

CLIMATE RISK INSURANCE FOR THE AGRICULTURE SECTOR IN ARMENIA



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CONTENTS

EXECUTIVE SUMMARY	3
INTRODUCTION	4
BACKGROUND	5
NATIONAL CLIMATE CHANGE STRATEGIES	6
FINANCIAL INCLUSION AND CLIMATE CHANGE POLICIES	7
The Role of the Central Bank of Armenia	7
Using Financial Services to Make Cleaner Technology More Accessible and Affordable	7
Building Climate Resilience through Agricultural Insurance	8
KEY CHALLENGES AND LESSONS LEARNED	12
CONCLUSION	13
ABBREVIATION AND REFERENCES	14
APPENDIX: REGISTERED NATURAL DISASTERS IN ARMENIA, 2008-2019	15

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EXECUTIVE SUMMARY

On 27 June 2019 a severe hailstorm¹ hit Armenia, the third within a month, severely damaging crops and potential yields in 14 rural communities in the Shirak region. About 3,900 households were affected overall, but 960 households of 4,300 people in the four most affected communities lost 80 to 100 percent of crop yields.²

Following natural disasters, the Armenian Government makes decisions about the feasibility and type of assistance to be provided, but in most cases there is no capacity to provide sufficient compensation. The major weather risks affecting agricultural producers in Armenia are hail, frost, drought, winds and floods. Of these five risks, expert opinion from the Ministry of Economy (MoE) and interviews with farmers indicated that the three main concerns were hail, frost and drought.

Agriculture is vital to Armenia's economy. Sixty percent of priority food products³ are produced domestically, but production is highly vulnerable to extreme weather events.

The Central Bank of Armenia (CBA) has recognized that climate change is a risk to the financial system requiring immediate action, and that monetary policies must be environmentally conscious and contribute to efforts to combat climate change.

The financial consequences of natural disasters have prompted the Government of Armenia and the CBA to collaborate on a comprehensive risk management approach to mitigate the risks of climate change. This has included developing and introducing an agricultural insurance scheme for farmers most vulnerable to the effects of extreme weather events. The project began in 2014 with the first agricultural insurance products launched in October 2019. To coordinate the development of the agricultural insurance scheme and ensure the project was implemented smoothly, the CBA established the Agricultural Insurers' National Agency (AINA) in 2019. AINA's responsibilities include data collection and determining loss adjustment capacity, factors considered critical to the successful implementation of an agricultural insurance scheme in Armenia.

While more of Armenia's public and private sectors are becoming convinced of the need for major structural change and concerted action, the CBA has emphasized the need to raise awareness of the scale of the changes and the benefits of an agricultural insurance product for both farmers and the economy as a whole.

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- 1 The hailstorm on 27 June 2019 was only one of many that summer. In June, July and August there were several hailstorms in Shirak region, eight of which were severe. The government set a maximum amount of compensation for grain.
 - 2 Armenian Red Cross Society, 2019
 - 3 "Priority food products" is a classification in Armenia for essential food products. Every year the food balance is calculated for the following 21 products: wheat, rye, barley, oats, maize, rice, other cereals, potatoes, vegetables, fruits (except grapes), leguminous crops, vegetable oil, sugar, egg, milk, beef, pork, mutton and goat meat, poultry, fish and grapes.



A shepherd gets his herd of sheep across the road near the village of Tatev in Armenia. (Photo by Ozbalci/iStock)

INTRODUCTION

Around the world, extreme weather events are becoming more frequent and intense, resulting in significant economic losses and damage to livelihoods. Findings from the United Nations Office for Disaster Risk Reduction (UNDRR) show that between 1998 and 2017, affected countries reported direct losses of USD 2.908 trillion from extreme weather events, more than three times the losses between 1978 and 1997 (\$895 billion).

The growing threat from extreme weather events now accounts for 77 percent of all national economic losses – \$2.245 trillion⁴ at the end of December 2018. According to a 2016 World Bank report, disasters such as droughts, floods, cyclones and earthquakes cost the global economy around \$520 billion a year and push 26 million people into poverty every year.⁵

Armenia's climate is characterized by relatively cool temperatures. The average annual temperature (1960-2015) is 7.6 degrees Celsius, ranging from -8°C in the high mountains to 12° to 14°C in low valleys. Climate stressors, such as rising temperatures, increased storms, changes in seasonal precipitation, lower rainfall and more drought, pose various risks to the Armenian economy. The country has a history of drought, significant land degradation and active desertification.



