

Azerbaijan's policy frameworks for climate change adaptation and resilience in agriculture

Draft stocktaking report for Output I



Paris, 2025



Published within the framework of the regional project PROGRESS – Promoting Green Deal Readiness in the Eastern Partnership Countries

Consortium Members:

- European Business Association (EBA) Moldova
- Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH (Consortium Lead)
- Institute for Economics and Forecasting of the National Academy of Sciences of Ukraine (IEF)
- Organisation for Economic Co-operation and Development (OECD)
- Regional Environmental Centre for the Caucasus (REC Caucasus)

Consortium Lead Registered office:

Bonn and Eschborn, Germany

Address:

Deutsche Gesellschaft für
Internationale Zusammenarbeit (GIZ) GmbH
42 Rustaveli Ave. / 31a Gribodov Str.
0108 Tbilisi, Georgia

E martina.kolb@giz.de

I www.giz.de/en

The project 'Promoting Green Deal Readiness in the Eastern Partnership Countries' (PROGRESS) is funded by the International Climate Initiative (IKI) of the German Federal Government and is implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, as the lead agency, in partnership with the Organisation for Economic Co-operation and Development (OECD), the Regional Environmental Centre for the Caucasus (REC), the European Business Association (EBA) Moldova and the Institute for Economics and Forecasting of the National Academy of Sciences of Ukraine (IEF).

Authors and contributors:

Parviz Aliyev

Head of Research Department, Agricultural Economics Research Centre
under the Ministry of Agriculture of Azerbaijan

Olga Olson

OECD Environment Directorate

Krzysztof Michalak

OECD Environment Directorate

Béatrice Marois

OECD Environment Directorate

Thomas Dworak

Fresh Thoughts Consulting



The Authors would like to express their gratitude for valuable contributions and excellent cooperation to GIZ colleagues (especially Martina Kolb, Franziska Schneider, Samir Abbasov, Rovshan Abbasov and Shahla Mammadova) and the Regional Environmental Centre for the Caucasus (REC C) (especially Ilaha Ibrahimova, Yashar Karimov and Sevinj Sarukhanova)

This report contains links to external websites. The responsibility for the content of the listed external sites always lies with their respective publishers. When the links to these sites were first posted, consortium checked the third-party content to establish whether it could give rise to civil or criminal liability. However, the constant review of the links to external sites cannot be reasonably expected without concrete indication of a violation of rights. If consortium itself becomes aware of or is notified by a third party that an external site that it has provided a link to gives a rise to civil or criminal liability, it will remove the link to this site immediately. Consortium expressly dissociates itself from such content.

The opinions expressed and arguments employed herein do not necessarily reflect the official views of the Member countries of the OECD. This document, as well as any data and map included herein, do not imply the expression of any opinion whatsoever on the part of the OECD concerning the status of or sovereignty over any territory, the delimitation of international frontiers and boundaries and the name of any territory, city or area and are without prejudice thereto.

Photo Credits: Cover © Dan75786/Shutterstock.com.

Paris, 2025

Background and acknowledgements

The purpose of this draft report is to take stock of Azerbaijan's policy frameworks for climate change adaptation and resilience in agriculture (as of May 2025) to inform future project activities.

This draft report was prepared within the framework of the project on "Promoting Green Deal Readiness in the Eastern Partnership Countries" (PROGRESS).

PROGRESS is funded by the International Climate Initiative (IKI) of the German Federal Government and is implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, as the lead agency, in partnership with the Organisation for Economic Co-operation and Development (OECD), the Regional Environmental Centre for the Caucasus (RECC), the European Business Association (EBA) Moldova and the Institute for Economics and Forecasting of the National Academy of Sciences of Ukraine (IEF).

PROGRESS aims to support the European Union (EU) Eastern Partnership countries (Armenia, Azerbaijan, Georgia, Moldova, Ukraine) with achieving long-term mitigation, adaptation and sustainable development consistent with the EU Green Deal objectives and 1.5°C pathways of the Paris Agreement. Another project objective is to promote the competitiveness of fruits, nuts and berries from the Eastern Partnership countries on the EU market, with two specific products selected in each country based on a value chain analysis (persimmons and pomegranates for Azerbaijan). PROGRESS lasts during 2023-2028 and has a total budget of EUR 20 million.

The GIZ selected persimmons and pomegranates as the two subsectors of particular focus for the PROGRESS project in Azerbaijan based on selection criteria and following consultations with the Ministry of Agriculture, sector experts and specialists. The selection was based on six criteria: economic potential, environmental impact, social inclusion, institutional development, opportunities for the value chain development, and processing potential.

The OECD leads implementation of two out of the Project's five Outputs:

- Output I on evidence-based national policies and frameworks for climate change adaptation and resilience in agriculture, and
- Output IV on access to and mobilisation of green finance in agriculture.

This draft report was developed as part of Output I on national policies and frameworks. Output I aims to analyse the state of national policies and frameworks for climate change adaptation and resilience in agriculture, with a focus on horticulture (fruits and vegetables), provide recommendations for improvement and share best practices, especially those of the EU. It also aims to improve the understanding of the EU Green Deal and EU standards among farmers and farming associations and promote public-private dialogue.

Concurrently, the OECD is also carrying out a stocktaking on mobilisation of green finance in agriculture under Output IV, the findings of which will be presented in a separate report.

Following an Executive Summary and the Introduction (Chapter 1), Chapter 2 provides an overview of Azerbaijan's main policy frameworks for climate change adaptation and resilience in agriculture and a few key issues relevant for the EU Green Deal approximation, as well as the

main institutions involved. Chapter 3 summarises relevant provisions of the EU Green Deal, the Farm to Fork Strategy, the EU Climate Adaptation Strategy, and key EU import standards for fruits and berries.

The draft report was prepared based on secondary research as well as the local consultant's consultations with government stakeholders.

Olga Olson, OECD Environment Directorate, managed the report preparation under the supervision of Krzysztof Michalak, OECD Environment Directorate. The main authors are: Béatrice Marois, Environment Directorate (Introduction chapter); Parviz Aliyev, Head of Research Department, Agricultural Economics Research Centre under the Ministry of Agriculture of Azerbaijan (Chapter 2 on the local policy frameworks and institutions as well as policy gaps, recommendations and Annexes); and Olga Olson, Environment Directorate (Chapter 3 on the EU Green Deal). Thomas Dworak of Fresh-Thoughts Consulting provided valuable inputs.

The authors express gratitude to the GIZ colleagues (especially Martina Kolb, Franziska Schneider, Samir Abbasov, Rovshan Abbasov and Shahla Mammadova) and the Regional Environmental Centre for the Caucasus (REC C) (especially Ilaha Ibrahimova, Yashar Karimov and Sevinj Sarukhanova) for their support and advice during report preparation.

Table of contents

| | |
|--|-----------|
| Background and acknowledgements | 3 |
| Abbreviations | 7 |
| Executive summary | 9 |
| 1 Introduction | 12 |
| Impact of climate change on Azerbaijan's agriculture | 12 |
| Brief description of the agricultural sector | 13 |
| Challenges facing the fruit and vegetable sector | 14 |
| 2 Overview of Azerbaijan's policy frameworks for climate change adaptation and resilience in agriculture | 17 |
| Azerbaijan's policy frameworks for climate change adaptation and resilience in agriculture | 17 |
| 1. Climate change adaptation plans for agriculture and the main measures foreseen | 17 |
| 2. Monitoring and forecasting the impact of climate change on agriculture | 22 |
| 3. Disaster Risk Reduction | 24 |
| 4. Information and early warning systems for farmers and food processing companies | 24 |
| 5. Promotion of sustainable soil practices to preserve soil quality in view of climate change impacts | 27 |
| 6. Promotion of sustainable practices to preserve water in view of existing and foreseen climate change impacts | 29 |
| 7. Pest, disease and invasive species management due to climate change | 35 |
| 8. Development, certification and use of climate resistance seeds or plant varieties | 36 |
| 9. Extension and advisory services and sharing of best practices | 37 |
| 10. Innovation for climate change adaptation | 38 |
| Additional topics of relevance for the EU Green Deal | 40 |
| 1. Environmental standards and certification | 40 |
| 2. Sustainable use of pesticides and mineral fertilizers | 44 |
| 3. Organic production | 45 |
| 4. Minimising farm food waste and loss | 46 |
| Institutional set-up for designing and implementing the climate change adaptation policy for agriculture in Azerbaijan | 47 |
| 3 EU Green Deal provisions and environmental standards | 48 |
| Relevant European Green Deal provisions | 48 |
| Relevant provisions of the EU Green Deal and the Farm to Fork Strategy | 48 |
| Relevant provisions of the EU Adaptation Strategy | 51 |
| EU environmental standards for fruit and vegetable imports | 52 |

| | |
|--|-----------|
| Mandatory requirements | 52 |
| Non-mandatory certifications | 53 |
| 4 Conclusions and initial policy gaps | 55 |
| Annex A: Key Activities of the State Programme “On the Adaptation of the National Standardization System to International Requirements for 2023-2025” | 59 |
| Annex B: Additional relevant international projects | 61 |
| Bibliography | 64 |

Tables

| | |
|---|----|
| Table 4.1. Key Activities of the State Programme “On the Adaptation of the National Standardization System to International Requirements for 2023-2025” | 59 |
|---|----|

Boxes

| | |
|--|----|
| Box 1.1. Persimmons and pomegranates in Azerbaijan: Economic potential, challenges and climate change impacts | 16 |
| Box 2.1. Measures foreseen in the State Programme on the Development of Agricultural, Fisheries, and Aquaculture Production and Processing Areas in the Republic of Azerbaijan for 2025-2030 | 20 |
| Box 2.2. Information deducted from the agro-meteorological observations | 23 |
| Box 2.3. National Hydrometeorology Service (NHS) activities | 25 |
| Box 2.4. Strategic priorities of Azerbaijan’s National Water Strategy and the three stages of implementation | 31 |
| Box 2.5. Agrarian Innovation Center under the Ministry of Agriculture of Azerbaijan | 39 |
| Box 2.6. Examples of Business Festivals | 40 |
| Box 0.1. GEF Project on Lifecycle Management of Pesticides focus areas | 63 |
| Box 0.2. Main results of the FAO Project on “Reduction of Food Losses in Azerbaijan, Turkey and Central Asia” (2019-2023) | 63 |

Abbreviations

| | |
|----------|--|
| ADB | Asian Development Bank |
| AFSA | Azerbaijan Food Safety Agency |
| ASTM | American Society for Testing and Materials |
| AXA | Agrarian Services Agency |
| AZSTAND | Azerbaijan Institute of Standardization |
| BMUKN | German Federal Ministry for the Environment, Climate Action, Nature Conservation and Nuclear Safety |
| CCVI | Climate Change Vulnerability Index |
| CEN | European Committee for Standardization |
| CENELEC | European Electrotechnical Commission |
| CIS | Commonwealth of Independent States |
| COP | Conference of the Parties |
| COVID-19 | Coronavirus Disease of 2019 |
| CRDI | Composite Regional Development Index |
| DRR | Disaster Risk Reduction |
| EAIS | Electronic Agricultural Information System |
| EBA | European Business Association |
| ECO | Economic Cooperation Organisation |
| EIA | Environmental Impact Assessment |
| EU | European Union |
| EUR | Euro |
| EWS | Early Warning System |
| FAO | Food and Agriculture Organisation of the United Nations |
| FIBL | Forschungsinstitut für biologischen Landbau (Research Institute of Organic Agriculture) |
| FLW | Food Loss and Waste |
| FTPP | FAO – Turkey Partnership Programme |
| GAP | Good Agricultural Practices |
| GCF | Green Climate Fund |
| GDP | Gross Domestic Product |
| GHG | Greenhouse Gas |
| GIAHS | Globally Important Agricultural Heritage Systems |
| GIZ | Deutsche Gesellschaft für Internationale Zusammenarbeit (German Agency for International Co-operation) |
| HACCP | Hazard Analysis and Critical Control Points |
| HHP | Highly Hazardous Pesticide |
| IB-MHEWS | Impact-Based Multi-Hazard Early Warning System |
| IEC | International Electrotechnical Commission |
| IEF | Institute of Economics and Forecasting of the National Academy of Sciences of Ukraine |
| IFOAM | International Federation of Organic Agriculture Movements |

| | |
|----------|---|
| IKI | International Climate Initiative |
| ISO | International Organisation for Standardization |
| IWRM | Integrated Water Resources Management |
| LULUCF | Land Use, Land-Use Change, and Forestry |
| MAC | Interregional Bureau for Standardization |
| MoA | Ministry of Agriculture |
| MENR | Ministry of Ecology and Natural Resources |
| MoES | Ministry of Emergency Situations |
| NAP | National Adaptation Plan |
| NDC | Nationally Determined Contribution |
| ND-GAIN | University of Notre Dame Global Adaptation Initiative |
| NHS | National Hydrometeorological Service |
| NIAHS | Nationally Important Agricultural Heritage Systems |
| NOP | National Organic Programme |
| OECD | Organisation for Economic Co-operation and Development |
| POP | Persistent Organic Pollutants |
| PROGRESS | Promoting Green Deal Readiness in the Eastern Partnership Countries |
| SDG | Sustainable Development Goal |
| SME | Small and Medium-Sized Enterprise |
| SWRA | State Water Resources Agency |
| UN | United Nations |
| UNEP | United Nations Environment Programme |
| UNFCCC | United Nations Framework Convention on Climate Change |
| USA | United States of America |
| USD | American dollar |
| WMO | World Meteorological Organisation |

Executive summary

Azerbaijan is already experiencing climate change effects, especially natural disasters (particularly floods and droughts), thermal stress and declining water resources. The agricultural sector is at particular risk, occupying almost 60% of the country's land area and using up to 70% of the water resources.

This stocktaking report has identified progress and recent developments in several key components of Azerbaijan's policy frameworks for climate change adaptation and resilience in agriculture:

- The Initial National Adaptation Plan (NAP) for 2025 was adopted in 2024, where agriculture is one of the key sectors. NAPs for the following years will be developed. At sector level, the "State Programme on the Development of Agricultural, Fisheries, and Aquaculture Production and Processing Areas in the Republic of Azerbaijan for 2025-2030" is expected to be approved in 2025. It aims to accelerate the country's transition towards intensive, high-technology and sustainable agricultural practices, including climate adaptation. This State Programme follows up the "Joint Action Plan of the Ministry of Environment and Natural Resources (MENR) and the Ministry of Agriculture (MoA) to Support 'Green Agriculture'" (2020-2023).
- The State Commission on Climate Change is chaired by the Deputy Prime Minister of Azerbaijan while the Deputy Chairperson is the Minister of Ecology and Natural Resources.
- The National Hydrometeorological Service (NHS) within the MENR carries out hydro-meteorological observations that can support climate monitoring and develops national weather forecasts. The equipment and automation of the stations as well as the quality of hydrometeorological services have been improved.
- Establishment of a Disaster Risk Reduction (DRR) system and of an Early Warning System (EWS) are government priorities. The GCF project on "Strengthening Climate Information and Multi-Hazard EWS for Increased Resilience in Azerbaijan" was signed in 2024.
- The key laws governing soil practices in Azerbaijan are the Law on Land Reclamation and Irrigation and the Land Code. Land consolidation is a priority for Azerbaijan, with a Law on Agricultural Land Consolidation and Land Banking expected in 2025.
- The National Strategy for the Efficient Use of Water Resources was adopted in 2024 and foresees several activities until 2040. The MENR has developed a flood risk map. A State Water Resources Agency and of a Commission to Ensure Efficient Use of Water Resources have been established, and an Electronic Water Management Information System has been set up. In addition, one of the two most important irrigation channels in the country (Shirvan Canal) will undergo reconstruction.
- The Law "On Phytosanitary Control" provides the legal framework for phytosanitary control while Resolution no. 41 of the Food Safety Agency outlines the phytosanitary requirements for materials under quarantine control imported to and transiting through the country. The State Agrarian Development Centres under the Agrarian Services Agency (AXA) identify

plant diseases and pests, and several research institutes carry out scientific research on the topic.

- The 1997 Law on Seed Production regulates the production of seeds and plant varieties with high productivity and resistance to pests, diseases and climatic conditions. In 2021, a Certification Centre for seeds was set up within AXA.
- An Agrarian Training Centre was established under the AXA of the MoA in 2021 to deliver training, and extension and advisory services to farmers. In addition, Azerbaijan is developing a five-year strategy aimed at improving the delivery of extension and advisory services. Agroparks that integrate sustainable practices and innovative technologies have been established. Furthermore, the MoA organises practical demonstrations for farmers, and larger agribusiness enterprises and commodity associations also carry out training. AXA also organises Business Festivals to showcase cutting-edge products and technologies.

The stocktaking report further identified several priority areas for reform to improve the policy framework for climate change adaptation and resilience in agriculture:

- Monitoring of climate change impacts on agriculture must address gaps in coverage, insufficient automation, a degraded and poorly maintained radar network, and a lack of modelling packages.
- A national strategy for DRR needs to be developed, and a co-ordination platform ensured for the agricultural sector.
- The EWS must be scaled up, and relevant institutions better co-ordinated. The hydrometeorological networks should be modernised, and incentives and training provided to relevant staff.
- A Flood Management Plan and a Drought Management Plan need to be put in place, as well as a comprehensive scheme for Integrated Water Resource Management (IWRM).
- Irrigation infrastructure must be improved to ensure access and to minimise water losses.
- Regulations for the production, import and use of climate-resistant seeds and plant varieties of pomegranates and persimmons must be adopted; and access to certified seeds improved.
- The extension and advisory services require more human and financial resources, a targeted approach to Small and Medium-Sized Enterprises (SMEs), and should include climate change topics.

In addition, the report identified some key issues for approximating the EU Green Deal which will also reduce the environmental impact of the agricultural sector:

Environmental standards and certification

- Recent improvements in standards and certification include revisions to the Law on Standardisation and on Technical Regulation to better align with international requirements, adoption of the Law on Food Safety in 2022 and of a Programme “On the Adaptation of the National Standardization System to International Requirements for 2023–2025”. A “Single Window” Export Support Center was established in 2017, and private companies such as INCERT and Food Cert offer certification services.
- Points for improvement are removing the duplication of duties of certification agencies and improving knowledge of GAP among farmers.

Pesticide and fertiliser use

- Azerbaijan aims to align its legal framework on pesticides and agrochemicals with international standards. It has established a Unified Tracking System for plant protection products and agrochemicals, and improved the subsystem for disposal of Persistent Organic Pollutants (POPs) and obsolete pesticides.
- Farmers and sellers of pesticides and fertilisers need better knowledge sharing and guidance to improve access to them.

Development of organic agriculture

- Azerbaijan's legislation on organic ("ecologically clean") agriculture consists of the Constitution and the Law "On Ecologically Clean Agriculture". The Azerbaijan Food Safety Institute (AFSI) and AXA under the MoA are the primary institutions certifying organic agricultural and food products in Azerbaijan. In 2015, a regional experimental centre was established to promote organic agriculture in the Shaki Zaqatala region.
- However, there is a need to set up a unit specialising in data collection on this topic, and an increase in local demand would help to promote the growth of organic agriculture.

Minimising food loss and waste

- A Food and Agriculture Organisation (FAO) project called "Reduction of Food Losses in Azerbaijan, Turkey and Central Asia" has recently taken place.
- Farmers often resort to discarding unsold products into riverbeds or other locations. There is a need to introduce legislation addressing prevention of food loss and waste (FLW) at farm level, which is currently absent.

The future work under the PROGRESS programme will focus on providing support to Azerbaijan on a selected number of topics from the ones listed above.

1 Introduction

Impact of climate change on Azerbaijan's agriculture

The Republic of Azerbaijan (referred to as Azerbaijan throughout the report) contributed 0.15% of the total global greenhouse gas (GHG) emissions in 2016, and its per capita emissions were just below the global average in 2023 (Ministry of Ecology and Natural Resources of the Republic of Azerbaijan, 2021^[1]; Crippa et al., 2024^[2]).

According to the 2022 vulnerability score of the University of Notre Dame Global Adaptation Initiative (ND-GAIN) Country Index, Azerbaijan is the 80th most vulnerable out of 187 countries worldwide. It is also the 100th “most ready”¹ country. Azerbaijan is already experiencing the effects of climate change, particularly through natural disasters and thermal stress (Ministry of Ecology and Natural Resources of the Republic of Azerbaijan, 2021^[1]; University of Notre Dame, 2025^[3]). Among these hazards, floods and droughts are especially frequent and damaging. In fact, Azerbaijan is considered one of the most flood-prone areas in the world due to its location along the Caucasus Mountains (Ministry of Ecology and Natural Resources of the Republic of Azerbaijan, 2021^[1]).

At the same time, the country is in an arid zone with limited water resources, accounting for only 15% of the South Caucasus' water resources² (Ministry of Ecology and Natural Resources of the Republic of Azerbaijan, 2021^[1]; FAO, 2022^[4]). Azerbaijan is a downstream country that receives more than 70% of its water resources from abroad (Caspian Alpine Society, 2024^[5]). National water availability has declined by 15% in the last decades (Ministry of Ecology and Natural Resources of the Republic of Azerbaijan, 2021^[1]; FAO, 2022^[4]). According to the World Resources Institute, Azerbaijan ranks 18th among 33 countries projected to experience severe drought by 2040 (World Resources Institute, 2025^[6]).

