25th MEETING OF THE COMCEC AGRICULTURE WORKING GROUP

Strengthening the Resilience of Family Farmers and Small-scale Producers in the Agriculture and Food Sector in OIC Member Countries

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Outline

- Objective of the Study

- Measuring Resilience in the Selected Case Study Countries

- Factors Influencing Resilience

  - Results of the Regression Analysis

  - Results of the Principal Component Analysis

- Policy Recommendations

- Conclusion

Objective

- The objective of this study is to measure the resilience and identify the factors that influence the resilience of the family farms and small-scale producers in the case study countries.

- With the identified factors policy recommendations will be provided to strengthening the resilience of the family farmers and small-scale producers in the OIC Member Countries.
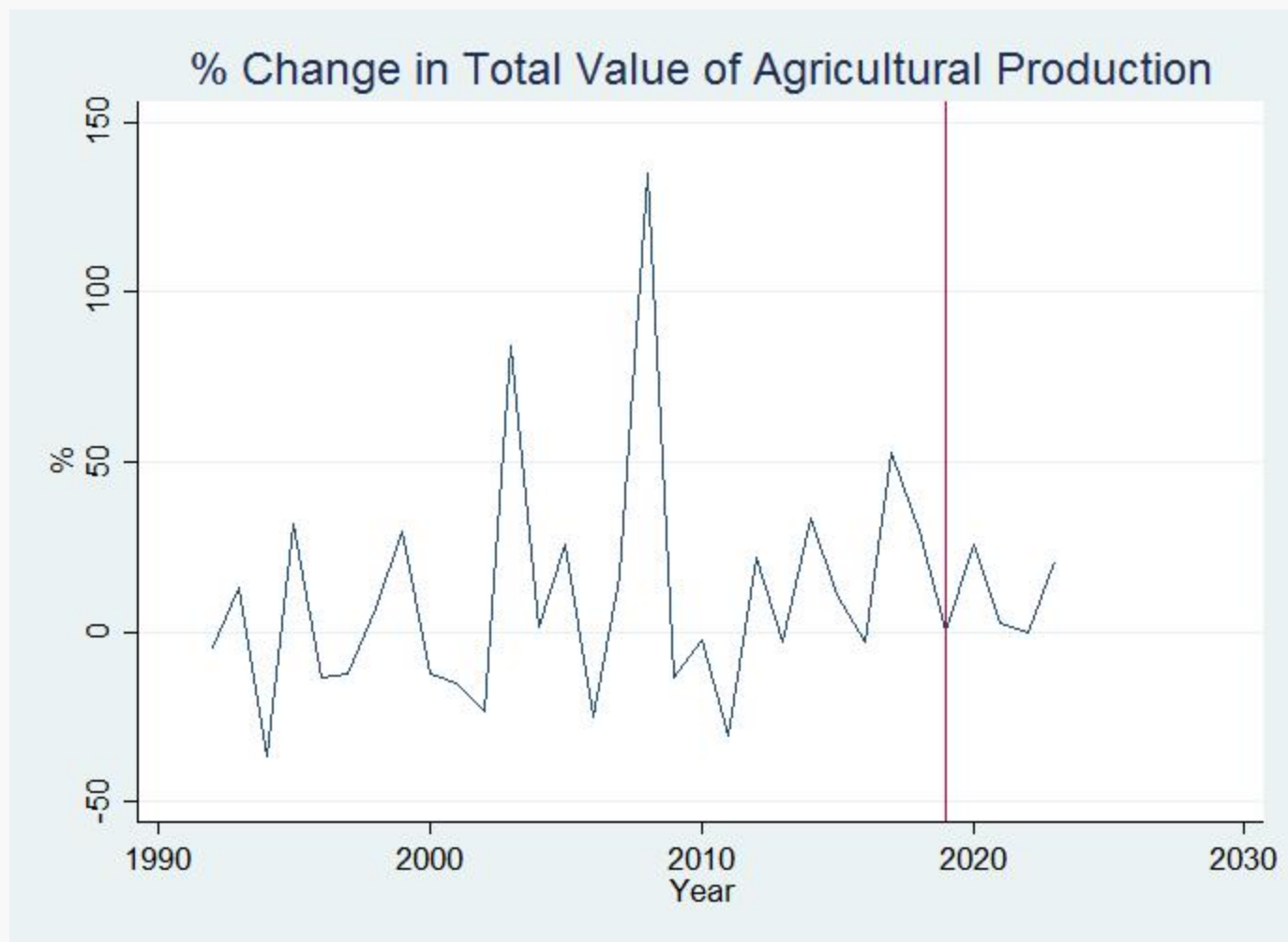
Resilience

- % Change in the Value of Agricultural Production = $\frac{y_t - y_{t-1}}{y_{t-1}} * 100$

