

Agricultural Adaptation in Nakhchivan

Confronting Climate Change Challenges

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While Azerbaijan contributes only a [small fraction](#) (0.1 percent) to global greenhouse gas emissions, the country is experiencing significant impacts of climate change. This highlights the importance of adaptation strategies, particularly in regions with a strong agricultural sector and coastal proximity. The Nakhchivan Autonomous Republic, characterized by arid and continental climate, advanced agriculture, and scarcity of water resources, is one of Azerbaijan's most vulnerable regions to climate change.

Nakhchivan faces a unique and challenging situation due to its lack of direct land connection with Azerbaijan and being surrounded by Armenia, Iran, and Türkiye. This geographical isolation has limited its development compared to other regions of Azerbaijan. Having historically lagged in adopting innovative approaches and attracting new resources, Nakhchivan entered a new stage of development in 2022 with the establishment of the President's Office of the Special Representative. This led to the preparation and [approval](#) of the State Program for the Socio-Economic Development of Nakhchivan for the years 2023-2027 in a relatively short period. The program focuses on sustainable development, the efficient utilization of natural resources, and the preservation of the environment as key objectives. The effects of climate change, especially the degradation of arable lands, is among the main threats identified as impeding socio-economic development. While the program addresses various agricultural and environmental challenges, it lacks details on strategies for adapting to climate change and the required adaptation tools.

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Climate Change and Agriculture

Several factors render Nakhchivan, particularly the Aras plains where agriculture has traditionally thrived, vulnerable to climate change. With an [annual precipitation](#) ranging from 110 to 350 mm, this region is one of the driest areas in Azerbaijan. This *low precipitation* underscores the critical need for effective irrigation systems. The utilization of the Aras River and internal river networks as water sources results in heightened reliance on transboundary sources and a reduction in available water resources. The mentioned trend significantly impacts the lands in the Aras plains, as well as in regions like Babek, Sharur, and Julfa.

In assessing the effects of climate change on Nakhchivan, it is critical to underscore the issue of *salinized soil*, which presents a significant environmental obstacle in the area. This problem is exacerbated by factors such as drought, traditional irrigation practices, groundwaters, and shifting climate patterns.

Despite the prevailing trends mentioned above, there is a notable shift in Nakhchivan's agricultural sector from livestock farming to crop cultivation. Data from 2000-2022 reveals a 58 percent expansion in agricultural land use in Nakhchivan. However, agricultural productivity has only [increased by 7 percent](#) during the same period. The significant disparity between the land area utilized and the actual yield underscores challenges such as water scarcity, soil quality issues, and a lack of crop adaptability to climate change. These factors emphasize the necessity for immediate interventions.

In recent years, cereals have become the predominant crop in Nakhchivan's agriculture. The average water needs of these plant varieties—these include spring wheat, spring barley, winter barley, and winter wheat—typically range from 450 to 650 mm during their growth stages. It is important to highlight that *crop water requirements*, also known as “evapotranspiration” (ET), are [highly influenced](#) by factors like soil fertility, soil type, plant species, and, particularly, climate.

Under such conditions, Nakhchivan farmers' continued preference for traditional crops, particularly cereals, could potentially result in an agricultural crisis over time.

Another essential challenge confronting agriculture in Nakhchivan is the insufficient coverage of climate change risks and adaptation strategies in *national policy documents*. While there are occasional legal measures aimed at mitigating the adverse impacts of climate change in legislation, they remain limited in scope. For instance, the agricultural [insurance mechanism](#) enables farmers to protect their crops from various adverse impacts of climate change, such as hail, hurricanes, and plant diseases. While the general principles of adjusting irrigation methods to local climate and cultivating climate-appropriate seeds are incorporated in national legislation, there is a lack of detailed regulations and strategic planning.