Agriculture is one of the most sensitive sectors to climate change because it heavily depends on natural resources, accounting for approximately 60-70% of the country's water use (Ministry of Ecology and Natural Resources of the Republic of Azerbaijan, 2021^[1]; FAO, 2022^[4]). Indeed, according to a survey administered by the Agricultural Research Center under the Ministry of Agriculture of the Republic of Azerbaijan in 2023, around 50-55% of farmers already report insufficient water availability. Extreme events such as floods, hail, droughts and early frosts³,

¹ The ND-GAIN Country Index is made of two scores: a vulnerability score and a readiness score. The vulnerability score measures the exposure, sensitivity and adaptive capacity of a country's food, water, health, ecosystem services, human habitat and infrastructure sectors. The readiness score evaluates the capacity of a country to invest in climate change adaptation and assesses economic, governance and social readiness. The index score is updated annually, and data is available at: [Country Index // Notre Dame Global Adaptation Initiative // University of Notre Dame](#).

² South Caucasus countries are Armenia, Azerbaijan and Georgia.

³ Value chains analysis report, elaborated within the PROGRESS project, based on ValueLinks 2.0. methodology designed by the GIZ.

heat stress, and changes in the climate and precipitation patterns particularly affect agriculture in Azerbaijan. For instance, in 2019, annual precipitation dropped to 65% of the norm, and the average temperature exceeded the norm by 1.7°C. Between 2020 and 2023, droughts led to the total loss of rainfed crops across increasingly large areas - reaching 178 300 ha in 2023 alone.

The **economic impact** of natural hazard-induced disasters on the sector was estimated at USD 10-20 million annually in the 2000s, increasing to USD 30-50 million annually in the 2010s (FAO, 2022_[4]). Droughts resulted in annual losses of USD 6 million during 1988-2007, and floods of USD 5.7 million during the same period (FAO, 2022_[4]). Additionally, changing temperatures and higher humidity are delaying fruit ripening while creating conditions that promote viral and fungal diseases, increasing the cost of pest and diseases management for farmers (FAO, 2022_[4]).

It is anticipated that Azerbaijan **will be subject to the following climate change impacts** in the next century:

- Temperature is expected to rise faster in Azerbaijan compared to the global average. According to a highest-level emissions scenario, Azerbaijan will suffer from a potential warming of 4.7°C by 2090, higher than the global mean surface temperature change of 3.7°C under the same scenario (1986-2005 baseline) (FAO, 2022_[4]; Core Writing Team, Pachauri and Meyer, 2014_[7]).
- The recurrence of dry winds is expected to double while the number of arid days will increase, albeit with seasonal and regional differences (FAO, 2022_[4]).
- Water supply will decrease due to higher evaporation and lower rainfall, especially in the spring and summer seasons. Indeed, in the case of a 2°C temperature rise, the water resources in the country are expected to diminish by 15-20% in 2071-2098 (Ministry of Ecology and Natural Resources of the Republic of Azerbaijan, 2021_[11]). This impact, combined with a predicted growth in irrigation demand and an increased variability of temperature and precipitation, will lead to reductions in crop yields (Ahouissoussi, Neumann and Srivastava, 2014_[8]). The available water resources of neighbouring countries will also impact Azerbaijan.
- The magnitude and frequency of floods are projected to increase, preventing agricultural planting and harvesting, disrupting optimal soil conditions and causing erosion (Ahouissoussi, Neumann and Srivastava, 2014_[8]).

Climate change could reduce crop productivity by 15-20% per year (FAO, 2022_[4]). Among the agricultural subsectors, cattle breeding is likely to experience the largest output losses (up to 6-12% by 2060), followed by the food processing sector. As climate change drives up the costs of primary inputs, the food processing sector output could decrease by 3-6% by 2060 (World Bank, 2023_[9]).

Brief description of the agricultural sector

The **agricultural sector** is a historically important sector in Azerbaijan, playing a key role in the economy and in supporting rural communities, where nearly half of the population lives (FAO, 2022_[4]; Ministry of Ecology and Natural Resources of the Republic of Azerbaijan, 2021_[11]). The sector made up 5.7% of the Gross Domestic Product (GDP) in 2024, and its share of the country's total employment was 35% in 2023, according to World Bank data (World Bank, 2023_[10]; World Bank, 2024_[11]).

Farmland occupied 57.8% of the country's total land area in 2022; around 30% of this farmland is irrigated (World Bank, 2022_[12]; Ministry of Ecology and Natural Resources of the Republic of

Azerbaijan, 2021^[11]). The government promotes the development and modernization of agriculture as well as the expansion of its exports, coinciding with the steady growth of gross agricultural output since 1996 (FAO, 2022^[4]).

Agricultural land became fragmented following agrarian reforms and the distribution of previously collective and state farms in the mid-1990s, resulting in a lot of small to medium-sized family farms. These farms currently account for most of the agricultural production (FAO, 2022^[4]). For example, 89% of the gross agricultural output in 2023 came from “private owners, family peasant farms and households”, with the remaining 11% from agricultural enterprises (The State Statistical Committee of the Republic of Azerbaijan, 2024^[13]). Additionally, almost 82% of the farmers possess land plots less than 2 ha in size (World Bank, 2023^[9]).

Horticulture is an economically important subsector of agriculture in Azerbaijan, largely composed of private producers. In 2023, fruit, berry and vegetable production occupied around 6% of the national farmland (The State Statistical Committee of the Republic of Azerbaijan, 2024^[13]). In 2020, exports of fruits and vegetables amounted to USD 607.7 million, making up one third of the country’s non-oil exports (United Nations Azerbaijan, 2021^[14]). Russia is the main export market for Azerbaijan’s fresh fruits and vegetables (The State Statistical Committee of the Republic of Azerbaijan, 2024^[15]). Fruit and berry production is more widespread than vegetable production. In 2023, fruits and berries covered 227 200 ha with a production of 1 261 300 tonnes. On the other hand, vegetables were cultivated on 61 200 ha and produced 1 825 000 tonnes (The State Statistical Committee of the Republic of Azerbaijan, 2024^[13]).

In Azerbaijan, **food processing** is the second largest industrial sector overall, after the extraction of crude petroleum and natural gas (The State Statistical Committee of the Republic of Azerbaijan, 2024^[16]). Since Azerbaijan lacks infrastructure to export fresh produce (such as refrigerator trucks), processing fruits and vegetables is given a priority (World Bank Group - IFC, 2018^[17]). In addition, it is also a suitable option for damaged crops, with 45-60% of total production typically processed due to damage (World Bank Group - IFC, 2018^[17]).

Challenges facing the fruit and vegetable sector

The agricultural sector in Azerbaijan faces challenges slowing its evolution and openness to international markets:

- Highly fragmented farmland and a lack of access of smallholder farms to resources and technology as well as difficulties in understanding policies and regulations (FAO, 2022^[4]).
- Unequal access to irrigation depending on producers and regions; dependence of traditional irrigation on furrows (earth trenches) that transport 75% of irrigation water, resulting in significant water loss through percolation and evaporation.⁴
- Lack of resources and infrastructure for post-harvest operations (transportation, cold storage, processing equipment, packaging materials), causing damaged products. Up to 60% of harvested vegetables and fruits are damaged and need to be processed (World Bank Group - IFC, 2018^[17]).
- Lack of co-ordination between different Ministries, combined with insufficient equipment and training, limits effective agrometeorology risk assessments (FAO, 2022^[4]).

Beyond the general agriculture vulnerabilities, the **horticultural** sector is particularly exposed to

⁴ Ibid.

some limitations:

- Low yields and high production costs despite favourable natural conditions (World Bank Group - IFC, 2018^[17]).
- Lack of access to quality certified seeds and saplings.
- Lack of access to extension services, especially for small producers.⁵

For information on the economic potential, as well as some specific challenges and climate change impacts on pomegranate and persimmon (the two subsectors of focus of PROGRESS), please see Box 1.1.

⁵ Ibid.

Box 1.1. Persimmons and pomegranates in Azerbaijan: Economic potential, challenges and climate change impacts

The GIZ selected persimmons and pomegranates as two subsectors of particular focus for the PROGRESS project in Azerbaijan based on selection criteria and following consultations with the Ministry of Agriculture, sector experts and specialists. The selection was based on six criteria: economic potential, environmental impact, social inclusion, institutional development, opportunities for value chain development, and processing potential.

Economic potential

In 2023, 190 500 tonnes of pomegranate and 187 100 tonnes of persimmon were produced in Azerbaijan, with each accounting for roughly 15% of national fruit and berry production. After apples, pomegranates and persimmons are respectively the second and third most produced fruits in the country (The State Statistical Committee of the Republic of Azerbaijan, 2024^[13]).

From 2014 to 2023, the pomegranate growing area increased by almost 7%, lower than the average growth for fruits. During the same period, productivity increased by 1.3% on average. However, national agrarian policy prioritizes pomegranate cultivation, subsidizing the development of intensive pomegranate orchards⁶. As of 2023, most pomegranate orchards remain traditional. Intensive orchards accounted for only 17% of all pomegranate orchards in 2023, which was still an 8.2% increase compared to 2022. The pomegranate industry is dominated by a small number of large companies, which own production areas, storage and processing facilities, and export the fruit.

From 2014 to 2023, the persimmon growing area increased by around 25% (The State Statistical Committee of the Republic of Azerbaijan, 2024^[13]). Persimmon's productivity of production is 3.7 times higher than the global average (FAO, 2025^[18]). Azerbaijan accounts for 1.1% of the global area of persimmon orchards (FAO, 2025^[18]). Local demand for persimmons is rising steadily. Producers currently sell fresh, unpacked persimmons to wholesalers. Moreover, only large producers have intensive⁷ production; 97% of persimmon orchards used traditional methods in 2023 (The State Statistical Committee of the Republic of Azerbaijan, 2024^[13]).

Some specific **challenges** faced by the persimmon and pomegranate producers, in addition to the ones listed in the main body of text, are:

- Poor access to fertilizers and pesticides and increasing pests and diseases.
- Lack of co-operation among producers and other actors from the value chain to share good practices and experiences.

Climate change impacts

Persimmon production is generally resilient to external environmental conditions, resisting low temperatures up to -23°C as well as high soil and air humidity. Its late vegetative growth period helps it avoid damage from spring frosts, however, early frost occurring in late October and in November are an important threat to the harvest. Persimmon production is increasingly vulnerable to pests and diseases, a challenge exacerbated by limited adoption of effective farm management practices. For example, the lack of knowledge about pests, diseases and pruning (including practices like installing wires that damage branches), as well as the absence of treatments, increase the vulnerability of the trees.

Pomegranates are fairly resistant to both drought and frost, with trees able to tolerate temperatures as low as -13°C. However, recent extreme cold events have dropped below this threshold, leading to significant frost damage to orchards.

Sources: Value chains analysis report, elaborated within the PROGRESS project, based on ValueLinks 2.0. methodology designed by the GIZ; (The State Statistical Committee of the Republic of Azerbaijan, 2024^[13]); (FAO, 2025^[18]).

⁶ Intensive pomegranate orchards are those provided with a drip irrigation system and where a minimum of 450 seedlings per hectare are planted.

⁷ Intensive persimmon orchards are those provided with drip irrigation.

2 Overview of Azerbaijan's policy frameworks for climate change adaptation and resilience in agriculture

Azerbaijan's policy frameworks for climate change adaptation and resilience in agriculture

1. Climate change adaptation plans for agriculture and the main measures foreseen

1.1 National level plans

Azerbaijan recognizes that it is highly vulnerable to climate change, especially in sectors like agriculture, water resources, forestry, and coastal areas. It commits to building resilience in key economic sectors and protecting food security.

By ratifying the **United Nations Framework Convention on Climate Change (UNFCCC)**, the **Kyoto Protocol** to the Convention and the **Paris Agreement**, Azerbaijan has joined international efforts to address the negative impact of global climate change, with a particular focus on climate change adaptation (National Assembly of the Republic of Azerbaijan, 1995^[19]; Republic of Azerbaijan, 2000^[20]; Republic of Azerbaijan, 2016^[21]). The UN and its partners in Azerbaijan are working towards achieving the Sustainable Development Goals (SDGs). As a result of this partnership, Azerbaijan has prioritized 17 SDGs, 88 targets and 119 indicators covering economic, social and environmental aspects of sustainable development.

Implementation of Azerbaijan's commitments arising from the Paris Agreement is one of the priorities for the Government of Azerbaijan. In accordance with the adaptation goals of the Agreement, Azerbaijan is working to strengthen its adaptive capacity, reduce vulnerability to climate change and integrate adaptation into national planning processes. The country is developing National Adaptation Plans (NAPs) and is co-operating with international partners to enhance resilience in key sectors such as water resources, agriculture, and public health (Republic of Azerbaijan, 2023^[22]). In 2024, Azerbaijan adopted an **Initial NAP**, in which agriculture is one of the three main directions. The Initial NAP for 2025 identifies the most vulnerable regions of Azerbaijan to climate change, assesses the vulnerability of the agricultural sector to climate change, and lists climate change adaptation measures in the sector. As part of

the NAP process, Azerbaijan carried out comprehensive evaluations of climate data and vulnerability studies, including of agriculture. The Initial NAP resulted in the preparation of several legal acts, including on irrigation, the development of a Climate Web Portal for collecting and sharing climate change and weather information, and training sessions.

A number of important national **strategies** include climate change adaptation provisions:

- The document “**Azerbaijan 2030: National Priorities for Socio-Economic Development**”, approved on 2 February 2021, details five national priorities that are particularly relevant to the fulfilment of obligations arising from the UN “Agenda for Sustainable Development 2030”. One of the priorities is “a clean environment and a country of green growth” (Republic of Azerbaijan, 2021^[23]).
- In accordance with the document above, the “**Socio-Economic Development Strategy of the Republic of Azerbaijan for 2022-2026**” was approved. It envisages creation of a National Database on Climate Change to collect and analyse national-level data on climate change, and preparation of a NAP for sectors that are more sensitive to climate change impacts, including agriculture (Republic of Azerbaijan, 2022^[24]). The Ministry of Ecology and Natural Resources (MENR) will lead NAP development, expected to be prepared by 2026. In order to enhance oversight of ongoing initiatives, the government has launched the Monitoring and Evaluation Portal for this Strategy (Cabinet of Ministers of the Republic of Azerbaijan, 2023^[25]).

Preparatory work for the NAP development began several years earlier. Notably, in 2017, the Green Climate Fund (GCF) initiated a project (“**National Adaptation Plan Support Project for Adaptation Planning and Implementation in Azerbaijan**”, 2021-2023) to support the Government of Azerbaijan with the development of the NAP and improve climate change adaptation actions in three priority sectors identified by the MENR through stakeholder consultations: water, agriculture and coastal areas. The stocktaking exercise in 2017 has identified barriers to NAP development, including:

- Limited access to data, including limited data exchange by stakeholders in Azerbaijan.
- Insufficient institutional and technical capacity on climate change adaptation at managerial, expert/practitioner and community levels.
- Limited mainstreaming of adaptation in national, regional, local and sectoral planning, budgeting and regulatory framework.
- Limited institutional co-ordination.
- Limited monitoring, evaluation and analysis of past and current programmes on climate change adaptation (UNDP, 2025^[26]).

In the framework of this project, the **Climate Vulnerability Index** for the country was developed (UNDP, 2023^[27]). It analysed climate exposure, sensitivity, adaptive capacity and overall vulnerability of several sectors including food.

1.2. Agriculture-specific plans

The “**State Programme on the Development of Agricultural, Fisheries, and Aquaculture Production and Processing Areas in the Republic of Azerbaijan for 2025-2030**” (hereinafter referred to as “the Programme”) is under development since 2022 and is expected to be approved in 2025. It outlines the strategic priorities of the Azerbaijani government in the agricultural sector for the next six years. The Programme’s strategic objective is to accelerate the transition towards intensive, high-technology and sustainable agricultural practices. It aims to modernize the sector

by embedding sustainable development principles, and to strengthen the competitiveness of production and processing, for example, through investments in agro-processing infrastructure. In addition to advancing agricultural development nationwide, the Programme incorporates targeted measures to enhance climate change adaptation within the sector. Additional details about the measures are available in Box 2.1.

Box 2.1. Measures foreseen in the State Programme on the Development of Agricultural, Fisheries, and Aquaculture Production and Processing Areas in the Republic of Azerbaijan for 2025-2030

1. Establishing a Mechanism for the Efficient Use of Irrigation Water.

The Programme established a key target to expand the use of water-saving irrigation systems (e.g. drip or pivot irrigation) from 100 000 ha in 2024 to 300 000 ha by 2030. In order to achieve this, the programme envisages the following actions:

- Preparation of irrigation maps for all agricultural zones.
- Implementation of area-specific irrigation modernization and consolidation programmes based on existing policy frameworks.
- Construction of water reservoirs and utilization of drainage and rainwater for irrigation.
- Transition of water transport systems from open to closed formats to reduce losses.
- Development of on-farm irrigation networks using pipeline systems.
- Expansion of controlled (modern) irrigation technologies across agricultural areas.
- Enhancement of the irrigation water management system.
- Improvement of water tariff regulation mechanisms.

2. Establishment of a System for Managing the Impacts of Climate Change on Agriculture.

Within the framework of the Programme, analytical assessments will be conducted to evaluate the effects of climate change on agriculture using key indicators such as minimum, average, and maximum air temperatures; soil surface temperature; precipitation levels; relative humidity; the number of days with wind speeds exceeding 15 m/s; river discharge levels; and water volumes in reservoirs.

By 2030, based on the outcomes of these assessments, a comprehensive action plan will be developed to support adequate adaptation measures. Efforts will also focus on strengthening institutional and technical capacities to enhance agricultural resilience to climate change. This includes the improvement of relevant legislation and the promotion of climate-smart agriculture practices. Ultimately, based on the analysis conducted and the measures identified, a national system for mitigating the impacts of climate change on agriculture will be established.

This will build on progress achieved so far. For example, a national climate atlas⁸ has been developed to assess the impacts of climate change on agriculture, which already possesses baseline information on the country's ecological situation.

The primary implementing body for this measure is the Ministry of Agriculture (MoA) with the support of the MENR, the Azerbaijan State Water Resources Agency, and the Ministry of Finance.

3. Developing an Institutional Framework for a Sustainable and Multidisciplinary Information and Advisory Service System.

This measure aims to establish a nationwide network of sustainable and multidisciplinary agricultural information and advisory services by 2030. The primary goal is to provide farmers with timely and practical guidance on

agro-technical practices while also supporting their capacity to adapt to the impacts of climate change. The advisory network will facilitate the dissemination of knowledge on climate-resilient farming, sustainable resource use and innovative technologies, thereby strengthening the resilience and productivity of the agricultural sector.

4. Improving the Existing Subsidy System.

Under this measure, comprehensive assessments will be conducted to align the current subsidy system with the strategic development objectives of the agricultural sector. The aim is to prepare proposals that promote more targeted and efficient support mechanisms. These may include incentives for transitioning from traditional to intensive orchards, extending the fruit production season, supporting the cultivation of fodder crops, and encouraging the establishment of field protection strips. Additionally, proposals will be developed to revise subsidy coefficients and introduce new criteria. Notably, promoting orchard development in higher elevation areas is considered a key climate adaptation measure.

5. Supporting the Expansion of Intensive Orchards.

This measure aims to increase the area of intensive orchards in Azerbaijan from 40 000 ha currently to 70 000 ha by 2030. Promoting the expansion of intensive orchards is a strategic priority as these systems use land and water resources more efficiently compared to traditional models. Expanding such orchards contributes not only to higher productivity, but also to climate adaptation by reducing water demand and improving resilience to extreme weather conditions.

6. Formation of an Agro-Meteorological Database.

The MENR serves as the primary implementation agency for this measure, with the MoA acting as a co-implementor. Currently, the National Hydrometeorological Service maintains an electronic database compiling daily, decadal, and monthly agro-meteorological and phenological data collected from observation stations and points across the country.

Under the Programme, proposals will be developed to incentivize the collection of agro-meteorological data directly from farmers' fields and ensure its integration into a centralized database. In parallel, mechanisms will be enhanced to improve the accessibility and usability of existing meteorological data for farmers. The measure also includes the development and implementation of incentive schemes to support data collection and sharing, and training programmes to raise farmers' awareness and capacity to use this data effectively for decision-making.

7. Implementation of a Pilot Project to Ensure the Sustainability of Traditional Food and Agricultural Systems.

This measure involves selecting and assessing suitable regions for the designation of Nationally Important Agricultural Heritage Systems (NIAHS) sites in the country by 2030.