- t: $1960, \ldots, 2023$

- % Change in the Value of Agricultural Production per Hectare =

  $\frac{v_t - v_{t-1}}{v_{t-1}} * 100$

- Positive % Change -> Resilient

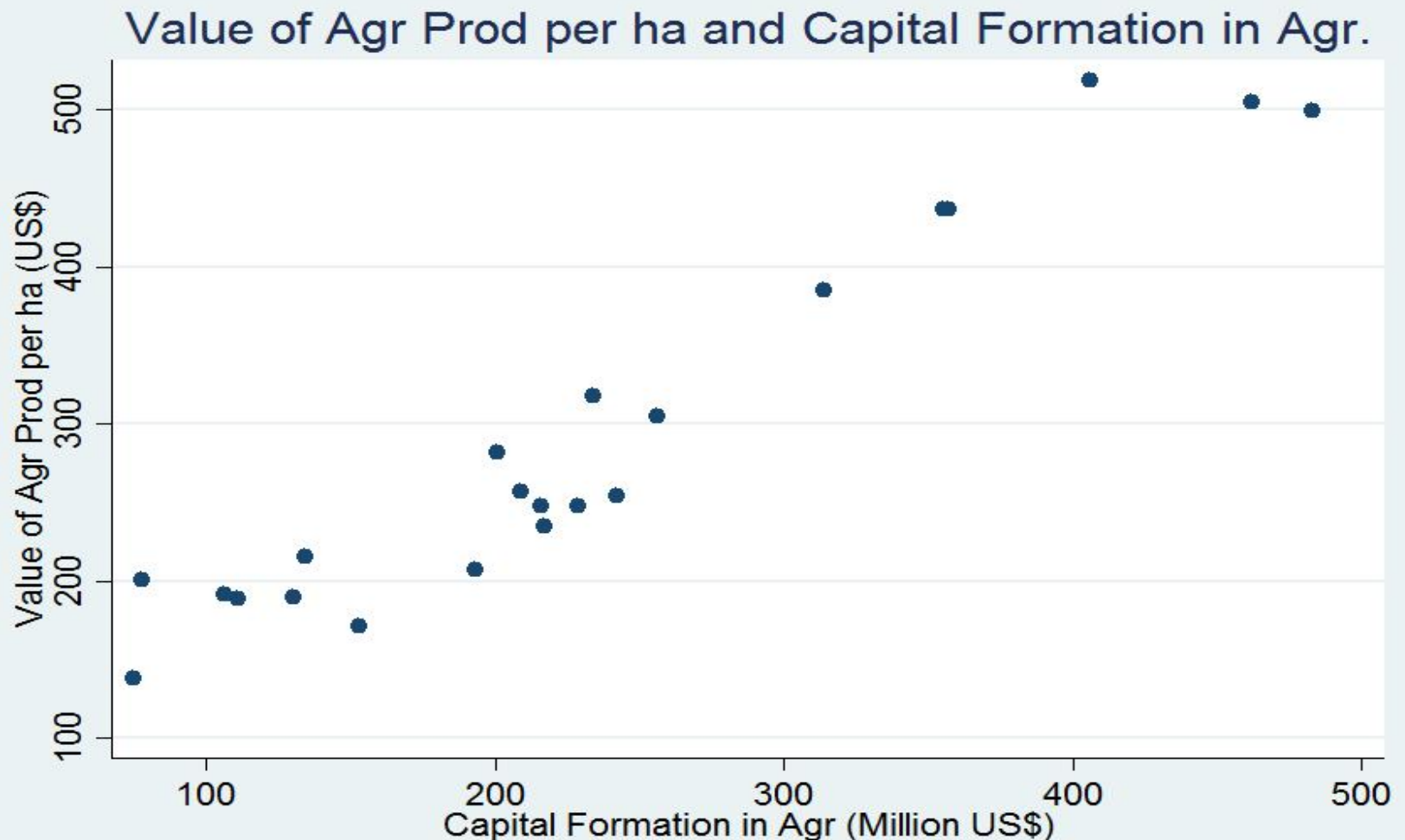- Zero % Change -> Resilient

- Negative % Change -> Non-resilient

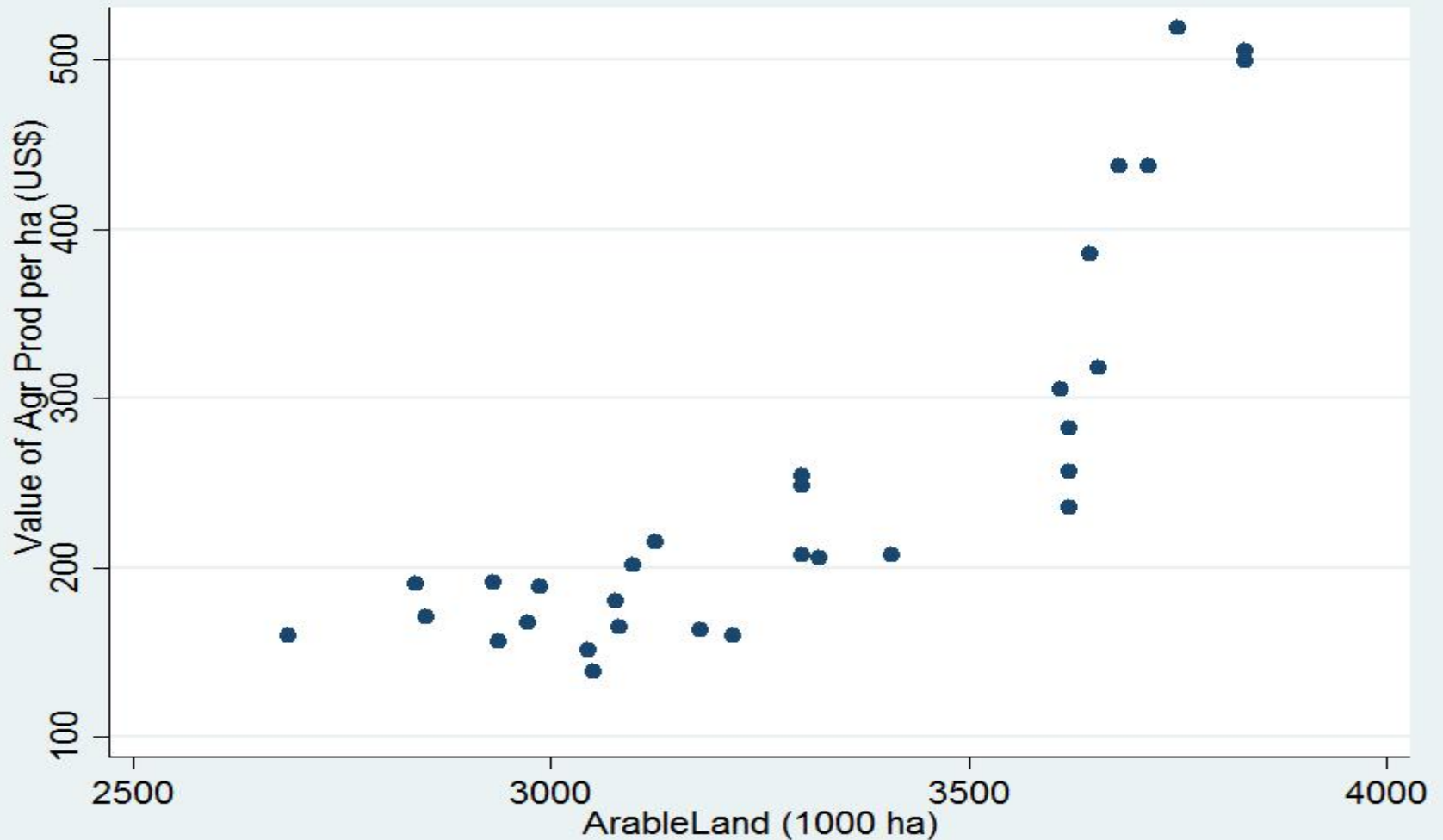# Resilience: Senegal

Total Value of Agricultural Production

Resilience: Senegal

% Change in Total Value of Agricultural Production
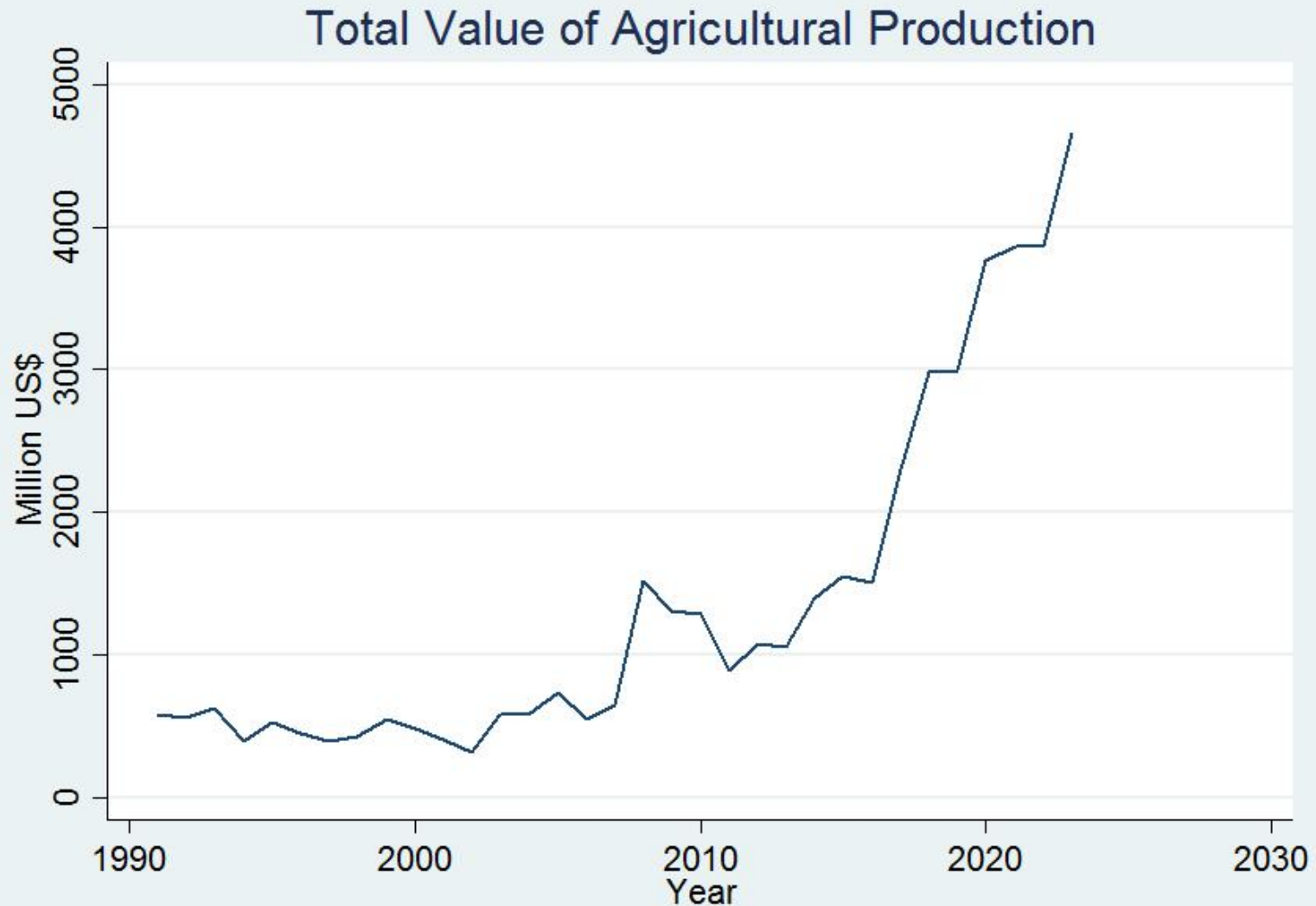
Factors Influencing Resilience: Capital Formation

Value of Agr Prod per ha and Capital Formation in Agr.

Factors Influencing Resilience: Arable Land

Factors Influencing Resilience: Livestock Inventory
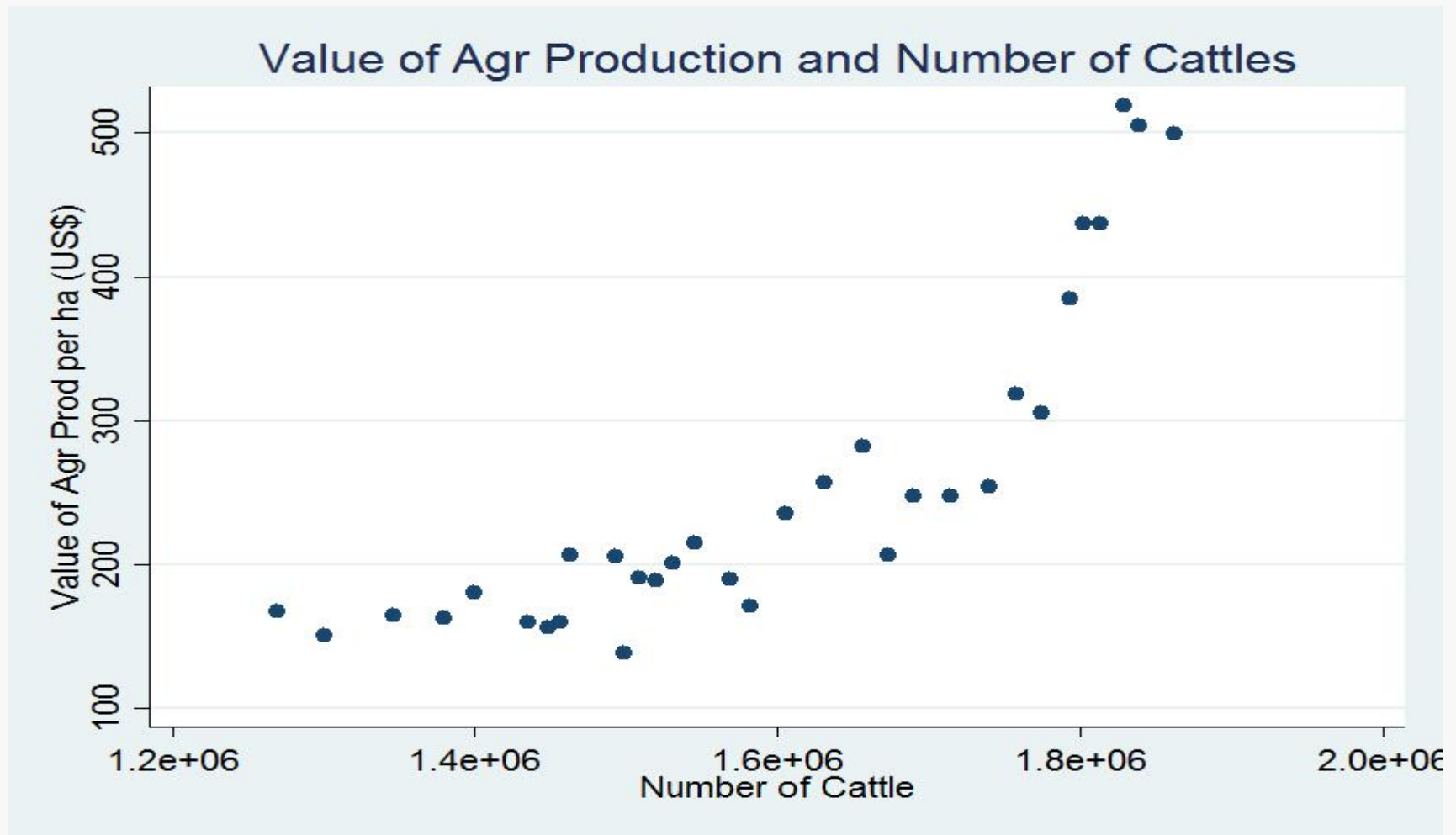
Value of Agr Production and Number of Cattles

Regression Analysis: Senegal

Dept. Variable: % Change in Value of Total Agricultural Production for Senegal

Variable	Coeff.	Std. Err.	t-Stat	p-Value
Δ **Credit**	- 0.090	0.137	-0.66	0.522
Δ **Capital**	1.424	0.296	8.17	0.000
Δ **Cattle**	0.050	0.002	0.22	0.832
Δ **ArableLand**	0.067	0.514	3.99	0.012
Constant	-0.045	0.057	0.44	0.442
N	19			
Adjusted R²	0.745			
F(4,14)	36.87			
p-Value	0.000			

Regression Analysis: Senegal

Dept. Variable: % Change in Value of Agricultural Production per Hectare for Senegal

Variable	Coeff.	Std. Err.	t-Stat	p-Value
Δ **Credit**	- 0.003	0.002	-1.15	0.271
Δ **Capital**	0.004	0.002	2.11	0.053
Δ **Cattle**	0.0001	0.0000	1.92	0.076
Δ **ArableLand**	0.001	0.0002	1.98	0.068
Constant	-0.049	0.049	-1.00	0.337
N	19			
Adjusted R^2	0.508			
F(4,14)	5.66			
p-Value	0.006			

Regression Analysis: Senegal

- **Results**
  - As access to capital accumulation in agriculture increases, the resilience increases.
  - As access to more arable land increases, the resilience increases.
  - As the number of cattle increases, the resilience increases (based on value per hectare).
- **Policy Implications**
  - Financial support programs, such as cost share programs, can be established for farmers to accumulate farm capital (e.g. building, equipment, machinery).
  - Farmers access to arable land can be increased through government support programs, such as rent cost sharing, and long term rental contracts through leasing. Care should be taken for deforestation.
  - Educational and financial support programs for livestock operators can be established to increase the number of cattle holdings.