The recently approved State Program for the Socio-Economic Development of the Nakhchivan Autonomous Republic for 2023-2027 contains initial steps towards climate change adaptation, including the implementation of modern irrigation systems, enhancing seed distribution to farmers, and offering advisory services to farmers. However, addressing localized and specific challenges alone is insufficient in adapting Nakhchivan's agriculture, which has been significantly impacted by climate change. Therefore, a more systematic and targeted National Adaptation Plan is urgently needed.

Adaptation

An in-depth examination of agricultural practices in Nakhchivan reveals that the key challenge in agriculture, amidst climate change, is the reliance on traditional cultivation methods without adjustments to evolving natural conditions and limited water and land resources. Therefore, adapting Nakhchivan's agriculture to climate change demands heightened political commitment and financial backing to implement substantial changes across various sectors, complementing conventional policy approaches.

A fresh and, in some instances, radical perspective on water usage and supply is essential in agricultural practices reliant on transboundary rivers and prevalent in arid climates. Merely revamping water conveyance channels and infrastructure, alongside adopting modern irrigation systems, is not enough.

In Nakhchivan, particular focus should be directed towards replacing water-intensive traditional plants and seeds with drought-resistant and lower water-consuming alternatives, while also addressing salinity issues. While transitioning away from traditional seeds, plants, and farming techniques may appear challenging initially, this shift could serve as a successful adaptation model for agriculture in Nakhchivan. As genetically modified seeds (plants) are rightly [prohibited](#) in Azerbaijan, cultivating climate-resilient seeds and sourcing them from external channels necessitates collaboration with agricultural research institutions and state-backed financial support for such scientific endeavors.

Over the past two decades, soil salinization and degradation have emerged as significant environmental challenges in Nakhchivan, demanding focused attention and immediate interventions. The exacerbation of this issue is attributed to the lack of adoption of contemporary protective measures in agricultural land usage, ineffective measures against groundwater salinization, reliance on traditional irrigation techniques, and the limited fertility of land areas outside the mountainous regions.

Another critical aspect contributing to this problem is the socio-economic development factor. In the past decade, about [one-third](#) of Azerbaijan's workforce has been engaged in agriculture, as per statistical data. This trend is also observed in Nakhchivan, where agriculture serves as a primary source of employment and livelihood for the community.

Consequently, there has been significant pressure on land resources due to extensive agricultural and animal husbandry practices in the region.

Policy Recommendations

The detrimental impacts of climate change are increasingly evident across all regions of Azerbaijan, particularly affecting the agricultural sector. However, certain regions, like Nakhchivan, necessitate immediate attention due to their geographical constraints and limited resources. The absence of an approved National Adaptation Plan in Azerbaijan may present challenges and ambiguity in determining the course of regional adaptation measures for local authorities. *To address this uncertainty, it is advisable to develop and execute a Local Adaptation Plan (LAP) for the governing bodies of Nakhchivan.*

Drawing from international examples such as [Nepal](#) and Vietnam, a flexible approach to climate change has demonstrated the ability to minimize regional losses and facilitate more effective adaptation to climate change. It is advisable to integrate the following focus areas into the Local Adaptation Plan, which should align with the challenges identified in this IDD Analytical Policy Paper and consider the unique geographical and climatic features of Nakhchivan:

- Assessment of the current status of agriculture's most vulnerable areas and limited resources due to climate change;
- Regular dissemination of information to local communities and farmers regarding the impacts, risks, and outcomes of climate change;
- Initiating pilot projects over the next five years to gradually replace high water-consuming cereals with climate-change and salinization-resistant seeds and plants;
- Implementation of a dedicated program, with 70 percent funding from the state budget, to transition to more efficient modern irrigation systems;
- Halting the expansion of agriculture into new land areas and implementing sustainable measures to restore and enhance the fertility of existing arable lands.

Undoubtedly, the proposed measures represent only a foundational set of actions for adapting agriculture to climate change in Nakhchivan. However, preparing a Local Adaptation Plan can indeed be a significant step in both addressing immediate losses and establishing climate adaptation as a political and legal objective.