1.3 Baku Harmony Climate Initiative for Farmers

The “Baku Harmony Climate Initiative for Farmers” (“Harmony”) was implemented within the framework of the 29th session of the Conference of the Parties (COP) to the UNFCCC (COP 29) held in Baku in 2024 (Baku29 Azerbaijan, n.d.^[28]). The aim of this initiative was to enhance the opportunities of rural communities, women and youth and increase the resilience of agriculture to climate change in Azerbaijan (Ministry of Agriculture of the Republic of Azerbaijan, 2024^[29]).

⁸ [Republic of Azerbaijan: Ecological Atlas.](#)

Within the framework of COP 29, the “Harmony” initiative emerged as a pivotal platform for unifying global efforts to transform agri-food systems into more sustainable and climate-resilient models. Serving as an aggregator of adaptation measures in the agricultural sector, the initiative fostered collaboration among networks and coalitions while facilitating the exchange of knowledge and best practices. Through this co-ordinated approach, “Harmony” played a key role in equipping farmers with practical knowledge, digital tools and exposure to global innovations.

Moreover, the initiative aimed to drive systemic transformation in agriculture by creating opportunities to mobilize investments that promote sustainable practices. Collaboration among international organisations, public and private sector actors, and other stakeholders enabled the discussion of new tools and projects related to climate finance. These efforts laid the groundwork for future co-operation under the initiative’s umbrella, reinforcing its role as a catalyst for change in sustainable agriculture.

1.4 Joint Action Plan of the Ministry of Ecology and Natural Resources of the Republic of Azerbaijan and the Ministry of Agriculture of the Republic of Azerbaijan to support “Green Agriculture”

Joint Action Plan of the Ministry of Ecology and Natural Resources of the Republic of Azerbaijan and the Ministry of Agriculture of the Republic of Azerbaijan to support “Green Agriculture” was implemented during 2020-2023 (FAO, 2022^[41]). The Action Plan was developed by relevant experts of the MENR and the MoA and approved in 2020. It identified several priorities of Azerbaijan’s state policy, including protection of agrobiodiversity and ecosystems, and efficient use of natural resources. In this regard, relevant programmes and other strategic documents have been adopted⁹. The Joint Action Plan included measures to mitigate and adapt agricultural activities to the environment, water and land efficiency, protection of forest resources, development of aquaculture, support for the development of organic (environmentally friendly) agriculture, and strengthening of institutional capacity. Seven specific measures covering each area were identified, with indicators, implementation deadlines and responsible bodies. Notably, the Joint Action Plan included the **rational use of water and land resources**. The main purpose of this measure was to increase the efficiency of water resources in irrigation, reduce the negative impact of irrigation activities on the quality of water resources, protect the quality of arable land and improve the use of pastures.

2. Monitoring and forecasting the impact of climate change on agriculture

In Azerbaijan, the **National Hydrometeorological Service (NHS)** within the MENR carries out hydro-meteorological observations that can support climate monitoring. Agro-meteorological observations in the country are carried out at 17 hydro-meteorological and nine agro-meteorological stations, as well as 3 agro-meteorological points (smaller than stations), covering the agriculturally important regions of the territory of Azerbaijan. Information deduced from the agro-meteorological observations is available in Box 2.2.

Box 2.2. Information deduced from the agro-meteorological observations

The agro-meteorological observations help to determine the following information:

- the development stages of agricultural plants
- plant height
- the number of cereals per 1 m²
- plant density
- the general condition of the crop and root system
- causes of plant damage or destruction
- agro-technical measures taken
- average, maximum, minimum air temperatures
- temperatures of the soil surface and various depths
- soil moisture
- amount of precipitation
- snow depth
- wind speed and direction
- relative humidity
- moisture deficiency

As a result of the analysis, the following data are calculated and systematized:

- the dates of transition of the average air temperature from 0, 5, 10, 15°C in various regions
- the sum of temperatures above 0, 5, 10, 15°C
- the beginning, end, and duration of the frost-free period
- the number of days with the maximum air temperature above 35°C
- the average air temperature in the hottest month (July)
- the average air temperature in the coldest month (January)
- the total precipitation during the vegetation period
- the number of dry days
- other agro-climatic data

From the beginning of the vegetation of wheat, barley, cotton, corn, grapes, tea, fruit and vegetable plants to the harvest, information is collected on the dates of all development stages, the condition of the plants and statistical information on agro-technical measures.

However, **significant gaps in data and monitoring** persist. Azerbaijan's current hydrometeorological network has gaps in its coverage, partially lacks automation and the timely generation of hydrometeorological-related warnings. The radar network is degraded and lacks a continuous maintenance programme. Azerbaijan does not possess a national numerical weather

prediction model, an operational impact-based flood forecasting model and surface water modelling software packages, which will become especially important as water resources become more strained (World Bank, 2023^[9]). To increase adaptive capacity to climate change in Azerbaijan, such gaps in climate information will need to be filled.

3. Disaster Risk Reduction

Disaster mitigation from natural hazards is among the key issues for the government, despite the fact that a **national strategy for DRR is yet to be developed**. The **Ministry of Emergency Situations (MoES)** is responsible for the formulation and co-ordination of DRR measures. The Ministry is committed to publishing the **Emergency Atlas** of Azerbaijan¹⁰. This atlas is intended for both scientific research purposes and for state bodies, the MoES, and municipalities to make operational decisions in the prevention of emergencies and elimination of their consequences. This is a positive development towards enhancing the protection of the population, settlements, industry, agriculture, and strategic infrastructure from disasters, and combining efforts to reduce the adverse impacts on its communities and economic sectors (Republic of Azerbaijan, 2016^[30]). It is also planned to establish a new unit at the MoES that will deal with post-disaster needs assessments for agriculture and food systems.

Currently, Azerbaijan lacks a national **DRR platform specific to the agricultural sector**. The establishment of such a platform is essential to facilitate both horizontal and vertical co-ordination across various sectors and administrative levels. Strengthened collaboration among relevant government agencies is also critical for the formulation of effective policies, strategies and action plans that support the implementation of DRR measures, including an Early Warning System (EWS), and agrometeorological services tailored to the needs of agriculture. This need is particularly urgent in the context of floods, forest fires and droughts - hazards that are often transboundary in nature. Addressing these risks effectively requires regional co-operation focused on harmonizing methodologies, adopting common standards, and enabling the exchange of information and data related to hazard monitoring, forecasting, and early warning across river basin countries.

4. Information and early warning systems for farmers and food processing companies

4.1 Government documents

The following government documents prioritise establishing an EWS:

- The **2016 Strategy Roadmap** for agriculture includes the development and establishment of an information system and an EWS for agriculture (Republic of Azerbaijan, 2016^[31]).
- **The National Strategy for the Efficient Use of Water Resources**, adopted in 2024, includes the measure “Expansion of Early Warning Systems for Hydro ecological Crises” (Republic of Azerbaijan, 2024^[32]). The measure includes conducting scientific research

¹⁰ The Emergency Atlas will have the following information: earthquake-prone areas, seismic zoning maps, landslides, mud volcanoes, avalanche risk zones, flood and mudflow-prone river basins, climate risks (drought, strong winds, etc.), risk maps of industrial enterprises, factories, oil and gas infrastructures, dangerous road and railway areas for transport accidents, objects that may pose radiation and chemical hazards, erosion and salinization areas, the possibility of water basin pollution, zones prone to forest fires, settlements affected by emergencies, population density, social facilities at risk (schools, hospitals, etc.), defence and evacuation routes, emergency preparedness and defence measures, etc.

on rivers at risk of flooding and identifying locations for the installation of EWS, as well as expanding, digitizing, mapping and integrating EWS into the “Electronic Water Management” information system.

4.2 The National Hydrometeorology Service (NHS) and the hydrometeorological observation network

The MENR **NHS** develops national weather forecasts in Azerbaijan. The country became a member of the World Meteorological Organisation (WMO) in 1993. It has established hydrometeorological stations, equipped with modern devices and equipment (FAO, 2022^[4]). They provide an automated exchange of hydrometeorological data at national, regional and international level. However, the number of such stations is limited, and the information they provide is often insufficient. Azerbaijan has also improved the quality of hydrometeorological services provided to various sectors of the economy. For more activities on the NHS, please see Box 2.3.

Box 2.3. National Hydrometeorology Service (NHS) activities

The NHS carries out the following activities

- ensuring the organisation and carrying out of hydrometeorological observations, preparation and distribution of forecasts and warnings;
- defining the hydrometeorological regime and climatic features of the territory of Azerbaijan, including the Caspian Sea;
- studying, analysing and forecasting hydrometeorological events and processes in Azerbaijan, including high atmospheric layers;
- preparing programmes and projects to develop hydrometeorology;
- carrying out active work on the hydrometeorological and geophysical processes with the aim to reduce and regulate the damage to the population and economy.

Source: Ministry of Ecology and Natural Resources of the Republic of Azerbaijan, n.d.^[31].

The **hydrometeorological observation network** comprises 84 observation stations on land and nine stations at sea. In recent years, in order to minimize errors caused by human activity in accordance with modern meteorological requirements, most of the meteorological observation network has been automated. Thus, 51 of the hydrometeorological stations operating on land and four of the stations at sea have been replaced with automatic stations (Ministry of Ecology and Natural Resources of the Republic of Azerbaijan, n.d.^[33]).

The hydrometeorological observation network covering the country provides observations on meteorological parameters (air temperature, dew point temperature, wind, visibility, humidity, atmospheric pressure, cloudiness, atmospheric phenomena, etc.) daily and every three hours. At the same time, the stations located in the Azerbaijani sector of the Caspian Sea provide data on marine hydrometeorological observations (sea level, wave regime, water temperature etc.), which are then analysed and used in daily reviews and forecasts. All the materials are published online at www.meteo.az for public access.

The MENR plans to modernize and automate the hydrometeorological observation network using innovative and cost-effective technologies where possible. This would include further automatization of meteorological and hydrological stations, posts and transmissions (for example, for water level in rivers, snow, glaciers and the Caspian Sea ecosystem); upgrading of

radar systems to ensure adequate coverage; increase in the number of sensors in existing stations (for instance, for agrometeorology) etc. (FAO, 2022^[4]).

In March 2021, the MoA launched a new project called **Digital Agriculture**. The pilot project on the transfer of data from climate stations to farmers was first implemented in Guba, Gusar, Khachmaz, and Shamakhi districts in Azerbaijan. Five stations covering about 60 villages have started to operate in these districts. At the initial stage, apple, cherry, nectarine, peach, and grape plants were identified as target plants. At the same time, for the purpose of more detailed and flexible transmission of risk data, a Telegram channel “digital agriculture” (<https://t.me/ktnsmart>) was created, with ongoing efforts to encourage farmers to use this channel (Ministry of Agriculture of the Republic of Azerbaijan, 2021^[34]).

As a result of agrometeorological observations, the NHS prepares data on a daily, monthly and annual basis. In addition, it issues an agrometeorological bulletin every ten days. This bulletin covers monthly and decadal data on agrometeorological conditions for crop development, as well as air and soil temperature, precipitation amount, percentage of humidity and other meteorological parameters for (citrus) fruit, vegetables, tea etc. The target audience of agrometeorological bulletins and reviews is agricultural organisations and farmers (National Hydrometeorology Service, 2021^[35]).

Phenological observations are carried out on cotton in the lowland regions; for lemon, feijoa and tea plants in the Lankaran-Astara zone; and for grapes in the Ganja, Shamkir, and Gazakh regions (Ministry of Ecology and Natural Resources of the Republic of Azerbaijan, n.d.^[36]).¹¹

Azerbaijan’s current weather forecasting and production processes do not allow efficient and timely dissemination of information, and the EWS is insufficient in scale and scope to ensure adequate knowledge of risk, disaster preparedness, and response capability of its population for safeguarding lives, infrastructure, and assets. The key challenges for the EWS include:

- Lack of co-ordination, collaboration and communication among the MoA, the MENR, the MoES and other relevant institutions.
- Poor quality of hydrometeorological observations.
- Low salary levels in the sector, making it difficult to attract and retain highly qualified professionals; there is a pressing need to increase the number of staff with academic degrees in meteorology and hydrology, as well as experts in data management, computing, and information technologies (IT).
- Furthermore, meteorological and hydrological networks require modernization, including the enhancement of calibration and maintenance systems in accordance with WMO standards; advancements in automatic analysis and editing tools are also necessary to strengthen surveillance and EWS capabilities, ultimately reducing the adverse impacts of disasters, particularly in the agricultural sector (FAO, 2022^[4]).

¹¹ During the vegetation period, a number of agricultural crops, including autumn cereals, are identified and observed in the lowlands and foothills. Based on these observations, the actual development phase of wheat and barley, plant height, number of plants per square meter, number of stems per square meter and one plant, plant density, general condition of planting and root system, size of damaged or destroyed crop areas, and plant damage or the causes of destruction, are investigated.

Introduction of impact-based forecasting¹² and social protection that is responsive to climate shocks will help the country shift from a reactive to a proactive approach to reducing disaster risks.

4.3 GCF project on “Strengthening Climate Information and Multi-Hazard EWS for Increased Resilience in Azerbaijan”

In 2024, the GCF has approved a USD 35 million project to increase climate resilience in Azerbaijan, supported by the United Nations Environment Programme (UNEP). The implementation period of the project is six years, and the total project lifespan is 10 years (Green Climate Fund, 2024^[37]). The project will support the establishment of science-based, data-driven climate information services and a people-centred, impact-based multi-hazard Early Warning System (IB-MHEWS) for the benefit of the government, the public, the private sector (including health, agriculture, and water resources management and communities in Azerbaijan (UNEP, 2024^[38]). The project aims to benefit up to 5.71 million people directly. A specific focus on engaging children and youth will help to promote a generation of climate-conscious leaders who can drive community-based resilience initiatives in the longer term. By empowering vulnerable sectors and communities to access and act on early warnings, the project aims to increase long-term resilience as well as support short-term reduction of climate-induced losses and damage.

5. Promotion of sustainable soil practices to preserve soil quality in view of climate change impacts

5.1 Main laws

The primary legislative framework governing these activities is the Law of the Republic of Azerbaijan “**On Land Reclamation and Irrigation**” (1996), which establishes the legal basis for land reclamation, regulates state oversight of drainage and soil protection, and defines the responsibilities of land users and the state (Government of Azerbaijan, 1996^[53]).

The **Land Code**, approved in 1999, is aimed at regulating land relations arising from the application of various types of land ownership in Azerbaijan, fulfilling the duties of land owners, users and lessees related to land and protecting their rights over land, creating conditions for the efficient use of land and its protection, restoring and increasing soil fertility, recultivating lands damaged by technogenic pollution and destruction, and preserving and improving the natural environment (Republic of Azerbaijan, 1999^[54]). According to the Land Code, land owners, users and lessees must protect land from water and wind erosion, floods, flooding, waterlogging, repeated salinization, compaction and drought, waste, pollution with chemical and radioactive substances, desertification, landslides, abrasion and other destructive processes.

According to the 1999 **Law of the Republic of Azerbaijan on Environmental Protection**, normative legal acts regulate environmental requirements for the use of land, subsoil, air, water bodies, forests and other plants, fauna, environmental objects of exceptional ecological, scientific and cultural value, specially protected natural areas and areas with ecological disaster conditions. Activities that lead to the disruption of systems in natural ecological balance, as well as the destruction of the genetic fund of humans, plants and animals, and are dangerous to the

¹³ It is based on a draft strategy prepared within the framework of the project “Support to the Development of a National Strategy for Land Consolidation and a Pilot Project on Land Consolidation”, also implemented by the MoA.

life and health of the population, are not allowed (Republic of Azerbaijan, 1999^[55]). There is no specific reference to climate change adaptation.

5.2 Land consolidation measures

A document “**Strategy on Consolidation of Agricultural Lands and Land Banking in the Republic of Azerbaijan**” is currently being prepared by the MoA,¹³ which aims to advance the unification of fragmented land plots owned by farmers into a single, centralized area. As a preliminary step in this process, the quality of existing land plots is enhanced through various land improvement measures, including the construction of drainage systems, the installation of modern irrigation infrastructure, land levelling and other interventions aimed at improving land usability. Land consolidation contributes to more efficient and sustainable land use. In this context, it can also be viewed as an effective adaptation measure to address the challenges posed by climate change.

The overall objective of the Strategy is to increase the competitiveness and productivity of the agricultural sector by eliminating structural deficiencies resulting from inefficient farm structures characterized by small-scale farms and excessive land fragmentation, a weak agricultural land market, land abandonment and inefficient agricultural infrastructure. This would support sustainable development and contribute to long-term environmental, economic and social sustainability in rural areas. The strategy envisages a voluntary or majority-consent approach (farmers will not be forced to consolidate their land if they do not wish to do so) based on the principles of “at least being in the previous state”¹⁴, sustainable development and environmental protection, consultation and participation, gender equality and transparency. Land consolidation and land banking¹⁵ will facilitate the reconstruction of irrigation and drainage infrastructure, improve the land cadastre and facilitate the formation of agricultural co-operatives.

As the next steps, it is also planned to prepare and adopt a **draft Law on Agricultural Land Consolidation and Land Banking** in 2025, appoint and (or) establish state institutions responsible for land consolidation in 2026, and prepare, adopt and implement a land consolidation programme in 2028 to implement the Law.

An **amendment in the Land Code** of Azerbaijan introduced a new policy to promote **more efficient use of land through consolidation**. Under this measure, permanent residential buildings intended for the production and processing of agricultural products, as well as the temporary accommodation of workers, may be constructed on no more than 1 percent of agricultural land plots (excluding summer and winter pastures and communal grazing areas) provided that the plots are at least 5 ha in size and located within a single boundary (Republic of Azerbaijan, 2024^[56]). In addition to enhancing the production and processing of agricultural goods, this initiative also encourages the expansion and consolidation of farms.

¹³ It is based on a draft strategy prepared within the framework of the project “Support to the Development of a National Strategy for Land Consolidation and a Pilot Project on Land Consolidation”, also implemented by the MoA.

¹⁴ The principle of “at least being in the previous state” in the context of the Strategy on Consolidation of Agricultural Lands means that any land consolidation or restructuring process should ensure that landowners and farmers are not left worse off than they were before the intervention. This principle acts as a safeguard to protect the rights and interests of participants in land consolidation projects.

¹⁵ In land banking, farmers lease their land to a land bank and receive rental payments, while the land bank earns income by subleasing the land.

Furthermore, the new subsidy system is designed to incentivize the consolidation and expansion of agricultural land. It establishes **minimum area requirements for orchards** to qualify for subsidies. These include at least 5 ha for walnut and almond orchards, at least 3 ha for pomegranate, pear, peach, and apricot orchards, and at least 2 ha for persimmon, grape, apple, and cherry orchards (Ministry of Agriculture of the Republic of Azerbaijan, n.d.^[57]).

5.3 Adoption of conservation agriculture practices among SME farmers

Conservation agriculture (mulching, minimum tillage, crop rotation) and drip irrigation are Climate-Smart Agricultural (CSA) practices already present in Azerbaijan and can help farmers better cope with climate shocks. However, while large commercial farms are already implementing such practices, their adoption within SME farms remains low to non-existent due to a lack of awareness, knowledge, practice, technology and limited financial resources. SME farmers in Azerbaijan still rely on traditional farming practices and are not aware of the benefits of CSA, such as increased yields, improved soil health, and reduced environmental impact.

Unlike large-scale farms, which typically have better access to qualified specialists, small agricultural producers often lack the resources to do so. As a result, they primarily rely on informal sources such as fellow farmers or limited state guidance for information on agrotechnical practices. The provision of structured and accessible advisory services can serve as a key instrument in supporting smallholders and enhancing their productivity and resilience (World Bank, 2023^[9]).

6. Promotion of sustainable practices to preserve water in view of existing and foreseen climate change impacts

6.1 Key legislation

Azerbaijan's water legislation consists of the Water Code, the laws "On Water Supply and Discharge", "On Land Reclamation and Irrigation", "On Hydrometeorological Activities", "On Municipal Water Resources Management", "On Hydro-technical Structures' Safety", and other normative legal acts.

The **Water Code** of the Republic of Azerbaijan, adopted in 1997, regulates legal relations concerning the use and protection of water resources within the country (Republic of Azerbaijan, 1997^[58]). The Code establishes general principles for the efficient and economical use of water; the protection and improvement of water quality; compliance with established plans, limits, rules, norms, and regimes; an obligation to use water bodies for their designated purposes; and an obligation to maintain proper records of water use. However, it does not specifically address issues related to climate change adaptation in agriculture.

6.2 National Strategy for the Efficient Use of Water Resources

The Republic of Azerbaijan has adopted a "**National Strategy for the Efficient Use of Water Resources**" (hereinafter referred to as the National Strategy) (Republic of Azerbaijan, 2024^[32]). It envisages increasing water resources, improving the supply of high-quality drinking water and irrigation water, modernizing management in this area, as well as developing co-operation in compliance with the requirements of international conventions. The National Strategy, in addition to the priorities set out in the "Socio-economic Development Strategy of the Republic of Azerbaijan for 2022-2026", reflects the goals in the fields of "clean water and sanitation", "combating climate change", "protection of the marine ecosystem" and "protection of the land ecosystem" envisaged in the UN's "Transforming our World: 2030 Agenda for Sustainable

Development” (Republic of Azerbaijan, 2022^[24]). The National Strategy outlines a comprehensive framework for sustainable management of water resources, aligning with international best practices, particularly the principles of Integrated Water Resource Management (IWRM). The strategy’s core priorities are structured to enhance legislative, institutional, and operational frameworks while addressing current and future challenges in water security.

