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# Municipal-Level Risk Differentiation as a Tool for Improving Financial Sustainability of Public-Private Agricultural Insurance Schemes: Evidence from Georgia

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**Research Article**

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# Municipal-Level Risk Differentiation as a Tool for Improving Financial Sustainability of Public-Private Agricultural Insurance Schemes: Evidence from Georgia

**Abstract:**

Georgia's public-private agricultural insurance system faces significant challenges, including low farmer awareness, prevalence of small farms, and spatial heterogeneity of climate risks. This study aims to develop a municipal-level, risk-based premium model and assess its impact on the financial sustainability of agricultural insurance. The methodology is based on official statistics from 2014–2024, data from insurance companies, and international references, incorporating historical loss analysis, calculation of municipal risk coefficients, and formulation of net and gross premium rates. The results indicate that risk-adjusted premiums differ substantially from uniform rates, providing stronger financial buffers in high-risk regions and reducing the net loss ratio. Empirical analysis confirms that municipal risk coefficients explain the majority of observed losses. The study demonstrates that a municipal risk-based approach improves the financial resilience of the insurance system, optimizes subsidy allocation, and enhances farmer participation. These findings offer evidence-based guidance for designing sustainable and efficient agricultural insurance schemes in Georgia.

**Keywords:** agricultural insurance; risk-based premiums; municipalities; Georgia; financial sustainability; loss ratio; subsidized program.

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**Author contribution statement**

The study was carried out under the scientific supervision of Aleksandr Sichinava.

The research concept and methodological framework were developed by Aleksandr Sichinava, Archil Tsertsvadze, and Shorena Jadugishvili.

Data collection and processing, econometric and mathematical analyses, calculation of municipal risk coefficients, and modeling were performed by Shorena Jadugishvili.

Aleksandr Sichinava, Archil Tsertsvadze, and Shorena Jadugishvili contributed equally to the interpretation of results and to the formulation of conclusions and recommendations.

All authors have read and approved the final manuscript.

**Introduction:**

Georgia has a long-standing agrarian tradition, with centuries of experience and rich cultural traditions in agriculture. The country's geographical location, diverse climatic conditions, and variety of crops create a unique context for farming activities, while also increasing the heterogeneity of climatic and economic risks. Agriculture plays a significant role in Georgia's economy and social structure, providing regional employment, supporting local production, reducing dependence on imports, and

creating export opportunities for wine, nuts, honey, and other traditional products [1–4].

Agricultural insurance is a key financial mechanism that protects farmers against climate and economic risks affecting crops, livestock, and other agricultural assets. Since 2014, Georgia's agricultural insurance system has operated under a public-private partnership (PPP) framework, providing premium subsidies and aiming to stabilize farmers' incomes [5–7].

Geographical variation in climate risks is particularly evident in the Kakheti region, where hail events frequently damage vineyards. Such heterogeneity presents a significant challenge to the financial sustainability of agricultural insurance, as uniform premiums fail to reflect differing municipal risk levels [8].

This study aims to present a municipal-level, risk-based premium model grounded in historical loss ratios. The research provides a basis for municipal risk classification, incentivizes farmer engagement, and strengthens the financial sustainability of the agricultural insurance system.

**Literature Review**

Agricultural insurance systems worldwide can be classified into three main models:

1. **Fully state-controlled system** – The government provides a unified insurance product, ensuring stability but incurring high fiscal costs and offering low-quality services due to a monopolistic environment (e.g., Canada, the Philippines, Indonesia, Panama) [9].
2. **Public-private partnership (PPP)** – Collaboration between the state and the private sector enables portfolio diversification, moderate fiscal expenditures, and stability (e.g., USA, Spain, Turkey, Italy, Brazil) [9–10].
3. **Fully market-based system** – Insurance is entirely managed by the private sector, driven by commercial criteria, with limited risk diversification (e.g., Australia, Germany, the Netherlands, Austria, Argentina) [9].

Regional experience indicates that the PPP model has been effective in Turkey, Azerbaijan, and Armenia, as it allows premium subsidies, diverse product offerings, and joint financing of catastrophic risks [11–13].

In Georgia, the state agricultural insurance program, operational since 2014, aims to support small and medium-sized farms through premium subsidy mechanisms. Studies confirm that the program increases insurance accessibility, stabilizes farmers' incomes, and promotes agribusiness development [14].

Notably, statistical data from the Kakheti and Shida Kartli regions demonstrate geographic heterogeneity of risk: vineyards and other crops are affected by hail events with varying intensity, directly impacting insured plots and farmers' interest in insurance. This study represents the first attempt in Georgia to analyze **municipal-level, risk-based premiums**, providing a foundation for improved subsidy planning and enhancing the financial sustainability of the agricultural insurance system [15–16].

According to the Georgian Insurers Association, agricultural insurance has been operating in Georgia for over 20 years, but the sector is still at an early stage of development. This situation is due to low insurance culture and risk management capacity, limited farmers' knowledge, and insufficient statistical data, which complicates comprehensive risk assessment.

Before the introduction of the program, agricultural insurance mainly covered viticulture and certain crops (wheat, maize, fruits), protecting against risks such as hail, storms, excessive rainfall, and fire. Later, livestock insurance products were introduced, indicating the sector's gradual expansion [17].

Since 2014, the Georgian government has implemented an agricultural insurance program. In September 2014, under the initiative of the Ministry of Environmental Protection and Agriculture of Georgia, a pilot agricultural insurance program was launched, which is still in operation today. The program subsidizes a significant portion of insurance premiums, providing farmers with additional incentives to participate and protecting their activities from climate-related risks. The coverage includes hail as well as other key hazards such as storms, excessive rainfall, and autumn frost (for citrus crops only) [18]. Based on annual results, the program has been regularly updated, refined, and improved [19–20].

**Methodology**

This study is based on a quantitative analysis using historical loss data from specific municipalities in Georgia. The main steps of the research are as follows:

**Data Sources:**

State Agricultural Insurance Program reports (2014–2024)

National Statistics: crop yields, climate events

Insurance company portfolios

Statistics from the Georgian Insurers Association.