Principal Component Analysis

Variable	Comp1	Comp2
Credit	0.470	-0.254
Capital	0.471	-0.355
Cattle	0.478	-0.119
ArableLand	0.439	0.042
FertilizerN	0.366	0.890

Component	Eigenvalue	Proportion
Comp1	4.11	0.82
Comp2	0.54	0.11
N	20	

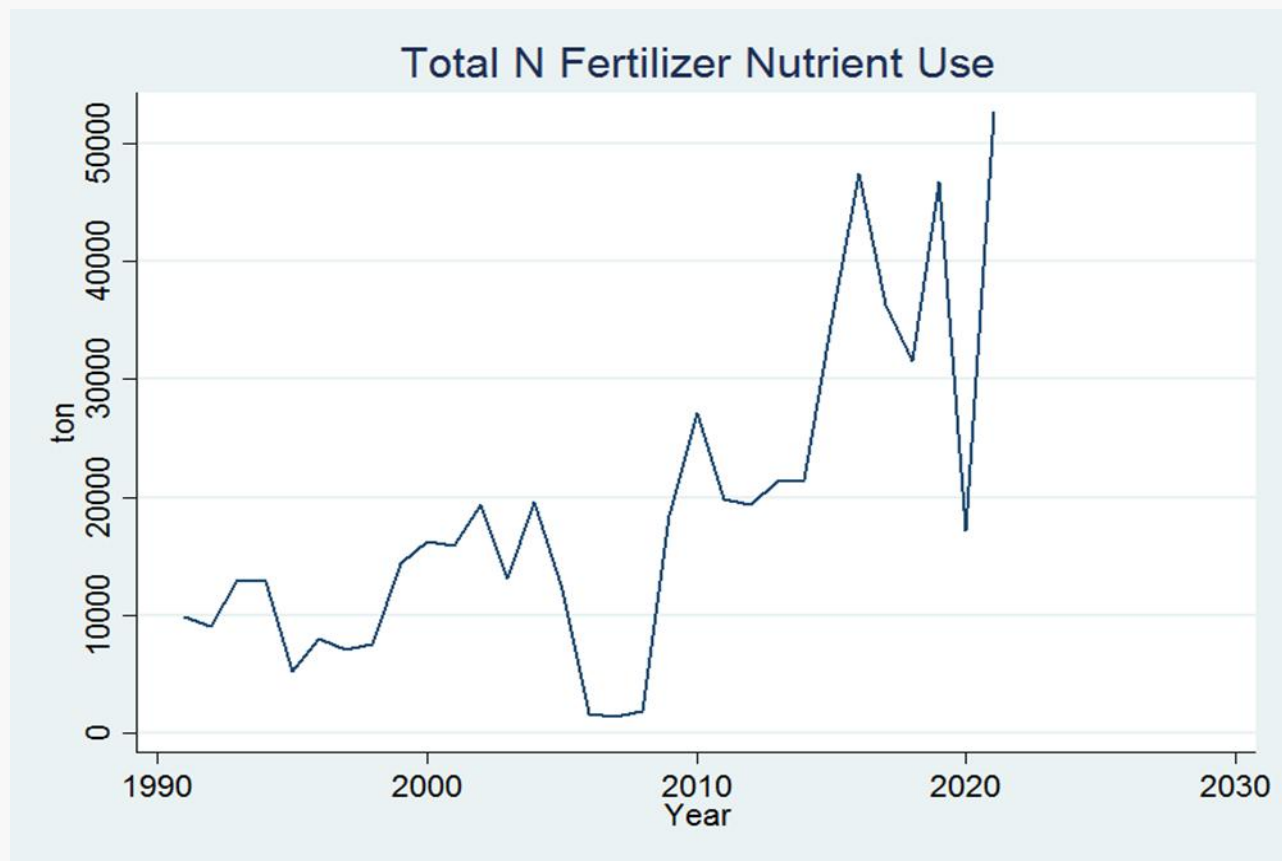# Regression Analysis & Principal Component Analysis

Dept. Variable: % Change in Value of Total Agricultural Production				
Variable	**Coeff.**	**Std. Err.**	**t-Stat**	**p-Value**
Δ **PC1: Productive Assets**	0.573	0.139	4.10	0.001
Δ **PC2: Variable Inputs**	-0.279	0.086	-3.24	0.005
Constant	-0.023	0.079	-0.30	0.768
N	19			
Adjusted R^2	0.496			
F(2,16)	9.87			
p-Value	0.002			

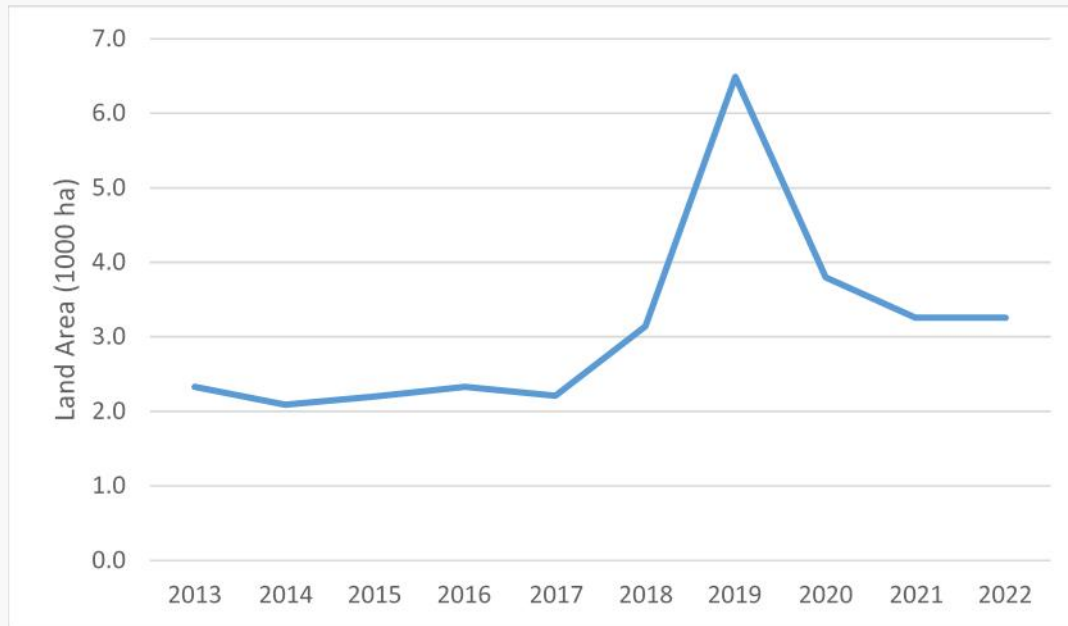# Regression Analysis & Principal Component Analysis

- **Results**

  - As the growth of access to productive assets/inputs in agriculture increases, the resilience increases.

  - As the growth of variable inputs (import dependent) increases, the resilience decreases.

Total N Fertilizer Nutrient Use

Regression Analysis & Principal Component Analysis

- **Policy Implications**
  - Farmers reliance on especially import dependent variable input can be decreased through alternative production systems, such as organic farming and use of manure.
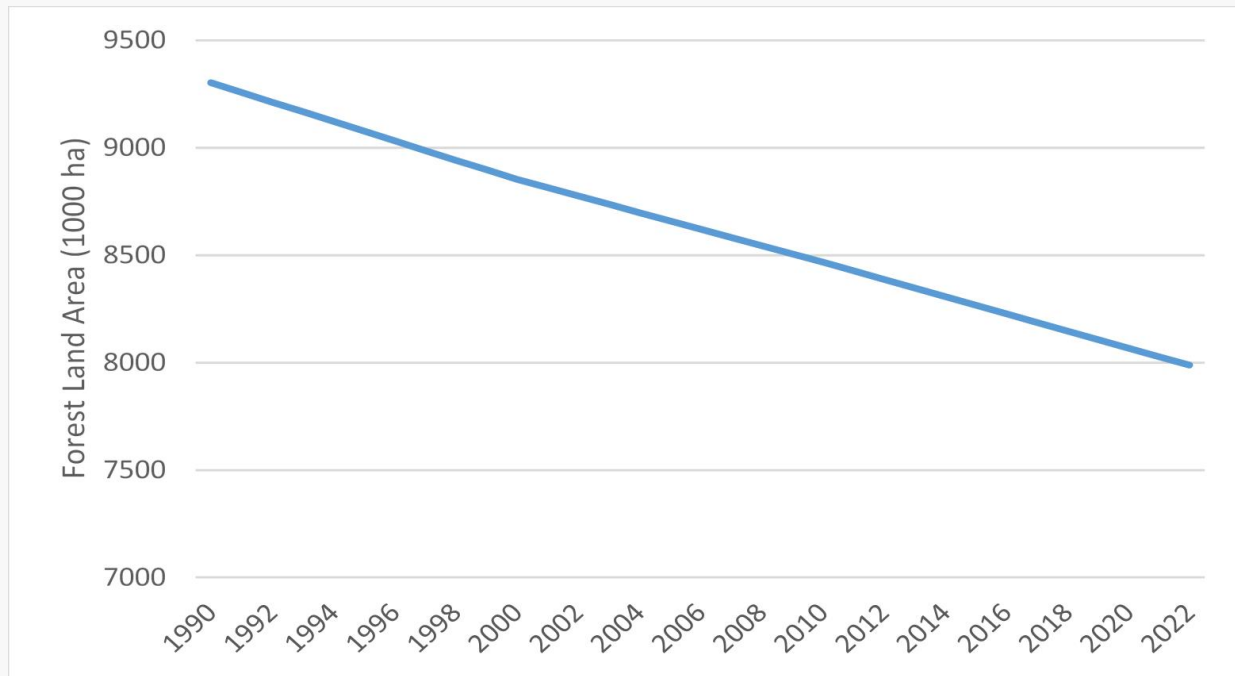

Source: FAOStatistics (2025)

  - Marketing support programs can be developed to connect farmers of organic agriculture to different market outlets, such as those in big cities and even to international markets.

Regression Analysis & Principal Component Analysis

- Forest land is critical both sustainable agriculture and income generated for the farmers as a productive asset.