Implementation of the National Strategy will enable Azerbaijan to reassess and optimize water resource allocation in response to climate change impacts, enhance water security to safeguard public health and socio-economic well-being, foster sustainable socio-economic development through integrated water management, and strengthen interagency co-ordination while maintaining clear separation between regulatory and permitting functions.

More details on the Strategy are available in Box 2.4.

Box 2.4. Strategic priorities of Azerbaijan's National Water Strategy and the three stages of implementation

The National Water Strategy has the following strategic priorities:

- strengthening water-related legislation to ensure full integration of IWRM principles
- establishing a robust regulatory framework to improve governance in the water sector
- implementing a transparent and independent water use permitting system, distinct from regulatory oversight
- adoption of a basin-wide approach to water resource management
- seawater desalination (for drinking) and connection to the water supply system
- treatment and reuse of collector, drainage and wastewater
- rainwater management and utilization
- development and implementation of River Basin Management Plans (RBMPs)
- optimization of water allocation and usage to enhance efficiency and sustainability
- taking climate change adaptation measures for drinking water and irrigation water supply, and wastewater management
- balancing supply and demand for water and agricultural crops, taking into account the volume of water resources
- conducting research on the development of artificial rain technology
- conducting research on obtaining water from the air
- establishment of Basin Authorities and Basin Councils to ensure integrated watershed management
- clarification of roles and responsibilities between national and regional water management entities
- enhancement of organisational capabilities within the water sector through training and institutional reforms
- reinforcement of water monitoring systems to assess ecological status and water quality
- promotion of investments in water conservation technologies, particularly in irrigation
- Transboundary Water Management, ensuring sustainable water use in energy production etc.

The National Strategy will be implemented in **three stages**, covering the years 2024-2040:

- **First stage (2024-2027):** the necessary infrastructure and management for the efficient use of water resources will be improved. Within this framework, the reassessment, increase, integrated management of water resources, use of water resources of the Karabakh and East Zangezur economic regions, management of waste and rainwater, improvement of water quality, expansion of water management facilities and reduction of water losses will be ensured.
- **Second phase (2028-2030):** based on strengthening the basic conditions, a significant convergence will be ensured with the SDGs adopted by the UN General Assembly, such as

“clean water and sanitation”, “combating climate change”, “protecting the marine ecosystem” and “protecting the land ecosystem”.

- **Third phase (2031–2040):** the demand for sustainable and high-quality water will be met by effectively managing hydro-ecological crises based on innovative technologies, increasing water resources, and expanding the use of alternative water sources.

6.3 Institutional improvements

Azerbaijan State Water Resources Agency

The **Azerbaijan State Water Resources Agency (SWRA)**, established by the Decree of the President of the Republic of Azerbaijan in 2023, based on the Emergency Ministry’s State Water Reserves Agency, was an important step towards overcoming institutional challenges in Azerbaijan’s water sector.

The SWRA serves as the central executive authority responsible for implementing a unified state policy and regulatory framework in the field of water resource management within Azerbaijan. Its mandate encompasses the extraction, treatment, transportation, and supply of water; the operation and maintenance of state-owned land reclamation and irrigation systems; the management of drinking water supply, as well as rainwater and wastewater treatment and discharge systems. Its responsibilities include the planning, distribution and control of water for irrigation in agriculture. The Agency is also engaged in the operation and renovation of canals, reservoirs, pumping stations and other hydrotechnical facilities.

One of the agency’s primary goals will be to enhance the efficiency of water management through the application of IWRM principles.

The Agency is also tasked with organizing and overseeing the provision of water services, conducting regular inspections and technical assessments of water management infrastructure under its jurisdiction, and monitoring both surface and groundwater resources. Its responsibilities extend to the oversight of water and water management facilities, hydrotechnical structures (excluding marine facilities within the Caspian Sea sector belonging to the Republic of Azerbaijan), and the main and auxiliary systems essential for their operation, maintenance, and protection across the national water supply framework.

A Commission on the efficient use of water resources

A **Commission on the efficient use of water resources** was established in 2020 by the **Decree of the President of the Republic of Azerbaijan “On measures to ensure the efficient use of water resources”**. Irrigation management is one of the core operational areas of the Commission. Its objectives include guaranteeing sufficient allocation of water resources for agricultural irrigation. The Minister of Agriculture is part of the Commission. In addition, the **“Action Plan for Ensuring the Efficient Use of Water Resources for 2020-2022”** was approved by the Decree of the President of the Republic of Azerbaijan in 2020 (Republic of Azerbaijan, 2020_[59]; Republic of Azerbaijan, 2020_[60]).

The **National Water Policy Dialogue (NWPD)**, initiated in 2010, serves as an inter-ministerial coordination platform to advance water sector reforms. Its mandate includes the formulation of a national Water Strategy aligned with the principles of IWRM, the EU Water Framework Directive (WFD), the UNECE Convention on the Protection and Use of Transboundary Watercourses and

International Lakes, and its accompanying Protocol on Water and Health.¹⁶ Therefore, it also promotes climate adaptation in agriculture.

6.4 Other recent initiatives to improve water management

Azerbaijan is constructing new irrigation canals, modernizing existing systems (e.g., drip irrigation and sprinkler technologies), building reservoirs and pumping stations, developing surface and underground drainage systems, and regulating water withdrawal from the Kura and Araz rivers (Azertac, 2022^[61]). Some of the recent initiatives in Azerbaijan to enhance water policy for agriculture include the following:

- **Flood risk map:** The MENR has developed a flood risk map to identify which areas are most likely to be affected by flooding. It supports safer planning of housing and infrastructure, guides emergency services in protecting vulnerable communities, and raises awareness so individuals can take precautions. It is also useful for governments and insurers when making decisions about land use, insurance policies, and disaster recovery (Ministry of Ecology and Natural Resources of Azerbaijan, 2024^[62]).
 - **Assessment of drought levels:** To evaluate drought conditions across the country, Azercosmos conducted nationwide monitoring using multi-year optical satellite imagery. It assessed vegetation dynamics over a 25-year period, providing insights into long-term changes. The 2024 assessment of drought levels, based on this satellite analysis, identified severe arid conditions primarily in the East Zangazur, Karabakh, and Shaki-Zagatala economic regions.
 - **Reconstruction of the Shirvan Canal.** The Shirvan Canal is one of Azerbaijan’s most important irrigation channels (the other being the Upper Garabagh Canal) and is a cornerstone of the country’s irrigation system. However, its aging infrastructure has presented growing challenges. In recognition of its strategic importance, on 8 April 2024, President Ilham Aliyev issued a decree to launch the canal’s comprehensive reconstruction. The project is designed to expand its capacity to 180 cubic meters per second and extend its length to 204.3 km, thereby upgrading the canal to modern standards and strengthening its ability to meet the irrigation needs of Azerbaijan’s agricultural lands (Government of Azerbaijan, 2022^[63]).
 - In 2021, the Regulation on the “**Electronic Water Management**” Information System was approved by the President of the Republic of Azerbaijan to modernize the country’s water management system (Republic of Azerbaijan, 2021^[64]). This initiative aims to digitalize the annual water management balance, enhance the assessment of water resources across key water and irrigation facilities, and establish electronic, including real-time, monitoring of sub artesian and artesian wells. Several international projects have been carried out recently, aiming to improve water management in Azerbaijan, including “Integrating Climate Change Risks into Water and Flood Management by Vulnerable Mountainous Communities in the Greater Caucasus Region of Azerbaijan (2012-17)” implemented by the UNDP and MoES; “Azerbaijan: Preparing Irrigation and Drainage System Development in Nachkivan Autonomous Republic” implemented by the Asian Development Bank (ADB); and the “Azerbaijan: Flood Mitigation Project” (2004-08) implemented by the ADB.
 - **Irrigation schedules.** In order to ensure efficient and economical use of water for irrigation, irrigation schedules are drawn up for farmers by the MoA on a yearly basis.
-

Thus, conditions have been created for farmers to use irrigation water in turns. So far, about 43 000 farmers with a total cultivated area of more than 80 000 ha have benefited from irrigation schedules (Ministry of Agriculture of Azerbaijan, n.d.^[65]).

Several major challenges contribute to increasing pressure on water consumption and management in the country.

The Azerbaijani government has invested significantly in modernizing irrigation infrastructure to combat climate challenges. Innovative irrigation systems are now operational across 134 078 ha, representing 7.1% of the country's total irrigated areas¹⁷. While significant progress has been achieved to improve Azerbaijan's irrigation infrastructure, substantial challenges persist, particularly in regions with limited access to reliable water sources. Given that the majority of arable land in the country relies on irrigation, enhancing water supply systems and promoting efficient use of irrigation water are critical to improving agricultural productivity and sustainability.

A significant number of farmers continue to rely on flood irrigation, which contributes to soil salinization and erosion. Additionally, nutrient run-off into surface water bodies is not currently addressed within the regulatory framework, posing risks to both soil health and water quality.

Despite the government's efforts to promote water-efficient agriculture through modern irrigation technologies, several key problems hinder their widespread adoption among farmers. These challenges stem from structural, financial, and knowledge-related limitations, which must be addressed to ensure sustainable agricultural development. Modern irrigation systems (e.g., drip, sprinkler, or pivot irrigation) are cost-prohibitive for smallholders, even with state subsidies.

Without consolidation or co-operative farming models, individual farmers struggle to justify the investment in advanced irrigation infrastructure. Some resort to improvised drip irrigation set-ups, which are cheaper initially, but unsustainable in the long run. Due to an inconsistent and low-pressure water supply, many farmers are compelled to construct artificial reservoirs on their land. This not only reduces the amount of arable land available for cultivation, but also imposes additional financial burdens on farmers. Furthermore, the insufficient water pressure necessitates the installation of specialized pumping equipment for irrigation purposes, leading to increased energy consumption and higher operational costs for farmers.

It is important to note that Azerbaijan has not yet developed a comprehensive scheme for the integrated use of national water resources. This absence complicates the rational allocation and management of water under conditions of scarcity and uneven distribution.

Furthermore, the underdevelopment of public-private partnerships in the provision of drinking water and irrigation water, combined with the exclusive involvement of state institutions among key stakeholders, has further exacerbated these challenges.

The rehabilitation and modernization of Azerbaijan's irrigation infrastructure is a pressing necessity. Current systems, many of which are soil-based, should be replaced with pipelines or concrete canal systems to minimize water losses from leakage and evaporation. Traditional irrigation on furrows (earth trenches) transport 75% of irrigation water, resulting in significant water loss through percolation and evaporation.

Establishing clear regulation of water use rights should be considered a priority. Doing so would allow for the definition of distinct categories of water use, enhance legal certainty, and create opportunities for greater private sector participation in water-related projects.

¹⁷ Electronic Agricultural Information System (EKTIS), Agricultural Research Center under the Ministry of Agriculture of the Republic of Azerbaijan.

Although the Water Code includes a provision to align water resources management with administrative-territorial and basin principles, current legislation does not specify the mechanisms for implementing IWRM or the basin approach. According to the State Statistical Committee, the level of implementation of IWRM in the country is 55 percent (medium high) (The State Statistical Committee, 2024^[66]).

Currently, Azerbaijan lacks a clearly defined river basin management framework for water resources governance. To enhance efficiency and sustainability, it is imperative to establish a centralized state authority responsible for integrated water supply across all sectors, including municipal, agricultural, and industrial uses as well as for implementing comprehensive measures to restore and preserve the ecological status of water bodies (rivers, lakes, reservoirs, etc.).

Finally, Azerbaijan lacks drought and flood management plans.

7. Pest, disease and invasive species management due to climate change

In the last five years, there has been a trend of increasing harmfulness of alternariosis or brown spot of pomegranate bushes (*Alternaria alternata* (Fr.) Keissl.) in the western part of Azerbaijan. The leading reasons for the increasing severity of the disease at present are climatic factors. Low temperatures and prolonged frequent rains in early spring and mid-summer in 2018-2023 contributed to the intensive spread and development of the disease in the western regions of Azerbaijan (Huseynova, 2024^[71]).

7.1 Main policy documents

The Law of the Republic of Azerbaijan “**On Phytosanitary Control**” provides the **legal framework for the organisation and enforcement of phytosanitary control** in the country (Republic of Azerbaijan, 2006^[72]). It regulates plant protection and quarantine measures while overseeing the use of pesticides, biological preparations, and agrochemicals, including organic, mineral, and bacterial fertilizers, chemical ameliorants, plant growth stimulants, and other substances aimed at enhancing soil fertility, increasing crop yields, and improving product quality.

Resolution No. 41 of the Food Safety Agency (Decision of the Board of the Food Safety Agency of the Republic of Azerbaijan on Approval of “**Phytosanitary norms and rules for materials under quarantine control imported into the Republic of Azerbaijan and transported in transit through the territory of the Republic of Azerbaijan**”) outlines the phytosanitary requirements for materials under quarantine control imported into and transiting through Azerbaijan (Food Safety Agency of the Republic of Azerbaijan, 2023^[73]).

7.2 Key institutions

The **State Agrarian Development Centres under the AXA** identify plant diseases and pests upon farmer requests. They serve as a key link between state agricultural services and the farming community. **Scientific research institutes under the MoA** include the Scientific Research Institute of Plant Protection and Technical Plants, the Scientific Research Institute of Fruit and Tea Growin of the MoA, the Scientific Research Institute of Viticulture and Winemaking, and the Scientific Research Institute of Vegetable Growing. These institutes engage in scientific research focused on the identification and management of plant diseases and pests, and disseminate their findings to farmers. Additionally, they perform diagnostic services based on farmers’ requests.

The Agrarian Services **Agency of the MoA** regularly conduct training programmes to support farmers in managing pests, diseases, and invasive species.

8. Development, certification and use of climate resistance seeds or plant varieties

8.1 Key government documents

The 1997 **Law of the Republic of Azerbaijan on Seed Production** (<https://e-ganun.az/framework/3819>) states that the purpose of seed production is to cultivate and propagate plant varieties with high productivity, stable hereditary characteristics, and resistance to diseases, pests, and various climatic conditions. However, the law does not explicitly address issues related to climate adaptation. Amendments may be introduced in the future to cover this aspect. In addition, there is a lack of seed-breeding farms while the capacity of the existing farms is limited, causing a dependence on seed imports (Ahouissoussi, Neumann and Srivastava, 2014^[8]).

Although there is active scientific research on the development of drought-resistant plant varieties, there are currently not enough incentives for farmers to adopt them.

8.2 Institutional set-up

The AXA is responsible for both managing agricultural seed production and certification in Azerbaijan¹⁸. On 29 July 2021, the Minister of Agriculture of Azerbaijan approved the **Regulations for the Laboratory, Expertise, and Certification Center within the Agrarian Services Agency** (Agrarian Services Agency, 2025^[50]). This centre comprises 11 regional facilities and a central laboratory, conducting research, expertise, and certification in agrarian services. It is responsible for seed certification based on varietal and sowing qualities, seed crop registration, assessment of planting materials, and examination of plant breeding innovations. Additionally, it oversees agrochemical research on agricultural land, laboratory diagnostics of animal diseases, and provides guidance on seed production and biological methods.

8.3 Dissemination of experience

In 2019, the Republican Seed Certification Center organised a “**Republican Seed Exhibition-Sale**” fair for the first time in the country in Hajigabul city. The exhibition featured products from more than 50 local private seed production and sales companies. The exhibition mainly showcased cereal (barley, wheat) as well as vegetable plant varieties and seeds. Within the framework of the exhibition, farmers received information on obtaining certified seeds, the correct selection of varieties according to the soil and climatic characteristics of the regions, cleaning seeds, and conditioning (Ministry of Agriculture of the Republic of Azerbaijan, 2021^[51]).

In addition, the **Azerbaijan Seed Growers Association** held the **Second Republican Seed Growers Forum** in Masalli district in 2024. The goals of the forum were to develop seed production on a scientific basis, promote state control over the quality of the seed production system, benefit from international experience in organizing primary seed production, align the seed production system with international standards, as well as develop the prospects of private

¹⁸ The Agricultural Services Agency (AXA) has four areas of activity: (1) Laboratory, Expertise and Certification Center, (2) Laboratory Diagnostics of Animal Diseases, (3) Plant Protection and Fumigation (Decontamination) Center, and (4) Agricultural Training Center. AXA's areas of activity include: optimizing and increasing the efficiency of state services provided in the agricultural sector, ensuring transparency and citizen satisfaction, ensuring animal health, increasing productivity in livestock breeding, plant health, plant protection and fumigation (decontamination) measures in the areas of increasing productivity in crop production, organizing agrochemical services, registering and protecting selection achievements, managing seed production in agriculture, conducting state registration of agricultural machinery, applying innovative methods of state control over its technical condition and operation, and extension services.

seed production and the application of new innovative technologies in this field (Azerbaijan Seed Growers Association, 2024^[52]).

9. Extension and advisory services and sharing of best practices

Azerbaijan is actively developing policies and regulations to support education and advisory services that help farmers and food processing companies adopt climate adaptation technologies. With support from the European Union (EU) and the Food and Agriculture Organisation (FAO), Azerbaijan is formulating a legislative framework to enhance agricultural advisory services. This includes a five-year strategy aimed at improving the delivery of these services, fostering collaboration among government bodies, the private sector, and civil society (FAO, 2022^[39]). The "Strengthening of Agricultural Advisory Services" project initiated pilot programs in regions like Ganja-Gazakh and Guba-Khachmaz to test and refine models of agricultural advisory services tailored to local needs (EU Neighbourhood East, 2021^[40]). In addition, the Electronic Agriculture Information System (EKTIS) digital platform provides farmers with electronic access to state services, including information and advisory services, enhancing transparency and efficiency in the agricultural sector.

9.1 Agrarian Training Centre of the Agrarian Services Agency

The **Agrarian Training Centre** was established under the **Agrarian Services Agency (AXA)** in 2021 (Agrarian Training Centre, n.d.^[41]). It is based on the Regional Agrarian Science and Innovation Centers in Beylagan, Ganja, Kurdamir, Guba, Lankaran, Salyan, Sheki, and Tartar, in accordance with Part 1 of Resolution No. 132 of the Cabinet of Ministers of the Republic of Azerbaijan from 7 May 2021 (Cabinet of Ministers of the Republic of Azerbaijan, 2021^[42]). These centers operate independently of the MoA. It has a central office and eight Regional Training Centers (RTMs).

The main areas of activity of the Centre are:

- Enhancing opportunities for value chain participants and promoting employment through the production of competitive agricultural products that significantly impact the development of the agrarian sector.
- Strengthening linkages between agrarian training institutions and farmers.
- Facilitating the dissemination of new technologies, international best practices, and scientific and technical innovations in the agrarian sector.
- Developing a qualified pool of trainers to serve the agrarian sector.
- Organizing and delivering training, informational, and advisory services.

To improve the knowledge and practical skills of farmers nationwide, the Center offers training in the following areas:

- grain cultivation, including weed, disease, and pest control
- modern animal husbandry practices
- cotton production, including pest and disease management
- beekeeping
- establishment of citrus and fruit orchards
- tea cultivation, with emphasis on modern agrotechnical care and pest/disease control

- implementation of modern irrigation systems
- horticulture, including the establishment of intensive and super-intensive orchards and modern cultivation techniques
- use and maintenance of modern agricultural machinery
- support for the implementation of relevant state programmes

Additionally, calendar-based crop cultivation plans are available on AXA's official website. The current extension system lacks the human and financial resources to respond to farmers' needs. As there are no current government measures to strengthen this capacity, **various private sector actors** respond with ad hoc measures of their own. Some of the larger agribusiness enterprises bring in international experts to train their own staff and supplier farmers. A number of **commodity associations** formed to support horticultural development are doing the same. Commodity associations represent their members' interests by engaging in dialogue with the government, including to advocate for improved market conditions, but they do not engage in joint production. However, the newly formed associations lack experience and resources to provide support to the sectors. So, although welcome, these initiatives are limited in scope (reaching few farmers relative to demand), short-term, and commodity specific. In addition, SMEs need support on skills development and extension services to improve productivity and build resilience against climate change (World Bank, 2023^[9]). Finally, the topics of training should also include measures to adapt to climate change impacts.

9.2 Ministry of Agriculture demonstrations

The MoA regularly showcases advanced soil and resource conservation machinery and technologies designed to adapt to climate change (such as precision agriculture, conservation tillage and water-efficient irrigation systems), providing farmers with **practical demonstrations**. In this context, demonstrations of these technologies took place in the Sheki district in 2022 and the Yevlakh district in 2024 (Ministry of Agriculture of the Republic of Azerbaijan, 2022^[43]; Agrarian Services Agency, 2024^[44]). Notably, in 2024, the MoA collaborated with the Economic Zones Development Agency under the Ministry of Economy (MoE) as well as private sector entities such as "Azeşeker" LLC agroholding¹⁹ and "Gilan Pivot" LLC²⁰ (a company designing irrigation systems) to organize these events.

