0.95662	0.95663	0.95664
Within R <sup>2</sup>	0.00138	0.00178	0.00187

*Clustered (District) standard-errors in parentheses*

*Signif. Codes: \*\*\*: 0.01, \*\*: 0.05, \*: 0.1*

### 3.9 Dependent Variable: Fruits Harvest

#### 3.9.1 Regressed on: Drought Index (SPEI)

Dependent Variable:	Fruits Harvest		
Model:	(1)	(2)	(3)
<i>Variables</i>			
SPEI	0.2105 (0.1612)	0.2145 (0.1631)	0.2239 (0.1622)
SPEI (Lag 1)		0.2010 (0.1169)	0.2022* (0.1042)
SPEI (Lag 2)			0.1975 (0.1402)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	194	194	194
R <sup>2</sup>	0.91392	0.91480	0.91565
Within R <sup>2</sup>	0.01062	0.02073	0.03042

*Clustered (District) standard-errors in parentheses*  
*Signif. Codes: \*\*\*: 0.01, \*\*: 0.05, \*: 0.1*

#### 3.9.2 Regressed on: SPEI Intense Share

Dependent Variable:	Fruits Harvest		
Model:	(1)	(2)	(3)
<i>Variables</i>			
SPEI Share	0.6161 (0.3458)	0.8515** (0.2807)	0.8986** (0.2913)
SPEI Share (Lag 1)		1.033** (0.3621)	1.188** (0.4138)
SPEI Share (Lag 2)			0.7552* (0.4113)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	194	194	194
R <sup>2</sup>	0.91406	0.91675	0.91813
Within R <sup>2</sup>	0.01223	0.04308	0.05892

*Clustered (District) standard-errors in parentheses*  
*Signif. Codes: \*\*\*: 0.01, \*\*: 0.05, \*: 0.1*

### 3.9.3 Regressed on: Agricultural Stress

Dependent Variable:	Fruits Harvest		
Model:	(1)	(2)	(3)
<i>Variables</i>			
Agric. Stress	0.6220** (0.2250)	0.5760*** (0.1782)	0.5885** (0.1992)
Agric. Stress (Lag 1)		0.6142* (0.3383)	0.5907* (0.3034)
Agric. Stress (Lag 2)			0.4338 (0.3242)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	194	194	194
R <sup>2</sup>	0.91457	0.91610	0.91670
Within R <sup>2</sup>	0.01802	0.03561	0.04253

*Clustered (District) standard-errors in parentheses*

*Signif. Codes: \*\*\*: 0.01, \*\*: 0.05, \*: 0.1*

### 3.9.4 Regressed on: Temperature

Dependent Variable:	Fruits Harvest		
Model:	(1)	(2)	(3)
<i>Variables</i>			
Temp.	0.1117 (0.3286)	0.1123 (0.3298)	0.1934 (0.3155)
Temp. (Lag 1)		0.0076 (0.1958)	0.0458 (0.2025)
Temp. (Lag 2)			0.3225* (0.1467)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	194	194	194
R <sup>2</sup>	0.91306	0.91306	0.91352
Within R <sup>2</sup>	0.00066	0.00067	0.00591

*Clustered (District) standard-errors in parentheses*

*Signif. Codes: \*\*\*: 0.01, \*\*: 0.05, \*: 0.1*

## 3.10 Dependent Variable: Potatoes Harvest

### 3.10.1 Regressed on: Drought Index (SPEI)

Dependent Variable:	Potatoes Harvest		
Model:	(1)	(2)	(3)
<i>Variables</i>			
SPEI	-0.0864 (0.0585)	-0.0913 (0.0683)	-0.0931 (0.0699)
SPEI (Lag 1)		-0.2477 (0.1406)	-0.2479 (0.1438)
SPEI (Lag 2)			-0.0391 (0.0848)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	194	194	194
R <sup>2</sup>	0.97357	0.97447	0.97449
Within R <sup>2</sup>	0.00395	0.03787	0.03871
<i>Clustered (District) standard-errors in parentheses</i>			
<i>Signif. Codes: ***: 0.01, **: 0.05, *: 0.1</i>			

### 3.10.2 Regressed on: SPEI Intense Share

Dependent Variable:	Potatoes Harvest		
Model:	(1)	(2)	(3)
<i>Variables</i>			
SPEI Share	-0.3500 (0.2041)	-0.5348* (0.2540)	-0.5406* (0.2604)
SPEI Share (Lag 1)		-0.8109** (0.3189)	-0.8300** (0.3329)
SPEI Share (Lag 2)			-0.0928 (0.2677)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	194	194	194
R <sup>2</sup>	0.97369	0.97481	0.97482
Within R <sup>2</sup>	0.00872	0.05073	0.05126
<i>Clustered (District) standard-errors in parentheses</i>			
<i>Signif. Codes: ***: 0.01, **: 0.05, *: 0.1</i>			