**Data Types:**

- Crop losses, insured plot areas, insurance premiums, and climate risk categories (hail, flood, windstorm).

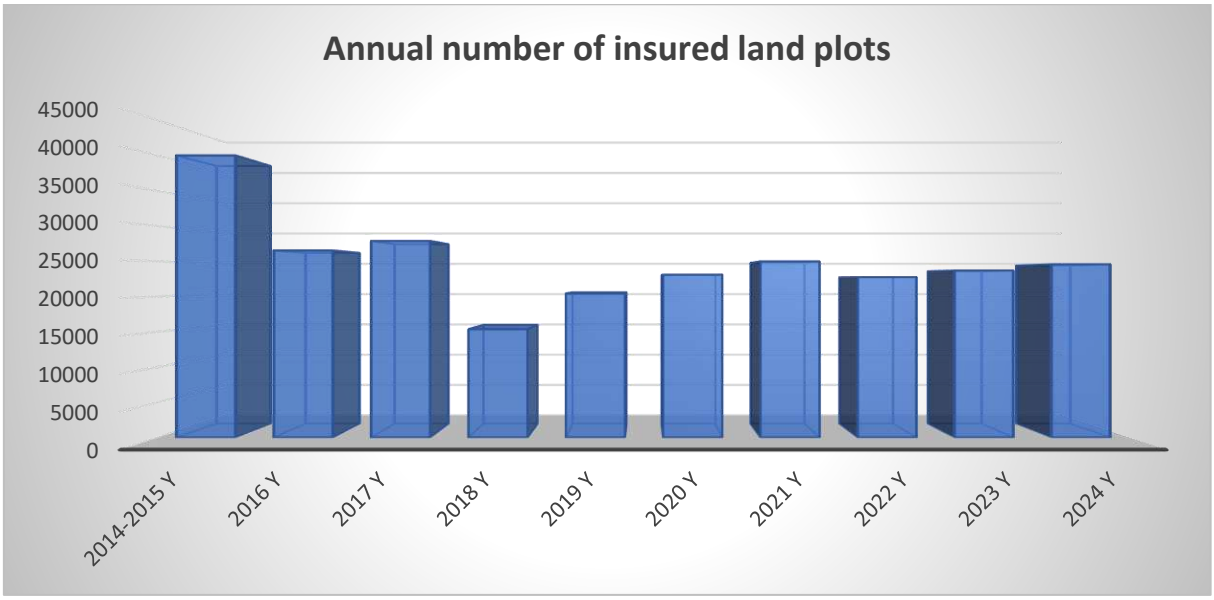
**Program Analysis:**

According to the Georgian Association of Insurance Companies [21], under the initial agricultural insurance program:

- In the 2014–2015 season, **state co-financing** of insurance premiums covered 92–95%, depending on the insured crops.
- In 2015–2016, co-financing ranged **40–60%**, depending on the crops.
- In 2016–2017, co-financing ranged **50–80%**, depending on crop type and whether the land was registered.
- From 2018 onward, co-financing applies **only to registered plots** and is set at **70% for all crops**.

Changes in program conditions over the years influenced the number of insured plots, reflecting adjustments in coverage, subsidy levels, and farmers' participation.

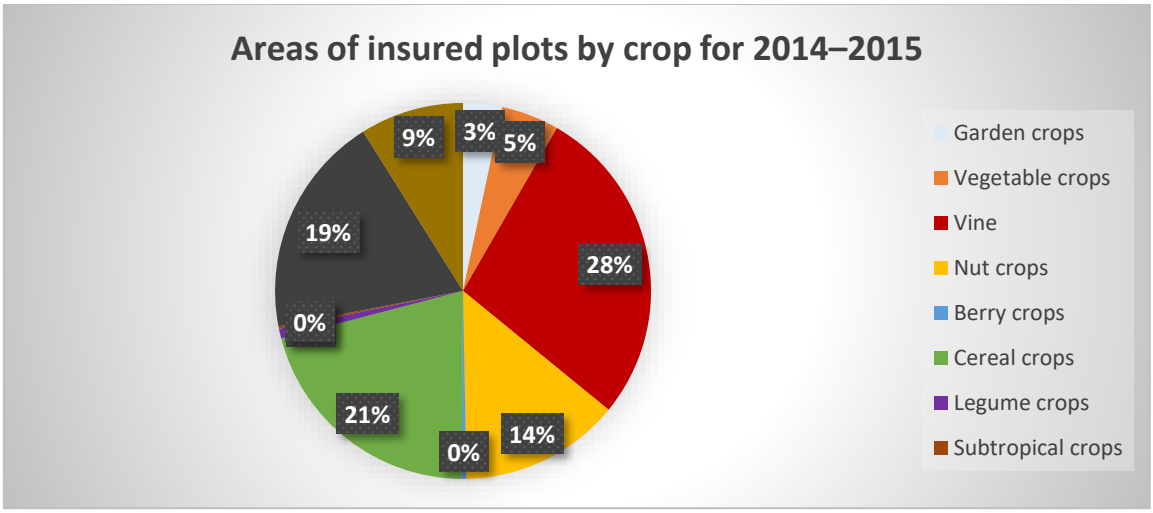
Fig 1.




Source: Georgian Insurance Association (GIA), authors' own calculations.

Due to Georgia's geographical location and complex terrain, various hydrometeorological hazards frequently occur, with hail being particularly significant. The Kakheti region stands out for its high hail frequency, which often damages vineyards. Within the framework of the implemented agricultural insurance program, farmers were able to maintain financial stability. Notably, vineyards accounted for 28% of all insured crops.

Fig 2.




Source: Georgian Insurance Association (GIA), authors' own calculations.