The primary objective of these demonstrations, along with the accompanying consultations, is to promote the widespread adoption of moisture conservation technologies and climate-resilient innovations. This initiative aims to mitigate the adverse effects of global warming on agriculture, enhance environmental protection, and improve the knowledge and skills of farmers operating in drought-affected regions. Additionally, the events facilitate knowledge exchange by enabling large farms and agroparks to share their expertise and best practices in sustainable agriculture.

10. Innovation for climate change adaptation

10.1 Agrarian Innovation Festivals and Business Festivals

During 2021-2023, the **Agrarian Innovation Center under the Ministry of Agriculture of Azerbaijan** (called the Agricultural Innovation Centre until 2021) organized **Agrarian Innovation Festivals** across various regions of the country. Since 2023, the Center has continued these

¹⁹ <https://azsf.az/en/page/about-us>.

²⁰ <https://www.gilanpivot.com/>.

initiatives with the launch of **Business Festivals**. These festivals serve as platforms for showcasing cutting-edge agricultural products and technologies, fostering innovation and sustainable development in the sector. Structured as exhibitions, start-up zones, roundtables, training sessions and informational meetings, the festivals highlight a wide range of advancements, including alternative energy devices, climate-resistant local fruit and vegetable seeds and ecologically clean products. These events play a crucial role in promoting modern agricultural practices, supporting entrepreneurship, and enhancing collaboration between industry stakeholders (Agrarian Innovation Center under the Ministry of Agriculture of the Republic of Azerbaijan, 2024^[45]). More information on the Agrarian Innovation Centre is available in Box 2.5, and examples of specific Business Festivals are provided in Box 2.6.

Box 2.5. Agrarian Innovation Center under the Ministry of Agriculture of Azerbaijan

Agrarian Innovation Center

Initially established in 2000 under the name “Agricultural Science and Innovation Center,” the institution was renamed “Agricultural Innovation Center” in 2021 to better reflect its strategic focus on innovation in the agricultural sector.

The Center has been established to advance agriculture in the Republic of Azerbaijan through a scientifically grounded approach. It aims to manage the agricultural sector and its subordinate institutions in a unified and co-ordinated manner. The Center is responsible for overseeing and harmonizing the activities of its affiliated entities, providing scientific and methodological assistance to farmers, and contributing to the overall economic development of the country. Furthermore, it seeks to modernize the agricultural sector in line with innovative standards, implement systematic measures to support regional agricultural innovation, and promote effective economic, social, and regional policies. The Center also prioritizes ensuring transparency, responsiveness, and operational efficiency.

Source: (Agrarian Innovation Centre, n.d.^[46]).

Box 2.6. Examples of Business Festivals

- **Pomegranate Festival.** Since 2006, the “**Pomegranate Festival**” has been held annually in the Goychay region of Azerbaijan. During the festival, pomegranate varieties grown in different villages of the Goychay region and products made from them are brought to the regional center and displayed at an exhibition organized in the city square. The festival also showcases products from local and foreign companies, useful agricultural technologies and various handicrafts. (Goychay District Executive Power of the Republic of Azerbaijan, 2023^[47]).
- **Persimmon Festival.** Since 2017, the Persimmon Festival has been held in the Balakan region to celebrate and promote its long-standing tradition of persimmon cultivation, one of the area’s key agricultural sectors. The festival plays a significant role in fostering agricultural development, particularly in fruit growing, while also showcasing the region’s rich cultural heritage, hospitality, and tourism potential. Additionally, it serves as an important platform for promoting persimmons and related products (Ministry of Agriculture of The Republic of Azerbaijan, 2024^[48]).
- **Hazelnut Festival.** Since 2017, the “**Hazelnut Festival**” has been held in Zagatala district almost every year to promote hazelnut farming more widely and to demonstrate the economic, cultural and tourism potential of both the country and the region. The festival also showcases products produced by enterprises engaged in hazelnut processing and export, modern technical equipment used in hazelnut harvesting and processing, and provides information on innovations applied in the establishment of intensive and super-intensive orchards (Zagatala District Executive Power of the Republic of Azerbaijan, 2017^[49]).

Source: (Goychay District Executive Power of the Republic of Azerbaijan, 2023^[47]); (Ministry of Agriculture of The Republic of Azerbaijan, 2024^[48]); (Zagatala District Executive Power of the Republic of Azerbaijan, 2017^[49]).

10.2 Agroparks

The government emphasizes the development of agroparks that integrate sustainable practices and innovative technologies. These agroparks focus on efficient water and land management, cultivation of drought- and heat-resistant plant varieties, and application of modern agrotechnical methods to increase productivity and resilience to climate change.

According to the Agricultural Research Center (ARC), a total of 53 agroparks were operational across the country in 2024. These agroparks collectively encompass 237 000 ha of agricultural land, including 201 000 ha of arable land. To date, total investments in these agroparks have reached 1.5 billion manats. The ARC manages the agroparks.

Additional topics of relevance for the EU Green Deal

1. Environmental standards and certification

1.1 Key laws and policy documents

Environmental protection is regulated by several laws. The **Law on Ecological Safety** establishes restrictions on economic and other activities to safeguard the environment (Republic of Azerbaijan, 1999^[78]). According to this law, one of the state’s duties in the field of environmental

safety is to approve state standards and other regulations that determine the requirements for ensuring environmental safety.

In recent years, a new edition of the Law of the Republic of Azerbaijan “**On Standardization**” and the Law of the Republic of Azerbaijan “**On Technical Regulation**” have been adopted in order to bring the country’s national standardization system in line with international requirements (Republic of Azerbaijan, 2019^[79]; Republic of Azerbaijan, 2019^[80]). According to the **Law on Standardization**, the requirements stipulated in documents in the field of standardization must comply with international standards; be based on modern achievements of science, technology and engineering; take into account the conditions of the goods (services, work), process, production method, and must not violate the requirements of the normative legal acts of the Republic of Azerbaijan. One of the main objectives of the **Law on Technical Regulation** is to ensure the protection of people’s lives and health, the environment, property, and the interests of the state.

The Law of Azerbaijan “**On Food Safety**” regulates the safety of food and feed products in the territory of Azerbaijan in accordance with paragraphs 11, 20 and 26 of Part I of Article 94 of the Constitution of Azerbaijan to protect the life and health of people, as well as animals, and the rights of consumers (Republic of Azerbaijan, 2022^[69]). According to this law, the requirements for the safety of food and feed products and the minimum quality of food products, including the maximum amount of residues in food and feed products, substances allowed for use in products and their established limits, as well as materials and products in contact with food products, the processes of primary production, production, processing, circulation and disposal of food and feed products are determined by technical regulatory legal acts in the field of food safety (sanitary and hygienic, veterinary, phytosanitary norms and rules). Technical regulatory legal acts in the field of food safety are developed on the basis of international standards, instructions and recommendations adopted by relevant international organisations.

The objectives of state regulation in the field of food safety are as follows:

- protection of life and health, consumer rights
- harmonization of legislation in the field of food and feed safety with international standards, norms and rules adopted by international organisations of which the Republic of Azerbaijan is a member
- increasing the competitiveness and export potential of local food and feed products
- creation of favorable conditions for the development of entrepreneurship in the field of primary production, production, processing, circulation and utilization of food and feed products

The state programme “**On the Adaptation of the National Standardization System to International Requirements for 2023–2025**” aims to adapt the national standardization system to international requirements, including the adoption of national technical regulations based on EU directives and standards (Republic of Azerbaijan, 2023^[81]).

Annex A includes the Programme’s action plan outlining the key activities and timelines. The main executive body for all the actions is the MoE.

1.2 Standards and certification for horticultural products

Currently, the export of fruits from Azerbaijan to EU countries remains limited. **Hazelnuts and pomegranates** constitute the primary fruit exports, with the necessary certifications already secured by relevant producers to meet EU market requirements. The EU has authorized imports

of Azerbaijani pomegranates into Germany, France, Latvia, and Poland, indicating compliance with specific EU phytosanitary standards (Euro Fresh Distribution, 2018^[82]). To expand fruit exports beyond these two products, it is essential for producers to obtain the appropriate certifications for other fruit as well. It is important to note that hazelnuts and pomegranates are grown in relatively few countries, which simplifies their entry into the EU market due to lower competition. In contrast, the export of other fruits faces significant challenges due to intense market competition within the EU, making it more difficult to achieve expansion in this segment.

Azerbaijan adopted 162 standards of food production for free movement of goods. **National standards** are registered by the Azerbaijan Institute of Standardisation (AZSTAND) and bear the abbreviation “AZS”. The **regional standards** “GOST”, adopted by the Interstate Council for Standardization and Certification of the Commonwealth of Independent States (CIS), are also used (FAO, 2018^[83]).

Efforts have been made to introduce and implement **Good Agricultural Practices (GAP)** in Azerbaijan. For example, as a result of the certification audit conducted by INCERT LLC, an agricultural producer of tomato, pepper and eggplant called “Bina Agro” has been certified according to one of the most popular standards, GLOBAL GAP (Bine Agro, 2025^[84]; Bine Agro, 2019^[85]). However, the widespread adoption of GAP among pomegranate and persimmon producers remains limited. Many farmers lack basic knowledge of GAP, and there is a need for more extensive training and support to achieve widespread compliance with international standards.

The standards adopted in the country are included in the “**State Fund of Normative Documents on Standardization**” (Azerbaijani Institute of Standardization, n.d.^[86]). The State Fund includes state standards; initial state standards (temporary); technical specifications; international, regional and interstate standards, rules and recommendations on standardization, standards of foreign states, international (regional) and interstate agreements on standardization, as well as official information on their application rules. For example, the production, processing, labeling and sale of “ecologically clean” (organic) agricultural and food products is recorded in the State Fund under the standard AZS 921-2022. The Fund also includes standards for Fresh oriental persimmons (AZS 275-2007, AZS 275:2024), Dried subtropical fruits (AZS 351-2009) and Pomegranate (AZS 810-2015 (Codex stan 310-2013)).

1.3 Certificates for export to EU

To meet EU import requirements, the key certificates for horticultural products in Azerbaijan are:

- **Phytosanitary Certificate** issued by the Food Safety Agency of the Republic of Azerbaijan (AFSA). Required for plant-based products (such as fruits, vegetables, grains, and seeds), this certificate verifies that the goods are free from pests, diseases, and quarantine organisms.
- **Food Safety and Hygiene Certificate** issued by AFSA: This certificate confirms that food products are produced in accordance with the Codex Alimentarius and EU food safety standards.

1.4 International co-operation with standardisation bodies

In order to adapt the national standardization system to international practice, Azerbaijan has established co-operation with the International Organisation for Standardization (ISO), the International Electrotechnical Commission (IEC), Codex Alimentarius, the European Committee for Standardization (CEN), the European Electrotechnical Commission (CENELEC), the Interstate Council for Standardization, Metrology and Certification of the CIS, the Interregional

Bureau for Standardization (MAC), the Economic Cooperation Organisation (ECO), the American Society for Testing and Materials (ASTM International), as well as other international and regional organisations. Up to 20 intergovernmental agreements and inter-agency memoranda of understanding have been signed in the fields of standardization, accreditation, conformity assessment and metrology (Republic of Azerbaijan, 2023_[81]).

1.5 Key institutions

The **Conformity Assessment Department**, a division of the **Azerbaijan Standardization Institute**, has been accredited as a certification body for products, works, and services in compliance with the ISO / the IEC 17065 international standard since 14 July 2017 (Azerbaijani Institute of Standardization, n.d._[87]). It certifies domestically produced, imported, and exported food, agricultural and industrial products, along with services, under the National Certification System's regulations.

According to a decision by the MoE's Board, the **State Service for Antimonopoly and Consumer Market Supervision** issues **certificates of origin** based on applications from legal entities and individuals (Republic of Azerbaijan, 2012_[88]). The State Service reviews applications within one day of submission and makes a corresponding decision. The "Center for Consumer Goods Expertise" LLC, operating under the State Service, conducts evaluations to determine the country of origin of goods, with associated fees set by the Tariff (Price) Council.

The **AFSA** oversees phytosanitary quarantine inspections and expertise of materials under quarantine control, both for imports and exports. Additionally, it issues health certificates for food and feed products exported or re-exported when required by importing countries (Azerbaijan Food Safety Agency, 2025_[89]; Cabinet of Ministers of the Republic of Azerbaijan, 2006_[90]; Cabinet of Ministers of the Republic of Azerbaijan, 2023_[91]).

Established in 2017 under a presidential decree, the "**Single Window**" **Export Support Center** helps entrepreneurs streamline the certification process for exports, reducing time and costs (Republic of Azerbaijan, 2008_[92]; Center for Analysis of Economic Reforms and Communication of the Republic of Azerbaijan, n.d._[93]). The centre also offers business consultations, assists with business plans, and supports the completion of customs declarations in real-time.

Several state agencies provide services through the "One Window" Export Support Center:

- The Azerbaijan Standardization Institute, which operates under the State Agency for Antimonopoly and Consumer Market Supervision under the President of the Republic of Azerbaijan issues certificates of origin and certificates of conformity²¹ (Cabinet of Ministers of the Republic of Azerbaijan, 2020_[94]).
- The AFSA provides food safety certificates, phytosanitary certificates for plants, and veterinary certificates for animal products, raw materials, and feed. AFSA also handles the registration of food sector entrepreneurs.

The "**Azterminalkompleks**" **Association** under the State Customs Committee assists exporters with filling out customs declarations.

There are some clashes between the duties of the agencies since their actions constitute unnecessary repetitions while certifying food products for ensuring food safety.

²¹ A certificate of conformity is a document confirming the compliance of the certified product (work, service), the process (including the management system), and the production method with the requirements set forth in the relevant standardization regulatory documents, technical regulations, and other regulatory legal acts.

Currently, **certification services**, including Organic, GlobalGAP, ISO, Hazard Analysis and Critical Control Points (HACCP), Brand Reputation Compliance Global Standards (BRCGS), International Featured Standard (IFS), Food Safety System Certification (FSSC), and others, are offered by several private companies operating in the country, such as INCERT²² and Food Cert²³. These companies serve as local representatives of international certification bodies and provide certification for both processes and products. In addition, they offer training programs to support compliance with certification standards.

2. Sustainable use of pesticides and mineral fertilizers

2.1 Policy documents

In the “**State Programme for the Development of Production and Processing of Agricultural, Fisheries and Aquaculture Products in the Republic of Azerbaijan in 2025-2030**”, there are two measures related to this issue:

- Measure 1.3.1 on “**Establishment of a Programme for Monitoring Plant Protection Products and Agrochemicals at All Stages**”. The **AFSA** is designated as the primary implementing body for this measure. Currently, the phytosanitary subsystem of the Electronic Agricultural Information System (EAIS) is operational, and the “Cengi Pesticides Polygon” storage of expired pesticides and agrochemicals is functioning. The Cabinet of Ministers of the Republic of Azerbaijan has approved an Action Plan for the phased safe storage and disposal of pesticides and agrochemicals for 2024-2025. In 2025, efforts will focus on aligning the legal framework with international standards. Future initiatives include establishing a Unified Tracking System for plant protection products and agrochemicals, enhancing the subsystem for the disposal of persistent organic pollutants (POPs) and obsolete pesticides, implementing supporting activities (e.g. capacity building for farmers, awareness-raising campaigns and institutional support mechanisms etc.), and developing a foundation for soil and environmental protection measures, including a mechanism for the disposal of outdated equipment.
- Measure 1.3.2, titled “**Detoxification of Pesticides and Agrochemicals Considered Hazardous to the Environment and Human Health and Improvement of Relevant Infrastructure**” is led by the MoA. This measure aims to organize and implement the safe storage and disposal of hazardous pesticides and agrochemicals and to strengthen the infrastructure necessary for this process.

2.2 Pesticide and fertiliser subsidies

Since 2007, the Government of Azerbaijan has been partially subsidizing farmers’ use of pesticides and fertilizers (Republic of Azerbaijan, 2007^[74]; Ministry of Agriculture of the Republic of Azerbaijan, 2019^[75]). Under the current subsidy programme, pesticide costs are covered as part of the “**Crop Subsidy**” initiative (Ministry of Agriculture of the Republic of Azerbaijan, 2019^[75]). Initially covering 50% of fertiliser costs, the state later increased its support to 70%, eventually extending the subsidy to include biohumus as well (Republic of Azerbaijan, 2019^[76]). This financial assistance has contributed to an overall increase in the use of fertilizers and pesticides in the country’s agricultural sector.

²² <https://incert.az/>.

²³ <https://foodcert.az/>.

Despite this support, the per-hectare use of fertilizers and pesticides in Azerbaijan remains significantly lower compared to many European countries. This is largely due to the prevalence of small-scale farms²⁴ and traditional agricultural methods. For instance, the application of nitrogen fertilizer in Azerbaijan averaged 7.0 kg/ha in 2022, whereas in France, Germany, and Italy, the figures stood at 79.3 kg/ha, 68.0 kg/ha, and 60.2 kg/ha, respectively (FAOSTAT, 2024^[77]).

3. Organic production

According to the statistical data from the International Federation of Organic Agriculture Movements (IFOAM) and the Research Institute of Organic Agriculture (Forschungsinstitut für biologischen Landbau (FiBL)), 40 779 ha were certified as organic in Azerbaijan in 2020. Out of these, 38 080 ha were agricultural land (including conversion land, which is transitioning from conventional farming to certified organic farming), 2 126 ha were wild collection of fruits, nuts, berries and aromatic medicinal plants, and 573 ha were aquaculture (FiBL & IFOAM - Organics International, 2021^[67]). Organic hazelnuts and pomegranate juices are exported mainly to Europe and to the USA. One company has specialised in soil improvers such as organic fertilisers and pesticides. The products are sold both in Azerbaijan and in the EU.

3.1 Key policy documents

Azerbaijan's legislation on organic ("ecologically clean") agriculture consists of the Constitution of the Republic of Azerbaijan, the Law "On Ecologically Clean Agriculture" as well as other normative legal acts adopted in accordance with them.

According to Article 39 of the "**Constitution of the Republic of Azerbaijan**", everyone has the right to live in a healthy environment, and the state ensures the maintenance of the ecological balance and the protection of legally defined species of wild plants and animals (Republic of Azerbaijan, 1995^[68]).

"**The Law of the Republic of Azerbaijan on Ecologically Clean Agriculture**" governs the production, processing, and distribution of ecologically clean agricultural and food products within the country (Republic of Azerbaijan, 2022^[69]). Its primary objective is to safeguard public health and ensure the protection of soil, water, plants and animals.

Under this law, ecologically clean agriculture is defined as the cultivation of crops and the breeding of livestock without the use of chemical-synthetic (artificial) substances. It also encompasses the production, processing, distribution, and certification of ecologically clean agricultural and food products. In accordance with the legislation, agricultural and food products may be certified as ecologically clean if they are produced and processed in compliance with the requirements established by technical regulatory legal acts in the field of food safety, as stipulated in the **Law of the Republic of Azerbaijan on Food Safety**. The Law on Ecologically Clean Agriculture addresses key aspects of organic agriculture, including its general principles, state regulation, organisational requirements, environmental monitoring, and certification procedures. It also sets forth provisions related to the circulation, labeling, storage, transportation, import and export of organic agricultural and food products. Additionally, it establishes the framework for financial and scientific support, international co-operation and legal accountability for violations of relevant regulations.

²⁴ According to Azerbaijan's Electronic Agricultural Information System (EAIS), approximately 70% of local farms have a cultivated area of up to 2 ha.

The primary objectives of the law are as follows:

- ensuring the production of high-quality agricultural and food products
- restoring, protecting, maintaining, and enhancing soil fertility and structure
- preserving and improving the environment
- promoting the efficient use of natural resources
- meeting consumer demand for ecologically clean agricultural and food products while fostering competition in this sector

3.2 Key institutions

“Ecologically clean” (organic) agricultural and food products are certified by relevant **accredited conformity assessment bodies** in Azerbaijan instead of by a single certification authority. These organisations are responsible for evaluating product compliance with ecological standards and issuing the corresponding confirmation documents. The primary institutions performing this role include the **Azerbaijan Food Safety Institute (AFSI)** and **AXA** under the MoA, along with their respective local and regional offices. **AZSTAND**, a public legal entity, issues “EKO-transition” and “EKO” designations to indicate products’ compliance with ecological standards.

Even if the legislation has an article on data collection, there is no specific system or unit specializing in systematically collecting and updating data on organic production, processing, marketing, consumption, import, and export.

At present, domestic demand for locally produced organic products in Azerbaijan remains relatively low. Although legislation on “ecologically clean” (organic) agriculture exists, its implementation is limited due to insufficient consumer demand within the country. The relevance of organic certification is therefore primarily linked to export opportunities, particularly access to the European market.

Organic products are mainly certified according to EU legislation by local and foreign companies and thus enter the European market. There are also products destined for the USA and certified according to the National Organic Programme (NOP). The most important certified organic products are rose oil, pomegranate, persimmon and hazelnuts, as well as fruits, berries and wild-collected medicinal and aromatic plants (Gengenbach, 2022^[70]).