- A market based approach could be to educate public to generate market premium for crops produced without deforestation, which is currently in the European Union.
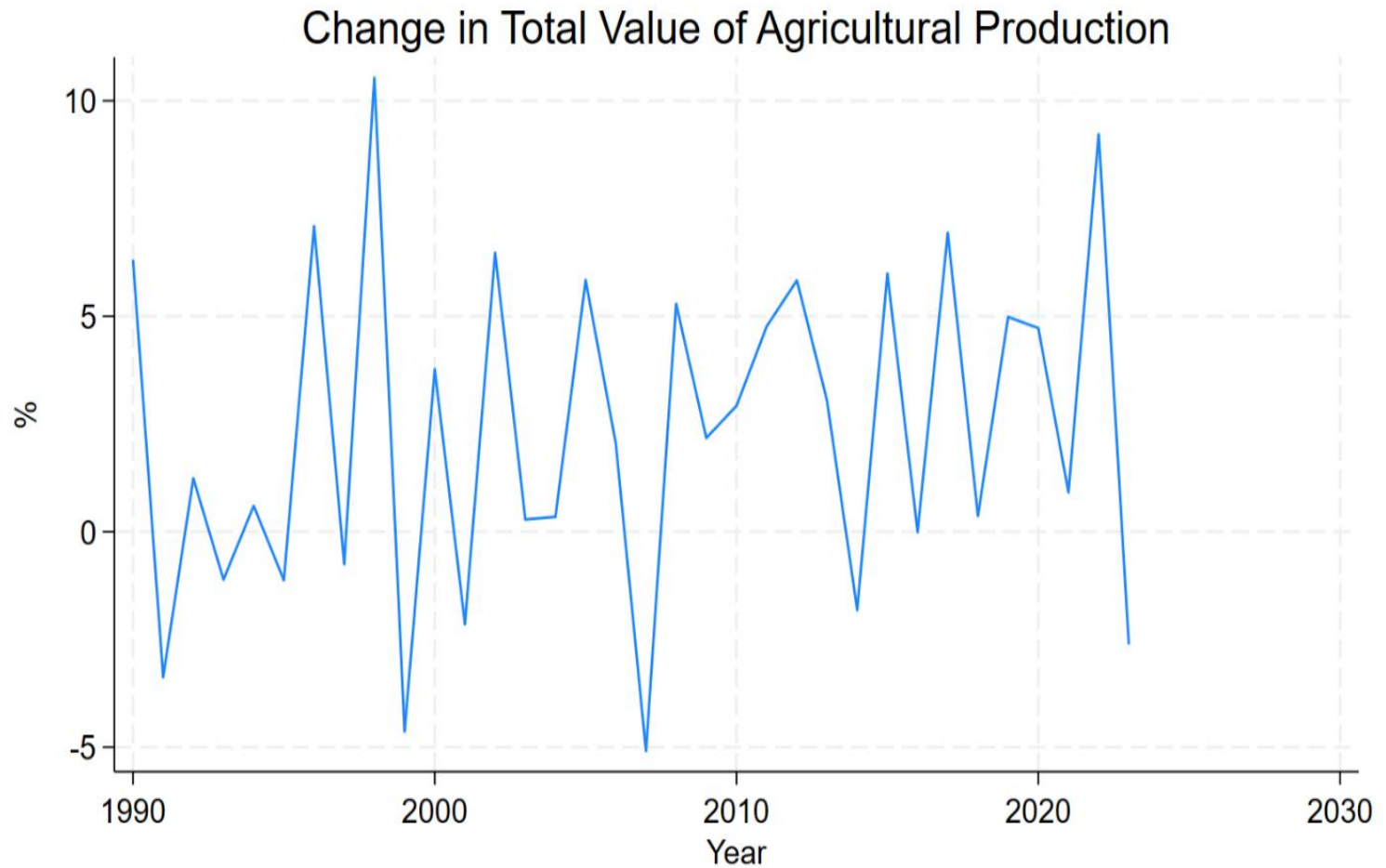

Source: FAOStatistics (2025)

Resilience: Türkiye

Total Value of Agricultural Production
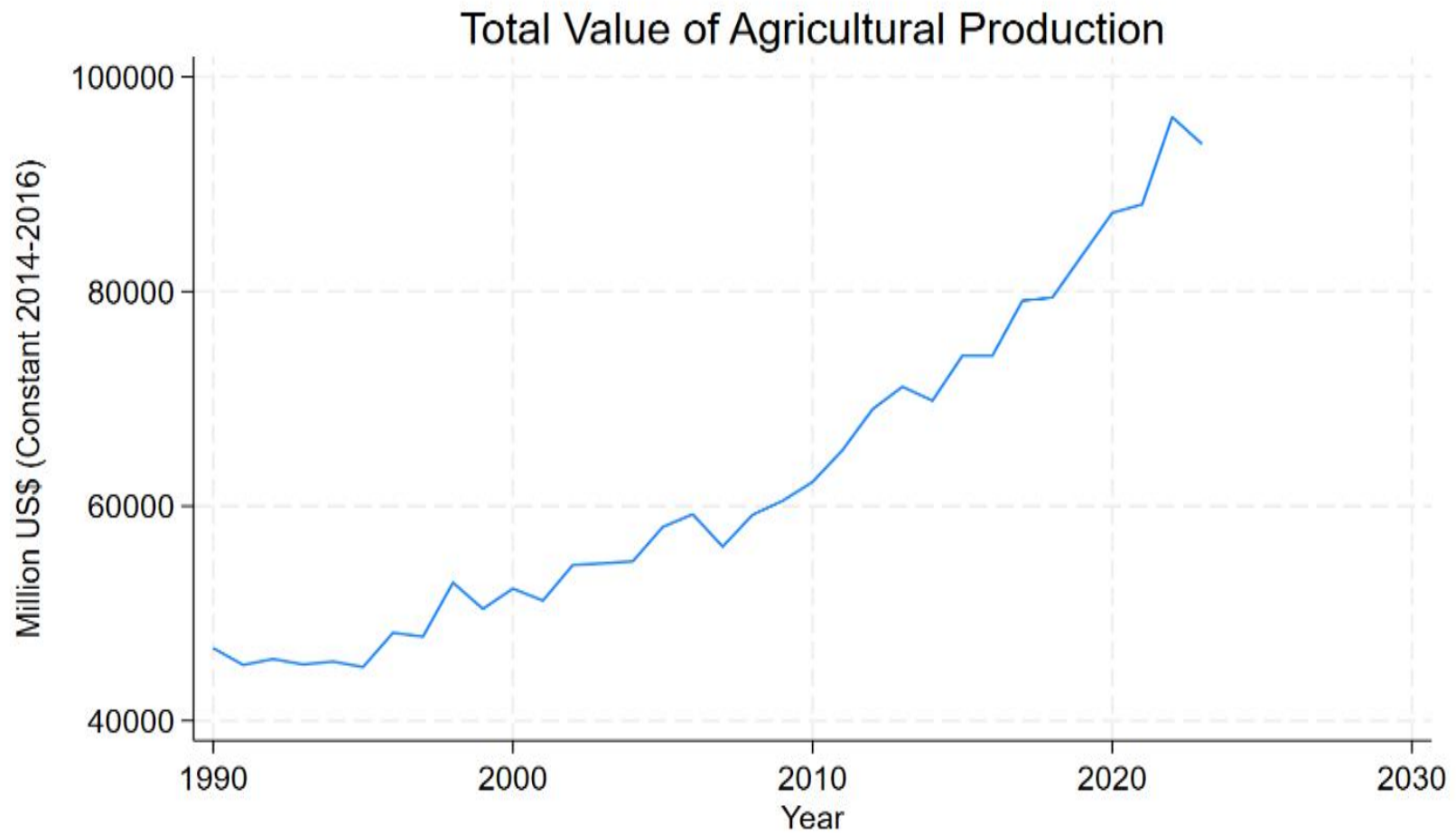
Resilience: Türkiye

Resilience: Türkiye

Dept. Variable: % Change in Value of Total Agricultural Production for Türkiye

Variable	Coeff.	Std. Err.	t-Stat	p-Value
Δ Credit	0.0000188	8.78e-06	2.14	0.047
Δ Capital	0.0000127	0.000012	1.00	0.329
Δ Cattle	1.05e-09	1.20e-08	0.09	0.931
Δ ArableLand	0.0000195	0.000017	1.13	0.275
Constant	0.0293235	0.008806	3.33	0.004
N	23			
Adjusted R²	0.234			
F(4,18)	2.68			
p-Value	0.065			

Resilience: Türkiye

Table 3. Results of the Principal Component Analysis

Variable	Comp1	Comp2
Credit	0.476	-0.187
Capital	-0.435	0.545
Cattle	0.443	0.361
ArableLand	-0.477	0.232
FertilizerN	0.399	0.695

Component	Eigenvalue	Proportion
Comp1	3.99	0.79
Comp2	0.57	0.11
N	24	

Resilience: Türkiye

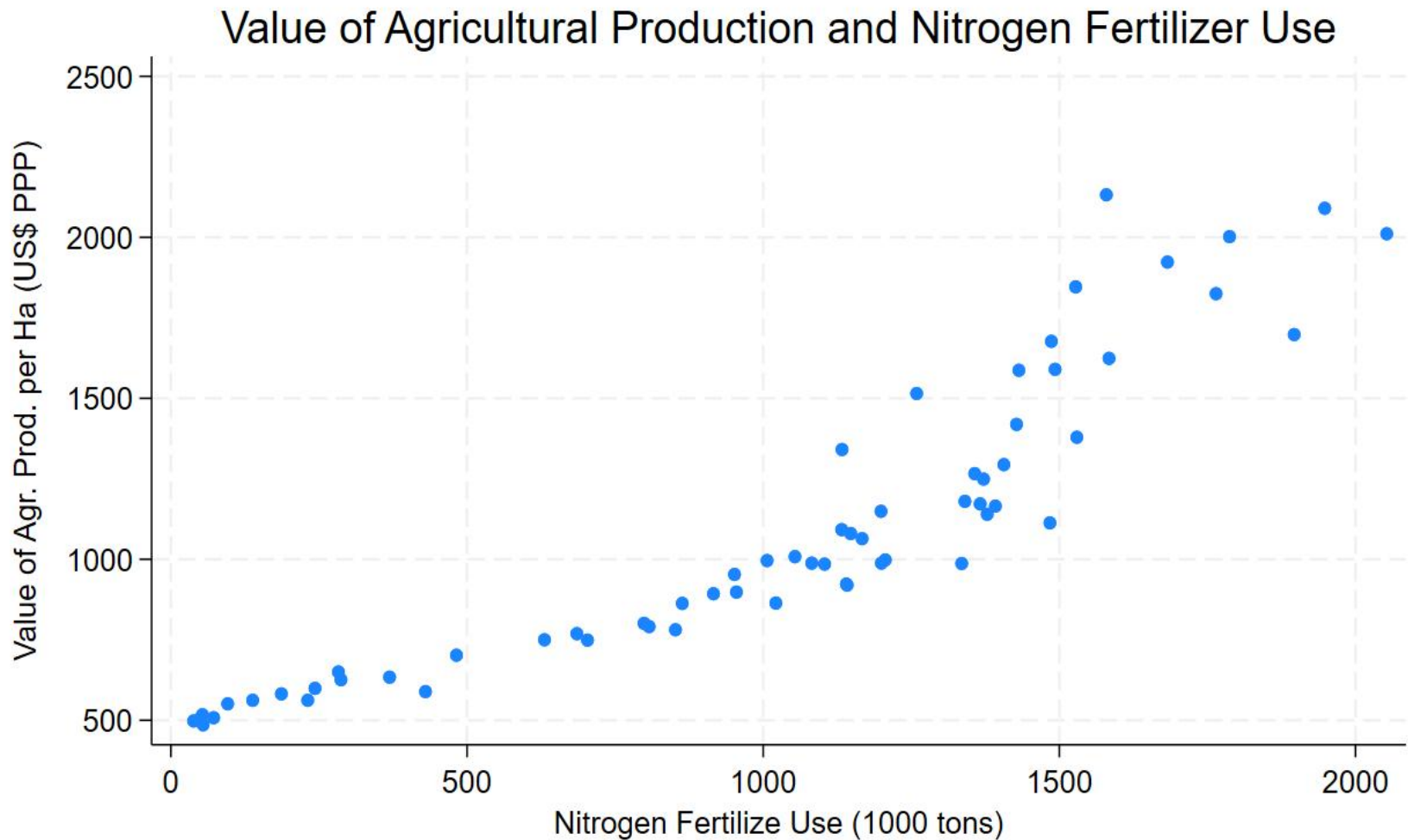**Table 4. Regression Analysis Results for Resilience with Principal Components**

Dept. Variable: *Change in Value of Total Agricultural Production*

Variable	Coeff.	Std. Err.	t-Stat	p-Value
PC1	540163	248354	2.17	0.041
PC2	-479056	657046	-0.73	0.474
Constant	1806840	486138	3.72	0.001
N	24			
Adjusted R^2	0.124			
F(2,21)	2.63			
p-Value	0.095			

