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CRUDE ACCOUNTABILITY

IMPACT OF WATER SCARCITY ON RURAL COMMUNITIES IN AZERBAIJAN

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About Crude Accountability

Crude Accountability is an environmental and human rights non-profit organization that works with communities in the Caspian and Black Sea regions, which struggle against threats to local natural resources and negative health impacts. Crude Accountability works on the local, national, regional, and international levels in partnership with communities and organizations committed to a just and environmentally sustainable world. Based in Northern Virginia, Crude Accountability also collaborates with other environmental organizations in the United States.

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Introduction

The rural population in Azerbaijan significantly depends on agriculture for their sustenance and socio-economic development. In rural regions of Azerbaijan, agriculture still employs most people, making up 34% of the labor force.[1] The sector provides a variety of jobs, from raising livestock and processing food to planting and harvesting crops. However, it is worth noting that the majority of individuals working in agriculture do so to fulfill their personal needs rather than for commercial gain (Figure 1).

This particular dynamic implies that the potential impact of any threats facing this sector will be extensive and influential. Given this context, it becomes evident that the village areas within Azerbaijan are the most susceptible and are in greatest need in terms of agricultural sustainability and development.

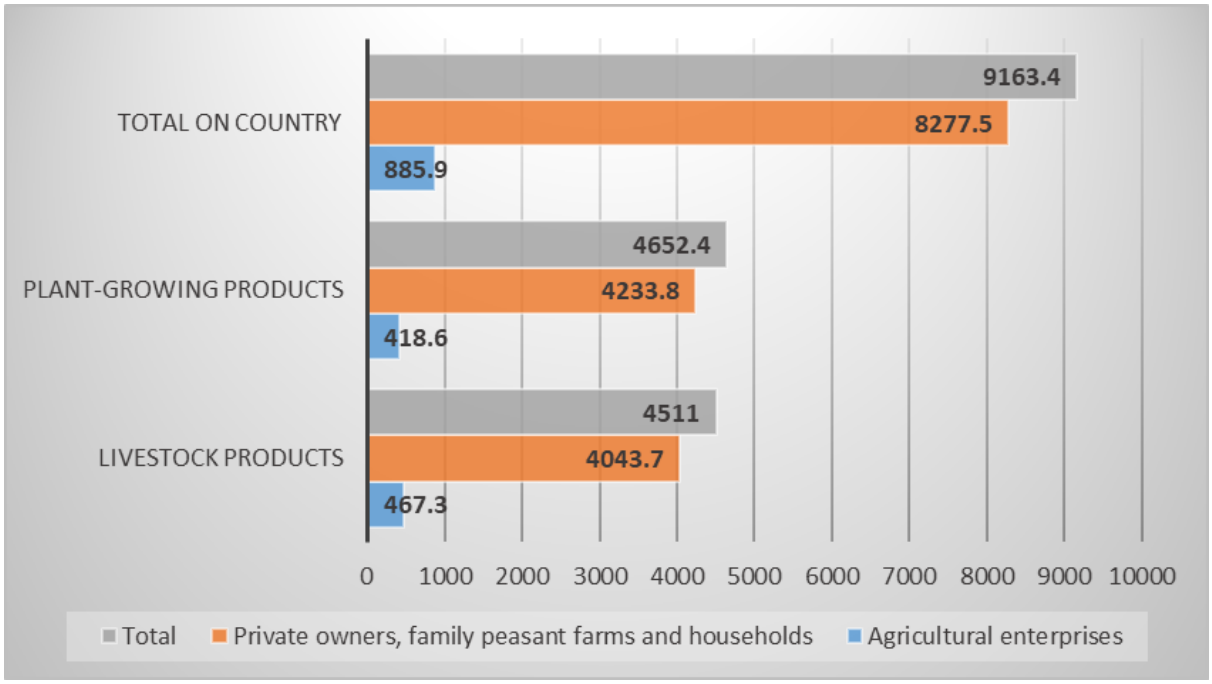

Fig. 1 . Total output of agricultural production by farm categories, in million manats

[1] https://www.stat.gov.az/source/agriculture/

During 2021, products worth 9,163.4 million manats were produced in the agricultural sector. 4,652.4 million manats of the agricultural products produced in the country were allocated to animal husbandry, and 4,511 million manats to crop production. In exchange for the high rate of growth of animal husbandry compared to the area of crop cultivation, as well as the expansion of grain-growing areas with extensive methods, where relatively low value-added is created, due to the decline in the production of other products with high value-added, the share of crop production in the structure of total agricultural production decreased from 57.5 percent in 1995 to 49 percent in 2021.[2]