### 3.10.3 Regressed on: Agricultural Stress

Model:	Dependent Variable: Potatoes Harvest		
	(1)	(2)	(3)
<i>Variables</i>			
Agric. Stress	-0.0492 (0.2602)	-0.0179 (0.2506)	-0.0237 (0.2470)
Agric. Stress (Lag 1)		-0.4188 (0.3375)	-0.4078 (0.3346)
Agric. Stress (Lag 2)			-0.2020 (0.1600)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	194	194	194
R <sup>2</sup>	0.97347	0.97395	0.97403
Within R <sup>2</sup>	0.00025	0.01831	0.02162

*Clustered (District) standard-errors in parentheses*  
*Signif. Codes: \*\*\*: 0.01, \*\*: 0.05, \*: 0.1*

### 3.10.4 Regressed on: Temperature

Model:	Dependent Variable: Potatoes Harvest		
	(1)	(2)	(3)
<i>Variables</i>			
Temp.	0.0188 (0.1026)	0.0361 (0.1132)	0.1030 (0.1501)
Temp. (Lag 1)		0.2291 (0.1470)	0.2607 (0.1665)
Temp. (Lag 2)			0.2664 (0.1743)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	194	194	194
R <sup>2</sup>	0.97346	0.97362	0.97383
Within R <sup>2</sup>	$4.14 \times 10^{-5}$	0.00597	0.01387

*Clustered (District) standard-errors in parentheses*  
*Signif. Codes: \*\*\*: 0.01, \*\*: 0.05, \*: 0.1*

### 3.11 Dependent Variable: Grains Yield

#### 3.11.1 Regressed on: Drought Index (SPEI)

Dependent Variable:	Grains Yield		
Model:	(1)	(2)	(3)
<i>Variables</i>			
SPEI	-0.2324*** (0.0584)	-0.2349*** (0.0563)	-0.2379*** (0.0524)
SPEI (Lag 1)		-0.1082 (0.0719)	-0.1090 (0.0768)
SPEI (Lag 2)			-0.0598 (0.0758)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	191	191	191
R <sup>2</sup>	0.78380	0.78558	0.78612
Within R <sup>2</sup>	0.03533	0.04328	0.04569

*Clustered (District) standard-errors in parentheses*

*Signif. Codes:* \*\*\*: 0.01, \*\*: 0.05, \*: 0.1

#### 3.11.2 Regressed on: SPEI Intense Share

Dependent Variable:	Grains Yield		
Model:	(1)	(2)	(3)
<i>Variables</i>			
SPEI Share	-0.4843** (0.2120)	-0.4983** (0.2098)	-0.5060** (0.2134)
SPEI Share (Lag 1)		-0.0607 (0.2006)	-0.0972 (0.1848)
SPEI Share (Lag 2)			-0.1884 (0.2824)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	191	191	191
R <sup>2</sup>	0.78048	0.78055	0.78114
Within R <sup>2</sup>	0.02055	0.02084	0.02348

*Clustered (District) standard-errors in parentheses*

*Signif. Codes:* \*\*\*: 0.01, \*\*: 0.05, \*: 0.1

### 3.11.3 Regressed on: Agricultural Stress

Dependent Variable:	Grains Yield		
Model:	(1)	(2)	(3)
<i>Variables</i>			
Agric. Stress	-0.7051** (0.2239)	-0.7082** (0.2265)	-0.7031** (0.2256)
Agric. Stress (Lag 1)		0.0484 (0.2655)	0.0446 (0.2562)
Agric. Stress (Lag 2)			0.1299 (0.2151)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	191	191	191
R <sup>2</sup>	0.78933	0.78940	0.78977
Within R <sup>2</sup>	0.06004	0.06032	0.06198

*Clustered (District) standard-errors in parentheses*

*Signif. Codes:* \*\*\*: 0.01, \*\*: 0.05, \*: 0.1

### 3.11.4 Regressed on: Temperature

Dependent Variable:	Grains Yield		
Model:	(1)	(2)	(3)
<i>Variables</i>			
Temp.	0.0868 (0.1574)	0.0847 (0.1513)	-0.0005 (0.1551)
Temp. (Lag 1)		-0.0277 (0.2003)	-0.0682 (0.2072)
Temp. (Lag 2)			-0.3419* (0.1569)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	191	191	191
R <sup>2</sup>	0.77612	0.77615	0.77978
Within R <sup>2</sup>	0.00110	0.00121	0.01743