Resilience: Türkiye

Resilience: Türkiye

Value of Agricultural Production and Nitrogen Fertilizer Use

Y-axis: Value of Agr. Prod. per Ha (US$ PPP)

X-axis: Nitrogen Fertilize Use (1000 tons)

Resilience: Türkiye

Value of Agrilcultural Production and Arable Land
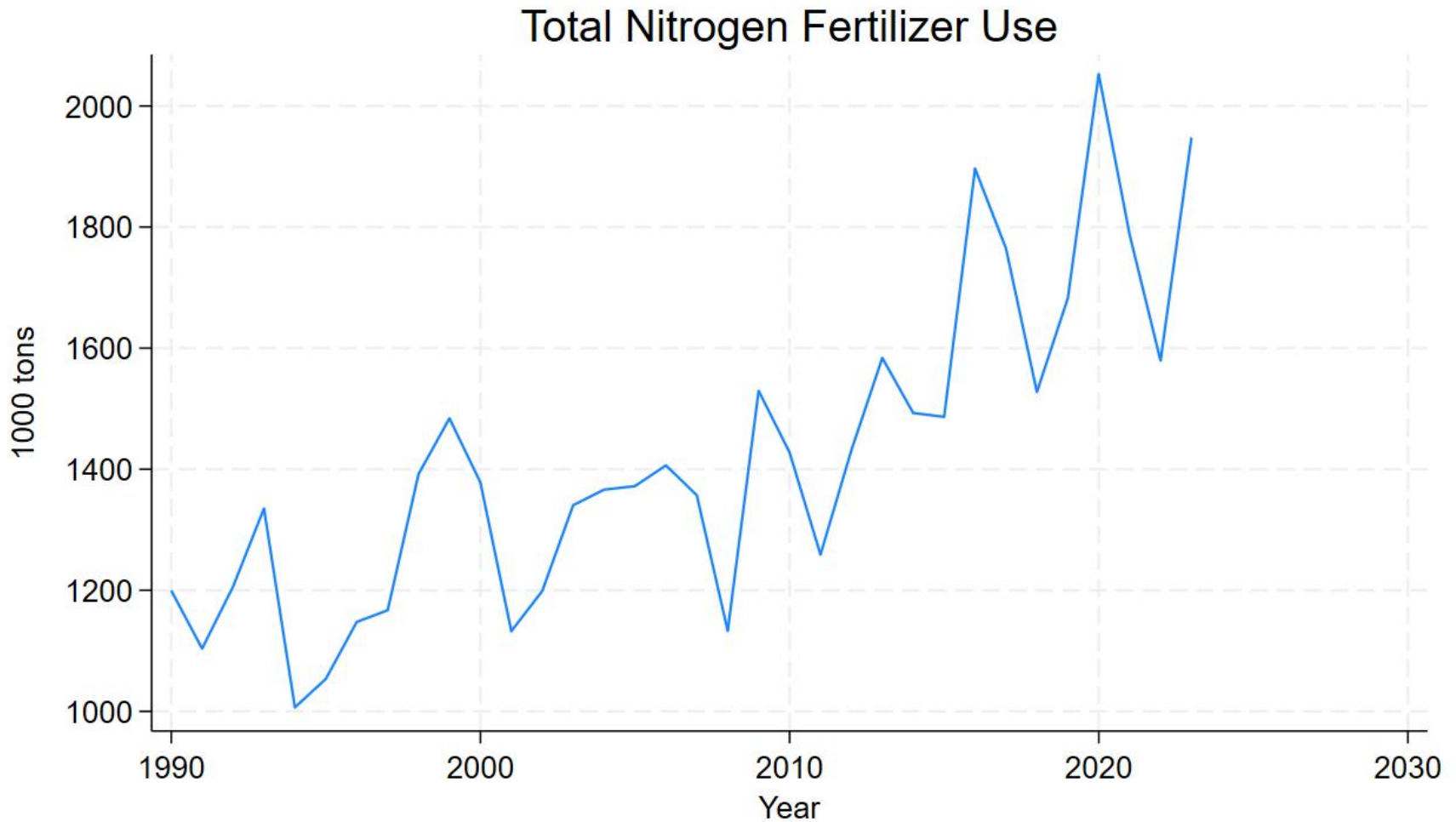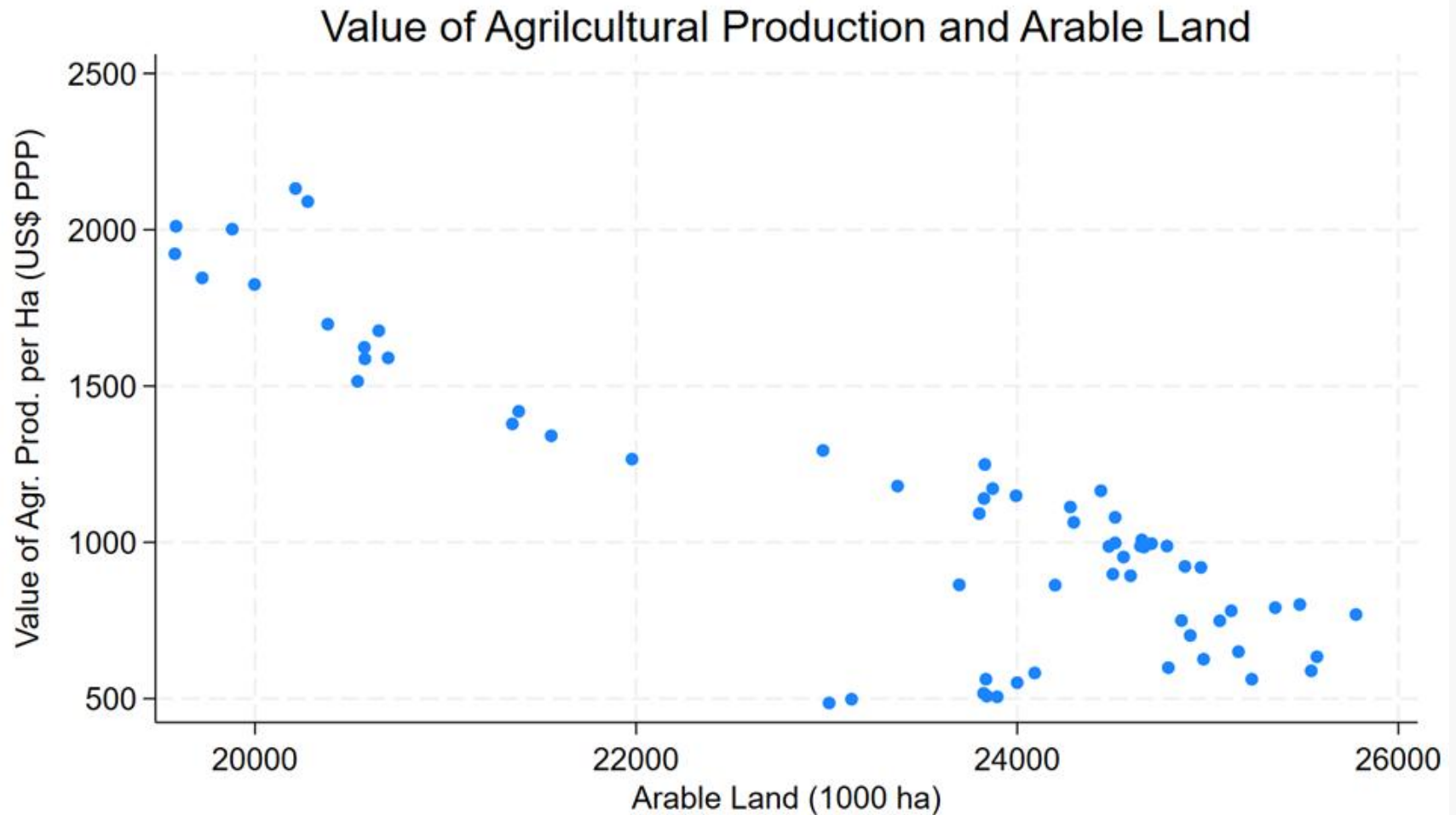
Regression Analysis

- **Results**

- Farmers in general purchase their input with an arrangement to pay at the harvest date.

- Hence, when there is a negative production shock to their agricultural production, farmers will face difficulties paying their debt and obtain production inputs the following year.

- For that reason, it is very curial for farmers to access credit to continue agricultural production and enhance their resilience towards negative economic shocks.
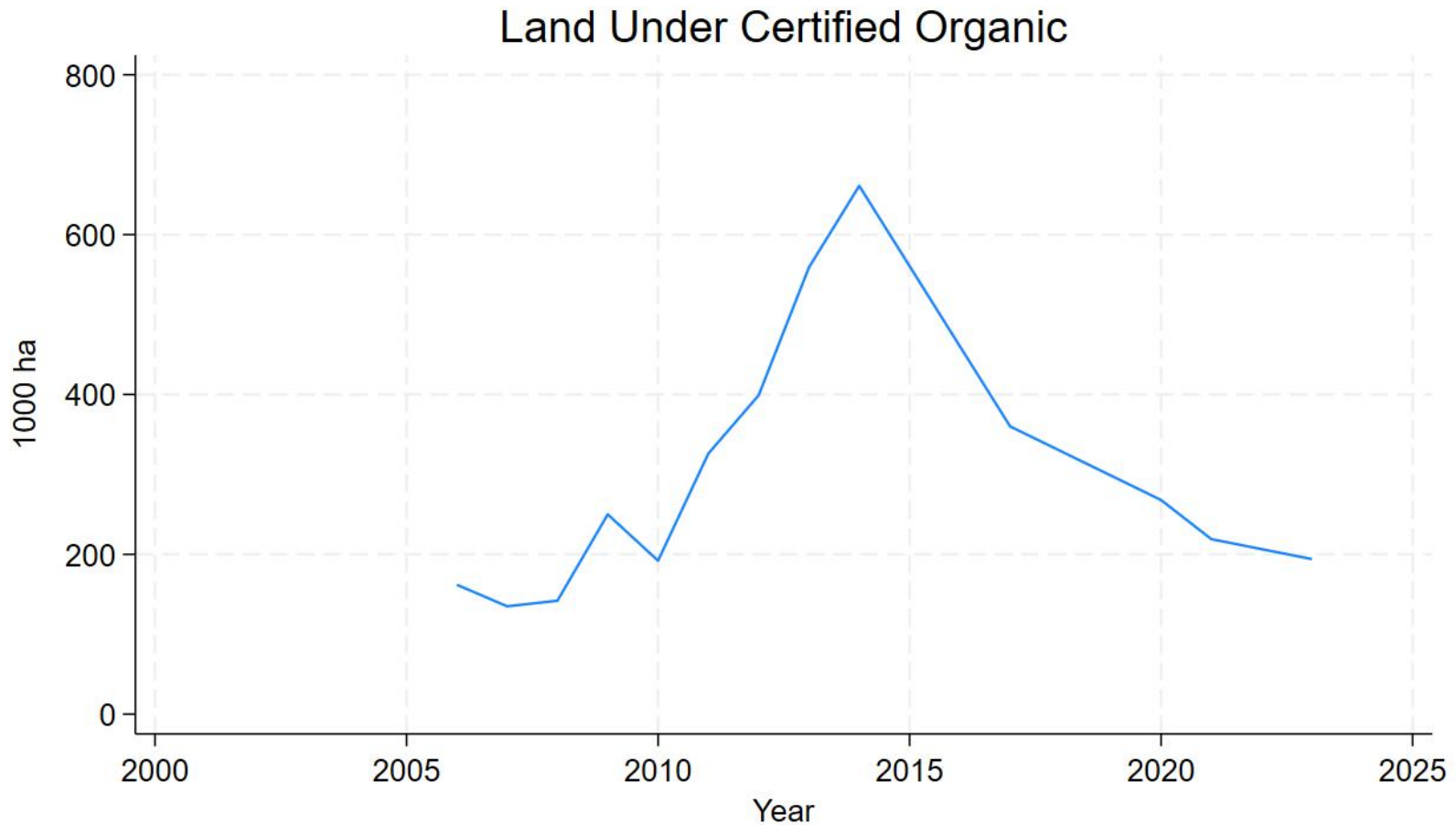
Regression Analysis

- **Policy Implications**

- Farmers' access to credit with deferred repayments with low interest rate is important for increasing the resilience of farmers and continuation of agricultural production especially for family farmers and small-scale producers.

