Appendix

Contents

1 Data

1.1 Detailed 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 n national 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.

Our main drought measuring tool is the Standardized Precipitation Evapotranspiration Index, which is a multi-scalar drought index that allows a comparison with respect to normal long term conditions. We then multiply it by (-1) in order to make interpretation of the regression coefficients easier. It follows a Standard Normal Distribution with sd = 1. A value of +0.8 to +1.2 should occur around once or twice in 10 years. It can be calculated over multiple durations. Here we use the SPEI-3 which represents the water balance over the last 3 months.

We use data from the Global Drought Observatory to calculate our values. The standard way of expressing it is geo-spatial data with pixels corresponding to certain coordinates. Then we use the District polygons of Armenia's Merz to select all SPEI pixels touched by the district and average them out to calculate the value of the district. As the SPEI is recalculated every 10 days we then transform these values into different indicators. First we average out per year and district to get the value mean SPEI. This tells us the average deviation from the long term 3 month water balance per year and is the main SPEI variable we use in our regressions.Furthermore, we create two dummies based on this index. Dummy drought 1 is equal to 1 if there were at least 10 observations in a row with an SPEI value above +1. which would correspond to a 90 day period where the water balance was in moderate drought conditions. A second dummy is equal to 1 if there are 15 observations below -1 in a year. They do not have to be consecutive.

Our measure for agricultural stress is based on the VHI index, which is computed from meteorological satellite data. It can detect plants that wilt or show unusual colors and drops the index if it is the case.

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: Equals 1 if there are at least 10 SPEI observations above +1
  - drought_dummy2: Equals 1 if there are at least 15 SPEI observations above +1
- 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

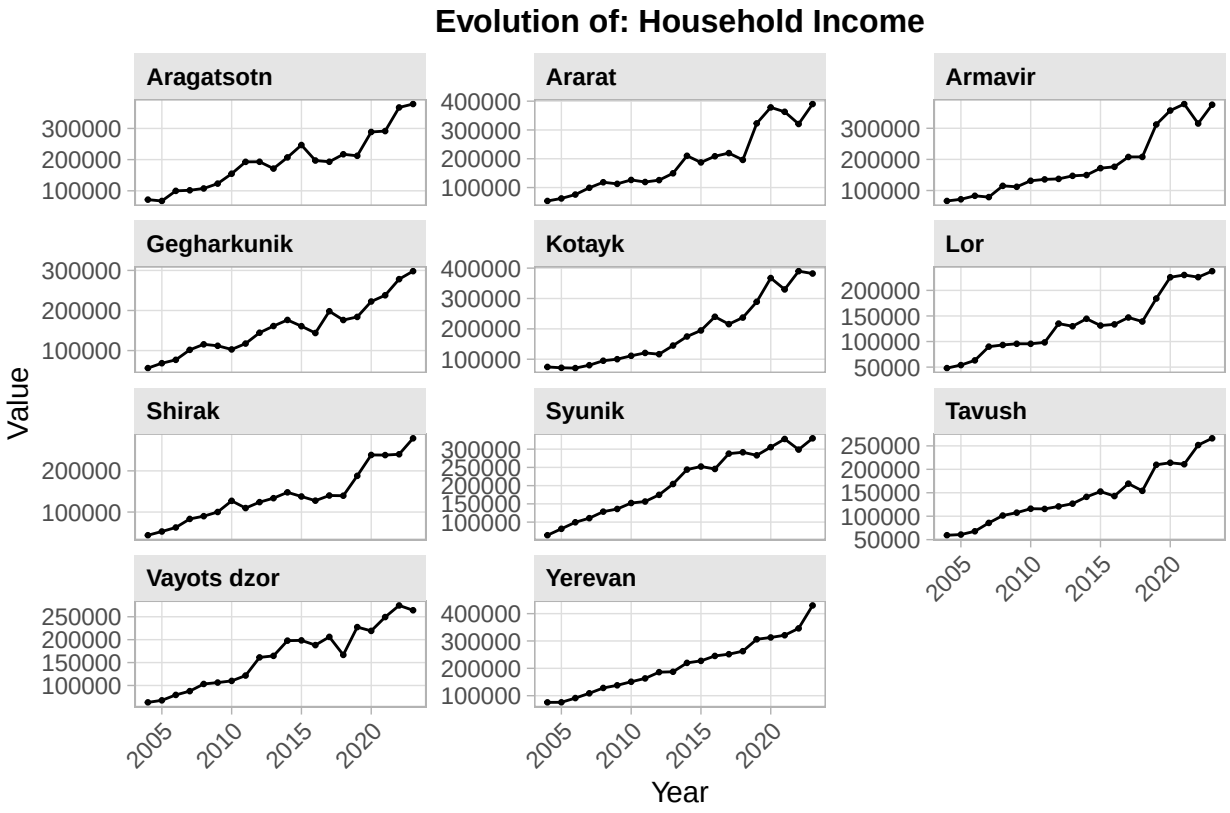
- Hectare (1000km2)
  - grains_area: Hectares used for harvesting grains and leguminous plants
  - vegetables_area: Hectares used for harvesting vegetables
  - fruits_area: Hectares used for harvesting fruits and berries
  - potatoes_area: Hectares used for harvesting potatoes
  - watermelon_area: Hectares used for harvesting watermelons
  - grapes_area: Hectares used for harvesting grapes

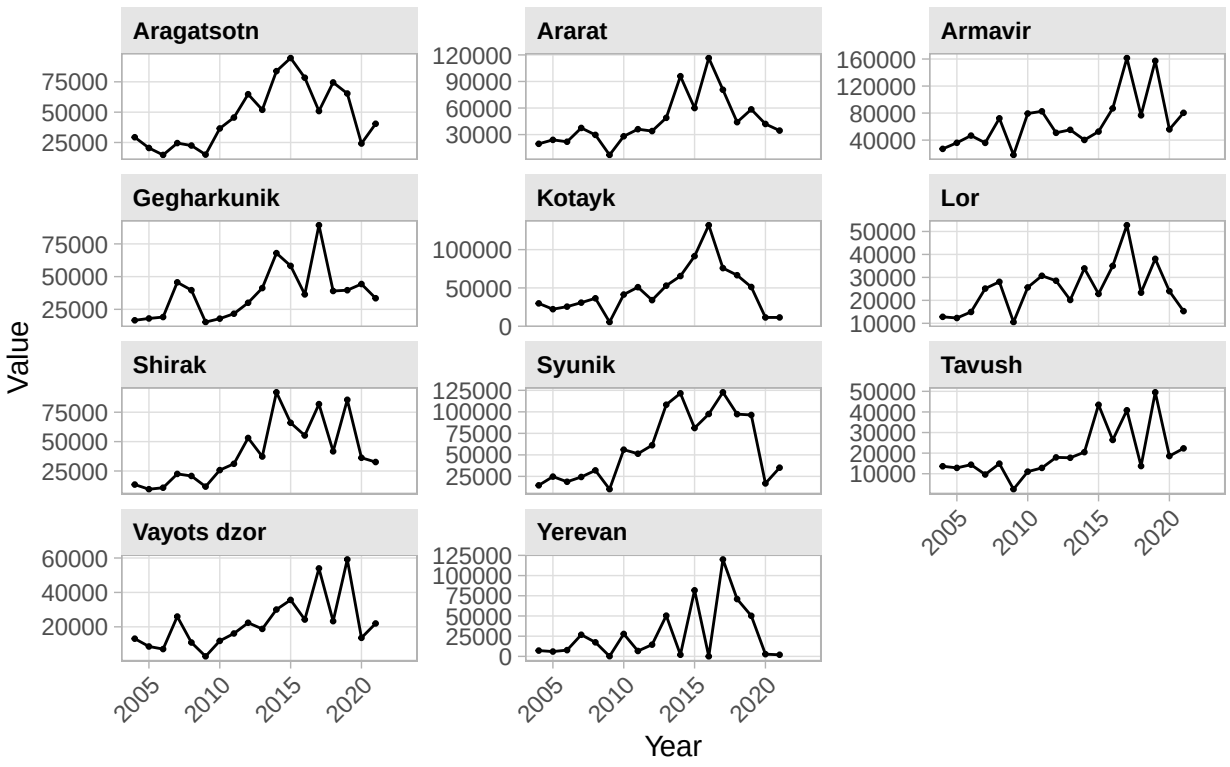
- Tons per hectare (1000kg / 1000km2)
  - output_per_field_grains: Grains harvested divided by area (yield)
  - output_per_field_vegetables: Vegetables harvested divided by area (yield)
  - output_per_field_fruits: Fruits harvested divided by area (yield)
  - output_per_field_potatoes: Potatoes harvested divided by area (yield)
  - output_per_field_grapes: Grapes harvested divided by area (yield)