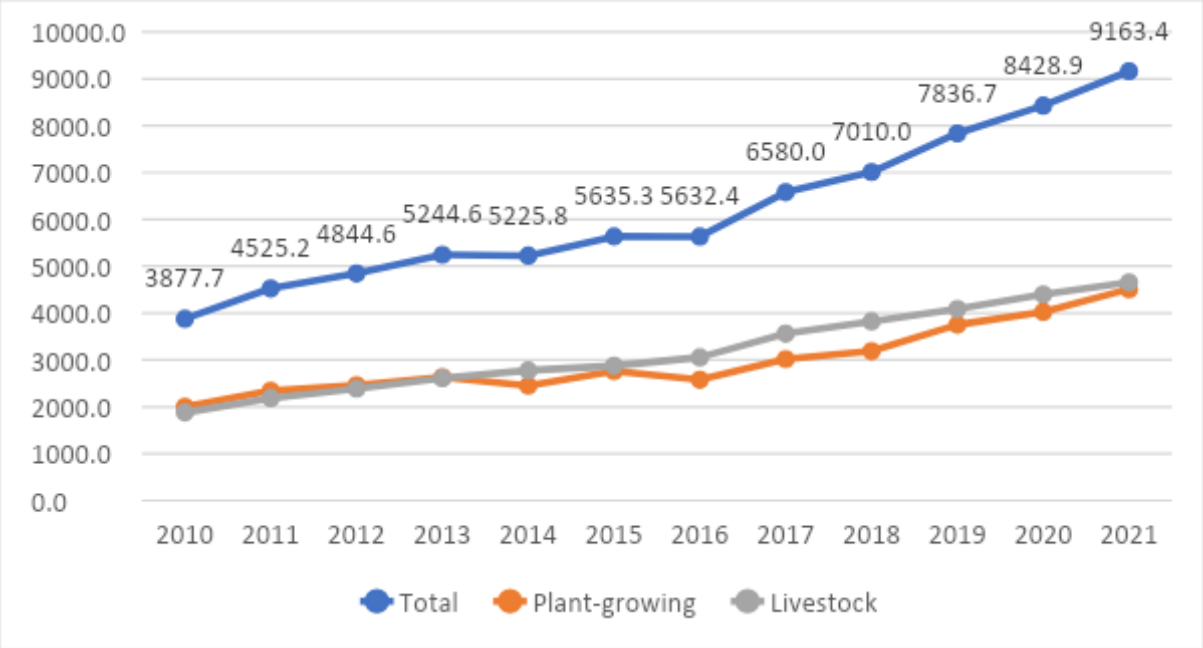

Fig. 2 Total agricultural output, at actual prices, in million manats

Since the 2000s, the extensive development of farmland has been noticeable. The main reason for this is the increase in the number of private entrepreneurs after independence. Between 1990 and 2021, the expansion was remarkable, with cultivated areas witnessing a staggering 12.4 percent increase, reaching a substantial 1,644.5 thousand hectares.[3] This surge in agricultural activities undoubtedly brought economic benefits, boosting food production, employment

[2] https://www.stat.gov.az/source/agriculture/
[3] https://idi-aze.org/files/pdf/2023-06-05/OOjq0fHXYN3zH3SgbkttKsxmxLNQtTZlLnWIZARs.pdf

opportunities, and local economies. However, it also brought to light a pressing environmental concern: the escalating demand for water resources.
As farmland expanded, so did the reliance on irrigation and other water-intensive agricultural practices. The irrigation systems were set up to meet the growing demands of crops, aiming to maximize yield and ensure consistent harvests. This amplified usage of water for crop cultivation subsequently strained rural Azerbaijan's water resources, leading to concerns about water scarcity and its potential long-term impact on the ecosystem.