Half-submerged wooden house in Lake Sevan, Armenia.
(Photo by volodya zakaryan/Shutterstock)

Frequent landslides, mudflows, floods and other natural hazards have a negative impact on infrastructure, agriculture and water resources, making the country more vulnerable to climate change.⁶ These impacts are felt most by vulnerable populations and small farmers whose only options are to reduce household consumption or borrow on credit until the next harvest. Average estimated losses from weather-related hazards were \$50 million a year from 1998 to 2010.⁷

The risks associated with climate change can also have a significant impact on the stability and development of the financial sector and macroeconomics.

To ensure financial stability and a sound financial system, in recent years the CBA has been using financial instruments to mitigate the risks and impacts of climate change.

For example, green financial products for renewable energy have been available since 2004. It has also worked to make inclusive green finance a priority, taking steps in 2014 to develop and introduce an agricultural insurance scheme that would reduce the financial impact of extreme weather events for Armenian farmers. Significant progress has been made with financial inclusion in Armenia. Bank deposits to GDP increased from 10 percent in 2006 to around 87 percent in 2019. The growth potential of the insurance sector remains untapped.⁸ The CBA continues to develop other risk mitigation instruments and infrastructure to integrate green financial inclusion in the economy.

The purpose of this case study is to highlight the important role of the CBA in combating climate change and transitioning Armenia to a green economy. It details the specific conditions that make Armenia's agricultural sector vulnerable to climate change, and the steps the CBA has taken to cope with the effects of a warming climate. The case study also shows how financial regulators and policymakers in Armenia are developing effective risk mitigation strategies to help rural populations cope with financial losses and adapt to quickly changing environmental realities. Finally, it traces the development of the CBA's dedicated lending facility and its use of agricultural insurance as a financial inclusion instrument to build resilience to climate change.

4 UN News, 2018

5 Elliott, 2016

6 USAID, 2017

7 Ibid.

8 Nurbekyan and Hovanessian, 2018

BACKGROUND

As a mountainous country, Armenia has vulnerable ecosystems, a dry climate, active exogenous processes and frequent natural disasters, all of which make the country more vulnerable to the effects of climate change. Global warming and related environmental degradation have had an impact on various sectors of the economy, from infrastructure and agriculture to health.

According to the Ministry of Emergency Situations of the Republic of Armenia (RA), the country is extremely vulnerable to earthquakes, landslides, rock slides, frosts, droughts and floods, among others.

Of the 350 known disasters in the world, 110 are unique to the territory of Armenia and, of those, about 10 are among the most threatening catastrophic events (see Appendix 1).

Significant warming trends have been observed in recent decades, with temperatures rising by 0.4°C between 1929 and 1996, by 0.85°C between 1929 and 2007 and by 1.23°C between 1929 and 2016.⁹ It is predicted that temperatures will increase by approximately 2.2°C by 2030.¹⁰ Annual storms, hail and frost are becoming more frequent and severe, causing damage to crops and livestock. Armenia is at high risk of natural disasters due to high exposure to extreme weather events and insufficient risk management capacity.¹¹

Over 80 percent of the country's land is subject to erosion, salinity, humidity and water hazards.¹²

AGRICULTURE: Agriculture is a key sector of the Armenian economy, but its contribution to GDP has been declining recently. In 2019, the sector accounted for just 12 percent or AMD 270 billion (\$542 million) of GDP¹³ compared to about 15 percent or AMD 340 billion (\$682 million) in the fourth quarter of 2017.¹⁴

Of the 361,064 farms in the agricultural sector in 2014, only 453 were legal entities. In 2017, most of the agriculture sector consisted of micro and small farms.¹⁵

Temperature variability and low rainfall especially affect micro, small and medium enterprises (MSMEs) and vulnerable populations living in rural areas where irrigation is needed. Forest cover accounts for 11 percent of the country's territory, and warmer weather, high temperatures and drought expose forests to more frequent and severe wildfires. Drier conditions also reduce plant growth and regeneration, making trees more susceptible to pests and diseases. In the last six years, damage to agriculture from hail, drought, frost and other weather events are estimated at over AMD 110 billion (\$221 million).¹⁶

According to the Armenian Ministry of Economy (MoE), the annual risk of hail accounts for 10 to 15 percent of costs for cultivated areas, and in some cases, crop losses from hail can reach 80 to 100 percent.¹⁷

WATER RESOURCES: Armenia has more than 100 small lakes, some of which dry up in the summer. According to the Food and Agriculture Organization of the United Nations (FAO), 83 of Armenia's water reservoirs were operational in 2004 with an estimated total capacity of 1,399 million cubic meters, most of which was used for irrigation while some was used for hydropower, recreation, fisheries and environmental protection.¹⁸ As a result of rising temperatures, river and reservoir flows are projected to decline and reduce freshwater supply.¹⁹

HUMAN HEALTH AND INFRASTRUCTURE: Extremely high temperatures in the summer (which can reach over 40°C), cold and snowy winters and longer heatwaves pose health risks and adversely affect infrastructure through increased damage to roads, homes, buildings, communication networks and other infrastructure.