*Clustered (District) standard-errors in parentheses*

*Signif. Codes:* \*\*\*: 0.01, \*\*: 0.05, \*: 0.1

## 3.12 Dependent Variable: Vegetables Yield

### 3.12.1 Regressed on: Drought Index (SPEI)

Dependent Variable:	Vegetables Yield		
Model:	(1)	(2)	(3)
<i>Variables</i>			
SPEI	0.0175 (0.0438)	0.0145 (0.0492)	0.0092 (0.0508)
SPEI (Lag 1)		-0.1505 (0.1425)	-0.1512 (0.1481)
SPEI (Lag 2)			-0.1108 (0.1046)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	194	194	194
R <sup>2</sup>	0.81793	0.82015	0.82134
Within R <sup>2</sup>	0.00016	0.01235	0.01890

*Clustered (District) standard-errors in parentheses*  
*Signif. Codes: \*\*\*: 0.01, \*\*: 0.05, \*: 0.1*

### 3.12.2 Regressed on: SPEI Intense Share

Dependent Variable:	Vegetables Yield		
Model:	(1)	(2)	(3)
<i>Variables</i>			
SPEI Share	0.0835 (0.1599)	0.0650 (0.1552)	0.0650 (0.1582)
SPEI Share (Lag 1)		-0.0810 (0.1714)	-0.0810 (0.2072)
SPEI Share (Lag 2)			-5.39 × 10 <sup>-5</sup> (0.2109)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	194	194	194
R <sup>2</sup>	0.81799	0.81806	0.81806
Within R <sup>2</sup>	0.00048	0.00089	0.00089

*Clustered (District) standard-errors in parentheses*  
*Signif. Codes: \*\*\*: 0.01, \*\*: 0.05, \*: 0.1*

### 3.12.3 Regressed on: Agricultural Stress

Dependent Variable:	Vegetables Yield		
Model:	(1)	(2)	(3)
<i>Variables</i>			
Agric. Stress	-0.3306 (0.3666)	-0.3029 (0.3502)	-0.3043 (0.3528)
Agric. Stress (Lag 1)		-0.3705 (0.4208)	-0.3679 (0.4132)
Agric. Stress (Lag 2)			-0.0483 (0.2269)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	194	194	194
R <sup>2</sup>	0.81989	0.82240	0.82243
Within R <sup>2</sup>	0.01094	0.02469	0.02487

*Clustered (District) standard-errors in parentheses*  
*Signif. Codes: \*\*\*: 0.01, \*\*: 0.05, \*: 0.1*

### 3.12.4 Regressed on: Temperature

Dependent Variable:	Vegetables Yield		
Model:	(1)	(2)	(3)
<i>Variables</i>			
Temp.	-0.0371 (0.1581)	-0.0314 (0.1647)	-0.0282 (0.1701)
Temp. (Lag 1)		0.0757 (0.1271)	0.0772 (0.1386)
Temp. (Lag 2)			0.0129 (0.1257)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	194	194	194
R <sup>2</sup>	0.81793	0.81804	0.81805
Within R <sup>2</sup>	0.00016	0.00079	0.00080

*Clustered (District) standard-errors in parentheses*  
*Signif. Codes: \*\*\*: 0.01, \*\*: 0.05, \*: 0.1*

### 3.13 Dependent Variable: Fruits Yield

#### 3.13.1 Regressed on: Drought Index (SPEI)

Dependent Variable:	Fruits Yield		
Model:	(1)	(2)	(3)
<i>Variables</i>			
SPEI	0.1856 (0.1434)	0.1887 (0.1457)	0.1952 (0.1438)
SPEI (Lag 1)		0.1567 (0.1054)	0.1575 (0.0973)
SPEI (Lag 2)			0.1367 (0.1568)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	194	194	194
R <sup>2</sup>	0.79919	0.80052	0.80152
Within R <sup>2</sup>	0.00881	0.01538	0.02034

*Clustered (District) standard-errors in parentheses*  
*Signif. Codes: \*\*\*: 0.01, \*\*: 0.05, \*: 0.1*

#### 3.13.2 Regressed on: SPEI Intense Share

Dependent Variable:	Fruits Yield		
Model:	(1)	(2)	(3)
<i>Variables</i>			
SPEI Share	0.5624 (0.3438)	0.7888** (0.2894)	0.8309** (0.3019)
SPEI Share (Lag 1)		0.9934** (0.3737)	1.132** (0.4357)
SPEI Share (Lag 2)			0.6764 (0.4382)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	194	194	194
R <sup>2</sup>	0.79960	0.80578	0.80853
Within R <sup>2</sup>	0.01088	0.04136	0.05493

*Clustered (District) standard-errors in parentheses*  
*Signif. Codes: \*\*\*: 0.01, \*\*: 0.05, \*: 0.1*