In 2015, the **Regional Experimental and Resource Center on Organic Agriculture** was established in Gakh at the Institute of Botany of the Academy of Sciences to promote organic agriculture in the Shaki Zaqatala region. The main reason for establishing the centre in this region is the clean and rich natural resources. The centre with its trained staff prepared an action plan with the following objectives: preserving local varieties that are well suited to the region, helping farmers to convert to organic farming and setting up a high-tech laboratory for soil, water and plant analysis. Currently, only a few soil and water analysis laboratories with limited analytical scope are available for the analysis of agricultural and food products.

4. Minimising farm food waste and loss

At certain times, seasonal price fluctuations and temporary export bans on key agricultural products (such as apples, tomatoes, potatoes, onions, and watermelons) result in market oversupply. Under these circumstances, farmers often lack sufficient incentives to sell their produce. The existing processing capacity of domestic food processing enterprises is insufficient to absorb these surpluses. Consequently, large quantities of products remain in storage facilities

or unharvested in the fields, eventually spoiling and being directly lost. In many cases, farmers resort to discarding unsold products into riverbeds or other locations.

In Azerbaijan, there is no separate legislation specifically addressing the prevention of food losses at the farm level. Such losses are generally considered within the broader framework of household waste management, which fails to recognize the systemic issues in agriculture such as seasonal oversupply, perishability, and market access limitations. To address this gap, dedicated legal provisions should be developed to regulate post-harvest handling, storage, and safe disposal of agricultural products, while also providing guidance and incentives for farmers to reduce losses. Legislation should promote sustainable alternatives like composting, biogas production, or using surplus as animal feed. Additional measures could comprise better market intelligence systems that would allow farmers to plan production and sales more effectively, expanding the network of cold storage facilities including mobile or temporary storage solutions in remote areas. Encouraging the formation of co-operatives, supporting secondary processing industries, and promoting digital marketplaces could create alternative routes for surplus products, ensuring they are not discarded. Training programmes for post-harvest management would also be helpful.

In 2018, the Cabinet of Ministers of Azerbaijan adopted a decision on the approval of “**Norms of Natural Loss of Food in Trade and Catering**” (Cabinet of Ministers of the Republic of Azerbaijan, 2018^[95]).

Institutional set-up for designing and implementing the climate change adaptation policy for agriculture in Azerbaijan

In 1997, the President of Azerbaijan signed a decree on the establishment of the **State Commission on Climate Change** to fulfil the country’s obligations under the UNFCCC (Republic of Azerbaijan, 1997^[96]). A Decree of the President of Azerbaijan dated 11 March 2020 revised the composition of the Commission. The Chairperson of the State Commission is the Deputy Prime Minister of Azerbaijan. The Deputy Chairperson is the Minister of Ecology and Natural Resources of Azerbaijan.

In addition, a **Working Group** of specialists from relevant state bodies has been set up, and its **Action Plan** was approved in 2020.

Over the last ten years, Azerbaijan has demonstrated its firm commitment towards achieving the 2030 Agenda. The President of Azerbaijan issued a Decree in 2016 to establish the **National Co-ordination Council for Sustainable Development** - a key partner for the United Nations (UN) to channel its support to the Government of Azerbaijan since then (Republic of Azerbaijan, 2016^[97]; UN, 2025^[98]).

The **MENR** led NAP development and drafts the NAP reports. Supporting implementing agencies include the MoE, the MoA, the MoES, the State Water Resources Agency of the Republic of Azerbaijan, and the Azerbaijan National Academy of Sciences. The MoA is key in terms of providing farmers with tools such as water-saving irrigation systems, advising services, drought resistant seeds etc.

3 EU Green Deal provisions and environmental standards

Relevant European Green Deal provisions

The **European Green Deal** is a package of policy initiatives that support the EU on the path to a green transition, with the ultimate goal of reaching climate neutrality by 2050. The Green Deal underlines the need for all policy areas to contribute to fighting climate change. It supports measures across economic sectors covering energy, transport, industry, agriculture, sustainable finance and more (European Council, 2025^[99]). The European Green Deal is an integral part of the European Commission's strategy to implement the United Nation's 2030 Agenda and the SDGs (European Commission, 2019^[100]).

The European Green Deal notes that food production still results in air, water and soil pollution, contributes to the loss of biodiversity and climate change, and consumes excessive amounts of natural resources, while an important part of food is wasted (European Council, 2025^[99]).

The Farm to Fork Strategy is a pillar of the European Green Deal which aims to make food systems more fair, healthy and environmentally friendly (European Commission, n.d.^[101]). This strategy aims to reward farmers, fishers and other operators in the food chain who have already undergone the transition to sustainable practices, enable the transition for the others and create additional opportunities for their businesses (European Commission, 2020^[102]). It states that farmers, fishers and aquaculture producers need to transform their production methods more quickly and make the best use of nature-based, technological, digital, and space-based solutions to deliver better climate and environmental results, increase climate resilience and reduce and optimise the use of inputs (e.g. pesticides, fertilisers).

Relevant provisions of the EU Green Deal and the Farm to Fork Strategy

The **key provisions** of the **EU Green Deal and the Farm to Fork Strategy** with relevance for the horticultural sector include²⁵:

- **Sustainable practices in national strategic plans under the CAP:** National strategic plans should lead to the use of sustainable practices such as precision agriculture, organic farming, agro-ecology, and agro-forestry. They will need to reflect an increased

²⁵ The PROGRESS project prioritises adaptation and resilience policy rather than mitigation policy. It does not focus on influence on consumer behaviour, carbon sequestration, bio-energy, and energy efficiency. The list includes some items that are not within the project scope but of importance to the horticultural sector overall. The list also covers matters on green finance, which are covered by Output IV of the PROGRESS project.

level of ambition to reduce significantly the use and risk of chemical pesticides, as well as the use of fertilisers and antibiotics.

- **Tackle climate change** in the agricultural sector (mitigate climate change and adapt to its impacts).
- **Reduced use of pesticides, fertilisers and antibiotics:** Strategic plans will reflect an increased level of ambition to reduce significantly the use and risk of chemical pesticides, as well as the use of fertilisers and antibiotics.
 - Measures to **reduce chemical pesticide risks** which contribute to soil, water and air pollution, and biodiversity loss include:
 - integrated pest management and safe alternative ways to protect the harvest from pests and diseases other than chemical pesticides (e.g. crop rotation, mechanical weeding)
 - biological pesticides
 - better environmental risk assessment of pesticides
 - improved data on pesticides
 - a faster pesticide authorisation process.
 - **Reduction in the use of fertilisers** by:
 - implementing and enforcing relevant environmental and climate legislation
 - applying balanced fertilisation and sustainable nutrient management
 - managing nitrogen and phosphorus better throughout the lifecycle
 - precise fertilisation techniques and sustainable agricultural practices.
- **Organic farming:** The area under organic farming will need to increase. It will be promoted through actions such as stimulation of supply and demand, promotion campaigns and green public procurement.
- **Protection against pests and diseases:** The EU needs to develop innovative ways to protect harvests from pests and diseases.
- **Seed security and diversity:** Farmers need to have access to a range of quality seeds for plant varieties adapted to the pressures of climate change. There is a need for registration of seed varieties, including for organic farming and easier market access for traditional and locally-adapted varieties.
- **Research and innovation:** Research and innovation is a key driver for accelerating the transition to sustainable, healthy and inclusive food systems from primary production to consumption. There is a need to consider the potential role of new innovative techniques to improve the sustainability of the food system while ensuring that it is safe. Innovative techniques, including biotechnology and the development of bio-based products, may play a role in increasing sustainability.
- **Reduction of FLW:** Measures to reduce FLW include legally binding targets, quantification of food waste levels, investigation and prevention of food losses at the production stage, and appropriate date marketing (use by and best before dates) etc.
- **Carbon sequestration** by farmers, which should be rewarded.

- **Circular bio-based economy** e.g. bio-refineries that produce bio-fertilisers, protein feed, bioenergy, bio-chemicals.
- **Renewable energy:** Biogas production from the food and beverage industry, solar panels etc.
- **Stimulating sustainable food processing, wholesale, retail, hospitality and food services practices:**
 - **Energy efficiency**, to reduce the environmental footprint and energy consumption.
 - **Reducing packaging.**
 - **Improvement of the corporate governance framework**, including a requirement for the food industry to integrate sustainability into corporate strategies.
 - **Circular business models in food processing and retail**, including specifically for SMEs; e.g. making use of food waste.
 - **Food packaging:** Revision of food contact materials legislation to improve food safety and public health (in particular, in reducing the use of hazardous chemicals), use of innovative and sustainable packaging solutions using environmentally-friendly, re-usable and recyclable materials, food waste reduction such as reusable packaging etc.
 - **Revision of marketing standards** to provide for the uptake and supply of sustainable agricultural products.
 - **Creation of shorter supply chains through** a reduction of dependence on long-haul transportation.
- Protecting land, soil, water, air, plant and animal health and welfare and reversal of **biodiversity** loss.
- **Enforcement of legislation**, including on pesticide use and environmental protection.
- **Certification and labelling** of sustainability performance of food products and **targeted incentives**.
- **Access to fast broadband internet:** This will enable precision farming and the use of Artificial Intelligence (AI), leading to better soil management and water quality as well as a reduction in the use of fertilisers, pesticides and GHG emissions.
- **Advisory services:** there is a need for objective, tailored advisory services for all actors in the food system.
- **Investments** are key to encourage innovation and create sustainable food systems²⁶.
- **Targeted support for SMEs:** Specific tailored solutions are required for SME food processors and small retail and food service operators, to help them develop new skills and business models while avoiding administrative and cost burdens.

Importantly, the EU aims to support the global transition to sustainable agri-food systems, including through **international co-operation** and **trade** policy. The EU will seek to ensure that all EU bilateral trade agreements have a robust sustainability chapter. The EU's trade policy will

²⁶ This topic falls under PROGRESS Output IV.

seek to obtain ambitious commitments from third countries in areas such as the use of pesticides and antimicrobial resistance (European Commission, n.d._[101]).

Relevant provisions of the EU Adaptation Strategy

The new **EU Adaptation Strategy** is part of the European Green Deal. It states that its adaptation action will be implemented in an integrated manner with the other European Green Deal initiatives, including the Farm to Fork Strategy, the Soil Strategy, the Circular Economy and Zero Pollution Action Plans and the Biodiversity Strategy (European Commission, 2021_[103]). The key relevant provisions include:

- The importance of the **private and the public sector to work more closely together**, especially on financing adaptation.
- Adaptation **awareness and planning** would be spread to every single local authority, company and household.
- There is a need to **expand adaptation knowledge**, and acquire more and better climate-related data, especially on economic losses. Dialogue between policy makers and scientists needs to be promoted, and improvements in modelling are needed.
- The **digital transformation** is critical to achieving Green Deal objectives: The use of latest technologies and climate services to underpin decision-making must be promoted (for example, remote sensing, smart weather conditions, artificial intelligence and high-performance computing).
- **Climate resilience considerations must be mainstreamed in all relevant policy fields** applicable to public and private sectors, to support the development and adaptation strategies and plans at all levels of government. **Adaptation strategies at all levels must be effective and based on the latest science.**
- **Monitoring, reporting and evaluation are essential** to setting a robust baseline against which to measure progress on adaptation.
- **Achieving resilience in a just and fair way is essential** so that the benefits of climate adaptation are widely and equitably shared. Adaptation measures need to consider the needs of men and women, older people, persons with disabilities, displaced persons, or socially marginalized groups. Support is needed for education, training and reskilling initiatives that lead to green jobs.
- **Budgetary planning, governance and institutional arrangements need to reflect disaster risk management** (including processes and tools to address ex-ante climate related risks and reducing ex-post disaster consequences).
- **Implementing nature-based solutions on a larger scale** would increase climate resilience and contribute to multiple Green Deal objectives. For example, **promoting and sustainably managing forests and farmland** will help adapt to climate change in a cost-effective way. It is vital to better quantify their benefits and to better communicate them to decision-makers and practitioners at all levels to improve take-up.
- To accelerate adaptation action, **implementation requires resources** that are commensurate with the challenge.
- **Solutions are urgently needed to help farmers and land managers** tackle climate risks. **Supply of suitable high-quality plant reproductive material** to support adaptation in agriculture, forestry and land ecosystem management should be facilitated

and broadened. More work is needed to encourage **collaborative, transnational production and transfer of seeds and planting material**.

- **Climate resilience decision support systems and technical advice** must become more accessible and rapid to foster their take-up. Such solutions would have to work on a timescale and with resources available for the financial sector, SMEs or small farmers.
- Climate adaptation action must better leverage synergies with broader work on **disaster risk prevention and reduction**.
- Ensuring that **freshwater is available** in a sustainable manner is fundamental for climate resilience. A wider use of **drought management plans**, measures to **increase the water retention capacity of soil and safe water reuse** should be promoted. In agriculture, a **knowledge-based approach**, as well as both **high tech and nature-based solutions** are necessary to ensure a sustainable use of water. Member States can support **precision farming** via national CAP Strategic Plans. Member States must also ensure that **water is priced correctly**, in line with the Water Framework Directive, so that consumers are not misled about the real cost of food.
- A **stable and secure supply of drinking water is of highest importance**, and it must be guaranteed. It is **important to include climate impacts** in the risk analyses of (drinking) water management plans, develop water-monitoring technologies and ensure minimum river flow. Similarly, **it is important to maximize the capacity of soils to purify water** and reduce pollution.

EU environmental standards for fruit and vegetable imports

Imported food that does not comply with relevant EU environmental standards is not allowed on EU markets (European Commission, n.d.^[101]). EU market requirements include mandatory requirements set in European regulations and non-mandatory private regulations set by buyers (certifications) (CBI, 2023^[104]).

Mandatory requirements

Mandatory requirements apply to food safety and quality, including:

- **Limited use of pesticides** according to a regularly updated list of Maximum Residue Levels (MRLs) of pesticides. Some EU Member States apply stricter rules to pesticide levels than is required by European legislation, including supermarket chains in the Netherlands, Austria and Germany (CBI, 2023^[104]). The [EU pesticide database](#) provides information on relevant MRLs for specific products.
- **Limits on contaminants** (substances that are not added to food on purpose but appear from various sources such as agricultural practices, pollution, packaging, transport and holding or occur naturally as “inherent plant toxins”) such as chemicals (e.g. heavy metals, nitrate and perchlorate). Rules for raw and processed fruits and vegetables may vary (CBI, 2023^[104]).
- **An HACCP Plan** to supply pre-cut fresh fruits and vegetables, to **control microbiological hazards** (viruses, parasites and bacteria) through the processing and packaging process. The buyer must be informed if there is a power cut during storage (CBI, 2023^[104]).

- **A phytosanitary certificate** for most fruits and vegetables, guaranteeing that the products are free from quarantine pests and other pests. This certificate is usually issued by the exporting country's plant protection authorities (CBI, 2023_[104]). The EU phytosanitary requirements are in line with the World Trade Organisation and other international rules (European Commission, n.d._[105]).

General marketing standards (GMS) for quality and maturity (CBI, 2023_[104]). The Organisation for Economic Co-operation and Development (OECD) Fruit and Vegetables Scheme has developed 31 explanatory brochures on the marketing standards (e.g. the one on apricots is available [here](#)). The UNECE also has explanatory brochures. It is better to aim even higher than the GMS to overcome the competition. The FAO publishes additional marketing standards for fruits and vegetables.

- **Traceability** of products according to the General Food Law Regulation, with the **proof of origin** document required for all fruits and vegetables (CBI, 2023_[104]).
- **Labelling and packaging:**
 - **Labelling** must adhere to EU legislation on food labelling. There are rules on labelling cartons of fresh fruits and vegetables as well as those that are processed or directly packed for consumption (CBI, 2023_[104]). Stricter regulations on the **use of plastic in packaging** are expected.
 - **Packaging requirements** aim to protect the environment and prevent risk to the health of consumers. Packaging must protect the product against contamination, leakage or dehydration (CBI, 2023_[104]).

It is important to keep abreast of EU regulations which are regularly updated. Products are submitted to compulsory tests at an entry point, which can include a check of phytosanitary certificates/documents; physical checks to ensure that they are free from harmful organisms; identity checks to ensure that they correspond to certification; and inspections to check for harmful organisms (CBI, 2023_[104]).

Non-mandatory certifications

The main **non-mandatory certifications** include:

- [Global Agricultural Practices \(Global G.A.P.\)](#) is a private, voluntary certification used by most buyers of fresh fruits and vegetables in the EU, especially in northern Europe and in supermarkets. Global G.A.P. includes standards on sustainable production practices and environmental protection, including crop management, as well as worker health and safety (CBI, 2023_[104]).
- [International Food and Safety Standard \(IFS\)](#) is a food safety management system dedicated to food safety and quality. Developed by Germany and France, it is widely recognized by food manufacturers and retailers in Europe (CBI, 2023_[104]).
- [British Retail Consortium Global Standards \(BRCGS\)](#) include a Retail and Safety Certification for companies in the food retail supply chain. The standard helps companies and their customers meet legislative requirements for food and product safety. BRCGS are used in the United Kingdoms, but are also common in mainland Europe (CBI, 2023_[104]).
- The [Rainforest Alliance Certification](#) applies to some fruits, including apricots and raspberries. The standard has detailed criteria for environmental, social and economic sustainability. It is used in large retail chains in northwestern Europe (CBI, 2023_[104]).

- [Fairtrade Standards](#) incorporate social, economic and environmental criteria. They cover fresh fruits including apricots and raspberries. These standards apply to the realities of farmer co-operatives, workers at large farms or factories, artisanal miners, as well as traders and companies who buy and sell Fairtrade products. These standards are not at the top of the list for buyers because of complex requirements and high costs (CBI, 2023_[104]).
- **Organic certification** is applied throughout the EU, with all European countries having their own national organic labels (CBI, 2023_[104]).
- [ISO 14001](#) for Environmental Management is an internationally recognised standard that provides a framework for organisations to design and implement an Environmental Management System (EMS). An EMS would help organisations ensure that they take steps to minimize their environmental impact, comply with legal requirements and achieve environmental objectives. It comprises many aspects, including the use of resources, waste management, monitoring of environmental performance, and involvement of stakeholders in environmental commitments (ISO, 2023_[106]).
- [Safe Quality Food \(SQF\)](#) provides an independent and external verification that a product, process and service complies with international, regulatory and other standards that enable a food producer to show that food has been produced, prepared and handled according to the highest possible standards. SQF certified sites span more than 40 countries (SQF, n.d._[107]).
- [FSSC 22000](#) provides a certification for the food manufacturing industry and the related supply chain to ensure food safety standards and processes.

Some multinational buyers in Western Europe have their **own compliance programmes**, such as [Unilever's Sustainable Agriculture Code](#) that applies to all Unilever suppliers of agricultural goods, farmers that produce these goods and contractors working on the farm.

4 Conclusions and initial policy gaps

Azerbaijan is already experiencing climate change effects, especially natural disasters (particularly floods and droughts) and thermal stress, with the temperature expected to rise faster in Azerbaijan compared to the global average. In addition, the country has limited and declining water resources. The agricultural sector - which makes up approximately 6% of Azerbaijan's GDP and one third of its employment - is at particular risk. It occupies almost 60% of the total land area in Azerbaijan and accounts for up to 70% of the country's water use. It has experienced losses of USD 30-50 million in the 2010s from natural hazards.

The report took stock of Azerbaijan's policy frameworks for climate change adaptation and resilience in agriculture. Azerbaijan has various elements of such frameworks in place, and they have recently undergone some updates, with the major ones being the following:

- The country has an Initial National Adaptation Plan since 2024, in which agriculture is one of the main sectors. In addition, it is expected that a State Programme on the Development of Agricultural, Fisheries, and Aquaculture Production and Processing Areas 2025-30 will be approved in 2025 and provide sector-specific climate adaptation measures.
- Equipment and automation of the hydrometeorological services have been improved. Establishment of EWS is a priority for the government as is the development of a DRR system.
- Azerbaijan is developing a five-year strategy for improving the delivery of extension and advisory services. In addition, an Agrarian Training Centre was established under the MoA in 2021 to provide these services to farmers.
- A Certification Centre was set up the same year for seeds and plant varieties.
- Land consolidation is a priority in the country, and a Law on Agricultural Consolidation and Land Banking is expected to be adopted in 2025.
- A National Strategy for the Efficient Use of Water Resources was adopted in 2024, a flood risk map has been developed, and new institutions on water management have been set up.
- There is a legal framework for phytosanitary control, and State Agrarian Development Centres support farmers with identifying plant diseases and pests. In addition, several research institutes carry out research in this area.
- There is a legal framework and a certification body for organic agriculture, while a regional experimental centre was established in 2015.
- Azerbaijan has established a Unified Tracking System for plant protection products and agrochemicals and improved its disposal of POPs and obsolete pesticides.

- There have been improvements in the regulatory framework for standards and certification, including a new Law on Food Safety. In addition, a Single Window Export Support Centre exists, and private certification companies operate.