- Promoting agricultural insurance through cost share for insurance premiums is an important policy option to promote farmers' access to alternative sources of funds in case negative production shocks occur.

- Promoting the enhancement of social capital is also important for farmers to help each other to promote the continuation of agricultural production. Farmers can be given financial support to work together and solve the problems together, which will eventually support their resilience towards negative economic events.

Regression Analysis

- **Policy Implications**

- As the use of idle land to agricultural production is expected to increase, instead of causing farmers to have farmland in difference locations, separated farmland locations should be gathered as much as possible.

- Alternative institutional arrangements can also be made, such as land rental by the neighbors or share cropping to make sure farmers have access to farmland adjacent to each other.

- There can be an overuse of nitrogen fertilizer per hectare in Türkiye. This can lead to economic losses and environmental pollution.

- To avoid this, precision agricultural (i.e. using fertilizer based on crop needs) technologies should be promoted and use of soil test to better match the amount of fertilizer used with crop needs.

Resilience: Türkiye
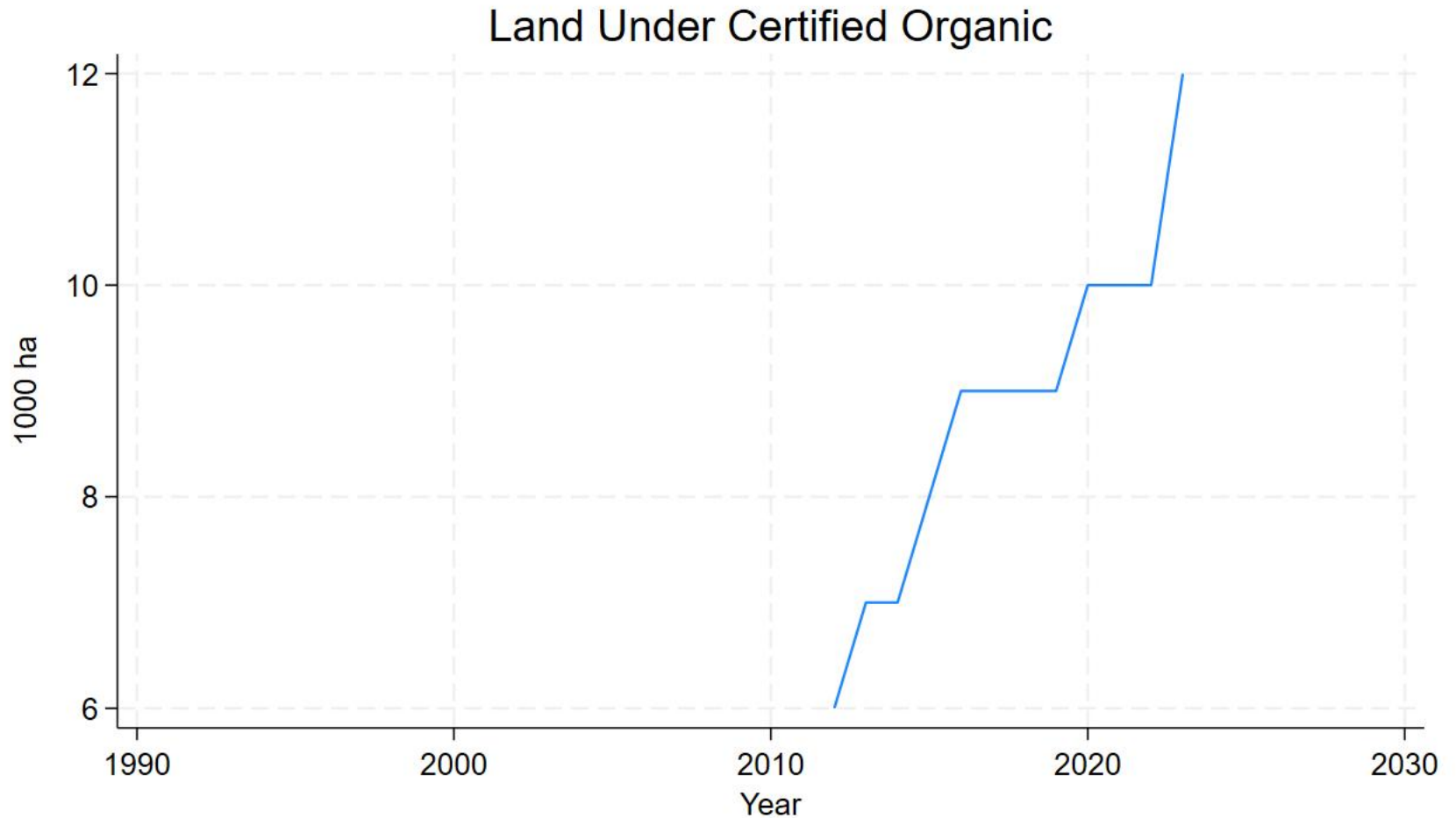

Land Under Certified Organic
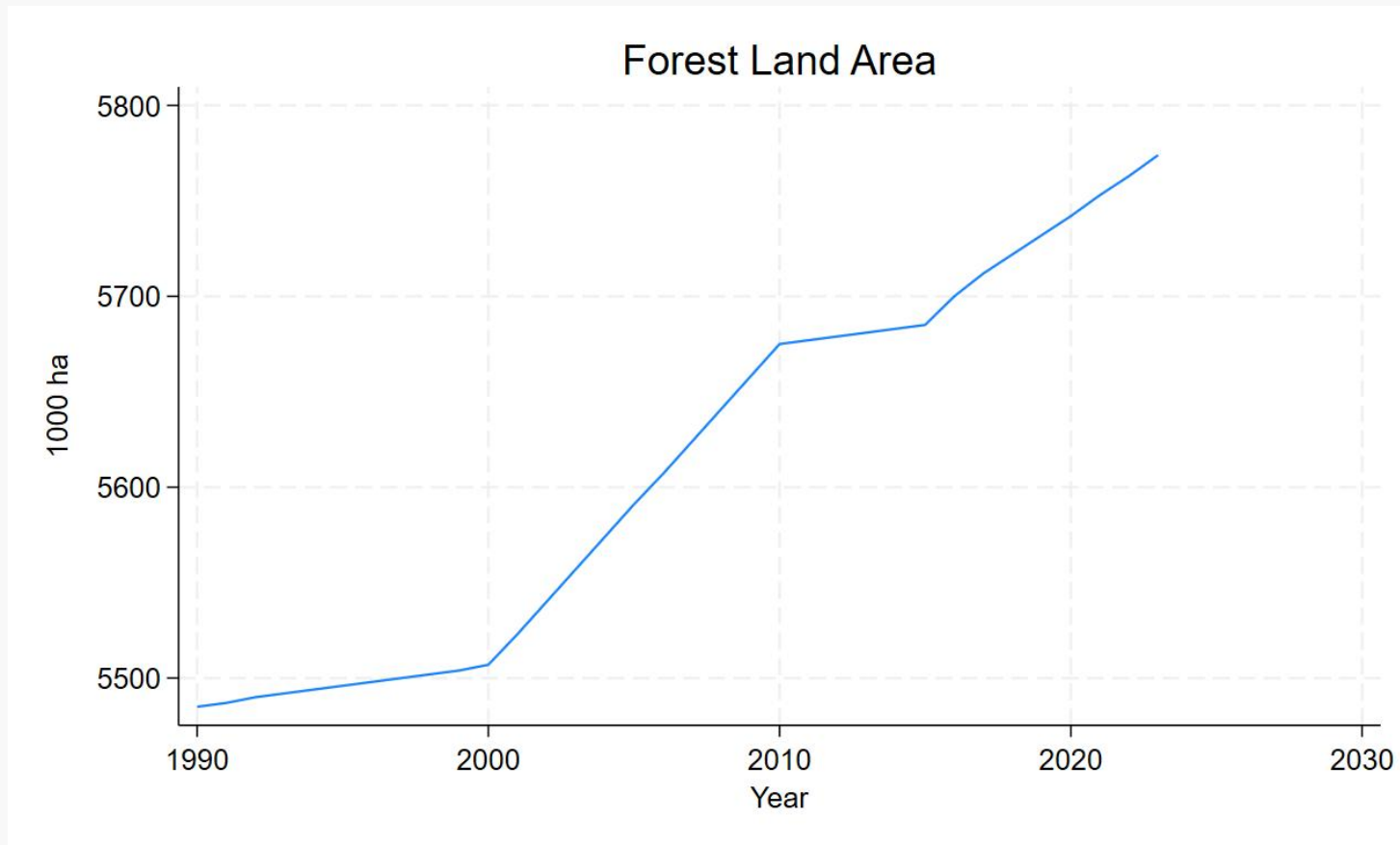
Regression Analysis

- **Policy Implications**

- Organic production enhances resilience of farmers both to climate related shocks and price shocks to fertilizers and other chemical input. Hence, it is important to increase organic production to enhance the resilience of farmers.

- With economic slowdowns and lack of trust to certification processes can be potential reasons from consumers' side for a decline in demand.

- On the other hand, since organic yields are lower than conventionally grown crops, farmers might find organic production not profitable over time.

- Turkish government has financial support programs (i.e. for three years) to promote organic production. These programs should be multi-year programs to promote continuous organic production.