As noted, hail is one of the most characteristic natural hazards for the Kakheti region. The region's specific geographical location and climatic conditions favor the formation and intensity of hail events. However, hail does not occur with uniform intensity across

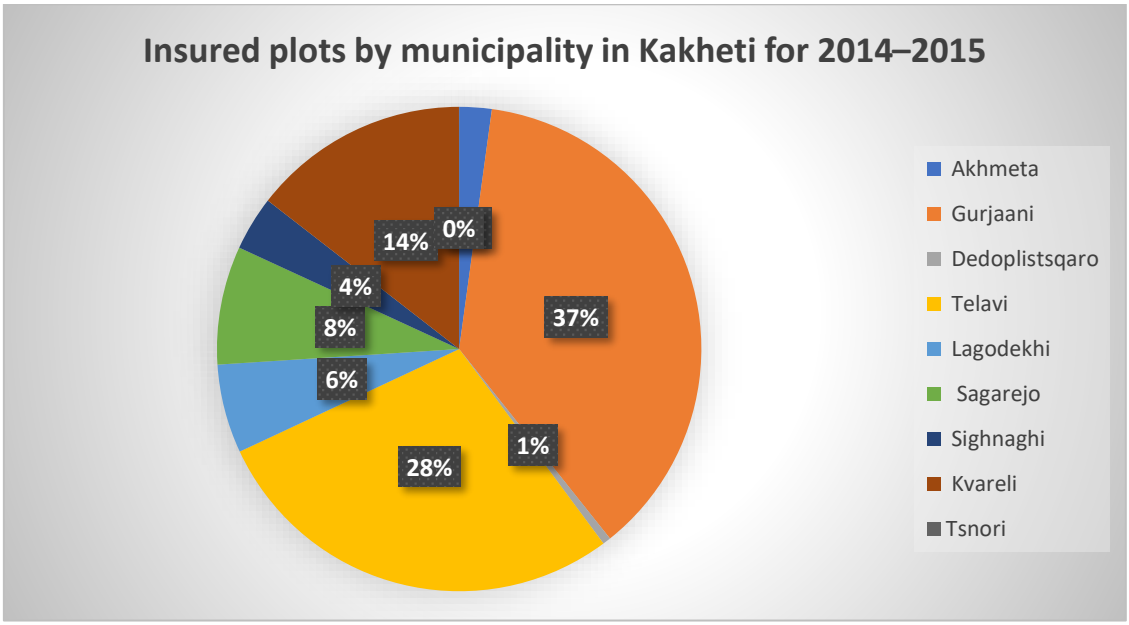
all municipalities – there are distinct spatial differences. Some municipalities are heavily affected, almost annually, while in others such events are relatively rare. This variation directly influences the level of interest in agricultural insurance across municipalities.

In the eastern and central parts of Kakheti, particularly Telavi, Gurjaani, and Akhmeta municipalities, hail events are frequent and have caused significant damage to agricultural crops over many years. Conversely, in Lagodekhi, Signagi, Dedoplistskaro, and Sagarejo, hail occurrences are relatively infrequent. As for Tsnori, there was no hail at all during 2014–2024.

Such spatial heterogeneity of hail risk determines the specific dynamics of agricultural insurance uptake in Kakheti. Analysis of insurance companies' portfolios and farmers' behavior shows that the highest interest in insurance is observed in municipalities with a history of frequent hail-related crop losses. Farmers who experienced losses in previous years are more likely to take preventive measures and purchase insurance policies, while in lower-risk areas, insurance adoption remains limited.

In 2014–2015, out of 8,733 insured plots in Kakheti, up to 80% were concentrated in three municipalities: 37% in Gurjaani, 28% in Telavi, and 14% in Kvareli, while the remaining 20% were distributed across six other municipalities (Akhmeta 2%, Dedoplistskaro 1%, Lagodekhi 6%, Sagarejo 8%, Signagi 4%, Tsnori 0.01%).

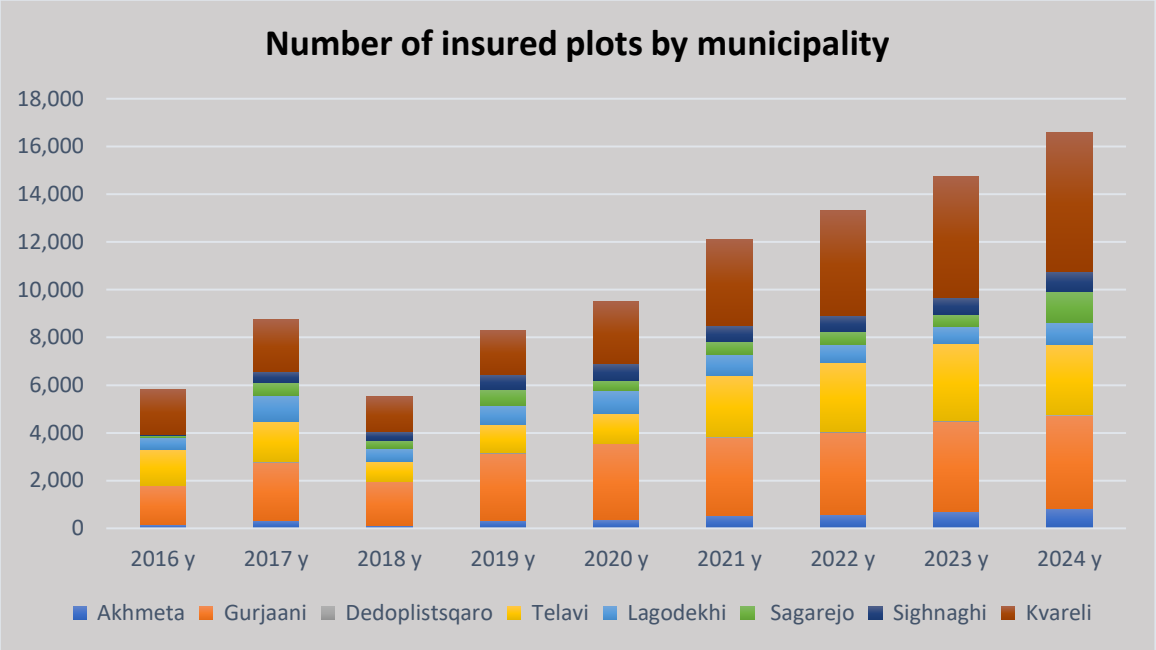
Fig 3.