Below is a summary of the initial gaps, covering the policy frameworks for climate change adaptation in agriculture as well as several EU Green Deal issues, with initial recommendations for improvement:

Monitoring and sharing of information on impact of climate change and EWS

- Azerbaijan should remove gaps in the coverage of its hydrometeorological network and improve the quality of the observations (World Bank, 2023^[9]).
- It needs to further automate the network to ensure timely hydrometeorological-related warnings (World Bank, 2023^[9]). Information on weather forecasting must be disseminated in a timely manner.
- The radar network must be upgraded, and continuous maintenance ensured (World Bank, 2023^[9]).
- Azerbaijan should acquire a) a national numerical weather prediction model; b) an operational impact-based flood forecasting model and c) surface water modelling software packages, which will become especially important as water resources become more strained (World Bank, 2023^[9]).
- The MoA, MoES and MENR and other relevant institutions need to co-ordinate to effectively deliver agrometeorology services. Proper co-ordination and/or information-sharing mechanisms should therefore be established among the ministries.
- Infrastructure for agrometeorology services needs to be improved (e.g. modern software and new sensors).
- The EWS must be scaled up. Human resources in EWS, including within the MENR, need to be improved, including by ensuring attractive salaries, increasing the number of staff with academic degrees in meteorology and hydrology, and hiring experts in data management, computing, and information technologies (IT). Establishing a systematic agrometeorology training programme for NHS staff would be beneficial (World Bank, 2023^[9]).
- There is a need for regional cross-country co-operation focused on harmonizing methodologies, adopting common standards, and enabling the exchange of information and data related to hazard monitoring, forecasting, and early warning across river basin countries.

Disaster Risk Reduction (DRR)

- Introduction of impact-based forecasting will help the country shift from a reactive to a proactive approach to reducing disaster risks.
- Government agencies including the MoES, MENR and MoA, need to strengthen collaboration to formulate an effective DRR strategy and action plans that support implementation of DRR measures.

Water management

- In order to mitigate the specific risk of flooding, a Flood Risk Management Plan and a Drought Management Plan should be adopted. The EU Flood Directive (2007/60/EC) can provide a useful example for the Flood Risk Management Plan.

- The technical capacity of Azerbaijan's local authorities to carry out flood risk assessments should be developed through training and education (FAO, 2022^[4]).
- There is a need for a comprehensive scheme for IWRM and a clearly defined river basin management framework as well as clear regulation of water use rights.
- Access to irrigation is unequal depending on producers and regions and must be improved.
- There is a need for a regulatory framework for limiting nutrient run-off into surface water bodies.
- The irrigation network needs to be further modernized to avoid water losses while the use of flood irrigation should be discouraged. Smallholders need financial and knowledge support to adopt modern irrigation technologies.
- Public-private partnerships for provision of irrigation water should be better developed.

Extension and advisory services

- The current extension and advisory must ensure better human and financial resources to respond to farmers' needs, including the Agrarian Training Centre in the AXA and commodity associations.
- SMEs should receive targeted support from skills development and extension services. SME farmers in Azerbaijan still rely on traditional farming practices and are not aware of the benefits of CSA. Unlike large-scale farms, small agricultural producers often lack the resources to access training.
- The topics of training should include measures to adapt to climate change impacts.

Climate-resistant seeds and plant varieties

- Farmers need better access to certified seeds.
- New local seed-breeding farms must be established and the capacity of existing local farms scaled up in order to reduce reliance on seed imports (Ahouissoussi, Neumann and Srivastava, 2014^[8]).

Certification schemes and standards

- Training and support should increase to achieve widespread compliance with international standards. For example, adoption of the GAP certification among pomegranate and persimmon producers remains limited, with many farmers lacking basic knowledge of GAP. They require targeted information and training on this certification.
- Overlaps in the duties of the agencies certifying food products for ensuring food safety should be removed.

Pesticides and fertilisers

- Access to quality pesticides and fertilizers must be improved through better knowledge-sharing and guidance for farmers and sellers.

Organic agriculture

- There is a need to set up a unit for systematically collecting and updating data on organic production, processing, marketing, consumption, import, and export within the State Statistical Committee (SSC) or the MoA.

Food waste and loss

- Resources and infrastructure for post-harvest operations (transportation, cold storage, processing equipment, packaging materials) should be improved to reduce the amount of FWL.
- Dedicated legal provisions should be developed to regulate post-harvest handling, storage, and disposal of agricultural products, while also providing guidance and incentives for farmers to reduce losses.

Annex A: Key Activities of the State Programme “On the Adaptation of the National Standardization System to International Requirements for 2023-2025”

Table 4.1. Key Activities of the State Programme “On the Adaptation of the National Standardization System to International Requirements for 2023-2025”

| Sequence | Actions | Execution Period |
|----------|---|------------------|
| 8.1. | Formation of a technical regulation system taking into account advanced international experience | |
| 8.1.1. | Improvement of legislation to determine the scope of products subject to technical regulation | 2023 |
| 8.1.2. | Creation of a normative legal framework for conformity assessment procedures, including a general list of conformity assessment schemes (modules) and detailed provisions of these schemes (modules) | 2023 |
| 8.1.3. | Adoption of technical regulations for products subject to technical regulation | 2023–2025 |
| 8.2. | Harmonization of the national standardization system with international requirements | |
| 8.2.1. | Removal of mandatory requirements from normative documents on standardization for products, related processes, and production methods subject to technical regulation | 2023–2025 |
| 8.2.2. | Ensuring the compliance of standards available in the state standardization fund (to be used as reference standards) with international standards | 2023–2024 |
| 8.2.3. | Improvement of the activities of technical committees on standardization, taking into account international experience | 2023–2025 |
| 8.2.4. | Removal of mandatory requirements from normative documents on standardization for products, related processes, and production methods to protect human health from hazardous food (primarily risks arising from food additives, contaminants, toxic substances, or disease-causing organisms in food products), animal and human health from animal diseases and hazardous feed, plant health from harmful organisms, as well as other damage caused by pests | 2023–2025 |
| 8.2.5. | Development of a national standardization framework | 2023 |
| 8.3. | Improvement of infrastructure support in the field of technical regulation | |
| 8.3.1. | Conducting diagnostic assessments of laboratories in the field of technical regulation | 2023 |
| 8.3.2. | Optimization of the laboratory network in the field of technical regulation, establishment of new laboratories meeting modern requirements, and provision of material-technical support | 2023–2025 |

| | | |
|--------|---|-----------|
| 8.4. | Formation of a risk-based state control system for the safety of products subject to technical regulation | |
| 8.4.1. | Improvement of legislation to implement control over compliance with technical regulations during the production of products subject to technical regulation | 2023–2025 |
| 8.4.2. | Development and implementation of a mechanism for assessing the compliance of imported products with relevant national technical regulations prior to importation | 2023–2025 |
| 8.4.3. | Formation of a legal framework for the recall, withdrawal, seizure, transportation, storage, neutralization, or destruction of products subject to technical regulation that are deemed hazardous to human health | 2023–2024 |
| 8.4.4. | Regulation of interaction with relevant state bodies (institutions) to organize control over products subject to technical regulation during import | 2023–2025 |
| 8.4.5. | Conducting information exchange with relevant state bodies (institutions) in the field of technical regulation during import | Ongoing |
| 8.5. | Harmonization of the national accreditation system with the international accreditation system | |
| 8.5.1. | Alignment of the national accreditation body with the requirements of the ISO/IEC 17011 international standard, ensuring full membership in relevant international and regional accreditation organisations, and concluding mutual recognition agreements | 2023–2025 |
| 8.5.2. | Determination of accreditation requirements for conducting accreditation in the field of conformity assessment | 2023–2024 |
| 8.5.3. | Improvement of legislation regarding supervision over the activities of accredited conformity assessment bodies | 2023–2024 |
| 8.6. | Implementation of high technologies and innovative solutions in the field of technical regulation and standardization | |
| 8.6.1. | Creation of a unified electronic information system for technical regulation and standardization | 2023–2024 |
| 8.6.2. | Organisation of electronic services in the field of technical regulation and standardization and their integration into the "E-Government" portal | 2023–2025 |
| 8.6.3. | Integration of databases belonging to relevant state bodies (institutions) into the unified electronic information system for technical regulation and standardization via the "E-Government" portal | 2023–2025 |
| 8.6.4. | Development and implementation of mobile applications in the field of technical regulation and standardization | 2025 |

Source: State Programme "On the Adaptation of the National Standardization System to International Requirements for 2023-2025".

Annex B: Additional relevant international projects

1. A technical assistance project “**Capacity Building for Azerbaijan to Meet the Requirements of Enhanced Transparency Framework of the Paris Agreement (CBIT) (2020-2025)**” is being implemented in order to establish a national GHG management system and tracking system for the implementation of Nationally Determined Contributions (NDCs) (UNEP, 2023^[108]).
2. **The FAO Project “Strengthening Country Capacities for NDC Implementation in the Agriculture and Land Use, Land-Use Change, and Forestry (LULUCF) Sectors and Supporting the Identification of Potential Direct Access Entities from Different Sectors Relevant for the Implementation of the Country Work Programme in Azerbaijan”** project was implemented between 2019-2021 (Ministry of Ecology and Natural Resources of the Republic of Azerbaijan, 2019^[109]). Based on the expected deliverables under the GCF Readiness and Preparatory Support proposal, the main objective of the assignment to be undertaken by the Czech University of Life Sciences Prague (CZU) and Dalga LLC (international and national service providers respectively) was to support FAO and the Government of Azerbaijan in the identification, prioritization and subsequent feasibility assessment of climate technologies to support implementation of NDC mitigation and adaptation targets in the Agriculture and LULUCF sectors.
3. **EU4Lankaran: EU Support to the Lankaran-Astara Economic Region of Azerbaijan Project** was implemented between 2021-2024 (EU Neighbourseast, n.d.^[110]). The main objective was to support government efforts in the diversification and recovery of the economy from the coronavirus disease of 2019 (COVID-19) Pandemic while promoting the balanced and inclusive growth of economically sound regions through enhancing the competitiveness and value-adding of the fruit and vegetable sector of the Lankaran economic region. The purpose of the project was the improvement of the system for territorial development planning under consideration and reflection of climate change concerns in natural resource management and introduction of regional profiling to the economic region, the improvement of entrepreneurial and investment conditions in the region and the establishment of a modern network of local economic and community cooperation hubs in the fruit and vegetable sub-sector. Within the framework of the Project, the following achievements related to climate change adaptation were accomplished:
 - Four strategies on Lankaran-Astara economic region prepared: i) Smart Specialization, ii) Climate Change including considerations on climate change adaptation in agriculture, iii) Applied Agriculture Research. iv) Green Tourism;
 - Two new indexes prepared: i) Composite Regional Development Index (CRDI) and ii) ND-GAIN Climate Change Vulnerability Index (CCVI);

- Two Directories prepared: i) Fruits and Vegetable Establishments and ii) Extension Service Providers.

Between 2020 and 2021, with support from the FAO, the project titled “**Development of Sustainable, Inclusive, and Local Agro-Food Systems in the North-West Region of Azerbaijan**” was implemented. As part of this initiative, efforts were made to identify areas with potential for designation under the Globally Important Agricultural Heritage Systems (GIAHS) programme, focusing on the districts of Gakh, Zagatala and Balakan. The GIAHS initiative of the FAO highlights farming systems that have developed over centuries in close harmony with their environments and cultures, which includes their climate adaptation capacity. In 2022, a dedicated **Working Group** comprising representatives from various state institutions was established to prepare legislative proposals and define implementation mechanisms for developing an institutional framework to support both the GIAHS and Nationally Important Agricultural Heritage Systems (NIAHS) in Azerbaijan. Ongoing activities are focused on advancing this initiative. As part of the Programme, it is planned to assess and identify suitable regions for the establishment of a NIAHS site and to officially designate at least one such site in the country by 2030.

4. As part of the FAO of the United Nations - Türkiye Partnership Programme (FTPP II), the project “**Strengthening the Development of Agricultural Land Markets to Address Land Abandonment and Improve Land Consolidation Procedures**” is being implemented in Azerbaijan during 2022-2025 (Agrarian Credit and Development Agency, n.d.^[111]). The project aims to support the implementation of the land bank tool in connection with Azerbaijan’s planned land consolidation programme. Through this initiative, Azerbaijan aims to address land abandonment, improve agricultural land use efficiency (through consolidation), and strengthen land consolidation efforts, contributing to the sustainable development of the agricultural sector.
5. The **GEF project “Lifecycle Management of Pesticides and Disposal of POPs Pesticides in Central Asian Countries and Türkiye”** was implemented during 2019-2022 (International Plant Protection Convention, 2022^[112]). The main objectives of the project were to reduce threats from POPs and other obsolete pesticides posing high risks to public health and the environment, to strengthen the legal as well as the institutional framework for proper pesticide management across its full lifecycle and to reduce the use of pesticides through introduction of improved agricultural practices. It included components on pest surveillance and adaptation to climate change, and Integrated Pest Management (IPM) field trials on selected crops. Additional details are provided in Box 0.1.
6. An **FAO Project on “Reduction of Food Losses in Azerbaijan, Turkey and Central Asia” (2019-2023)** analysed the country-specific context, including existing policy and legislative frameworks, data on causes and impacts of FLW in Azerbaijan, and outlined comprehensive programmes for the prevention and reduction of FLW (FAO, 2023^[113]). More details on the results of the project are available in Box 0.2.

Box 0.1. GEF Project on Lifecycle Management of Pesticides focus areas

The project's relevant areas of work for Azerbaijan were:

- national inventory of obsolete pesticides and related materials
- development of national disposal capacity
- safeguarding and disposal of POPs pesticides
- container management system
- management of contaminated sites
- completing the legal framework on pesticide life-cycle management
- improving the pesticide registration system
- promoting alternatives to Highly Hazardous Pesticides (HHPs)
- improving better spraying practices and ground applications

Box 0.2. Main results of the FAO Project on “Reduction of Food Losses in Azerbaijan, Turkey and Central Asia” (2019-2023)

The project focused on a multi-pronged approach. The FAO conducted in-depth assessments of each country's policy and legislative frameworks, the root causes of FLW, and their socio-economic and environmental impacts. Drawing on this analysis, national gender-sensitive strategies and action plans were drafted to reduce FLW across the entire food chain (from production to consumption). The project introduced systems for the measurement and monitoring of FLW, enabling more robust data-driven policy and programme responses. The FAO enhanced the capabilities of government authorities, food value chain actors, and civil society through training, knowledge management, and awareness campaigns. A regional committee was formed to facilitate cross-country dialogue, cooperation, and shared learning on FLW reduction.

In May 2022, the FAO, in partnership with Azerbaijan's MoA and other national stakeholders, including private sector companies, civil society, and academia, hosted a full-day consultation workshop in Baku. During this workshop, the FAO presented its findings on Azerbaijan's FLW situation and submitted a draft national **Strategy on Food Loss and Waste Prevention, Reduction and Monitoring** for validation and finalisation.

The strategy aimed to:

- reduce FLW at all stages (production, processing, distribution, and consumption)
- promote circular value chains to maximize resource efficiency
- improve legal and regulatory frameworks governing FLW
- establish a national food recovery and redistribution mechanism
- raise awareness among the public and food chain actors
- strengthen capacities for FLW measurement, monitoring, and reporting

Bibliography

- Agrarian Credit and Development Agency (n.d.), *The project “Strengthening the Development of Agricultural Land Markets to Address Land Abandonment and Improve Land Consolidation Procedures – GCP/SEC/022/TUR”*, <https://akia.gov.az/az/content/268.html>. [111]
- Agrarian Innovation Center under the Ministry of Agriculture of the Republic of Azerbaijan (2024), *Innovation Festival*, <http://aim.gov.az/az/hesabatlar/innovasiya-festivali>. [45]
- Agrarian Innovation Centre (n.d.), *About the centre*, <http://aim.gov.az/en/haqqimizda/merkez-haqqimizda> (accessed on 9 September 2025). [46]
- Agrarian Services Agency (2025), *About us*, <http://www.axa.gov.az/az/services/204/haqqimizda>. [50]
- Agrarian Services Agency (2024), *A republican meeting was held in Ecuador during the “Year of Cooperation for the Green World”*, <http://axa.gov.az/az/news/945?yevlaxda-yasil-dunya-namine-hemreylik-ili-cercivesinde-respublika-musaviresi-kecirilib>. [44]
- Agrarian Training Centre (n.d.), *About Us*, <https://axa.gov.az/az/services/83/haqqimizda> (accessed on 9 September 2025). [41]
- Ahouissoussi, N., J. Neumann and J. Srivastava (2014), *Building Resilience to Climate Change in South Caucasus Agriculture*, World Bank, <https://doi.org/10.1596/978-1-4648-0214-0>. [8]
- Azerbaijan Food Safety Agency (2025), *Issuance of phytosanitary certificate (re-export phytosanitary certificate) for the export of plants and plant products*, <https://afsa.gov.az/storage/pages/10011/bitki-ve-bitkicilik-mehsullarinin-ixracina-fitosanitar-tekrar-ixrac-fitosanitar-sertifikatinin-verilmesi-1.pdf>. [89]
- Azerbaijan Seed Growers Association (2024), *The 2nd Forum of Seed Growers of the Republic was held*, <https://toxumcular.az/news/respublika-toxumcularinin-ii-forumu-kecirilib>. [52]
- Azerbaijani Institute of Standardization (n.d.), *About the certification agency*, <https://azstand.gov.az/az/sertifikatlasdirma-organi-haqqinda>. [87]
- Azerbaijani Institute of Standardization (n.d.), *State Fund of Normative Documents on Standardization*, <https://azstand.gov.az/az/standartlasdirma-uzre-normativ-senedlerin-dovlet-fondu>. [86]
- Azernews (2019), *Azerbaijan to hold seed fairs for the first time*, <https://www.azernews.az/business/156232.html> (accessed on 18 July 2025). [126]

- Azertac (2022), *The country's land reclamation and water management are on the path to sustainable development*, [61]
https://azertag.az/xeber/olkenin_meliorasiya_ve_su_teserrufati_dayaniqli_inkisaf_yolundadir-2165513.
- Baku29 Azerbaijan (n.d.), *Baku Harmoniya Climate Initiative for Farmers*, [28]
<https://cop29.az/en/pages/baku-harmoniya-climate-initiative-for-farmers-concept> (accessed on 11 September 2025).
- Bine Agro (2025), *Bine Agro*, <https://bineagro.az/en>. [84]
- Bine Agro (2019), *GLOBAL G.A.P Certificate*, [85]
<https://bineagro.az/frontend/web/uploads/images/reports/Global-GAP-sertifikat-2024-2025.pdf>.
- Cabinet of Ministers of the Republic of Azerbaijan (2023), *Introduction of the azerbaijan2030.gov.az portal at the Cabinet of Ministers*, [25]
<https://nk.gov.az/az/xeberler/matbuat-xidmatinin-malumat/nazirler-kabinetinde-azerbaijan2030govaz-portalini-2924>.
- Cabinet of Ministers of the Republic of Azerbaijan (2023), *Resolution of the Cabinet of Ministers of the Republic of Azerbaijan on approval of the "Rules and form for issuing health certificates for food and feed products"*, [91]
<https://e-qanun.az/framework/55467>.
- Cabinet of Ministers of the Republic of Azerbaijan (2021), *Improving the structure of the Ministry of Agriculture of the Republic of Azerbaijan and amending the Resolution No. 549 of the Cabinet of Ministers of the Republic of Azerbaijan dated December 19, 2018*, [42]
<https://e-qanun.az/framework/47467>.
- Cabinet of Ministers of the Republic of Azerbaijan (2020), *Resolution of the Cabinet of Ministers of the Republic of Azerbaijan on approval of the "Form of the Certificate of Conformity, Rules for the Use and Issuance of the Conformity Mark"*, [94]
<https://e-qanun.az/framework/46135>.
- Cabinet of Ministers of the Republic of Azerbaijan (2018), *Resolution of the Cabinet of Ministers of the Republic of Azerbaijan on approval of the "Norms of natural loss of food products in the field of trade and public catering"*, [95]
<https://e-qanun.az/framework/39601>.
- Cabinet of Ministers of the Republic of Azerbaijan (2014), *Resolution of the Cabinet of Ministers of the Republic of Azerbaijan on approval of the Charter and structure of the "National Nuclear Research Center" Closed Joint-Stock Company*, [116]
<https://e-qanun.az/framework/30619>.
- Cabinet of Ministers of the Republic of Azerbaijan (2006), *Resolution of the Cabinet of Ministers of the Republic of Azerbaijan on approval of some normative legal acts in the field of phytosanitary control*, [90]
<https://e-qanun.az/framework/12610>.
- Caspian Alpine Society (2024), *Water Resource Management in Azerbaijan: Strategy, Innovation, and International Cooperation*, [5]
<https://caspien-alpine.org/water-resource-management-in-azerbaijan-strategy-innovation-and-international-cooperation/> (accessed on 6 October 2025).
- CBI (2023), *What Requirements Must Fresh Fruit and Vegetables Comply with to be Allowed on the European Market?*, [104]
<https://www.cbi.eu/market-information/fresh-fruit-vegetables/buyer-requirements>.