9 CC Armenia, 2020

10 KfW, 2019

11 United Nations Development Program Bureau of Crisis Prevention and Recovery Capacity Development Group, 2010

12 FAO/ENPARD, 2015

13 Source date: March 30, 2020

14 Statistical Committee of the Republic of Armenia, 2020

15 Ibid.

16 Ministry of Economy, 2019

17 Armenian Red Cross Society, 2019

18 FAO, 2016

19 Grantham Institute, 2012

NATIONAL CLIMATE CHANGE STRATEGIES

Given that Armenia faces climate change and adaptation challenges with significant consequences for different sectors, several Ministries are in charge of dealing with climate change-related issues and disaster risk management. Joint efforts from the government and public sector are critical, and several initiatives are underway in areas such as energy efficiency, food safety, irrigation and agriculture.

Armenia has ratified international conventions that address climate change, including the United Nations Framework Convention on Climate Change (UNFCCC) (1993), the Kyoto Protocol (2003) and the Paris Agreement (2017). In its Nationally Determined Contribution (NDC), Armenia's adaptation priorities are focused on water resources, agriculture, energy, health, tourism and human settlements. The submission communicated Armenia's intent to "limit its greenhouse gas (GHG) emissions to 633 million tons CO2 equivalent

at an aggregate level by 2050, while with international support; it intends to achieve ecosystem neutral GHG emissions by 2050".²⁰

Armenia is also a signatory of several environmental conventions, such as the United Nations Economic Commission for Europe (UNECE), Convention on Long-Range Transboundary Air Pollution (CLRTAP), the Vienna Convention for the Protection of the Ozone Layer and the United Nations Convention on Biological Diversity (CBD).

Armenia has developed legal and policy frameworks to address climate change and sustainable development issues, implementing a range of sectoral policies and programs.

In the Strategy of the Main Directions Ensuring Economic Development in the Agricultural Sector of the Republic of Armenia for 2020-2030, there is recognition of the risks posed by climate change in the agriculture sector and the need for a systematic way to compensate farmers for agricultural losses. Agricultural risk insurance is therefore considered a strategic priority for the sector.²¹

20 Government of the Republic of Armenia, 2015

21 Government of the Republic of Armenia, 2020



Anti-hail plant for generating a shock wave in a vineyard. Ilusarat village, Ararat province, Armenia. (Photo by Martynova Anna/Shutterstock)

FINANCIAL INCLUSION AND CLIMATE CHANGE POLICIES

THE ROLE OF THE CENTRAL BANK OF ARMENIA

Climate change cannot be viewed solely as a governmental issue since the effects of a changing environment are felt by various sectors and society as a whole.

In 2019 alone the government provided AMD 454 million (around \$949,000) in compensation to farms affected by natural disasters.²²

The CBA has emphasized the importance of mitigating the impacts of climate change through the use of appropriate financial tools and active engagement in prevention policies. The CBA has implicitly included combating climate change in its policy agenda and promotes green finance products in its draft National Financial Inclusion Strategy (NFIS) and action plan. Some projects from the draft strategy action plan, including the agricultural insurance project, are already underway.

As a starting point, the CBA has linked the draft NFIS to climate change and identified target groups as SMEs and vulnerable populations. In the draft strategy, the CBA outlines two main ways the financial services sector can strengthen resilience to climate change and mitigate its impacts:

- > Using financial services to make cleaner technology more accessible and affordable; and
- > Using financial services to build resilience to climate change through risk-sharing mechanisms.

On April 15, 2020, the CBA became a full member of the International Financial Cooperation Platform, the Network of Central Banks and Supervisors for Greening the Financial System (NGFS). This cooperation will help to promote green finance through the introduction of international best practices and standards for green financing.

USING FINANCIAL SERVICES TO MAKE CLEANER TECHNOLOGY MORE ACCESSIBLE AND AFFORDABLE

Since 2004, several refinancing schemes for green products and initiatives have been underway to reduce carbon emissions in Armenia. Some have been managed through the German-Armenian Fund (GAF)²³ since it was established in 1998 with the support of the KfW Development Bank (KfW).²⁴