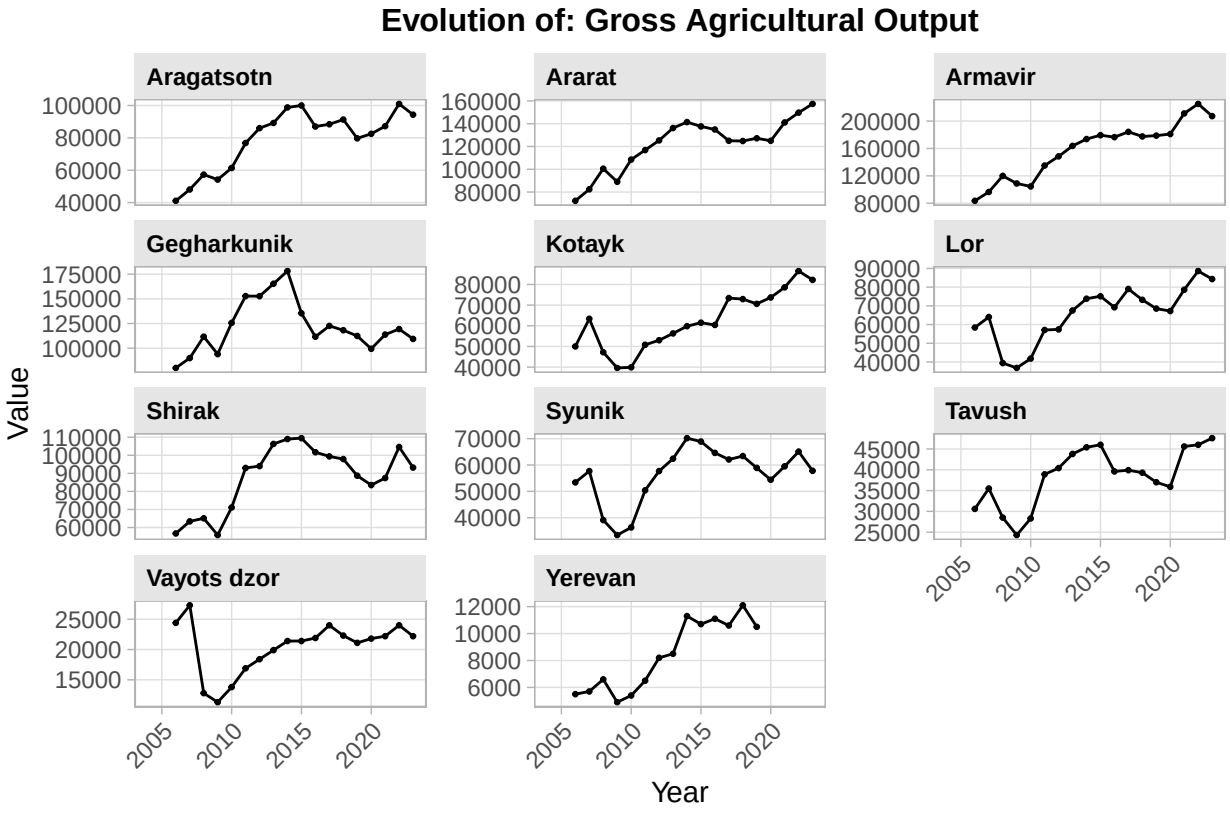
- Other:
  - spei: SPEI measures deviation of the water balance from the long term mean. A value of 0 means we are at the long term mean, while +1 is a moderate drought that happens once or twice in 10 years. Note that we took the official SPEI and multiplied it by (-1) in order to adjust the coefficient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