Source: Georgian Insurance Association (GIA), authors' own calculations.

A similar pattern continued in subsequent years up to 2024. In Kakheti, up to 80% of insured plots were consistently concentrated in three municipalities: Gurjaani, Telavi, and Kvareli.

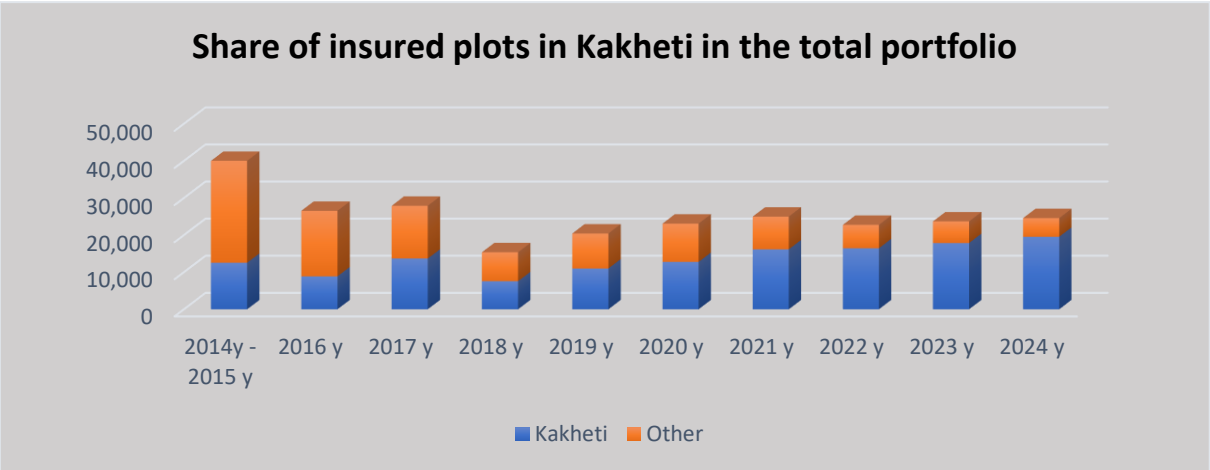
Fig 4.




Source: Georgian Insurance Association (GIA), authors' own calculations.

Unlike other regions, under the agricultural insurance program, the number of insured plots in Kakheti has increased year by year. By 2024, up to 80% of all insured plots in Georgia were concentrated in Kakheti. The annual dynamics of insured plots are presented as follows.

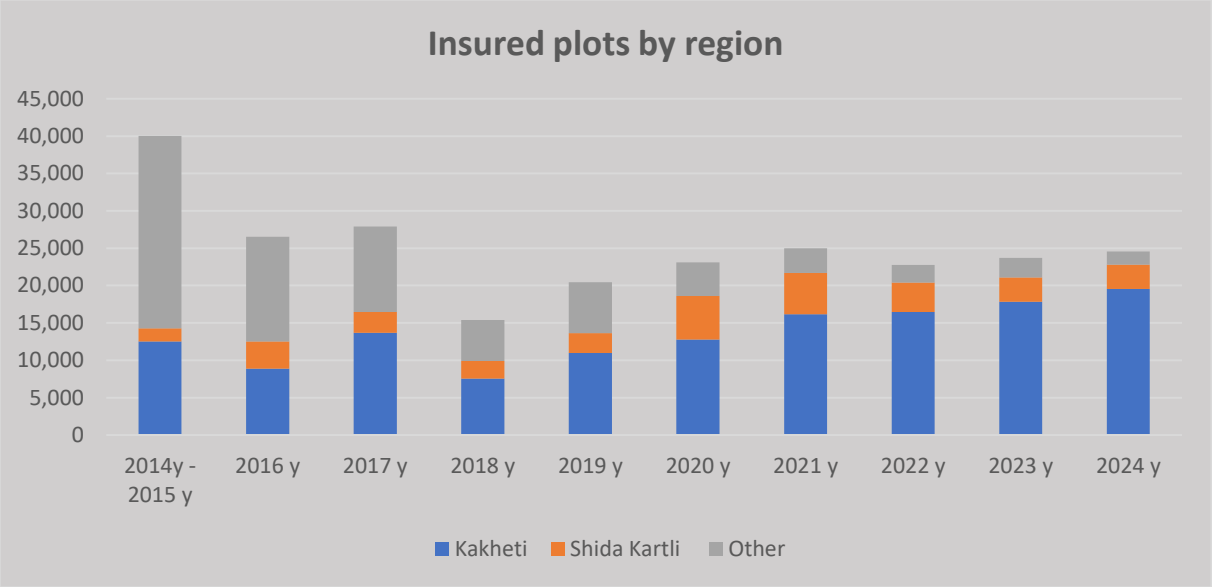
Fig 5.




Source: Georgian Insurance Association (GIA), authors' own calculations.

Over the years, following Kakheti, the region of Shida Kartli holds the second largest share of insured plots. By 2024, 13% of the total insured portfolio was located in Shida Kartli.

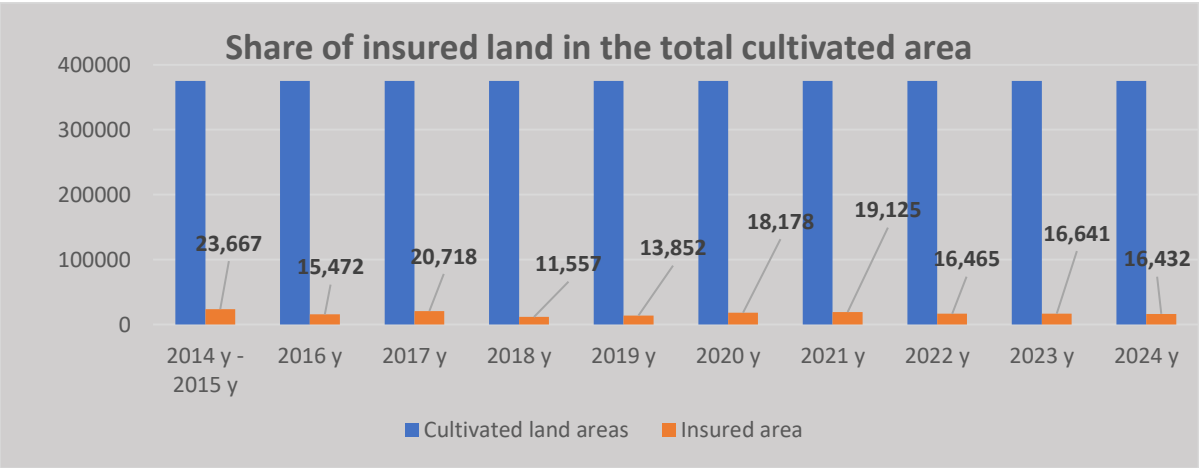
Fig 6.