1. **The Promotion of Energy Efficiency for SMEs (GAF-EE) program**, launched in 2016, supports energy-efficient investments in Armenian enterprises and helps MSMEs become more competitive while reducing energy consumption and CO₂ emissions. Partner financial institutions have been receiving loans to refinance sub-loans with a five-year maturity and market interest rate. Since the beginning of the program, 452 loans totaling AMD 11.9 billion (\$20 million) have been refinanced with attractive interest rates. As of December 31, 2019, the outstanding loan portfolio is AMD 5.8 billion, which includes 280 loans.
2. **The Development of Renewable Energies (GAF-RE) program**, implemented in collaboration with the Ministry of Energy Infrastructure and Natural Resources, began in 2004 to attract lending to renewable energy projects. The program has already refinanced 5,521 solar-thermal heating and small-scale photovoltaic projects at a total of AMD 5.8 billion (EUR 10.7 million).²⁵
3. **The Developing Sustainable Housing program is another success story**.²⁶ The program aims to strengthen Armenia's financial market (by promoting mortgage lending) and improve the livelihoods of households with limited access to housing finance by providing access to energy-efficient housing. Technical guidelines set minimum requirements for improving the energy efficiency of privately owned houses and apartments, and financial institutions use the guidelines to assess the eligibility of mortgage loans for the program. Since the program began, the GAF has refinanced 5,543 mortgage loans amounting to AMD 40.8 billion.

²² <https://mineconomy.am/news/2059>

²³ The German-Armenian Fund was founded in 1998 by the Central Bank of Armenia. The Governor of the CBA is a member of the Supervisory Council. The goal of the institution is to support Armenia's financial system by channeling funds from external and internal sources to develop specific sectors of the economy. The GAF provides long-term refinancing to partner financial institutions and refinancing is provided in local currency, making the loans more attractive. For more information, see: <http://www.gaf.am/en/about-us/history>.

²⁴ On behalf of the German Federal Government, primarily the Federal Ministry for Economic Cooperation and Development, KfW finance and support programs and projects mainly involve public sector players in developing countries and emerging economies.

²⁵ German-Armenian Fund 2019 Annual Report: http://www.gaf.am/images/GAF_AnnualReport_2019_eng.pdf

²⁶ German-Armenian Fund Sustainable Housing Program: <http://www.gaf.am/en/sectors-of-lending/housing-finance>

BUILDING CLIMATE RESILIENCE THROUGH AGRICULTURAL INSURANCE

Agriculture is a key sector of the Armenian economy, accounting for 15 percent of Armenia's GDP in 2017 and 12 percent in 2019 (52 percent from crop production and 48 percent from animal husbandry). Agricultural land accounts for 68.7 percent of the country's area and is critical to the country's food supply. In recent years, more than 60 percent of priority food products were grown domestically.

At the beginning of 2019, rural residents represented 36.1 percent of Armenia's population and 26 percent of the employed population works in the agriculture sector. Small and micro farming operations in Armenia operate on a small scale in terms of plot size, production volumes and income. About 90 to 93 percent of farming equipment is already fully depreciated (made between 1976 and 1991), although efforts have been made in recent years to upgrade agricultural machinery.²⁷

Farmers are constantly facing the consequences of natural disasters, with significant losses from hail, drought, frost and other extreme weather events. In the last six years, agricultural damages from extreme weather events amounted to over AMD 110 billion (\$0.221 billion). More than 80 percent of these losses were due to hail. Annual hail damage ranges from 10 to 15 percent of cultivated area, and in some areas hail has caused yield losses of 80 to 100 percent (Figure 1).

The poor rural population, which depends mainly on income from agricultural goods, is extremely vulnerable to the effects of climate change. Extreme weather events exacerbate this precarious financial situation for those with loans, who must continue making loan payments even when they lose their source of income and desperately need financial resources to continue farming. In 2016, the outstanding agricultural loan portfolio of banks represented six percent of all bank loans, according to CBA data.

In extreme situations, farmers depend on government support, which does not cover all their losses. Assistance to farmers is provided through the distribution of fertilizer, seeds and direct cash payments.

Based on past experience, the Government of Armenia and the CBA agreed there was an urgent need to introduce new solutions and develop a comprehensive approach to mitigate the risks of climate change.

This prompted a decision to create an agricultural insurance scheme that would be available to all farmers whose production is primarily exposed to the risk of extreme weather events, for example, outdoor crop production. Inclusive green finance is part of the draft NFIS, and the new agricultural insurance scheme was included in the action plan for implementing the draft strategy (Table 1).

A comprehensive risk management approach included introducing agricultural insurance, leveraging technology, modern farming practices and infrastructure improvements. Introducing this innovative insurance product to the market required joint efforts from the public and private sector, with key stakeholders including the Ministry of Economy, Ministry of Finance, the CBA, insurance companies, financial institutions, the Armenian National Farmers Union and international donors, including KfW, InsuResilience Investment Fund (IIF) and reinsurance companies. While it was developing this mechanism, the Armenian Government continued to support farmers with subsidies, awareness-raising campaigns about agricultural insurance and various other forms of assistance.