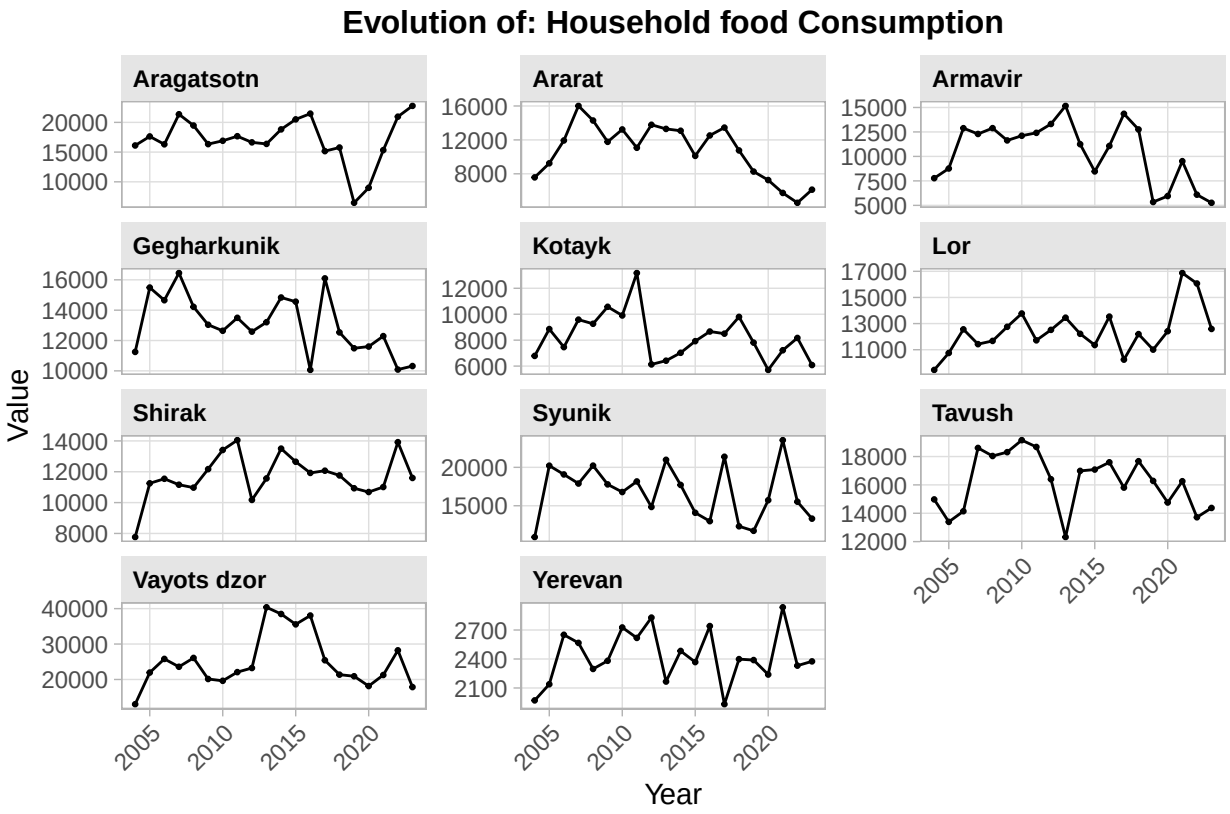
1.2 Descriptive Evidence

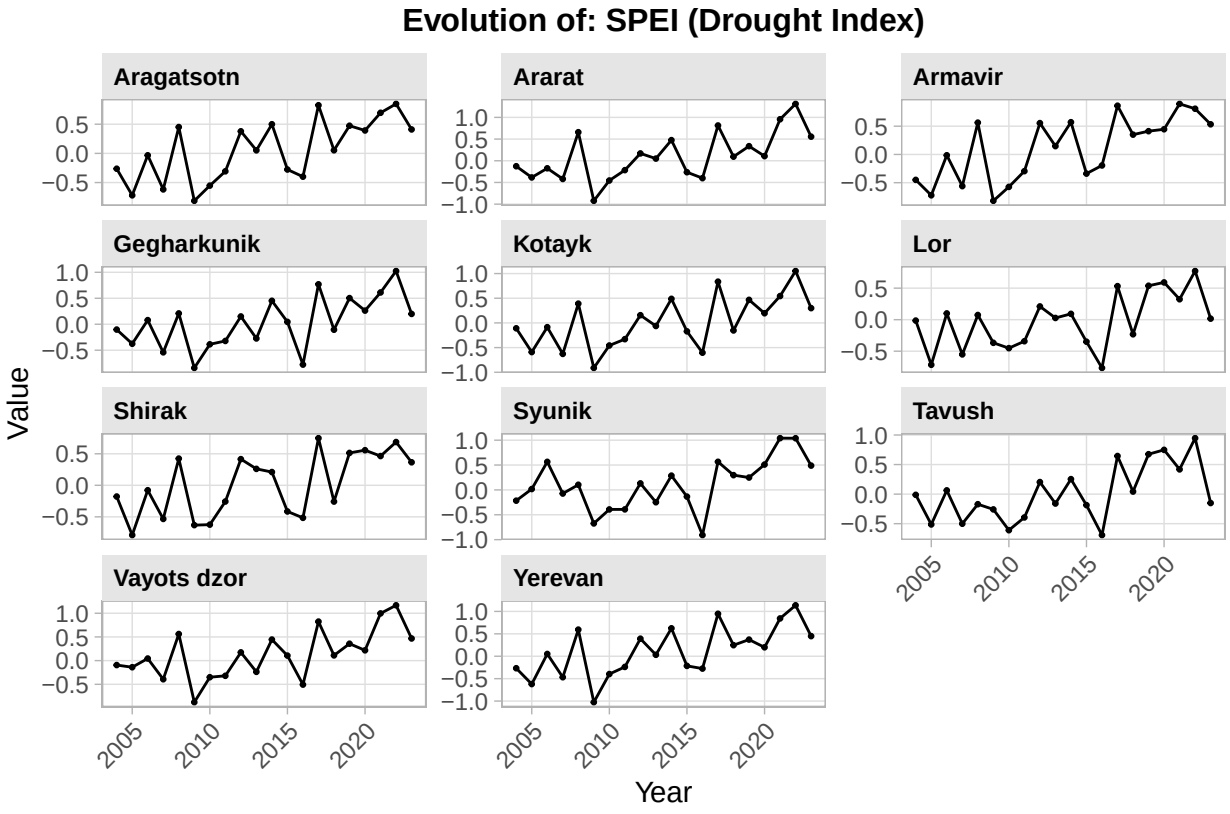
1.2.1 Raw Data Graphs

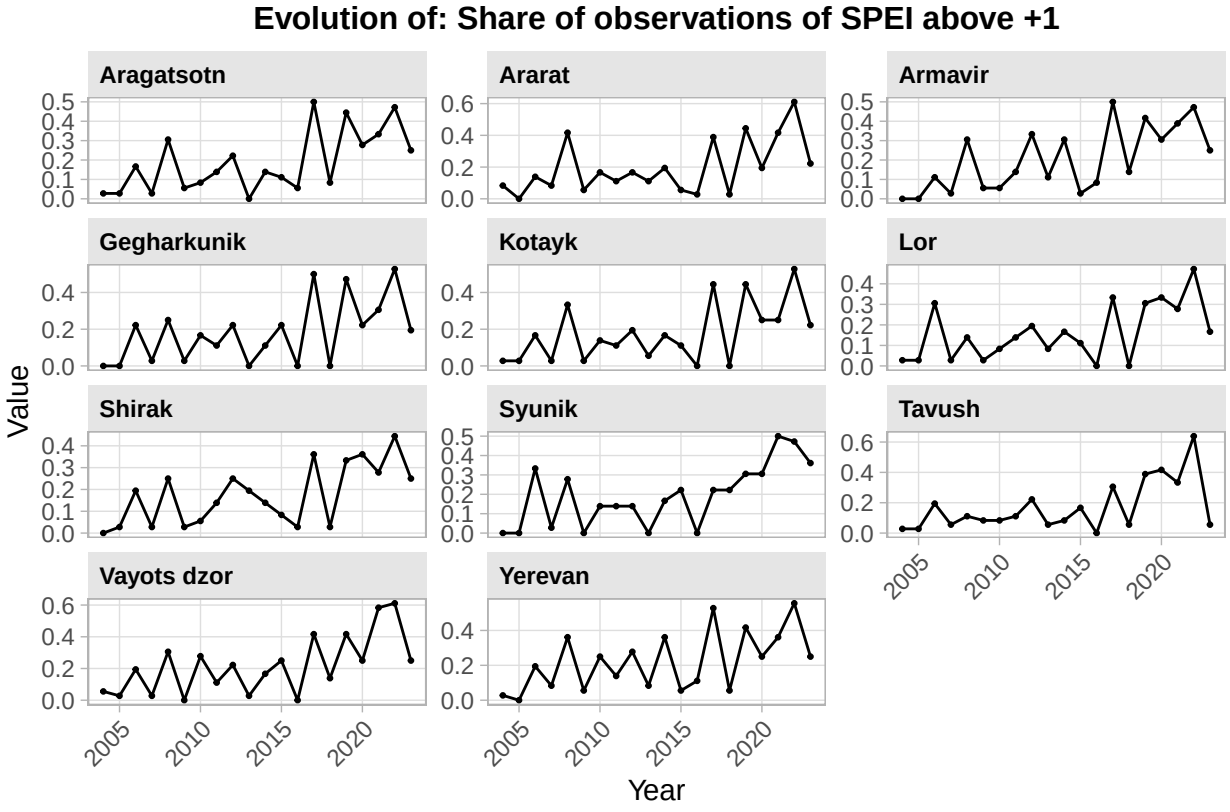


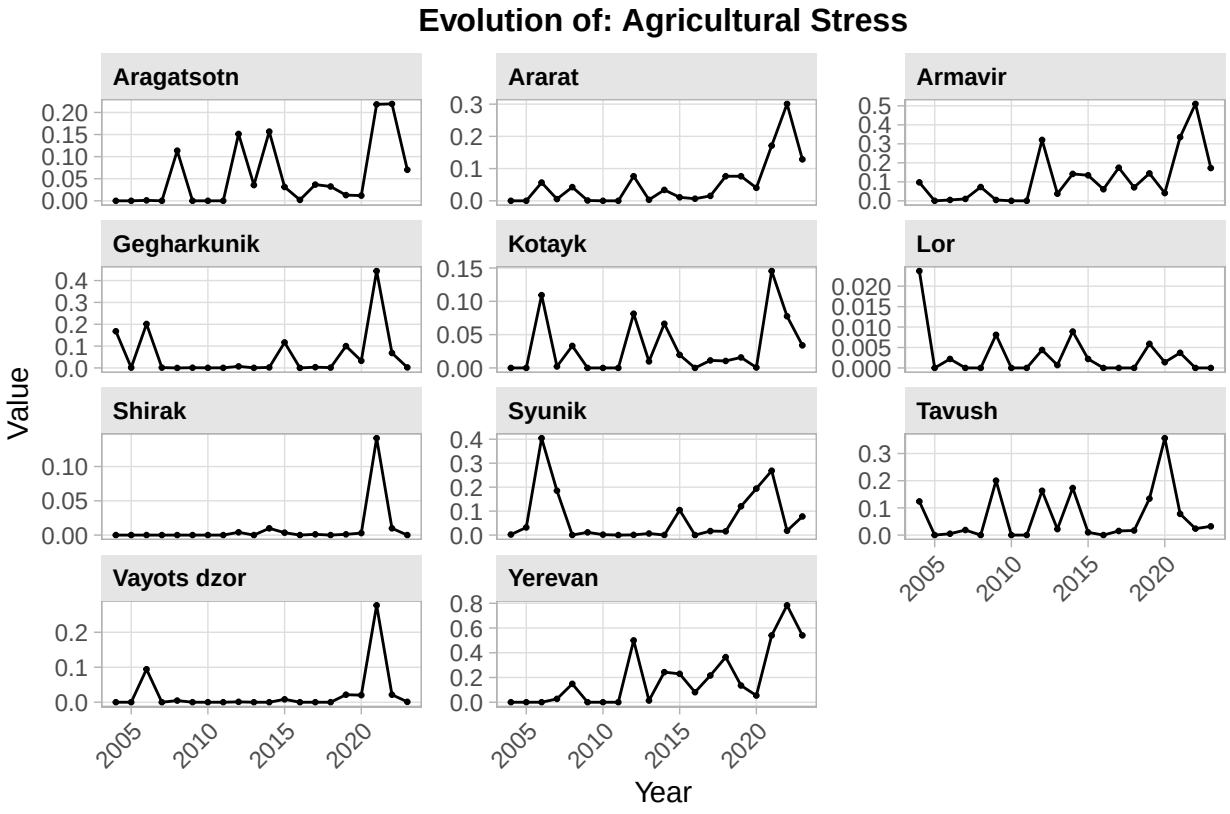


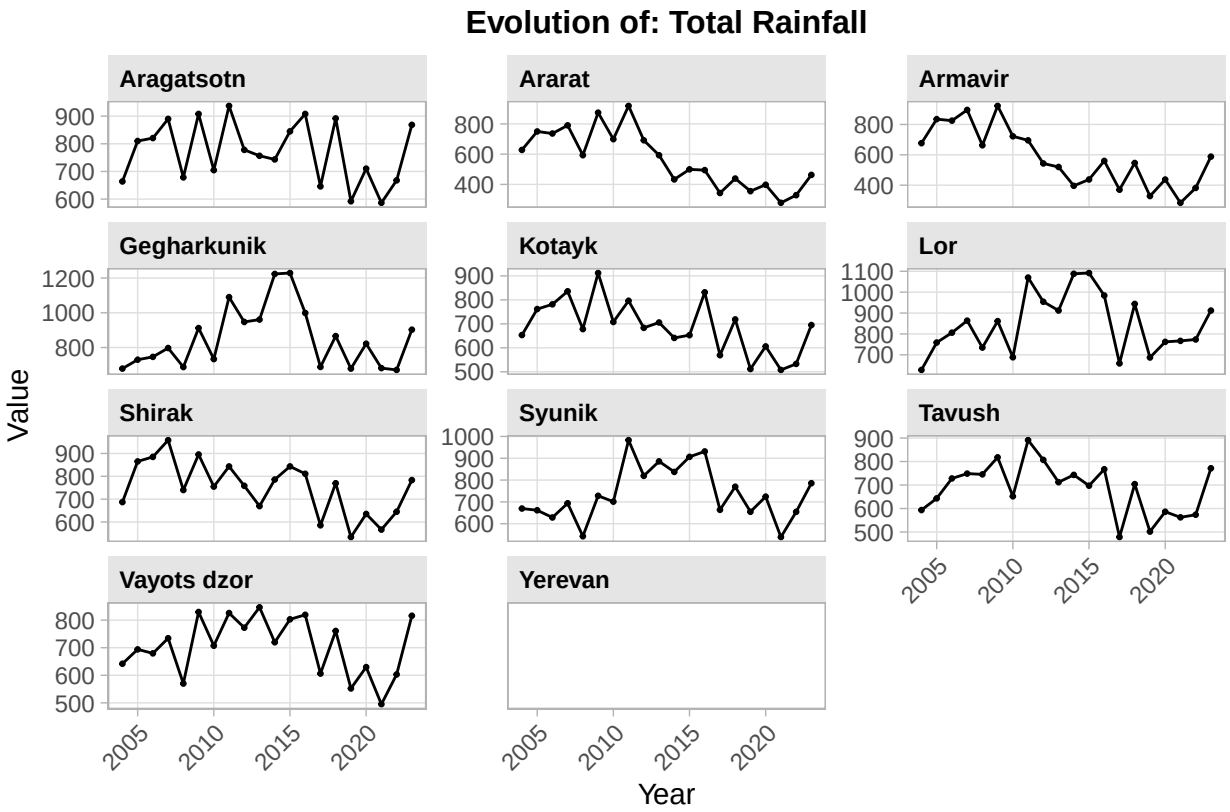

Evolution of: Gross Agricultural Output