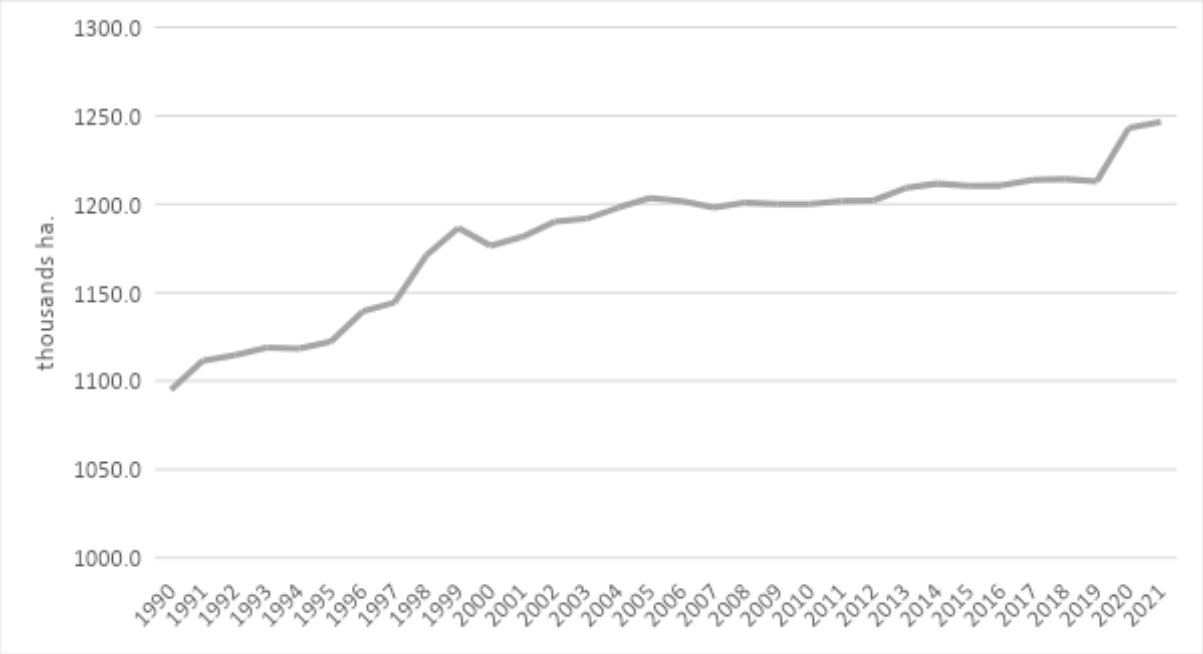

Fig. 3 Irrigated land, by end of the year, in thousand ha[4]

[4] https://www.stat.gov.az/source/agriculture

Unrest About Water Scarcity in the Media

In recent news, there have been reports focusing on the occurrence of unrest within the Azerbaijani population caused by water scarcity issues. These incidents serve as a clear indication of the gravity of the water scarcity problem and the subsequent socio-economic and environmental difficulties that rural communities are confronted with. The unrest is a manifestation of the public's discontent with the insufficient availability of water resources and the negative impacts it has on their everyday lives and agricultural endeavors.

1. A resident of Çöl Beşdəli, a village in the arid plains of Sabirabad, expresses concern over a two-year water problem that has greatly affected the lives of the village's nearly three thousand residents. Another 38-year-old villager expresses sadness about how their fields used to thrive with water from the river. However, now the area is completely deserted, and the lack of water has turned their once-fertile lands into infertile ones. This has resulted in the loss of their farming and animal husbandry jobs, causing significant hardship. In an effort to bring attention to their situation, a group of villagers recently attempted to obstruct a significant road, expressing their frustration with the lack of response from officials. One resident expresses their disappointment and anger, stating that they have been promised water for two months but have yet to see any progress. They feel that these promises are meaningless. One resident describes their difficult situation, explaining that they used to have no trouble watering their crops but now even a small amount of water is a luxury they cannot afford. They have to go to nearby communities to get drinking water and can only get a small amount. This highlights the challenge of surviving with limited resources. Another resident expresses their concern about the future of their land when there is a lack of water, emphasizing the strong link between water, sustenance, and the identity of a rural community. These quotes serve as strong evidence of the difficulties faced by the people of Çöl Beşdəli. The

lack of water has had a profound impact on their lives, causing problems with farming and affecting their overall income and health.[5]

2. A retired teacher from İbrahimhacılı village in Tovuz district expressed his desire to engage in agricultural activity in order to earn money. However, the lack of proper irrigation infrastructure in the village has caused his children, who are struggling to cultivate their fields, to also rely on his small pension. The interviewee emphasizes that if their village had access to water, they would be able to cultivate their fields and enhance their own livelihoods.[6]

These interviews provide insight into the significant challenges that arise from a lack of water in rural communities. The residents express their distress as they talk about a two-year water crisis that has resulted in infertile fields, loss of farming jobs, and the need to rely on outside sources for drinking water. The promised solutions have been disappointing, which has only added to their frustrations. The interviews emphasize the importance of water for survival, as access to it has become a luxury that affects both farming and overall well-being. The lack of irrigation infrastructure has forced the residents to depend on limited pensions instead of being able to engage in productive agricultural activities. These stories collectively highlight the various ways in which water scarcity impacts rural life, including economically, agriculturally, and socially.