To coordinate the development of the agricultural insurance scheme and ensure it was launched smoothly, the CBA established the Agricultural Insurers' National Agency (AINA) in 2019 as a public-private partnerships (PPP).

The agricultural insurance scheme was introduced in a three-stage process:

- > **STAGE 1:** The CBA, with financial and technical support from KfW, initiated a feasibility study on agricultural insurance for Armenia. In 2015, a team of international consultants presented the results of the preliminary analysis to the CBA and other stakeholders (Ministry of Economy, KfW, etc).
- > **STAGE 2:** The consultant team of experts proposed directions and mechanisms for introducing insurance cover for agricultural risks in Armenia to the main project stakeholders (CBA, KfW, Ministry of Economy and insurance companies).
- > **STAGE 3 (2019):** A conglomerate of Swiss consulting companies, reinsurance company with financing and technical support from KfW and InsuResilience Investment Fund SICAV-RAIF (IIF), finalized the development and implementation of the insurance scheme. In 2019, the CBA established the AINA as a PPP to serve as a central hub.

AGRICULTURAL INSURERS' NATIONAL AGENCY (AINA)

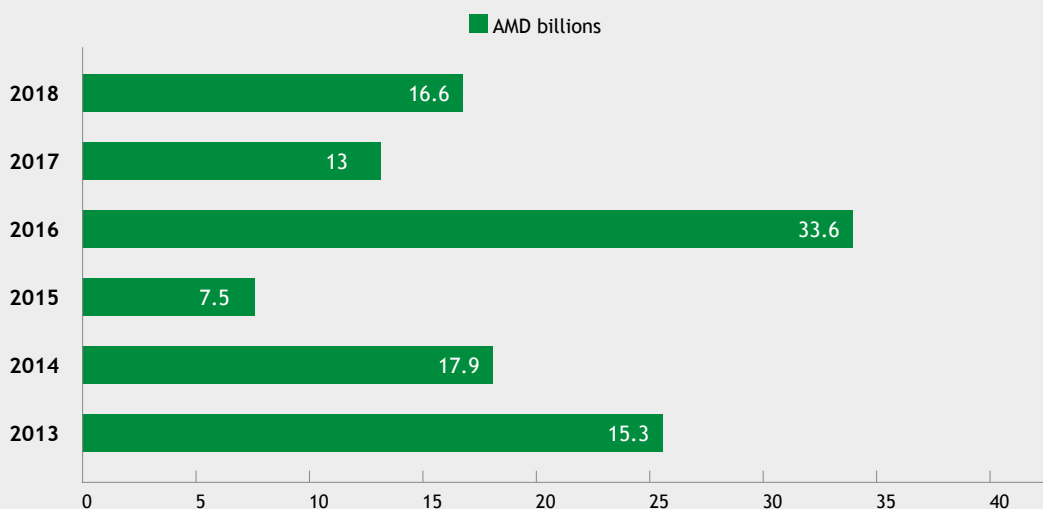
AINA is financed exclusively through membership fees from its private sector members, and membership is open to any Armenian insurer. AINA is effectively owned by insurance companies, with rotating board members from the CBA, the Ministry of Economy and insurance companies.

Since AINA was established as a service provider and centralized knowledge hub, it has been responsible for implementing the agricultural insurance product and coordinating agricultural insurance activities in Armenia. It will also provide services to insurance companies willing to add agricultural insurance as a new line of business. As a service provider, AINA will aim to improve the efficiency of the agricultural insurance market and, as a centralized knowledge hub, to help Armenian insurers grow their agricultural business.

AINA's main responsibilities include:

- > Developing agricultural insurance products, agreements and rules;
- > Carrying out activities to develop Armenia's agricultural insurance sector and all other activities for its members;
- > Overseeing the activities of member insurance companies related to agricultural insurance products provided by AINA;
- > Managing government subsidies for agricultural insurance;
- > Certifying and training agricultural insurance loss adjusters; and
- > Managing a database that includes farms, loss amounts and weather conditions, such as hailstorms and frost.

FIGURE 1: ESTIMATED LOSSES FROM EXTREME WEATHER EVENTS AND NATURAL DISASTERS



Source: Central Bank of Armenia, 2018 Note: 2016 was a year with frequent severe weather events and several regions were badly affected by strong wind, hail and frost.

TABLE 1: IMPACTS OF CATASTROPHIC WEATHER EVENTS, 2015-2018

Year	Affected regions	Number of affected communities	Damaged orchards and vineyards (hectares)	Losses in AMD millions (USD thousands)
2015	8	82	2900	3.59 (\$7.5)
2016	7	151	9135.5	16.35 (\$34.0)
2017	7	74	2990	4.68 (\$9.7)
2018	7	104	1762.9	2.72 (\$5.6)

Source: Central Bank of Armenia, 2018

AINA began operating in 2019 and introduced a range of agricultural insurance products in October of that year. Some products were made available in several regions and introduced later in other regions.