Aragatsotn
Ararat
Armavir
Gegharkunik
Kotayk
Lor
Shirak
Syunik
Tavush
Vayots dzor
Yerevan
Value
Year

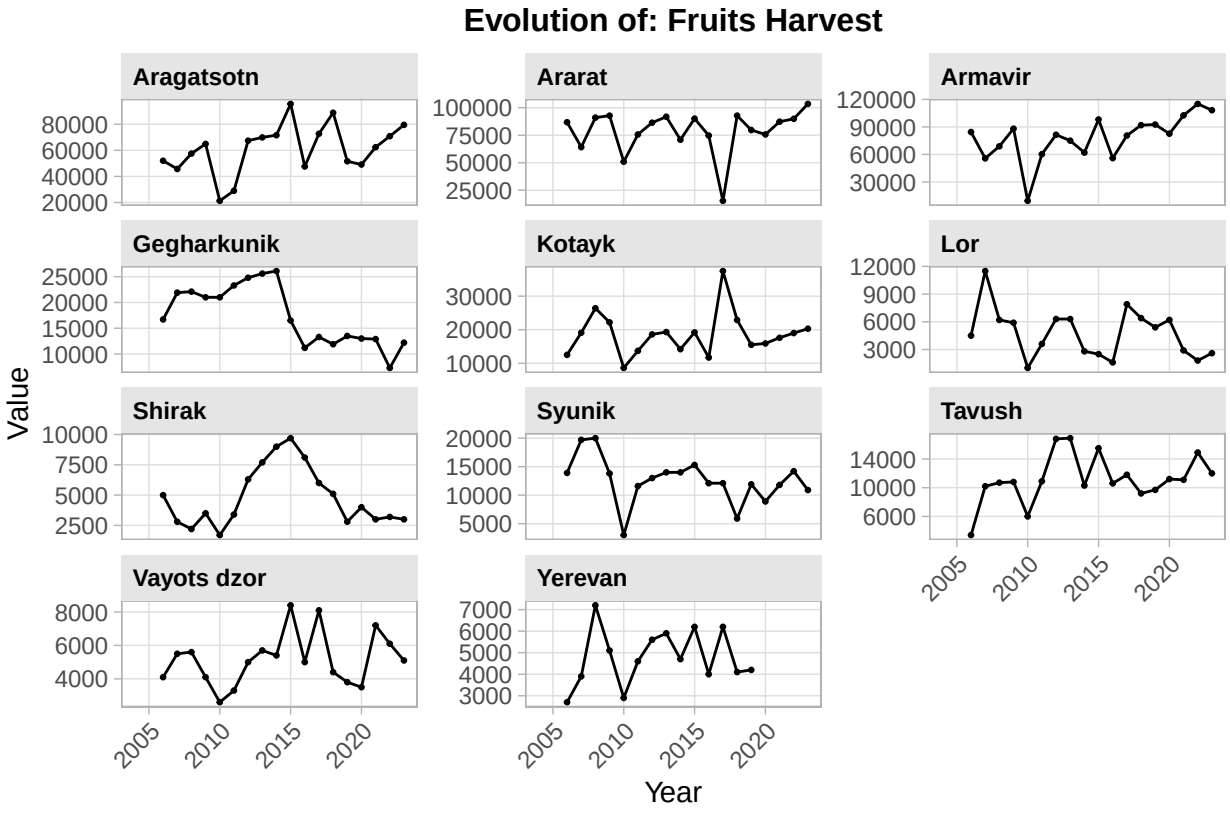

Evolution of: Household food Consumption
Aragatsotn
Ararat
Armavir
Gegharkunik
Kotayk
Lor
Shirak
Syunik
Tavush
Vayots dzor
Yerevan
Value
Year