- Support programs in terms of direct marketing and establishing a marketing cooperative and creating a brand could be potential policies to support farmers to grow crops organically.
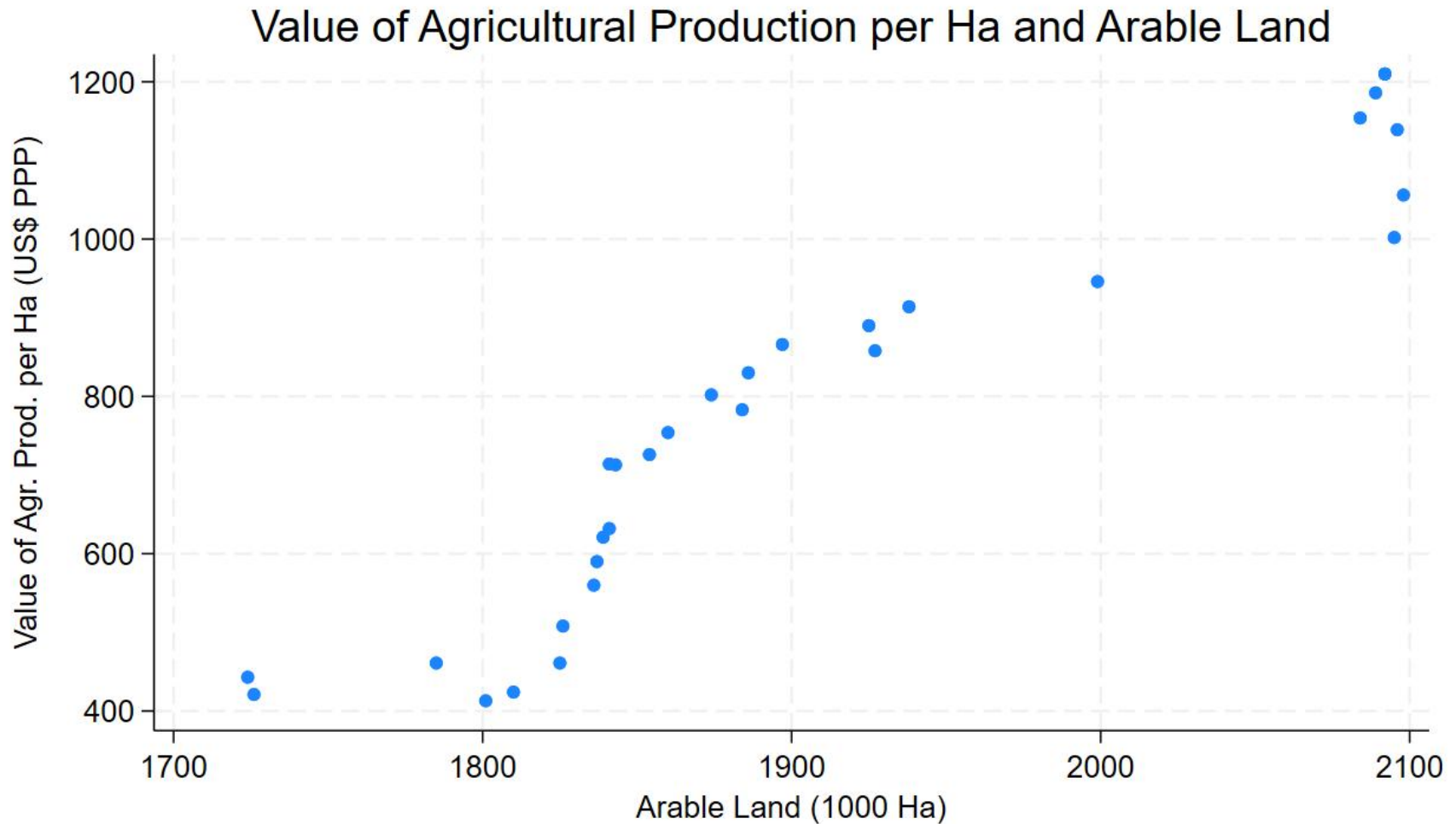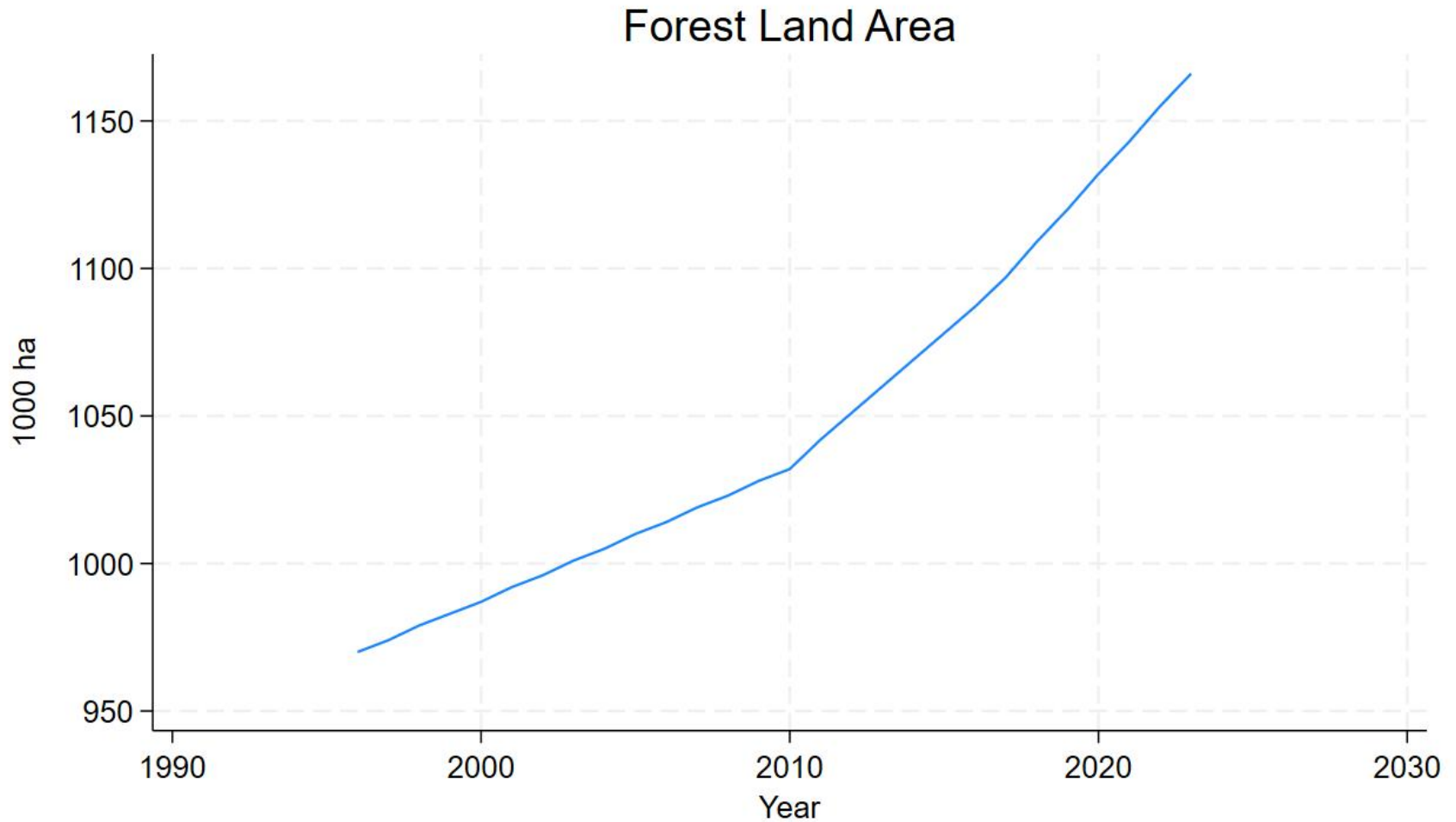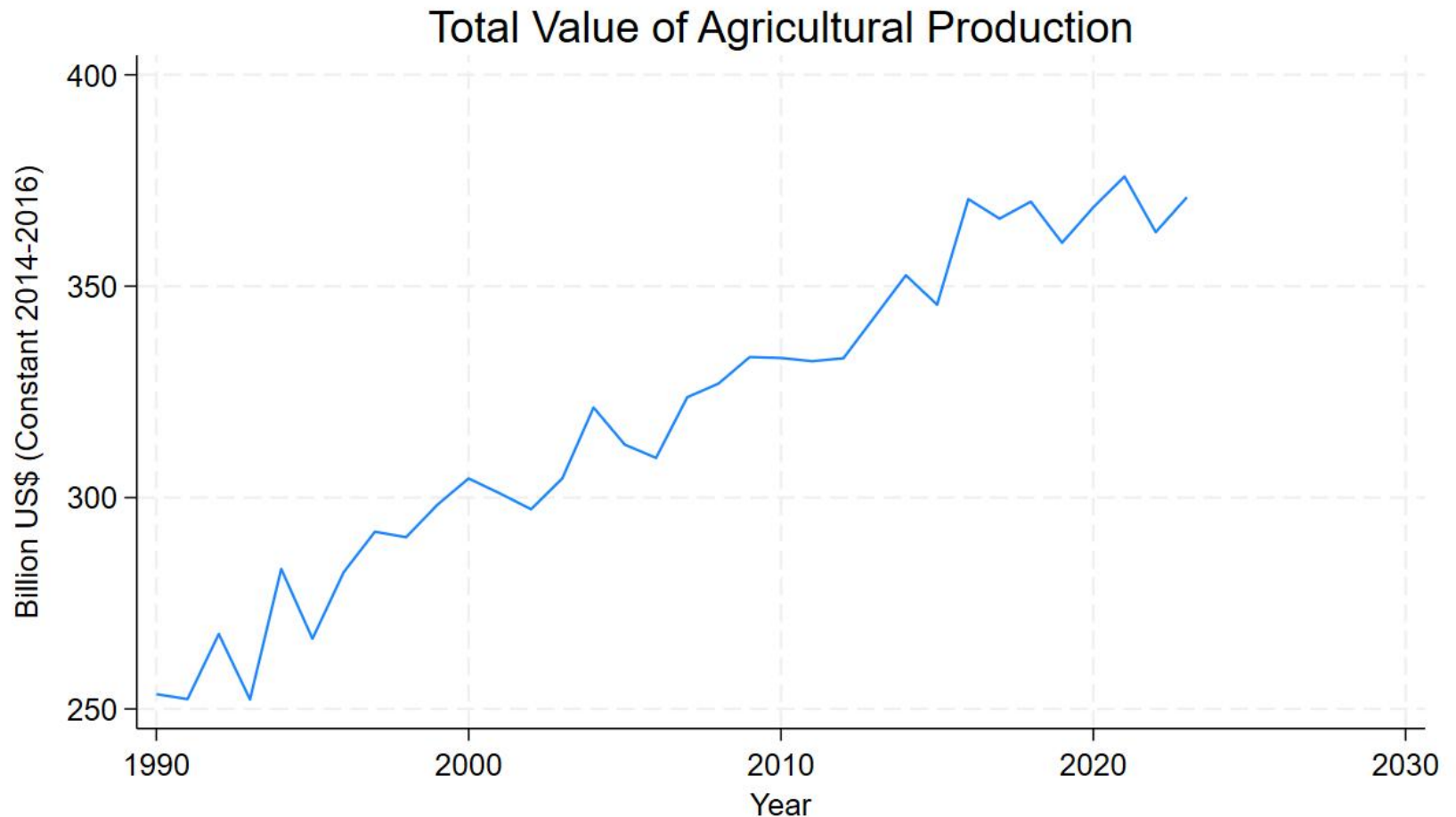
Key Lessons: Morocco