Currently, agricultural insurance products only cover the cost of crop damage. They include a government subsidy component for insurance premiums, with farmers initially provided a 50 to 60 percent subsidy on the insurance premium stipulated in the insurance contract (depending on the type of insurance product).

The premium subsidies are designed to be cost effective and not become a financial burden for the government. AINA will review the level of insurance premium subsidy for each product annually. Following the introduction of agricultural insurance products to the market and during the pilot stage (three to four years), the insurance premium will be subsidized equally by the Armenian and German governments.

The agricultural insurance products will be introduced in stages. During the first stage, in 2020, insurance will cover the risk of hail, hail and fire and spring frost, allocated as follows:

- > Apricots, grapes and peaches (hail, fire, spring frost);
- > Apples (hail); and
- > Wheat/barley (hail, hail and fire).

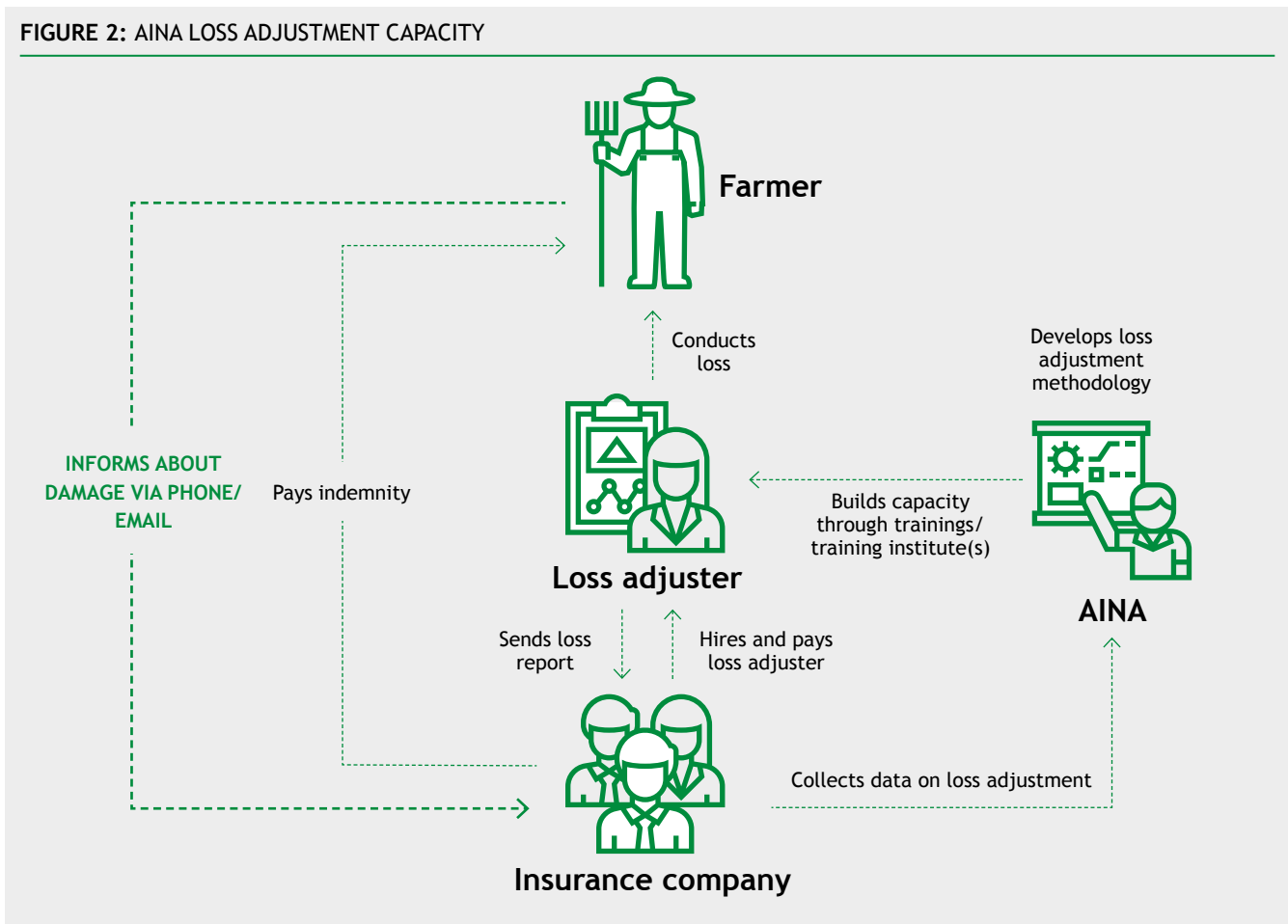
The crops to be insured in the first stage were selected based on stakeholder suggestions and interviews with farmers. Later, insurance products will be extended to cover other crops and additional risks. In the long term, AINA is considering extending insurance coverage to livestock.