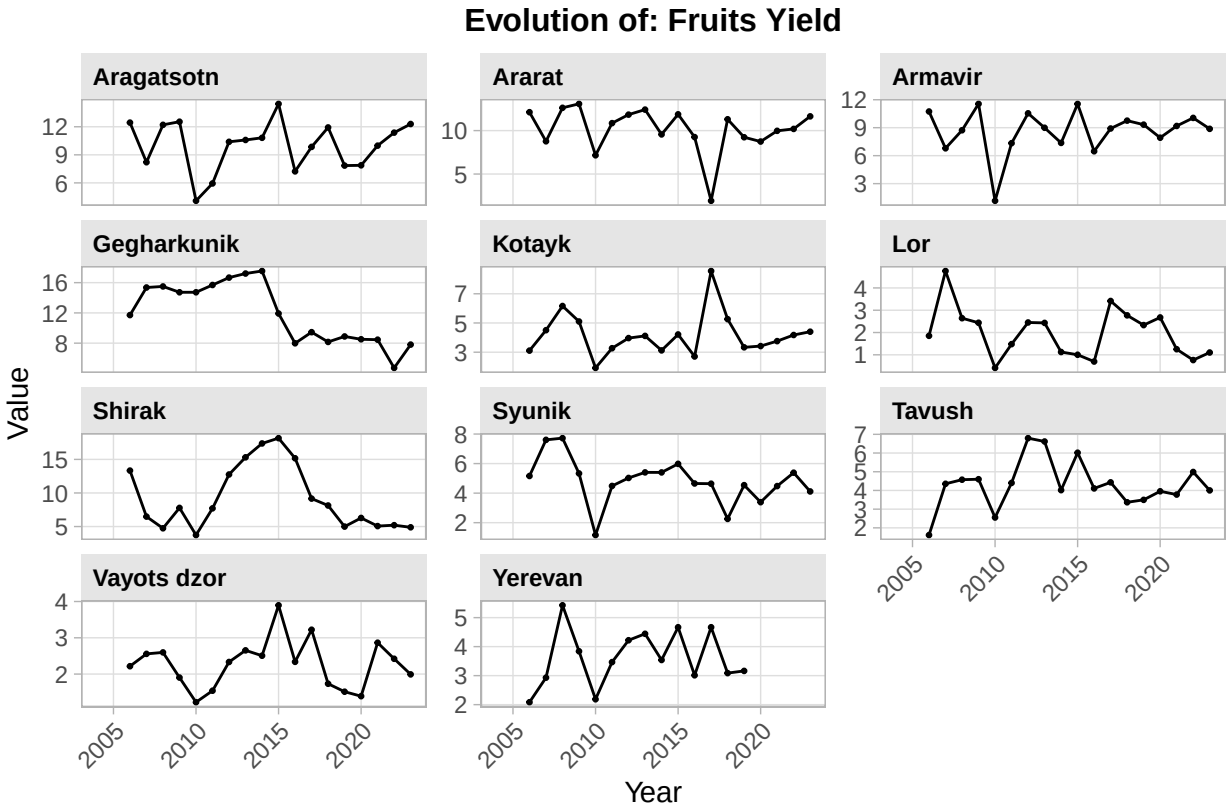

Evolution of: SPEI (Drought Index)
Aragatsotn
Ararat
Armavir
Gegharkunik
Kotayk
Lor
Shirak
Syunik
Tavush
Vayots dzor
Yerevan
Value
Year
2005
2010
2015
2020

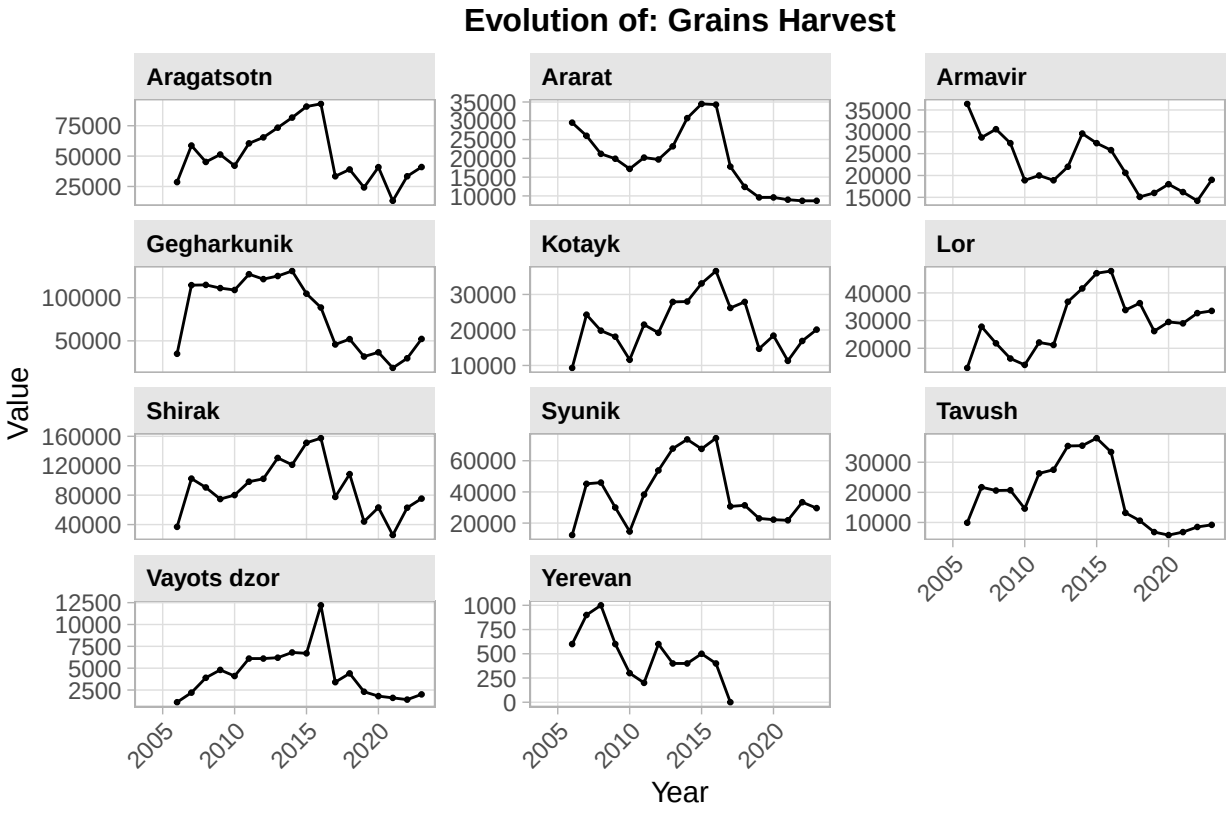

Evolution of: Share of observations of SPEI above +1
Aragatsotn
Ararat
Armavir
Gegharkunik
Kotayk
Lor
Shirak
Syunik
Tavush
Vayots dzor
Yerevan
Value
Year
2005
2010
2015
2020

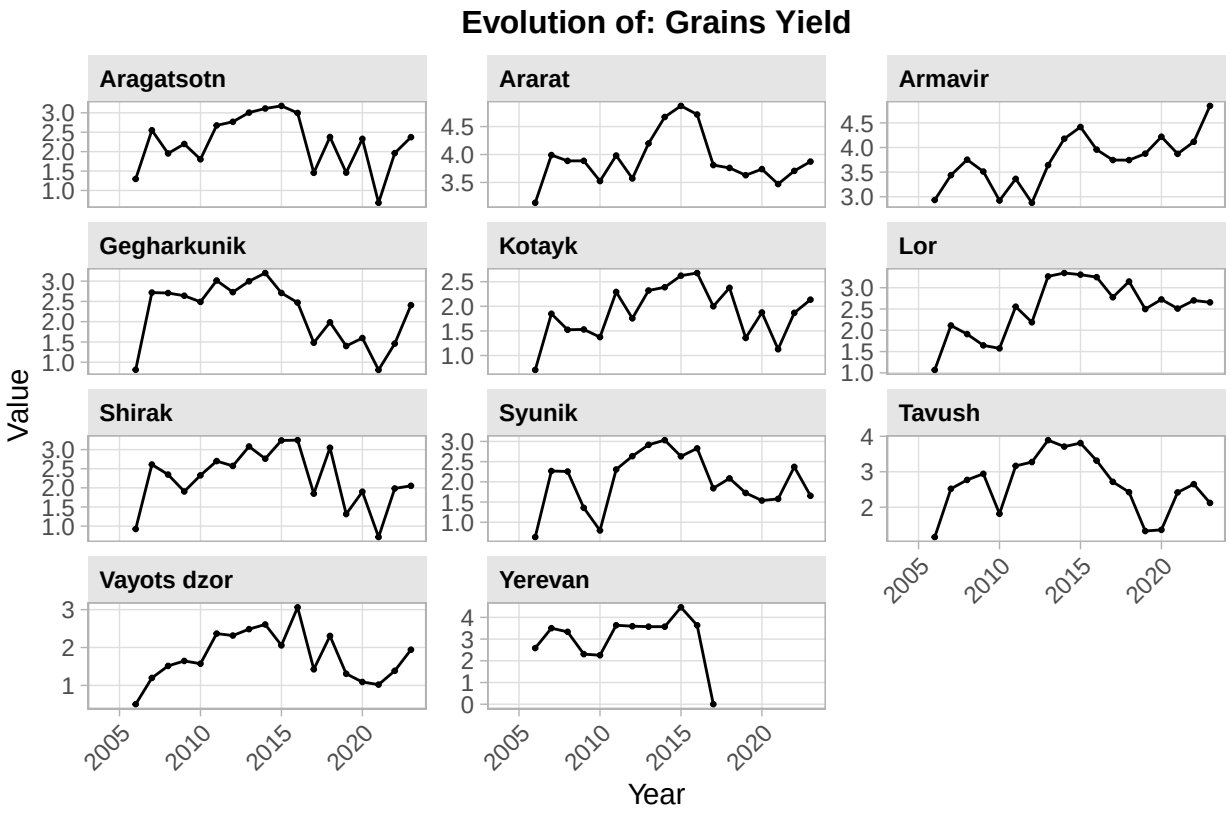

Evolution of: Agricultural Stress
Aragatsotn
Ararat
Armavir
Gegharkunik
Kotayk
Lor
Shirak
Syunik
Tavush
Vayots dzor
Yerevan
Value
Year