Source: Georgian Insurance Association (GIA), authors' own calculations.

According to the 2014 Agricultural Census by the National Statistics Office of Georgia, the total arable land area in Georgia comprises 110,000 ha of perennial orchards and 265,000 ha of cultivated land [22]. On average, insured land accounts for only 5% of the total arable land. These data indicate that the share of insured agricultural land relative to the total cultivated area remains limited, with insurance coverage primarily concentrated in two regions (Kakheti and Shida Kartli), while participation in other regions is significantly lower.

Fig 7.

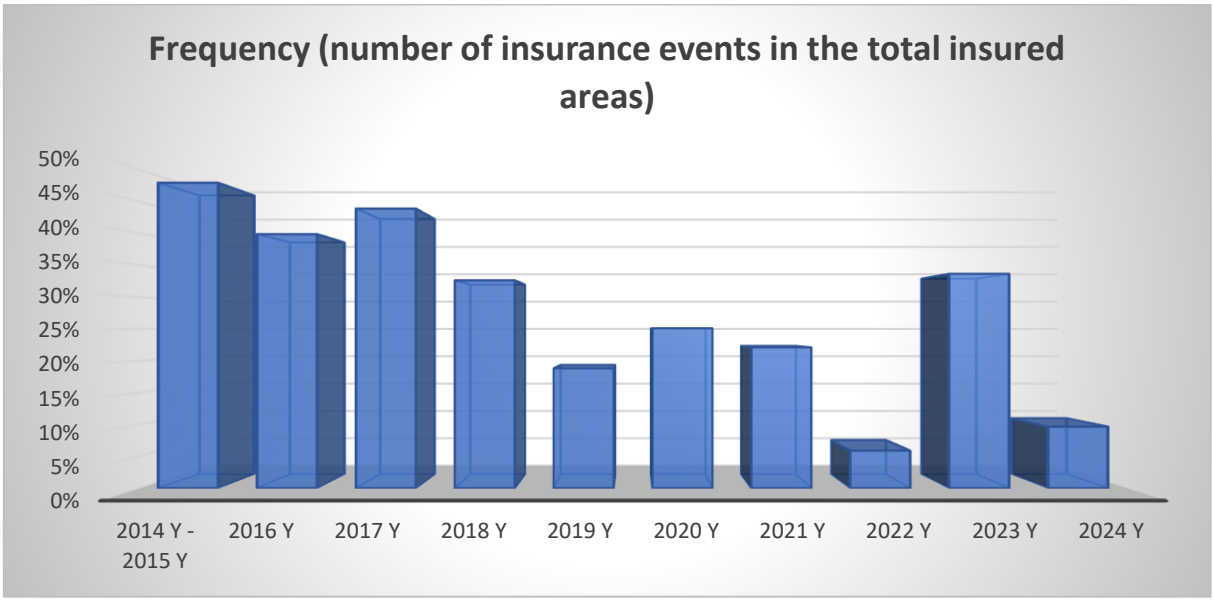


Source: Georgian Insurance Association (GIA), authors' own calculations.

Low insurance coverage is not only a statistical indicator but also a signal of systemic risk, affecting both individual farmers and the overall resilience of the agricultural sector. When the share of insured farms is small, losses are borne by a limited group, increasing financial instability and reducing the sustainability of the insurance fund. Consequently, low coverage complicates the geographic and sectoral distribution of risks, heightening adverse selection and weakening the financial sustainability of the program.

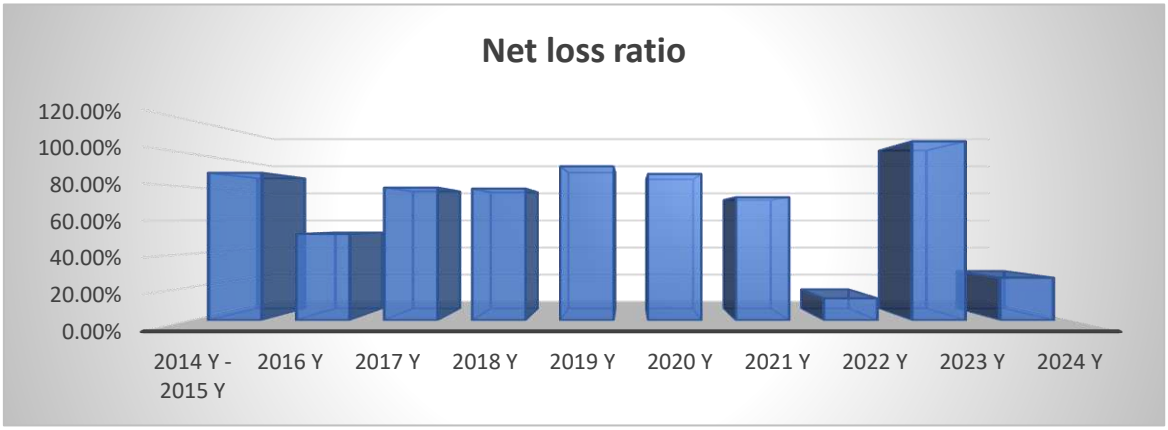
It is also important to consider information on compensated losses. Over the ten-year period, collected premiums exceeded USD 50 million, while indemnities paid to farmers surpassed USD 34 million. The ten-year average net loss ratio was 68%. Annual frequency and net loss ratios over the years are presented in Figure 8.