Agricultural insurance is just one component of Armenia's comprehensive risk management approach. Building, modernizing and maintaining infrastructure like weather stations, developing and modernizing agricultural risk mitigation technologies, supporting agro-meteorological research and providing farmers with technical assistance and education about insurance, will all help to sustain agricultural insurance and risk evaluation.



Harvesting grapes at a vineyard in Armas Winery, Aragatsotn Province, Armenia. (Photo by Elena Diego/Shutterstock)

FIGURE 2: AINA LOSS ADJUSTMENT CAPACITY



Awareness Campaign: An important objective of the CBA is ensuring there is adequate consumer protection, and this cannot be achieved without increasing financial awareness and literacy among the population. In the agricultural insurance sector, the CBA actively supports awareness-raising programs about new agricultural insurance products.

In 2019, the CBA conducted an extensive information campaign about the basics of agricultural insurance and risk management.

Given that Armenian farmers have no experience with agricultural insurance, the awareness-raising programs are aimed at helping farmers understand the role of insurance in their overall risk management strategies – that is, what makes insurance valuable, how to assess and make informed decisions about a suitable agricultural insurance product, how to understand risk exclusions in terms and conditions, how to report an insurance event and file a claim, understand how the claims administration process works and how to file a complaint if they are unhappy with the products or services.

Statistical Data Collection and Consolidation:

Statistical information is critical for insurance pricing, new product development, analyzing existing products, insurance fraud detection and other areas. The absence of insurance data for pricing and product development is typical for countries introducing an agricultural insurance program for the first time. An additional challenge is the insufficient number of weather stations to provide weather-related data. When all data is accumulated and collected in one database, it becomes easier to analyze portfolio performance and define terms and pricing adjustments to improve agricultural products. AINA began building its database and collecting data in 2019.

Building Loss Adjustment Capacity: AINA will coordinate building loss adjustment capacity and the process is currently being developed (Figure 2). This is another major achievement given the lack of experience in loss adjustments in the agricultural sector. The loss adjusters will assess the insurance claim objectively, addressing the concerns of policyholders and insurers. AINA will certify and organize the training for adjusters.

KEY CHALLENGES AND LESSONS LEARNED

Implementing agricultural insurance and public spending through insurance premium subsidies is not enough to develop, implement and run an agricultural insurance scheme effectively and efficiently.

It also requires close collaboration and long-term commitment from all stakeholders. The key challenges and lessons of stakeholders in Armenia are as follows:

1. A clear long-term strategy and objectives must be formulated in the initial stage of implementing an agricultural insurance product to ensure sufficient resources are allocated for the development and administration of agricultural insurance, as these expenses can easily exceed the budget.
2. Preparatory work is needed before and during the pilot stage to:
 - > Define the regulatory framework, including roles for loss adjustment, subsidy management and claims-handling procedures;
 - > Build capacity in loss adjustment; and
 - > Create an electronic database with sufficient data and statistical information for insurance premium pricing. If statistical data is not available, proxy crop rates and expert estimates can be used initially. However, over the long term, and for the sustainable development of agricultural insurance, it is necessary to build a historical database for weather and risk events for each crop type and administrative unit.
3. Attractive insurance contracts and products²⁸ for farmers, insurance and reinsurance companies should be designed, delivered and administered effectively.
4. Financial education campaigns targeting farmers, insurance companies and public agencies should develop specific programs for agricultural insurance.
5. An effective mechanism for managing government subsidies should be in place, otherwise high costs can be incurred from allocating resources inappropriately.
6. Governments should continuously subsidize the insurance premium since removing government support completely could pose challenges both for farmers and the insurance suppliers.
7. Financial intermediaries should be involved in the development of the products, such as banks and microfinance institutions that provide agricultural lending, as well as potential distributors of agricultural insurance products.
8. Given that close cooperation and coordination between stakeholders is critical to success, it is necessary to define clear roles and responsibilities and develop specific reporting tools to enable strong project management between the different stakeholders (ministries, international organizations, reinsurance company, insurance companies, agencies, etc.). This is particularly important with PPPs.
9. If the private insurance sector is not interested in offering agricultural insurance, the risk pooling practice²⁹ or a government-owned company can be another option.
10. Developing and introducing agricultural insurance is a multi-stakeholder project that requires identifying a project lead. In Armenia, the CBA, with the support of KfW and the government, initially took the lead in developing agricultural insurance. Once the agricultural insurance scheme is set up, AINA will become the project lead, responsible for coordinating and sustaining the development of agricultural insurance in Armenia.