[5] https://www.bbc.com/azeri/articles/cpejn748jgqo
[6] https://www.bbc.com/azeri/azerbaijan-63643116

Current Situations

Water Withdrawal Trends in the Agricultural Sector

An essential facet of comprehending the multifaceted water scarcity challenges in Azerbaijan lies in the analysis of annual freshwater withdrawals, particularly within the agricultural domain. From 1992 to 2020, the data shows that the proportion of freshwater withdrawals allocated to agriculture has fluctuated significantly. In the early 1990s, agriculture accounted for approximately 67.5% of total freshwater withdrawals, indicating a heavy reliance on water resources for farming and irrigation. This percentage steadily increased over the years and reached its highest point at around 92.4% in 2020.[7] The trend exhibits a cyclical pattern, with peak withdrawals occurring in the mid-2010s, coinciding with intensified agricultural activities.

This statistical panorama underscores the considerable weight that agriculture carries in terms of water utilization. The sector's ongoing significance in yearly freshwater withdrawals, along with the fluctuations observed, calls for a more thorough investigation into the agricultural practices and policies governing water resource management. This information sheds light on the crucial point at which Azerbaijan currently stands, as it tries to balance the need to maintain agricultural productivity with the goal of wisely allocating and conserving water across all sectors. As the country grapples with the complexities of water scarcity, the statistics present a compelling story, urging the implementation of strategic measures to maximize water usage and guarantee the sustainability of both agricultural systems and future water supplies.

[7] https://data.worldbank.org/indicator/ER.H2O.FWAG.ZS?locations=AZ

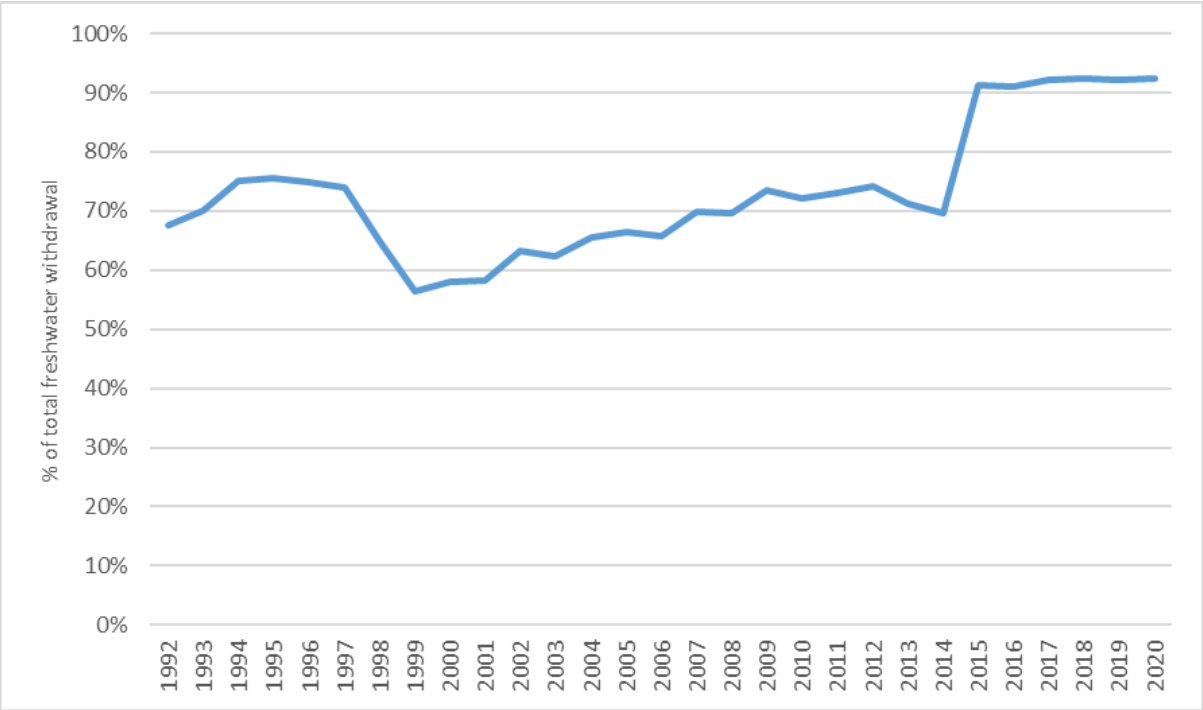

Fig. 4 Annual freshwater withdrawals, agricultural sector (% of total freshwater withdrawal)

Level of Water Stress

The level of water stress is a crucial measure used to assess how effectively water resources are managed. It provides insights into the proportion of freshwater being withdrawn in relation to the amount of accessible freshwater available. When considering the situation in Azerbaijan, this metric reveals a significant story about the intricate relationship between water usage and the availability of resources. Analyzing the data spanning from 2010 to 2020 exposes interesting patterns and developments in the country's levels of water stress.