Fig 8.




Source: Georgian Insurance Association (GIA), authors' own calculations.

Fig 9.




Source: Georgian Insurance Association (GIA), authors' own calculations.

**Mathematical Model**

**Objective:** To determine risk-based agricultural insurance premiums at the municipal level.

**Methodology:** Regression models and Geographic Information System (GIS) spatial analysis were applied to evaluate geographical heterogeneity and develop risk-adjusted insurance premiums.

Currently, agricultural insurance premiums in Georgia are determined without explicit geographical risk differentiation, despite significant spatial variability in climate-related losses. This study develops a municipal-level, risk-based premium zoning model using historical loss experience. Municipalities are classified into risk categories based on multi-year loss ratio analysis, and corresponding premium adjustment coefficients are derived. The results highlight substantial discrepancies between uniform and risk-adjusted premiums, revealing systematic underpricing and overpricing across regions.

The proposed framework provides an evidence-based foundation for enhancing the financial sustainability and risk sensitivity of agricultural insurance schemes in Georgia. Considering regional and crop-specific factors is essential for accurate, risk-adjusted premium allocation, which improves the efficiency and resilience of the agricultural insurance system.

The analysis focuses on aggregated agricultural insurance data from municipalities in the Kakheti region, which constitutes a significant portion of Georgia's agricultural insurance portfolio. Only grapevine cultivation is considered, as it represents the largest share of the insured portfolio.

**Contributions of this study:**

1. Introduces, for the first time in Georgia, a municipal-level, loss-ratio-based premium zoning model for agricultural insurance.
2. Provides empirical evidence on the effectiveness of geographically differentiated premiums, useful for program design and subsidy allocation.
3. Demonstrates the limited effectiveness of uniform premiums in regions with heterogeneous climate-related risks.

Table 1.

| **Region** | Municipalities | Insured premium (GEL) | Gross Loss (GEL) | Net Loss (GEL) | Sum insured (GEL) |
|---|---|---|---|---|---|
| Kakheti | Sighnaghi | 3,185,950 | 1,125,445 | 1,769,830 | 35,072,397 |
| Kakheti | Kvareli | 24,338,905 | 19,558,118 | 29,394,336 | 253,640,512 |
| Kakheti | Telavi | 11,364,822 | 6,767,258 | 12,011,923 | 120,329,668 |
| Kakheti | Akhmeta | 2,445,801 | 1,441,024 | 2,114,077 | 26,387,438 |
| Kakheti | Lagodekhi | 2,524,100 | 1,720,469 | 2,605,267 | 28,023,817 |
| Kakheti | Gurjaani | 13,849,614 | 6,885,779 | 11,154,672 | 149,976,896 |
| Kakheti | Sagarejo | 2,957,937 | 614,803 | 1,005,433 | 32,969,288 |
| Kakheti | Dedoplistsqaro | 155,506 | 105,532 | 154,508 | 1,745,190 |
| Kakheti | Tsnori | 7,140 | 0 | 0 | 84,000 |

| | | | | | |
|---|---|---|---|---|---|
| | **Total** | **60,829,774** | **38,218,429** | **60,210,045** | **648,229,206** |

- **Total Net Loss (GEL)** = 60,210,045
- **Total Sum insured (GEL)** = 648,229,206

$$Net\ Rate_{avg} = \frac{Net\ loss}{\text{Sum insured}} = 9.29\%$$

The 9.3% value is defined as the baseline (aggregate) risk level and is normalized to a coefficient of 1.0.

The overall portfolio average loss ratio was calculated as follows:

$$LR_{avg} = \frac{\sum Net\ loss}{\sum Insured\ premium} = 98.98\%$$

This indicator represents the baseline risk level and is normalized to one (1.0).

Accordingly, the loss ratios for the municipalities are presented as follows:

$$LR_{mun} = \frac{Net\ loss}{Insured\ premium}$$

Our objective is to identify risks by municipality; therefore, we developed a risk coefficient that reflects the relative risk contribution of each municipality to the overall risk. We proceed to calculate the risk coefficients by municipality

$$K_{mun} = \frac{LR_{mun}}{LR_{avg}}$$

The indicated coefficient reflects the risk contribution of each municipality within the overall portfolio. The municipality of Tsnori was excluded from the calculations due to the absence of losses.

| Municipalities | $K_{mun}$ |
|---|---|
| Sighnaghi | 0.56 |
| Kvareli | 1.22 |
| Telavi | 1.07 |

| | |
|---|---|
| Akhmeta | 0.87 |
| Lagodekhi | 1.04 |
| Gurjaani | 0.81 |
| Sagarejo | 0.34 |
| Dedoplistsqaro | 1.00 |

In this study, we classified risk classes based on municipal boundaries.

| **Risk class / Risk category** | **$K_{mun}$** | **Municipalities** |
|---|---|---|
| **Low** | < 0.6 | Sighnaghi, Sagarejo |
| **Medium** | 0.6 – 1.05 | Akhmeta, Lagodekhi, Gurjaani, Dedoplistsqaro |
| **High** | 1.05 – 1.25 | Telavi, Kvareli |
| **Very high** | > 1.25 | — |
| **Exceptional** | 0 | Tsnori |

In this study, we developed the following formula to calculate the Net Rate by municipality:

$$Net\ Rate_i = Net\ Rate_{avg} \times K_{mun,i}$$

Considering that tariffs in low-risk regions should not be disproportionately low, management and other operational costs were taken into account. Consequently, the Net Rate includes a loading component to represent these additional expenses.

The Risk Charge Rate (RCR) represents an additional loading on the base Net Rate.