²⁸ Attractive insurance products are defined as affordable, easily accessible and transparent for consumers, and reasonable for insurance and reinsurance companies.

²⁹ "Risk pooling practice" refers to insurance companies joining together to share the risks of catastrophic events.

CONCLUSION

Climate change is one of the major challenges facing humanity. It affects all sectors of the economy in different ways, from workforce productivity and economic activities to smoothly functioning financial markets. Agricultural producers are extremely vulnerable to the risks of climate change, which destabilize their incomes and significantly reduce incentives to invest in increasing agricultural production.

Small farmers are particularly vulnerable to climate change as they do not have sophisticated risk management tools to mitigate the impacts of extreme weather events. The most common ways to mitigate risk are growing a diversity of crops and relying on in-kind savings. Borrowing and reducing consumption are also common strategies for coping with weather-related losses since most farming households do not have substantial savings to fall back on.

Financial regulatory authorities in many countries are beginning to respond, and in Armenia the CBA has played a vital role in mitigating risk with an agricultural insurance scheme. These national efforts have required close cooperation between the CBA, the Government of Armenia, international organizations and the private sector.

Although much progress has been made in Armenia, much work remains to be done, including raising awareness, improving technologies, collecting data, extending and introducing new insurance coverage, knowledge sharing and other activities that will help to modernize Armenia's agriculture sector. Establishing suitable agricultural insurance is a long-term process with long-term effects and, like other climate change activities, requires tangible contributions and ongoing commitments from all stakeholders.



Armenian women sell freshly picked, ripe organic fruits and vegetables at a local market. (Photo by Sarine Arslanian/Shutterstock)

ABBREVIATIONS

AINA	Agricultural Insurers' National Agency
AMD	Armenian Dram
CBA	Central Bank of Armenia
CBD	Convention on Biological Diversity
CLRTAP	Convention on Long-Range Transboundary Air Pollution
GAF	German-Armenian Fund
GAF-EE	German-Armenian Fund - Promotion of Energy Efficiency for SMEs Program
GAF-RE	German-Armenian Fund - Development of Renewable Energies Program
GDP	Gross Domestic Product
GHG	Greenhouse Gas
IIF	InsuResilience Investment Fund
KfW	KfW Development Bank
MoE	Ministry of Economy
MSME	Micro, Small and Medium Enterprise
NDC	Nationally Determined Contribution
NFIS	National Financial Inclusion Strategy
PPP	Public-Private Partnership
PV	Photovoltaic
RA	Republic of Armenia
SMEs	Small and Medium-Sized Enterprises
STH	Solar-Thermal Heater
UNDRR	United Nations Office for Disaster Risk Reduction
UNECE	United Nations Economic Commission for Europe
UNFCCC	United Nations Framework Convention on Climate Change

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APPENDIX

REGISTERED NATURAL DISASTERS IN ARMENIA, 2008-2019

	Number of accidents, units											
	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008
Strong wind, hurricane, storm, tornado, dust storm	47	34	50	44	95	114	48	38	29	45	55	44
Lightning storm	7	6	3	4	9	3	4	9	4	3	2	1
Hail	59	46	36	19	24	44	33	41	53	32	58	34
Heavy rain	6	12	3	8	6	12	7	15	17	19	30	7
Landslide, scree	4	4	4	14	3	7	6	6	12	19	9	5
Mudflow	-	1	1	7	1		2	4	10	13	19	-
Heavy snowfall, snowstorm	13	5	17	43	39	64	77	81	41	19	7	27
Black ice	17	21	40	53	76	96	-	-	-	-	-	-
Avalanche	1	1	1	-	-	-	-	1	-	-	-	-
Forest fire	60	21	22	32	15	17	4	26	5	21	2	21
Extreme heat, drought, dry wind	-	-	2	-	-	-	-	-	-	-	-	-
Frost in the early growing season	7	4	4	1	-	-	3	-	-	-	2	2
High water and flood	10	10	10	22	10	7	8	4	39	29	37	-
Rockfall (karst phenomena)	10	15	19	9	8	11	9	2	8	15	3	8
Stoning/rockfall	53	43	27	61	52	48	32	19	5	11	5	2
Earthquake	40	47	49	72	82	76	72	179	222	150	170	109
High groundwater levels	-	3	1	-	-	-	-	1	-	7	-	15
Wild animal attack	55	33	-	-	-	-	-	-	-	-	-	-
Total	389	306	289	389	420	499	305	426	445	383	399	280

Source: Statistical Committee of the Republic of Armenia

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