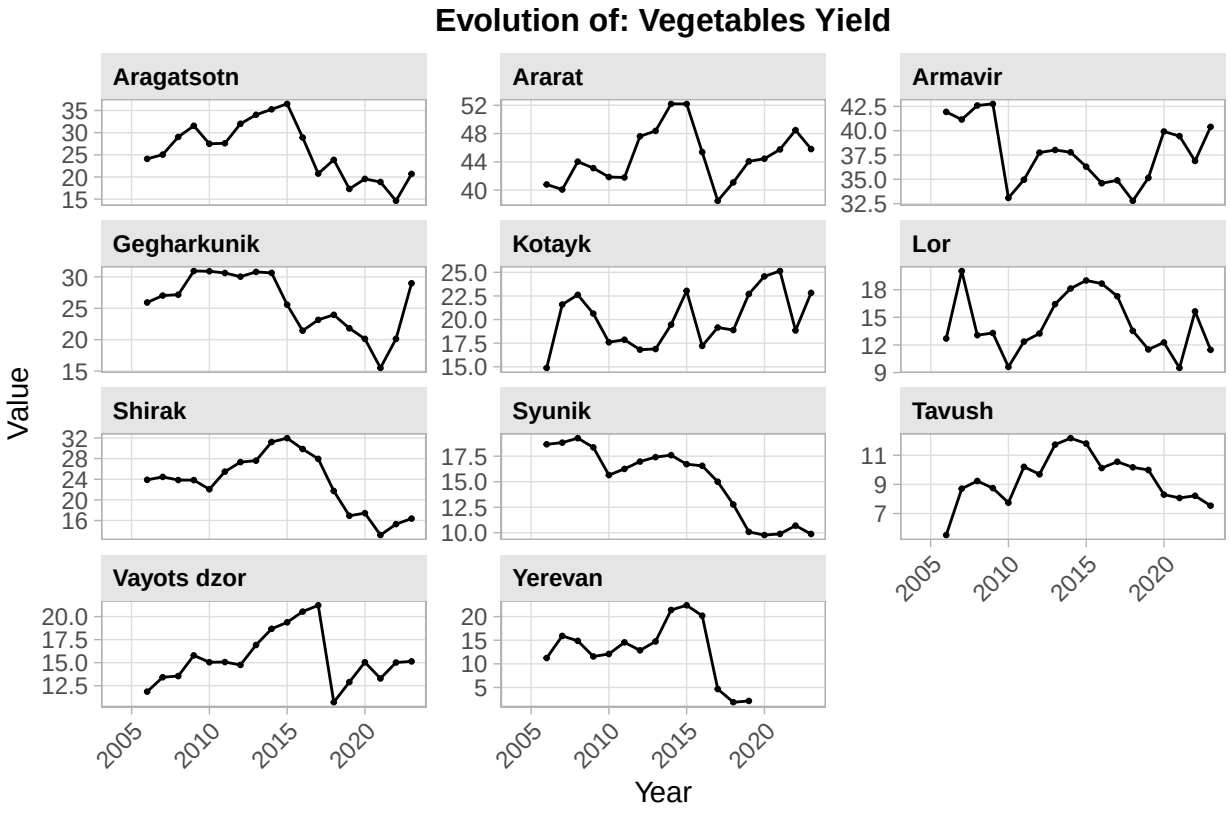

Evolution of: Total Rainfall
Aragatsotn
Ararat
Armavir
Gegharkunik
Kotayk
Lor
Shirak
Syunik
Tavush
Vayots dzor
Yerevan
Value
Year

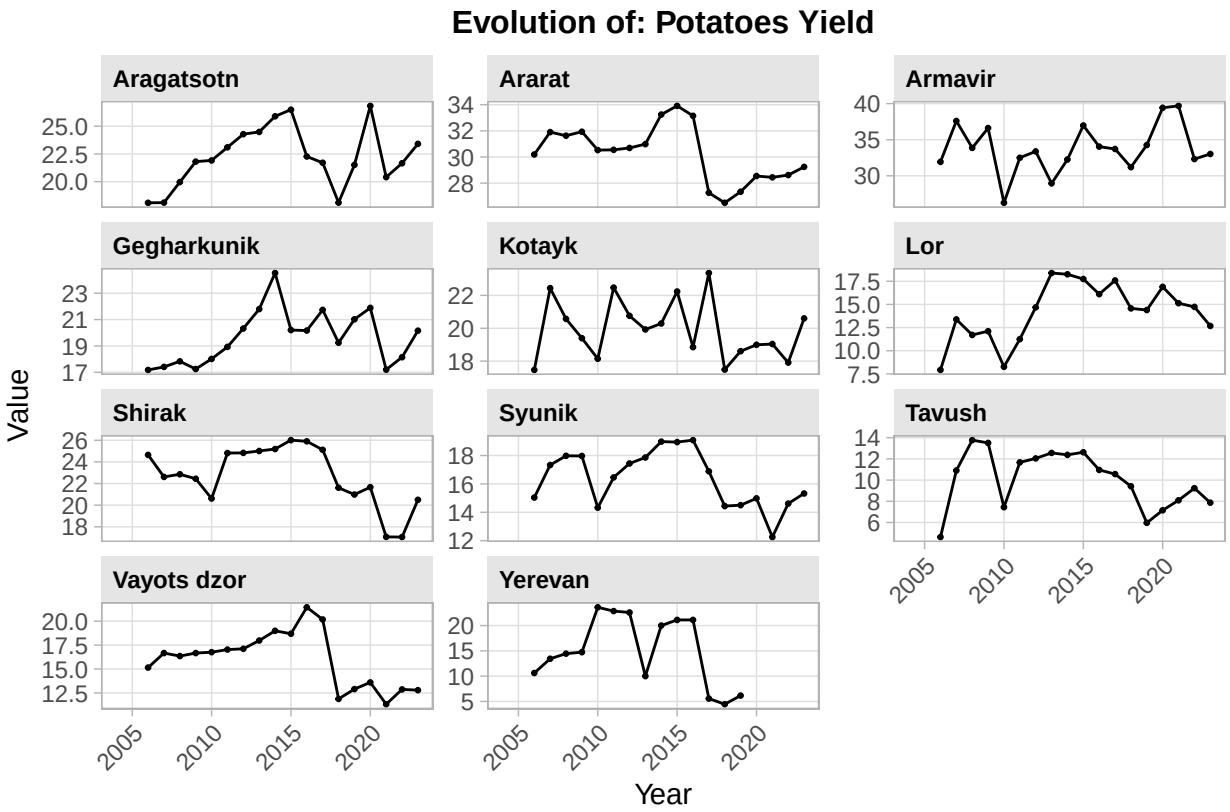

Evolution of: Fruits Harvest
Aragatsotn
Ararat
Armavir
Gegharkunik
Kotayk
Lor
Shirak
Syunik
Tavush
Vayots dzor
Yerevan
Value
Year


Evolution of: Fruits Yield
Aragatsotn
Ararat
Armavir
Gegharkunik
Kotayk
Lor
Shirak
Syunik
Tavush
Vayots dzor
Yerevan
Value
Year