Land Under Certified Organic

Key Lessons: Morocco

Key Lessons: Azerbaijan

Value of Agricultural Production per Ha and Arable Land

Key Lessons: Azerbaijan

Forest Land Area

Resilience: United States

Total Value of Agricultural Production

Resilience: United States

Change in Total Value of Agricultural Production

Resilience: United States

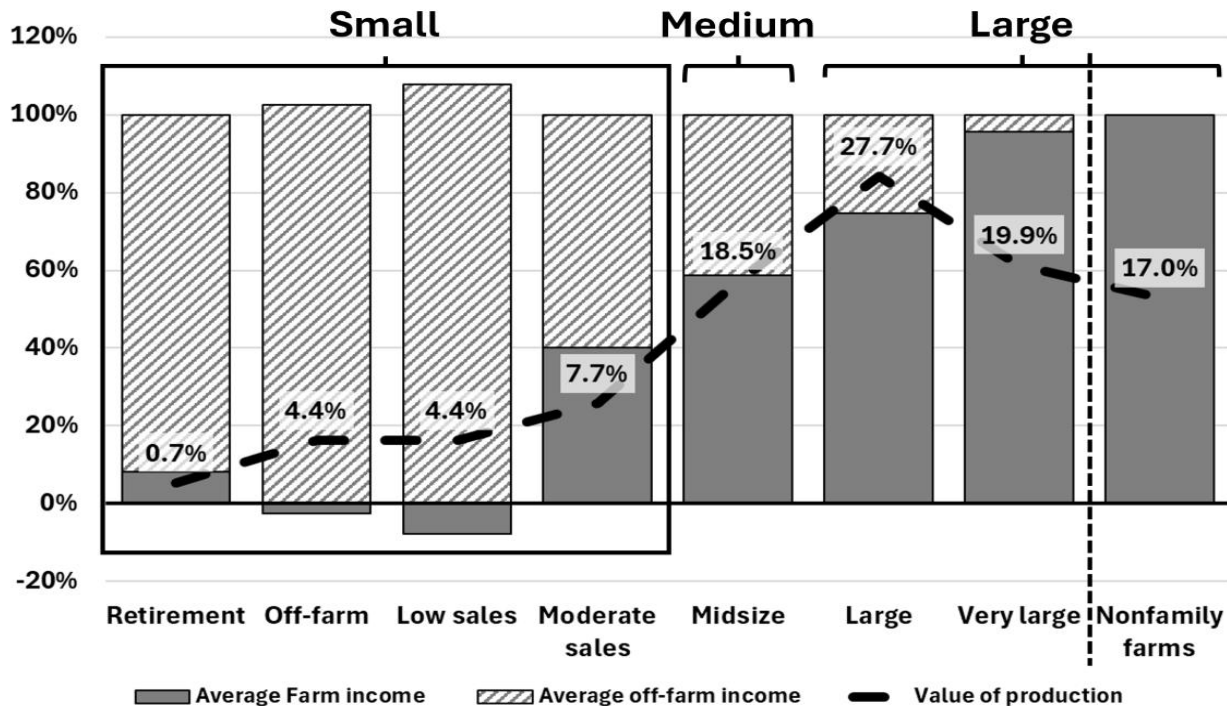Value of Agricultural Production per Ha and Capital Formation in Agr.
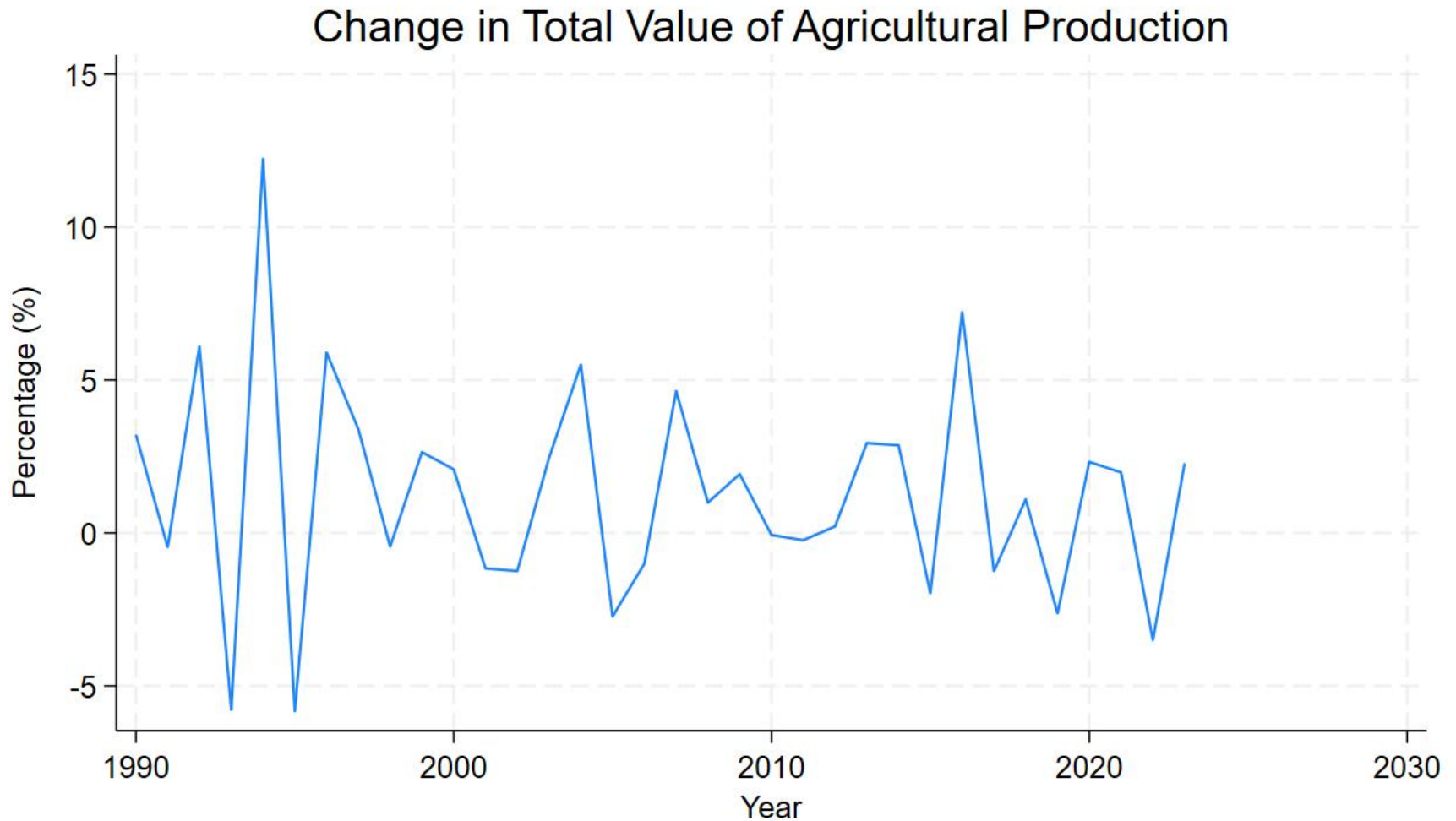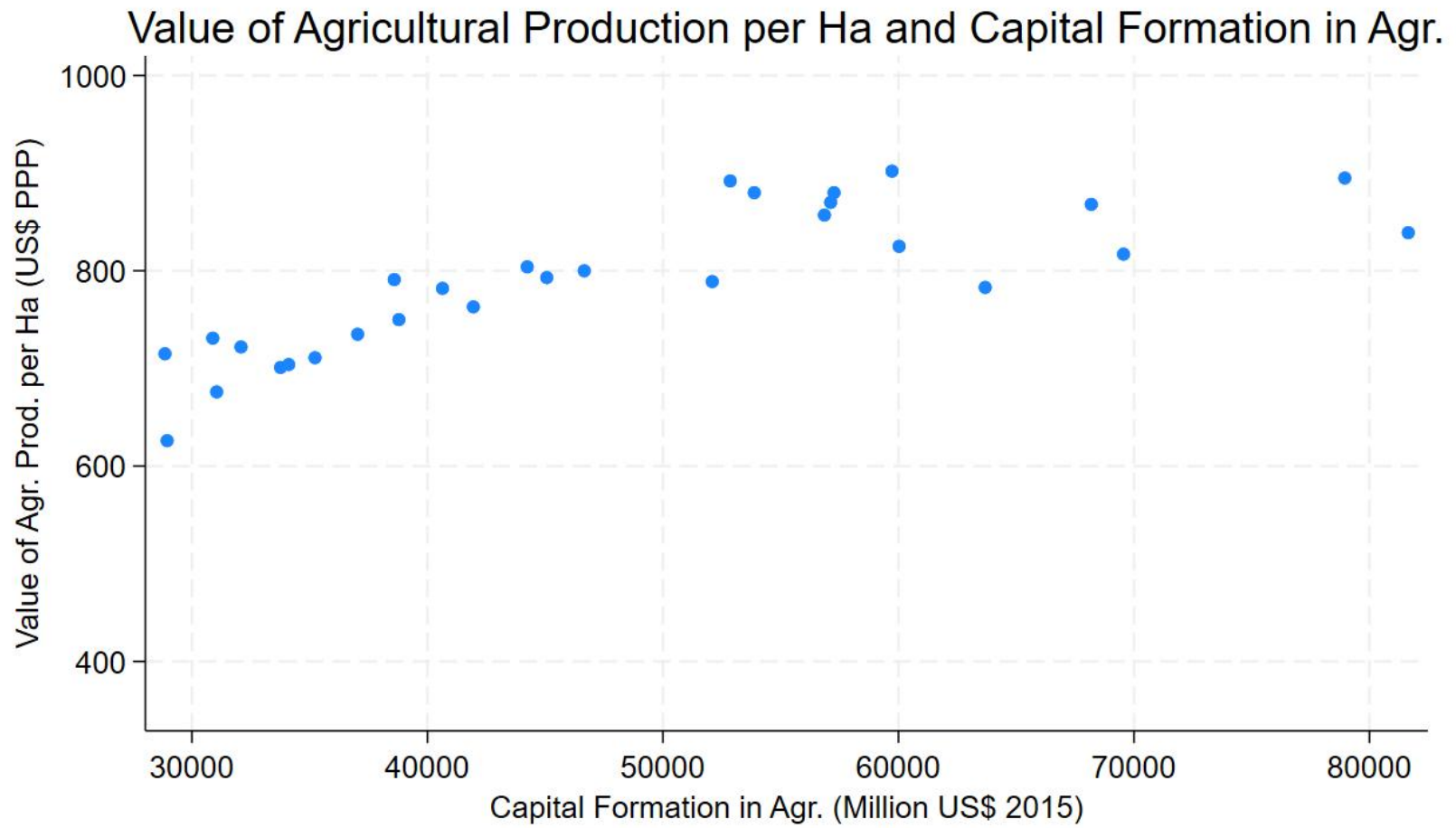
Regression Analysis: United States

Dept. Variable: Change in Value of Total Agr. Production for the United States

Variable	Coeff.	Std. Err.	t-Stat	p-Value
Δ Credit	0.1124	0.3343	0.34	0.740
Δ Capital	0.1464	0.7167	0.20	0.840
Δ Cattle	0.0005	0.0018	0.30	0.766
Δ ArableLand	-0.0001	0.0018	-0.08	0.939
Constant	4.0777	2.7319	1.49	0.150
N	26			
R^2	0.008			
F(4,21)	0.05			
p-Value	0.995			

Resilience: United States

Share of Farm and Off-farm Income by Farm Type

Resilience: United States

- Off-farm income

- Entrepreneurship: Farmers as businessman

- Direct marketing/farm brands

- Farmers markets: Government support to establish

- University Extension: Value-added Centers

- New technology adoption multi-year government support programs

- Agricultural insurance

Conclusion

- Increasing the resilience of family farmers and small-scale producers require policies at different levels;

    – Farm level (e.g. creating cost share programs for farmers to adopt new technologies)

    – Regional (e.g. generating off-farm income opportunities)

    – National level (e.g. having universities involved in agricultural extension)

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Thank You!

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