Formally:

$$Gross\ Rate_i = Net\ Rate_i \times (1 + Risk\ Charge\ Rate)$$

$$RCR = \gamma \times \frac{\sigma L}{\mu L}$$

Where:

- i Each municipality
- $\mu L$ – Average Net Loss
- $\sigma L$ - Standard deviation of net loss
- $\gamma$- Risk aversion parameter

Under the conservative approach, we set $\gamma$ = 0.25

$$RCR = 0.25 \times 9{,}652{,}450 / 6{,}690{,}005 = 0.36$$

In conclusion,

$$Gross\ Rate_i = Net\ Rate_i \times (1 + Risk\ Charge\ Rate)$$

The new gross rates, calculated using the formula, are as follows:

| Municipalities | New Gross Rate |
|---|---|
| Sighnaghi | 7.1% |
| Kvareli | 15.4% |
| Telavi | 13.5% |
| Akhmeta | 11.0% |
| Lagodekhi | 13.2% |
| Gurjaani | 10.3% |
| Sagarejo | 4.3% |
| Dedoplistsqaro | 12.7% |
| Tsnori | 4.3% |

| | |
|---|---|
| **Average** | **12.6%** |

### Second Stage of the Study

The objective of the second stage is to evaluate the extent to which the municipal risk coefficients derived in the first stage explain the observed net losses. This approach is based on the assumption that risk coefficients calculated from historical losses reflect the geographical heterogeneity of municipal risks and, therefore, should have explanatory power regarding current loss dynamics.

The empirical validation of this assumption is conducted using regression analysis, within which the following hypothesis is formulated:

### Research Hypothesis

The study hypothesizes that the municipal risk coefficients calculated in the first stage based on historical losses significantly explain the observed net losses across municipalities through a regression model.

Formally:

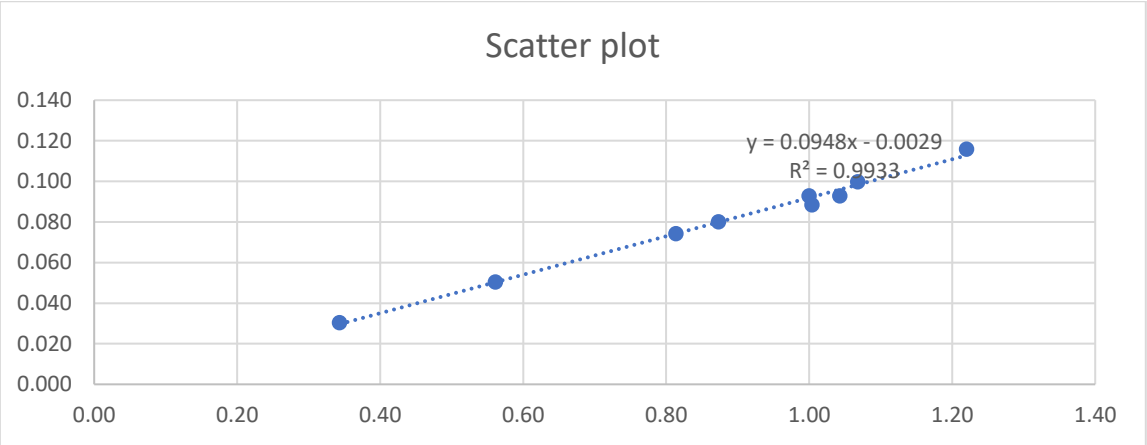
- $H_0$**:** There is no statistically significant relationship between municipal risk coefficients and net losses (the risk coefficient does not explain the losses).
- $H_1$**:** There is a statistically significant relationship between municipal risk coefficients and net losses (the risk coefficient explains the losses).

To test this hypothesis, data were selected where $X$ represents the independent (explanatory or predictor) variable—the municipal risk coefficient—and $Y$ represents the dependent (response) variable—the net loss.

If a linear deterministic relationship exists between the variables $Y$ and $X$, it can be expressed as:

$Y = B_0 + B_1X$. Each observed pair of values is represented as: $y = B_0 + B_1x$

This framework allows for the empirical evaluation of how well the municipal risk coefficients explain actual net losses. Before fitting the regression line, a scatter plot is created to visualize the data distribution.




The scatter plot revealed a linear trend in the relationship between the dependent variable $Y$ and the independent variable $X$. We assumed that a simple linear regression could adequately describe this relationship. Consequently, a linear regression model was selected as the mathematical framework to provide a stochastic linear approximation between the two variables.

To determine the best-fitting regression line using the selected data, the **least squares method** was applied. This method identifies coefficient values that minimize the sum of squared deviations between observed and predicted values. Using this approach, the regression coefficients were calculated, enabling the estimation of the regression line.

**Validation**

To assess the model's performance, the **coefficient of determination** was calculated as $R^2 = 0.99$. 99% of the variance in net losses is explained by the regression model. In other words, the regression accounts for the vast majority of the observed variability, and therefore there is no need to consider an alternative model.

In the final stage, the hypotheses regarding the regression coefficients $B_0$ and $B_1$ are tested. The primary focus is on the coefficient $B_1$, as it carries economic significance. Specifically, the null hypothesis is formulated as: $H_0 : B_1 = 0$

Testing $B_1$ against zero is crucial because, if $B_1 = 0$, the regression line would be parallel to the $X$-axis. In this case, changes in $X$ would not result in any variation in $Y$, implying that an increase in the municipal risk coefficient would have no effect on the observed net loss. Rejection of $H_0$ indicates that variations in the risk coefficient significantly explain changes in net losses, confirming the economic and statistical relevance of the model.

$T_i = \frac{b_i - B_i}{S_{b_i}}, \quad i = 0,1$. The statistic calculated from the formula follows the Student's t-distribution with $n - 2$ degrees of freedom. The confidence level was set at $0.95 = 1 - \alpha$, $\alpha/2 = 0.025,\ n - 2 = 7$. Therefore, according to the Student's t-distribution table, $t_{7,0.025} = 2.365$

Hypothesis Testing

$$H_0: B_1 = 0$$

$$H_1: B_1 \neq 0$$

We reject $H_0$ if $|t_1| > t_{n-2,\alpha/2}$ where $t_1$ is the observed value of the $T_1$ statistic and $t_{n-2,\alpha/2}$ is the $\alpha$ -critical value of the Student's t-distribution with n−2 degrees of freedom $t \cdot (n-2)$.