- Center for Analysis of Economic Reforms and Communication of the Republic of Azerbaijan (n.d.), “One Stop Shop” Export Support Center, <https://ereforms.gov.az/en/page/bir-pencere-ixraca-destek-merkezi-12>. [93]
- Core Writing Team, C., R. Pachauri and L. Meyer (2014), *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. [7]
- Crippa, M. et al. (2024), *GHG emissions of all world countries*, Publications Office of the European Union, <https://doi.org/10.2760/4002897> (accessed on 24 April 2025). [2]
- EU Neighbourhood East (2021), *Azerbaijan: new platforms for agricultural advisory services*, <https://euneighbourseast.eu/news/latest-news/azerbaijan-new-platforms-for-agricultural-advisory-services/>. [40]
- EU Neighbourseast (n.d.), *EU4Lankaran: EU Support to Lankaran-Astara Economic Region of Azerbaijan Project*, <https://euneighbourseast.eu/projects/eu-project-page/?id=1632>. [110]
- Euro Fresh Distribution (2018), *EU authorises imports of pomegranate from Azerbaijan*, <https://www.eurofresh-distribution.com/news/eu-authorises-imports-of-pomegranate-from-azerbaijan/>. [82]
- European Commission (2021), *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Forging a Climate-Resilient Europe - the New EU Strategy on Adaptation to Climate Change*, <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52021DC0082>. [103]
- European Commission (2020), *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: A Farm to Fork Strategy for a Fair, Healthy and Environmentally-Friendly Food System*. [102]
- European Commission (2019), *Green Deal Communication*. [100]
- European Commission (n.d.), *Farm to Fork Strategy*, https://food.ec.europa.eu/horizontal-topics/farm-fork-strategy_en. [101]
- European Commission (n.d.), *The EU: A Common Market for Plants and Plant Products*. [105]
- European Council (2025), *European Green Deal*, <https://www.consilium.europa.eu/en/policies/european-green-deal/#:~:text=The%20European%20Green%20Deal%20is,reaching%20climate%20neutrality%20by%202050>. [99]
- FAO (2025), *Crops and livestock products*, <https://www.fao.org/faostat/en/#data/QCL>. [18]
- FAO (2023), *Reduction of Food Loss and Waste in Azerbaijan, Turkey, and Central Asia*, <https://www.fao.org/platform-food-loss-waste/regions/reu/projects/project-detail/reduction-of-food-loss-and-waste-in-azerbaijan--t%C3%BCrkiye--and-central-asia/en>. [113]
- FAO (2022), *Comprehensive analysis of the disaster risk reduction system for the agricultural sector in Azerbaijan*, <https://doi.org/10.4060/cb8486en>. [4]

- FAO (2022), *Side event of the FAO Science and Innovation Forum – Strengthening of Agricultural Advisory Services in Azerbaijan*, <https://openknowledge.fao.org/items/ea4b3895-5cda-4045-89c9-1415beeab918>. [39]
- FAO (2018), *Organic Agriculture in Azerbaijan, Current status and potentials for future development*, <https://openknowledge.fao.org/server/api/core/bitstreams/9900ae12-cf19-49ec-baed-fc3c0d9371da/content>. [83]
- FAOSTAT (2024), *Fertilizers by Nutrient*, <https://www.fao.org/faostat/en/#data/RFN>. [77]
- FiBL & IFOAM - Organics International (2021), *Development of organically farmed agricultural land worldwide*. [67]
- Food Safety Agency of the Republic of Azerbaijan (2023), *Decision of the Board of the Food Safety Agency of the Republic of Azerbaijan on approval of “Phytosanitary norms and rules for materials under quarantine control imported and transported through the territory of the Republic of Azerbaijan”*, <https://e-qanun.az/framework/56051>. [73]
- Gengenbach, H. (2022), *Country Report, Organic Azerbaijan*, https://www.ekoconnect.org/tl_files/eko/p/Projekte/MOE-Laenderberichte/Country-Report-Organic-AZERBAIJAN-EkoConnect-2022.pdf. [70]
- Government of Azerbaijan (2022), *Decree of the President of the Republic of Azerbaijan on the reconstruction of the Shirvan irrigation canal*, <https://e-qanun.az/framework/56701>. [63]
- Government of Azerbaijan (1996), *On Land Reclamation and Irrigation*, <https://e-qanun.az/framework/4170>. [53]
- Goychay District Executive Power of the Republic of Azerbaijan (2023), *The 15th “Pomegranate Festival” was held in Goychay*, <http://goychay-ih.gov.az/az/news/goycayda-15-ci-nar-festivali-kecirildi.html>. [47]
- Green Climate Fund (2024), *Strengthening Climate Information and Multi-Hazard Early Warning Systems for Increased Resilience in Azerbaijan*, [https://www.greenclimate.fund/project/sap046?f\[\]=field_subtype:341](https://www.greenclimate.fund/project/sap046?f[]=field_subtype:341). [37]
- Huseynova, L. (2024), “Alternariosis or brown spot of pomegranate bushes in the western part of Azerbaijan”, *Current Agronomy*, Vol. 53/1, <https://doi.org/10.2478/cag-2024-0007>. [71]
- International Plant Protection Convention (2022), *Lifecycle management of pesticides and disposal of persistent organic pollutants pesticides in Central Asian countries and Türkiye*, <https://www.ippc.int/en/publications/91510/>. [112]
- ISO (2023), *ISO 14001:2015, Environmental Management Systems – Requirements with Guidance for Use*, <https://www.iso.org/standard/60857.html>. [106]
- Ministry of Agriculture of Azerbaijan (n.d.), *Irrigation Schedule*, <https://www.agro.gov.az/az/qrafik>. [65]
- Ministry of Agriculture of The Republic of Azerbaijan (2024), *The 4th Persimmon Festival was held in Balakan district*, <https://www.agro.gov.az/az/news/2910244>. [48]
- Ministry of Agriculture of the Republic of Azerbaijan (2024), *Baku Harmony Climate Initiative for Farmers announced as part of COP 29*, <https://www.agro.gov.az/az/news/191124>. [29]
- Ministry of Agriculture of the Republic of Azerbaijan (2022), *A meeting was held on the topic of* [43]

- “Demonstration of new soil and resource-conserving techniques that adapt to climate change”, https://www.agro.gov.az/az/news/iqlim-deyisikliyine-adaptasiya-eden-torpaq-ve-resursqoruyucu-yeni-texnikalarin-nuemayisi-moevzusunda-muesavire-kecirilib?fbclid=IwAR0szFEmV3cFvf4IleraF_w1oqJZOxquD_mOZvml5FzmoN90-WhKHBDkDE.
- Ministry of Agriculture of the Republic of Azerbaijan (2021), *Agricultural Research Center - Digital Agriculture Project expands coverage*, <https://atm.gov.az/az/news/532/reqemsal-kend-teserrufati-layihesinin-ehate-daires/>. [34]
- Ministry of Agriculture of the Republic of Azerbaijan (2021), *The Republican Seed Exhibition and Sales Fair successfully concluded its work*, <https://www.agro.gov.az/az/news/respublika-toxum-sergi-satis-yarmarkasi-oez-isini-ugurla-yekunlasirdi>. [51]
- Ministry of Agriculture of the Republic of Azerbaijan (2019), *Agricultural Research Center - The rules for providing subsidies to farmers have changed*, <https://atm.gov.az/en/news/25/fermerlere-subsidiyalarin-verilmesi-qaydalari-deyi/>. [75]
- Ministry of Agriculture of the Republic of Azerbaijan (n.d.), *The Agricultural Subsidy Council's Subsidy Coefficients for 2025*, <https://www.agro.gov.az/az/news/020924>. [57]
- Ministry of Ecology and Natural Resources of Azerbaijan (2024), *Initial National Adaptation Plan, Azerbaijan 2024*, https://unfccc.int/sites/default/files/resource/2024_NAP_Azerbaijan.pdf. [62]
- Ministry of Ecology and Natural Resources of the Republic of Azerbaijan (2021), *Fourth National Communication to the United Nations Framework Convention on Climate Change*, <https://unfccc.int/sites/default/files/resource/FNC%20report.pdf>. [1]
- Ministry of Ecology and Natural Resources of the Republic of Azerbaijan (2019), *National Designated Authority Strengthening and Country Programming Support for Azerbaijan through FAO*, <https://www.greenclimate.fund/sites/default/files/document/readiness-proposals-azerbaijan-fao-nda-strengthening-country-programming.pdf>. [109]
- Ministry of Ecology and Natural Resources of the Republic of Azerbaijan (n.d.), *Hydrometeorology - Activities*, <https://eco.gov.az/az/hidrometeorologiya/fealiyyet-istiqametleri>. [114]
- Ministry of Ecology and Natural Resources of the Republic of Azerbaijan (n.d.), *Hydrometeorology - Prognoses*, <https://eco.gov.az/az/hidrometeorologiya/hidrometeoroloji-proqnozlar>. [33]
- Ministry of Ecology and Natural Resources of the Republic of Azerbaijan (n.d.), *Hydrometeorology - Agrometeorological observations*, <https://eco.gov.az/index.php?ln=az&pg=336>. [115]
- Ministry of Ecology and Natural Resources of the Republic of Azerbaijan (n.d.), *National Hydrometeorology Service*, <http://eco.gov.az/az/nazirlik/tabeli-qurumlar/milli-hidrometeorologiya-xidmeti>. [36]
- National Assembly of the Republic of Azerbaijan (1995), *Decision of the Milli Majlis of the Republic of Azerbaijan on the Ratification by the Republic of Azerbaijan of the United Nations Framework Convention on Climate Change*, <https://e-qanun.az/framework/9117>. [19]
- National Hydrometeorology Service (2021), *Agrometeorological observations*, <https://meteo.az/index.php?ln=az&pg=64>. [35]

- OECD (n.d.), *Environmental policies and evaluation*, [124]
<https://www.oecd.org/en/topics/environmental-policies-and-evaluation.html>.
- Republic of Azerbaijan (2024), *Decree of the President of the Republic of Azerbaijan on approval of the “National Strategy for the Efficient Use of Water Resources”*, [32]
<https://e-qanun.az/framework/58119>.
- Republic of Azerbaijan (2024), *Law of the Republic of Azerbaijan on Amendments to the Land Code of the Republic of Azerbaijan*, [56]
<https://e-qanun.az/framework/57637>.
- Republic of Azerbaijan (2023), *Decree of the President of the Republic of Azerbaijan “On improving management in the areas of water resources, water management and land reclamation”*, [120]
<https://e-qanun.az/framework/53813>.
- Republic of Azerbaijan (2023), *State Programme “On the adaptation of the national standardization system to international requirements for 2023-2025”*, [81]
<https://e-qanun.az/framework/53271>.
- Republic of Azerbaijan (2023), *The Republic of Azerbaijan Updated document on Nationally Determined Contributions*, [22]
https://unfccc.int/sites/default/files/NDC/2023-10/Second%20NDC_Azerbaijan_ENG_Final%20%281%29.pdf.
- Republic of Azerbaijan (2022), *Charter of the Agency for Innovation and Digital Development*, [118]
<https://president.az/az/articles/view/57665>.
- Republic of Azerbaijan (2022), *Decree of the President of the Republic of Azerbaijan on approval of the “Socio-economic Development Strategy of the Republic of Azerbaijan for 2022–2026”*, [24]
<https://e-qanun.az/framework/50013>.
- Republic of Azerbaijan (2022), *Law of the Republic of Azerbaijan “On Food Safety”*, [69]
<https://e-qanun.az/framework/15321>.
- Republic of Azerbaijan (2021), *Azerbaijan 2030: National Priorities for Social and Economic Development*, [23]
<https://president.az/az/articles/view/50474>.
- Republic of Azerbaijan (2021), *Decree of the President of the Republic of Azerbaijan on approval of the Regulations on the “Electronic Water Management” information system*, [64]
<https://e-qanun.az/framework/46872>.
- Republic of Azerbaijan (2021), *Decree of the President of the Republic of Azerbaijan on some measures related to improving governance in the field of digitalization, innovation, high technologies and communications in the Republic of Azerbaijan*, [117]
<https://e-qanun.az/framework/48367>.
- Republic of Azerbaijan (2020), *Decree of the President of the Republic of Azerbaijan “On measures to ensure the efficient use of water resources”*, [59]
<https://e-qanun.az/framework/44899>.
- Republic of Azerbaijan (2020), *Order of the President of the Republic of Azerbaijan on Additional Measures to Ensure the Efficient Use of Water Resources*, [60]
<https://e-qanun.az/framework/45487>.
- Republic of Azerbaijan (2019), *Action Plan to reduce the negative impact of plastic packaging waste on the environment in the Republic of Azerbaijan for 2019-2020*, [125]
<https://e->

[qanun.az/framework/41394](https://e-qanun.az/framework/41394).

- Republic of Azerbaijan (2019), *Decree of the President of the Republic on the establishment of a new subsidy mechanism in the agricultural sector*, <https://e-qanun.az/framework/42750>. [76]
- Republic of Azerbaijan (2019), *Law of the Republic of Azerbaijan on Standardization*, <https://e-qanun.az/framework/42881>. [79]
- Republic of Azerbaijan (2019), *Law of the Republic of Azerbaijan on Technical Regulation*, <https://e-qanun.az/framework/43689>. [80]
- Republic of Azerbaijan (2018), *Law of the Republic of Azerbaijan on Environmental Impact Assessment*, <https://e-qanun.az/framework/39511>. [121]
- Republic of Azerbaijan (2018), *National Strategy for Improving Solid Waste Management in the Republic of Azerbaijan for 2018–2022*, <https://e-qanun.az/framework/40445>. [123]
- Republic of Azerbaijan (2017), *Decree of the President of the Republic of Azerbaijan on approval of the “State Program on the Development of Agricultural Cooperation in the Republic of Azerbaijan for 2017-2022”*, <https://e-qanun.az/framework/36076>. [119]
- Republic of Azerbaijan (2016), *Decree of the President of the Republic of Azerbaijan on the establishment of the National Coordination Council for Sustainable Development of the Republic of Azerbaijan*, <https://e-qanun.az/framework/33838>. [97]
- Republic of Azerbaijan (2016), *Decree of the President of the Republic of Azerbaijan on the publication of the “Atlas of Emergency Situations of the Republic of Azerbaijan”*, <https://e-qanun.az/framework/32236>. [30]
- Republic of Azerbaijan (2016), *Law of the Republic of Azerbaijan on the ratification of the Paris Agreement adopted at the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change*, <https://e-qanun.az/framework/34278>. [21]
- Republic of Azerbaijan (2016), *The Strategic Roadmap for the production and processing of agricultural products in the Republic of Azerbaijan was approved by Decree No. 1138 of the President of the Republic of Azerbaijan*, <http://Azərbaycan Respublikası Prezidentinin>. [31]
- Republic of Azerbaijan (2012), *Resolution No. 2 of the Board of the Ministry of Economy of the Republic of Azerbaijan, on approval of the “Rules for Issuing a Certificate Confirming the Country of Origin of Goods”*, <https://e-qanun.az/framework/23506>. [88]
- Republic of Azerbaijan (2008), *Decree of the President of the Republic of Azerbaijan on the application of the “single window” principle in the inspection of goods and vehicles passing through the checkpoints of the state border of the Republic of Azerbaijan*, <https://e-qanun.az/framework/15605>. [92]
- Republic of Azerbaijan (2007), *Decree of the President of the Republic of Azerbaijan on state support for agricultural producers*, <https://e-qanun.az/framework/12705>. [74]
- Republic of Azerbaijan (2006), *Law of the Republic of Azerbaijan “On Phytosanitary Control”*, <https://e-qanun.az/framework/12384>. [72]
- Republic of Azerbaijan (2004), *Decree of the President of the Republic of Azerbaijan on approval of the “State Programme on the Efficient Use of Summer-Winter Pastures, Hayfields and* [127]

- Prevention of Desertification in the Republic of Azerbaijan*", <https://e-qanun.az/framework/5994>.
- Republic of Azerbaijan (2000), *Law of the Republic of Azerbaijan on Accession to the Kyoto Protocol to the United Nations Framework Convention on Climate Change*, <https://e-qanun.az/framework/339>. [20]
- Republic of Azerbaijan (1999), *Land Code of the Republic of Azerbaijan*, https://e-qanun.az/framework/46942#_edn33. [54]
- Republic of Azerbaijan (1999), *Law of the Republic of Azerbaijan on Ecological Safety*, <https://e-qanun.az/framework/3851>. [78]
- Republic of Azerbaijan (1999), *Law of the Republic of Azerbaijan on Environmental Protection*, <https://e-qanun.az/framework/3852>. [55]
- Republic of Azerbaijan (1998), *Law of the Republic of Azerbaijan on Industrial and Domestic Waste*, <https://e-qanun.az/framework/3186>. [122]
- Republic of Azerbaijan (1997), *Decree of the President of the Republic of Azerbaijan on measures to ensure the implementation of the commitments adopted by the Republic of Azerbaijan in accordance with the United Nations Framework Convention on Climate Change, ratified by the Republic*, <https://e-qanun.az/framework/13632>. [96]
- Republic of Azerbaijan (1997), *Water Code*, <https://e-qanun.az/framework/46940>. [58]
- Republic of Azerbaijan (1995), *Constitution of the Republic of Azerbaijan*, <https://e-qanun.az/framework/897>. [68]
- SQF (n.d.), *What Is SQF?*, <https://www.sqfi.com/our-program/what-is-sqf>. [107]
- The State Statistical Committee (2024), *Ensure availability and sustainable management of water and sanitation for all*, <https://sdg.azstat.gov.az/az/indicators/365/degree-of-integrated-water-resources-management->. [66]
- The State Statistical Committee of the Republic of Azerbaijan (2024), , <https://www.stat.gov.az/source/trade/?lang=en> (accessed on 16 July 2025). [15]
- The State Statistical Committee of the Republic of Azerbaijan (2024), *Agriculture, forestry and fishing*, <https://www.stat.gov.az/source/agriculture/?lang=en> (accessed on 16 July 2025). [13]
- The State Statistical Committee of the Republic of Azerbaijan (2024), *Industry*, <https://www.stat.gov.az/source/industry/?lang=en> (accessed on 22 July 2025). [16]
- UN (2025), *Our Work on the Sustainable Development Goals in Azerbaijan*, <https://azerbaijan.un.org/en/sdgs>. [98]
- UNDP (2025), *National Adaptation Plan (NAP) support project for adaptation planning and implementation in Azerbaijan*, <https://www.adaptation-undp.org/projects/naps-gcf-azerbaijan>. [26]
- UNDP (2023), *Azerbaijan*, <https://climatepromise.undp.org/what-we-do/where-we-work/azerbaijan>. [27]
- UNEP (2024), *Azerbaijan to strengthen climate resilience through early warning systems*, <https://www.unep.org/technical-highlight/azerbaijan-strengthen-climate-resilience-through-> [38]

[early-warning-systems](#).

- UNEP (2023), *Capacity Building for Azerbaijan to Meet the Requirements of Enhanced Transparency Framework of the Paris Agreement*, <https://www.unep.org/gef/projects/capacity-building-azerbaijan-meet-requirements-enhanced-transparency-framework-paris>. [108]
- United Nations Azerbaijan (2021), *Fruits and vegetables: the secret weapons of these Azerbaijani's food heroes*, <https://azerbaijan.un.org/en/145880-fruits-and-vegetables-secret-weapons-these-azerbaijani%E2%80%99s-food-heroes> (accessed on 15 July 2025). [14]
- University of Notre Dame (2025), *ND-GAIN Country Index (ND-GAIN)*, <https://gain.nd.edu/our-work/country-index/rankings/> (accessed on 25 April 2025). [3]
- World Bank (2024), *Agriculture, forestry, and fishing, value added (% of GDP)*, <https://data.worldbank.org/indicator/NV.AGR.TOTL.ZS> (accessed on 13 June 2025). [11]
- World Bank (2023), *Employment in Agriculture (% of total employment) (modelled ILO estimate)*, <https://data.worldbank.org/indicator/SL.AGR.EMPL.ZS> (accessed on September 2024). [10]
- World Bank (2023), *The Azerbaijan Country Climate and Development Report*, <https://documents1.worldbank.org/curated/en/099112723161524095/pdf/P17904806938f5083093a707fa0352e87a5.pdf>. [9]
- World Bank (2022), *Agricultural land (% of land area) - Azerbaijan*, <https://data.worldbank.org/indicator/AG.LND.AGRI.ZS?locations=AM-AZ&view=map-LC>. [12]
- World Bank Group - IFC (2018), *Azerbaijan Agriculture Value-Added Processors Overview*. [17]
- World Resources Institute (2025), *Ranking the World's Most Water-Stressed Countries in 2040*, <https://www.wri.org/insights/ranking-worlds-most-water-stressed-countries-2040> (accessed on 9 September 2025). [6]
- Zagatala District Executive Power of the Republic of Azerbaijan (2017), *Hazelnut Festival held for the first time in Zagatala*, <http://www.zaqatala-ih.gov.az/az/news/470.html>. [49]