### 3.13.3 Regressed on: Agricultural Stress

Dependent Variable:	Fruits Yield		
Model:	(1)	(2)	(3)
<i>Variables</i>			
Agric. Stress	0.5254*** (0.1508)	0.4862*** (0.1244)	0.4959*** (0.1335)
Agric. Stress (Lag 1)		0.5233* (0.2771)	0.5052* (0.2487)
Agric. Stress (Lag 2)			0.3352 (0.2826)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	194	194	194
R <sup>2</sup>	0.80018	0.80294	0.80384
Within R <sup>2</sup>	0.01374	0.02737	0.03178

*Clustered (District) standard-errors in parentheses*

*Signif. Codes:* \*\*\*: 0.01, \*\*: 0.05, \*: 0.1

### 3.13.4 Regressed on: Temperature

Dependent Variable:	Fruits Yield		
Model:	(1)	(2)	(3)
<i>Variables</i>			
Temp.	0.1055 (0.2922)	0.1050 (0.2914)	0.1634 (0.2703)
Temp. (Lag 1)		-0.0068 (0.1793)	0.0207 (0.1890)
Temp. (Lag 2)			0.2323 (0.1724)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	194	194	194
R <sup>2</sup>	0.79753	0.79753	0.79812
Within R <sup>2</sup>	0.00063	0.00063	0.00354

*Clustered (District) standard-errors in parentheses*

*Signif. Codes:* \*\*\*: 0.01, \*\*: 0.05, \*: 0.1

### 3.14 Dependent Variable: Potatoes Yield

#### 3.14.1 Regressed on: Drought Index (SPEI)

Dependent Variable:	Potatoes Yield		
Model:	(1)	(2)	(3)
<i>Variables</i>			
SPEI	-0.0961*	-0.1006	-0.1018
	(0.0434)	(0.0607)	(0.0622)
SPEI (Lag 1)		-0.2282	-0.2283
		(0.1451)	(0.1473)
SPEI (Lag 2)			-0.0243
			(0.0680)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	194	194	194
R <sup>2</sup>	0.80594	0.81511	0.81521
Within R <sup>2</sup>	0.00795	0.05479	0.05532

*Clustered (District) standard-errors in parentheses*

*Signif. Codes: \*\*\*: 0.01, \*\*: 0.05, \*: 0.1*

#### 3.14.2 Regressed on: SPEI Intense Share

Dependent Variable:	Potatoes Yield		
Model:	(1)	(2)	(3)
<i>Variables</i>			
SPEI Share	-0.1459	-0.2399	-0.2216
	(0.1639)	(0.1776)	(0.1901)
SPEI Share (Lag 1)		-0.4124*	-0.3520*
		(0.2125)	(0.1922)
SPEI Share (Lag 2)			0.2948
			(0.2023)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	194	194	194
R <sup>2</sup>	0.80487	0.80833	0.81003
Within R <sup>2</sup>	0.00247	0.02015	0.02882

*Clustered (District) standard-errors in parentheses*

*Signif. Codes: \*\*\*: 0.01, \*\*: 0.05, \*: 0.1*

### 3.14.3 Regressed on: Agricultural Stress

Model:	Dependent Variable: Potatoes Yield		
	(1)	(2)	(3)
<i>Variables</i>			
Agric. Stress	-0.2087 (0.1711)	-0.1706 (0.1614)	-0.1728 (0.1598)
Agric. Stress (Lag 1)		-0.5089 (0.3339)	-0.5048 (0.3311)
Agric. Stress (Lag 2)			-0.0758 (0.1075)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	194	194	194
R <sup>2</sup>	0.80581	0.81430	0.81445
Within R <sup>2</sup>	0.00730	0.05069	0.05145

*Clustered (District) standard-errors in parentheses*  
*Signif. Codes: \*\*\*: 0.01, \*\*: 0.05, \*: 0.1*

### 3.14.4 Regressed on: Temperature

Model:	Dependent Variable: Potatoes Yield		
	(1)	(2)	(3)
<i>Variables</i>			
Temp.	-0.0084 (0.0602)	0.0049 (0.0696)	0.0456 (0.0968)
Temp. (Lag 1)		0.1761 (0.1118)	0.1953 (0.1248)
Temp. (Lag 2)			0.1621 (0.1202)
<i>Fixed-effects</i>			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
<i>Fit statistics</i>			
Observations	194	194	194
R <sup>2</sup>	0.80439	0.80550	0.80644
Within R <sup>2</sup>	$1.36 \times 10^{-5}$	0.00571	0.01047

*Clustered (District) standard-errors in parentheses*  
*Signif. Codes: \*\*\*: 0.01, \*\*: 0.05, \*: 0.1*