In our case, we reject $H_0$ if $|t_1| > t_7, 0.025 = 2.365$ where $T_1$ is the calculated value of the statistic $t_1 = \frac{b_1 - B_1}{S_{b_1}} = 32.15 > t_7, 0.025 = 2.365$

Thus, based on the available data, the null hypothesis is rejected. At the significance level of $\alpha = 0.05$, there is sufficient evidence to conclude that a linear relationship exists between the municipal risk coefficient and net loss. The results confirm that risk-based zoning represents a statistically and economically justified mechanism for premium determination.

The implementation of tariffs determined according to municipal risk coefficients substantially improves the financial performance of the agricultural insurance system and creates preconditions for sustainable market development. In particular, in the Kakheti region, the application of this approach would have resulted in total premium revenues of GEL 81,928,057, while the net loss ratio would have decreased from 99% to 73%, indicating a more accurate reflection of risk within the tariff structure.

From an economic perspective, the risk-based premium model ensures a more efficient and equitable allocation of premiums across municipalities. Higher premiums in high-risk areas create an adequate financial buffer to cover expected losses, while optimized premiums in lower-risk municipalities maintain affordability and encourage market expansion.

Moreover, the reduction in the net loss ratio reflects an improved portfolio structure and more effective risk management. Such an outcome strengthens financial sustainability,

reduces the probability of systemic losses, and enhances the capital stability of insurance companies.

Overall, the introduction of municipal-level risk-based tariffs promotes the long-term financial stability of the agricultural insurance market, increases actuarial accuracy, and enables better adaptation of the insurance system to a geographically heterogeneous risk environment.

**Results**

The analysis identifies clear spatial heterogeneity in agricultural risk at the municipal level. Climatic loss exposure is unevenly distributed across regions, with hail-related losses significantly higher in Kakheti compared to Shida Kartli. This confirms that agricultural risk in Georgia is geographically concentrated rather than uniformly distributed. Municipal risk indices, calculated on the basis of observed loss ratios, range from 0.34 to 1.22. Such variation demonstrates that the current uniform premium structure does not adequately reflect local risk conditions. The introduction of risk-adjusted tariffs produces substantial pricing differences. In high-risk municipalities, premiums increase by 20–60% relative to the standard rate, while in low-risk areas they decrease by 10–50%. This differentiation improves actuarial accuracy and reduces implicit cross-subsidization between municipalities. Simulation results indicate that the introduction of municipal risk-based tariffs results in more targeted subsidy allocation toward high-risk territories, improving fiscal efficiency and enhancing the financial resilience of the public–private agricultural insurance scheme.

**Discussion**

The results of the study demonstrate that geographic heterogeneity across municipalities significantly affects the efficiency of agricultural insurance. A uniform tariff that does not account for regional differences leads to several structural challenges:

**1. Adverse Selection in High-Risk Zones**

- Farmers whose plots are frequently affected by losses are more likely to purchase insurance policies, while participation in low-risk areas remains limited.

- As a result, the insurance portfolio becomes concentrated in a few high-risk regions, increasing financial instability and undermining the actuarial balance of the system.

**2. Inefficient Allocation of State Subsidies**

- A uniform tariff results in suboptimal subsidy distribution: subsidies may be disproportionately high in low-risk municipalities, while remaining insufficient or inefficient in high-risk areas.
- This misallocation reduces the overall effectiveness of public financial support mechanisms.

**3. Advantages of Risk-Adjusted Tariffs**

- The application of municipal-level risk coefficients enables tariff optimization, ensuring:
    - improved financial sustainability of the insurance fund;
    - enhanced farmer participation based on objectively assessed risk exposure;
    - more targeted and efficient subsidization in high-risk regions.

**4. Policy and Entrepreneurial Implications**

- Risk-adjusted tariffs create a predictable and equitable institutional environment that supports investment attraction in the agricultural sector.
- Private insurance companies are incentivized to develop more balanced and stable portfolios, thereby strengthening their financial resilience and long-term viability.

**Conclusion**

1. The study confirms that the agricultural insurance market in Georgia requires geographic risk differentiation in practice.
2. Tariffs determined on the basis of municipal risk coefficients ensure:
    - improved financial sustainability of both state and private insurance funds;
    - alignment of farmers' interests with actual risk exposure;

- more efficient allocation of subsidies across regions.

Based on the research findings, the following recommendations are proposed:

- **Introduction of new insurance products** – differentiated packages tailored to various types of farms (small family farms and medium-sized commercial enterprises). It is recommended to develop additional programs or products for regions characterized by a high concentration of medium and relatively small farms, aimed at protecting them against catastrophic (mass-loss) events. Such programs may rely on catastrophic risk insurance mechanisms that provide compensation in cases of large-scale losses, thereby increasing farmers' motivation to participate in insurance schemes. This approach would support market diversification and broader inclusion in the insurance system.
- **Enhancement of farmers' awareness** – strengthening educational and informational initiatives to improve understanding of insurance benefits and risk management tools.
- **Strengthening public–private partnerships** – increasing financial accessibility and introducing more flexible state co-financing mechanisms to enhance the effectiveness of agricultural insurance programs.

Agricultural insurance represents not only a mechanism for ensuring farmers' financial security but also a strategic instrument for national economic development. Stabilization of this segment contributes to strengthening the local economy, attracting foreign investment, and fostering sustainable economic growth, while increasing the share of agriculture in Gross Domestic Product (GDP).

For Georgia, it is essential that agriculture remains a priority sector from both economic and social policy perspectives. The country's geographic and climatic diversity creates unique conditions for cultivating a wide range of agricultural products, thereby reinforcing domestic market stability and expanding rural development opportunities.

In the case of Georgia, this process has already begun: state–private partnership insurance programs enhance farmer security and stimulate investment in the agricultural sector. The government continues to pursue an active agricultural policy by promoting financial support schemes, research initiatives, and insurance programs that enable farmers and other stakeholders to operate in a safer and more sustainable environment.

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