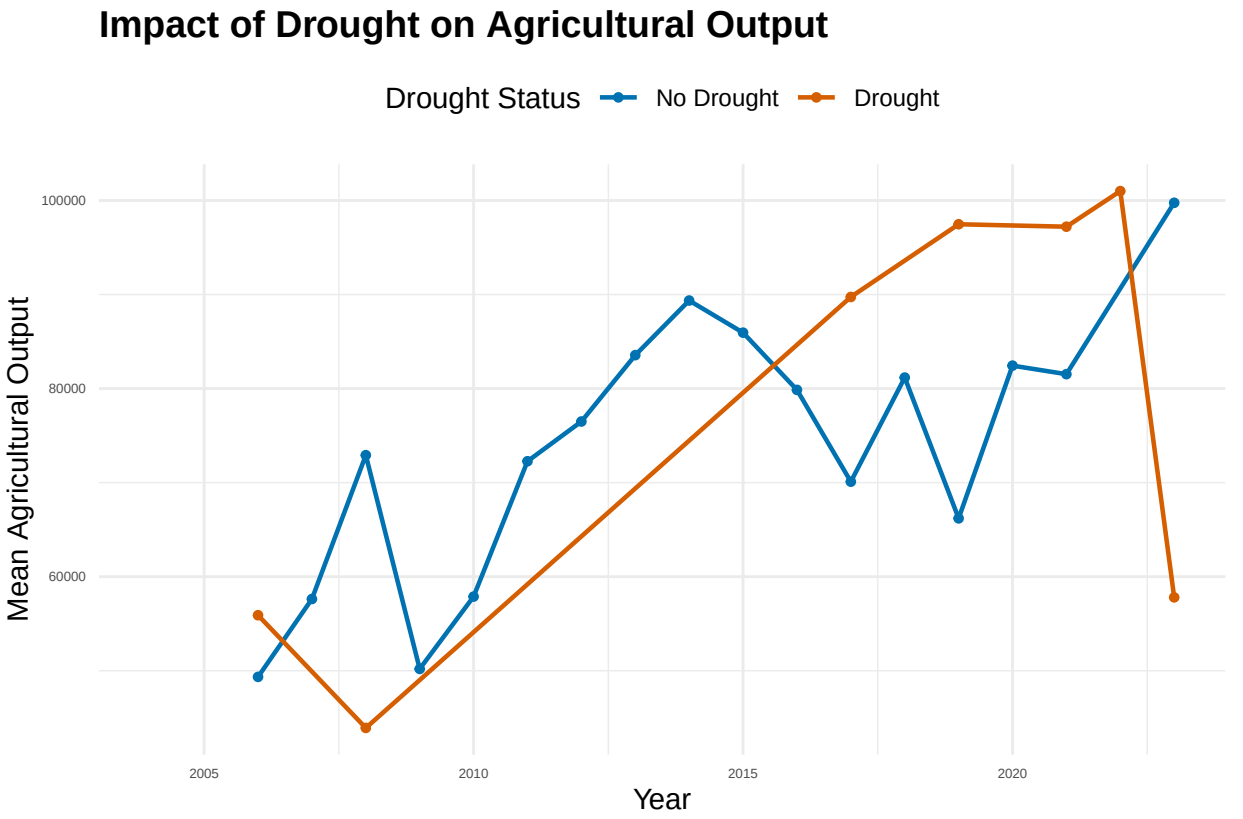

Evolution of: Grains Harvest
Aragatsotn
Ararat
Armavir
Gegharkunik
Kotayk
Lor
Shirak
Syunik
Tavush
Vayots dzor
Yerevan
Value
Year


Evolution of: Grains Yield
Aragatsotn
Ararat
Armavir
Gegharkunik
Kotayk
Lor
Shirak
Syunik
Tavush
Vayots dzor
Yerevan
Value
Year


Evolution of: Vegetables Yield
Aragatsotn
Ararat
Armavir
Gegharkunik
Kotayk
Lor
Shirak
Syunik
Tavush
Vayots dzor
Yerevan
Value
Year

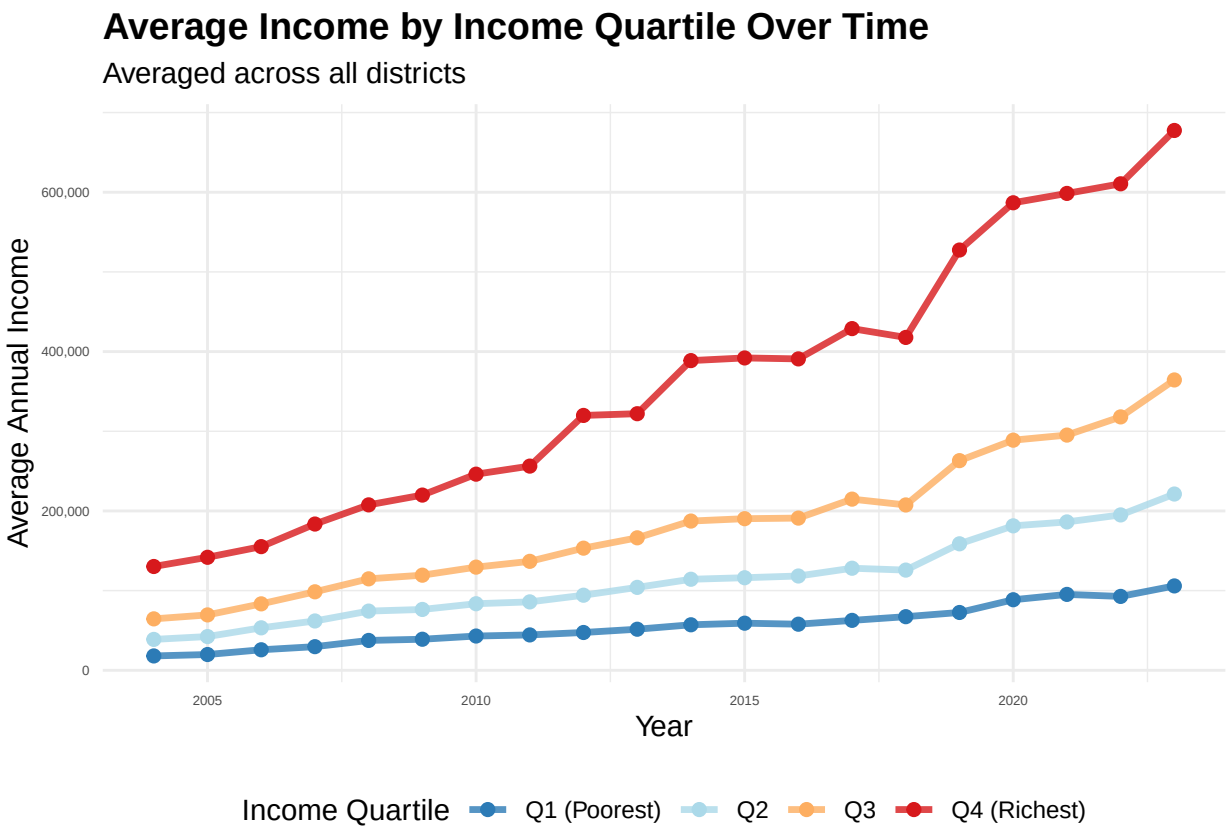

Evolution of: Potatoes Yield
Aragatsotn
Ararat
Armavir
Gegharkunik
Kotayk
Lor
Shirak
Syunik
Tavush
Vayots dzor
Yerevan
Value
Year

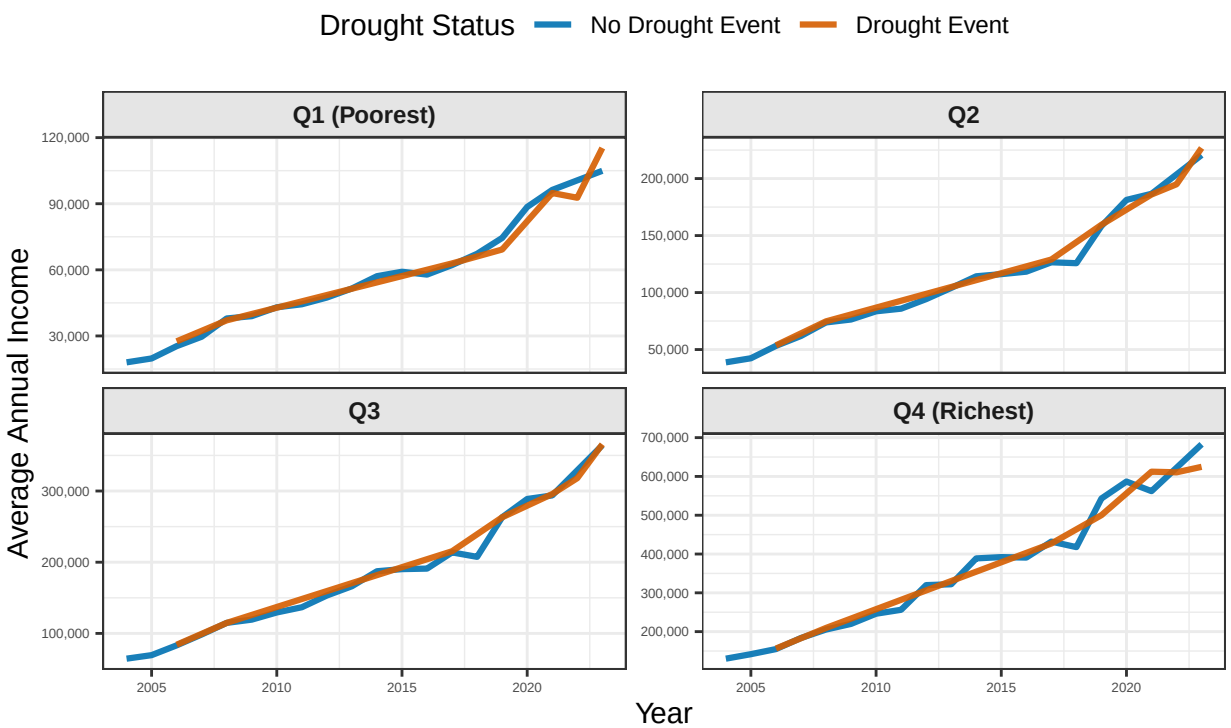
1.2.2 Graphs with Drought Dummy



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 confoun

1.2.3 Graphs with Drought Dummy and Quartiles





2 TWFE Regressions

2.1 Data

2.1.1 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 / 1000km2)
  - Grains output per field
  - Vegetables output per field
  - Fruits output per field
  - Potatoes output per field

```
## Dependent variables are in logs.
```

2.2 Regressions

2.2.1 Equation

All our regressions resemble the following equations, where Y_{dt} represents the chosen outcome variable for district d at time t, λ_d represents the district-specific fixed effect, γ_t represents the time-specific fixed effect, X_{dt} is the chosen explanatory variable, β is the effect of said variable on the outcome, and ϵ_{dt} is the error.

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

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

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

2.3 Dependent Variable: Household Income

2.3.1 Regressed on: Drought Index (SPEI)

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

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

2.3.2 Regressed on: Share of observations of SPEI above +1

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

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

2.3.3 Regressed on: Agricultural Stress

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

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

2.3.4 Regressed on: Temperature

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

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

2.4 Dependent Variable: Household Agricultural Income

2.4.1 Regressed on: Drought Index (SPEI)

Dependent Variable:	Household Agricultural Income		
Model:	(1)	(2)	(3)
Variables			
SPEI	0.2773	0.2786	0.2814
	(0.2633)	(0.2720)	(0.2893)
SPEI (Lag 1)		0.0586	0.0572
		(0.2790)	(0.2737)
SPEI (Lag 2)			0.0400
			(0.2727)
Fixed-effects			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
Fit statistics			
Observations	197	197	197
R^2	0.71669	0.71680	0.71685
Within R^2	0.00952	0.00992	0.01009

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

2.4.2 Regressed on: Share of observations of SPEI above +1

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

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

2.4.3 Regressed on: Agricultural Stress

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

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

2.4.4 Regressed on: Temperature

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

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

2.5 Dependent Variable: Gross Agricultural Output

2.5.1 Regressed on: Drought Index (SPEI)

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

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

2.5.2 Regressed on: Share of observations of SPEI above +1

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

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

2.5.3 Regressed on: Agricultural Stress

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

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

2.5.4 Regressed on: Temperature

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

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

2.6 Dependent Variable: Household food Consumption

2.6.1 Regressed on: Drought Index (SPEI)

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

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

2.6.2 Regressed on: Share of observations of SPEI above +1

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

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

2.6.3 Regressed on: Agricultural Stress

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

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

2.6.4 Regressed on: Temperature

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

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

2.7 Dependent Variable: Grains Harvest

2.7.1 Regressed on: Drought Index (SPEI)

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

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

2.7.2 Regressed on: Share of observations of SPEI above +1

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

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

2.7.3 Regressed on: Agricultural Stress

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

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

2.7.4 Regressed on: Temperature

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

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

2.8 Dependent Variable: Vegetables Harvest

2.8.1 Regressed on: Drought Index (SPEI)

Dependent Variable:	Vegetables Harvest		
Model:	(1)	(2)	(3)
Variables			
SPEI	-0.1150	-0.1191	-0.1240
	(0.0697)	(0.0697)	(0.0725)
SPEI (Lag 1)		-0.2078	-0.2084
		(0.1572)	(0.1617)
SPEI (Lag 2)			-0.1035
			(0.0929)
Fixed-effects			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
Fit statistics			
Observations	194	194	194
R^2	0.95674	0.95738	0.95753
Within R^2	0.00428	0.01891	0.02251

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

2.8.2 Regressed on: Share of observations of SPEI above +1

Dependent Variable:	Vegetables Harvest		
Model:	(1)	(2)	(3)
Variables			
SPEI Share	-0.1733	-0.2713	-0.2927
	(0.1950)	(0.1901)	(0.1953)
SPEI Share (Lag 1)		-0.4297	-0.5002
		(0.3137)	(0.3758)
SPEI Share (Lag 2)			-0.3438
			(0.2918)
Fixed-effects			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
Fit statistics			
Observations	194	194	194
R^2	0.95661	0.95693	0.95712
Within R^2	0.00131	0.00854	0.01298

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

2.8.3 Regressed on: Agricultural Stress

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

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

2.8.4 Regressed on: Temperature

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

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

2.9 Dependent Variable: Fruits Harvest

2.9.1 Regressed on: Drought Index (SPEI)

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

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

2.9.2 Regressed on: Share of observations of SPEI above +1

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

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

2.9.3 Regressed on: Agricultural Stress

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

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

2.9.4 Regressed on: Temperature

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

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

2.10 Dependent Variable: Potatoes Harvest

2.10.1 Regressed on: Drought Index (SPEI)

Dependent Variable:	Potatoes Harvest		
Model:	(1)	(2)	(3)
Variables			
SPEI	-0.0864	-0.0913	-0.0931
	(0.0585)	(0.0683)	(0.0699)
SPEI (Lag 1)		-0.2477	-0.2479
		(0.1406)	(0.1438)
SPEI (Lag 2)			-0.0391
			(0.0848)
Fixed-effects			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
Fit statistics			
Observations	194	194	194
R^2	0.97357	0.97447	0.97449
Within R^2	0.00395	0.03787	0.03871

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

2.10.2 Regressed on: Share of observations of SPEI above +1

Dependent Variable:	Potatoes Harvest		
Model:	(1)	(2)	(3)
Variables			
SPEI Share	-0.3500	-0.5348*	-0.5406*
	(0.2041)	(0.2540)	(0.2604)
SPEI Share (Lag 1)		-0.8109**	-0.8300**
		(0.3189)	(0.3329)
SPEI Share (Lag 2)			-0.0928
			(0.2677)
Fixed-effects			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
Fit statistics			
Observations	194	194	194
R^2	0.97369	0.97481	0.97482
Within R^2	0.00872	0.05073	0.05126

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

2.10.3 Regressed on: Agricultural Stress

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

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

2.10.4 Regressed on: Temperature

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

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

2.11 Dependent Variable: Grains Yield

2.11.1 Regressed on: Drought Index (SPEI)

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

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

2.11.2 Regressed on: Share of observations of SPEI above +1

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

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

2.11.3 Regressed on: Agricultural Stress

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

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

2.11.4 Regressed on: Temperature

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

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

2.12 Dependent Variable: Vegetables Yield

2.12.1 Regressed on: Drought Index (SPEI)

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

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

2.12.2 Regressed on: Share of observations of SPEI above +1

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

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

2.12.3 Regressed on: Agricultural Stress

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

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

2.12.4 Regressed on: Temperature

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

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

2.13 Dependent Variable: Fruits Yield

2.13.1 Regressed on: Drought Index (SPEI)

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

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

2.13.2 Regressed on: Share of observations of SPEI above +1

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

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

2.13.3 Regressed on: Agricultural Stress

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

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

2.13.4 Regressed on: Temperature

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

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

2.14 Dependent Variable: Potatoes Yield

2.14.1 Regressed on: Drought Index (SPEI)

Dependent Variable:	Potatoes Yield		
Model:	(1)	(2)	(3)
Variables			
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)
Fixed-effects			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
Fit statistics			
Observations	194	194	194
R^2	0.80594	0.81511	0.81521
Within R^2	0.00795	0.05479	0.05532

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

2.14.2 Regressed on: Share of observations of SPEI above +1

Dependent Variable:	Potatoes Yield		
Model:	(1)	(2)	(3)
Variables			
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)
Fixed-effects			
District (11)	Yes	Yes	Yes
Year (18)	Yes	Yes	Yes
Fit statistics			
Observations	194	194	194
R^2	0.80487	0.80833	0.81003
Within R^2	0.00247	0.02015	0.02882

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

2.14.3 Regressed on: Agricultural Stress

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

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

2.14.4 Regressed on: Temperature

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

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