Over the course of this time frame, there have been noticeable variations in the level of water stress. In the year 2010, the amount of freshwater taken out was around 48.4% of the total available freshwater resources, indicating a relatively moderate level of stress. However, as time went on, there were gradual increases in this percentage, and by the years 2019 and 2020, the withdrawal reached approximately 55.6%, highlighting a heightened state of water stress. It is worth

mentioning that both 2019 and 2020 shared the exact same percentage, underscoring a consistent and sustained level of stress for consecutive years.[8]

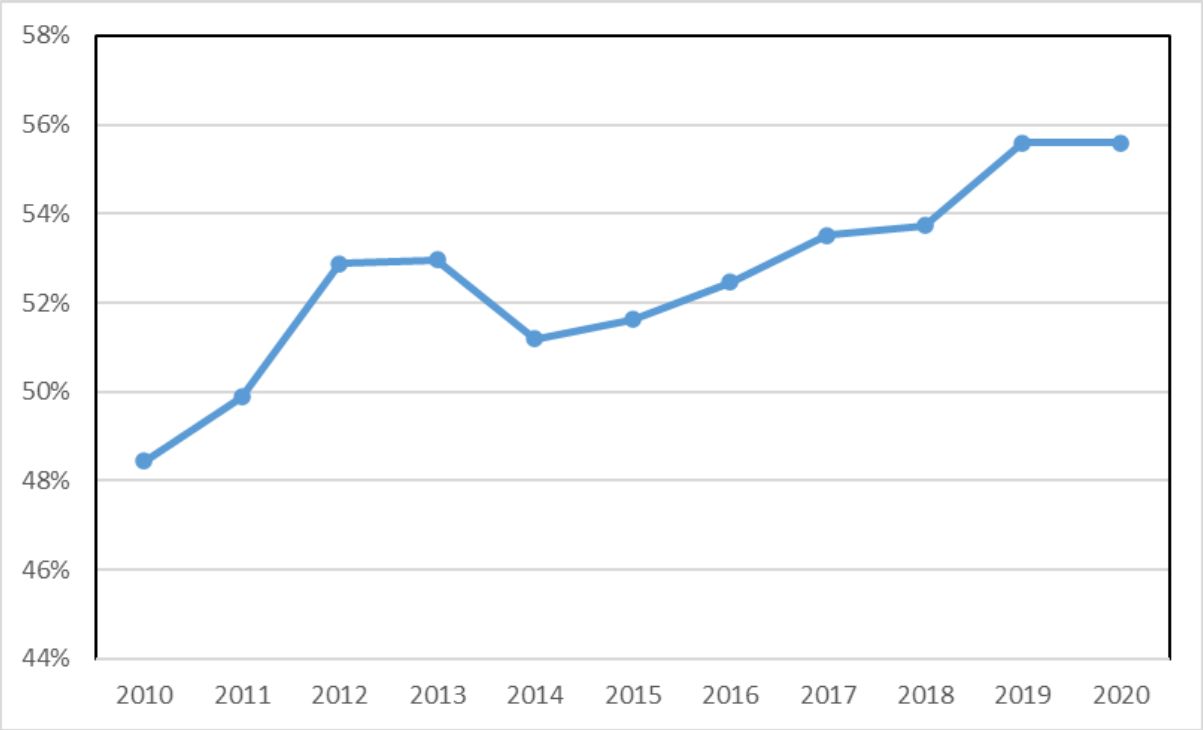

Fig. 5 Level of water stress: freshwater withdrawal as a proportion of available freshwater resources

The increasing significance of this pattern highlights the growing burdens that Azerbaijan's freshwater reserves face, which stem from a range of influences such as the need for agricultural irrigation, the expansion of industries, and the consumption of water by households. The gradual escalation of water stress observed over the course of the examined ten-year period demonstrates the mounting difficulties tied to the judicious distribution and preservation of water resources. Furthermore, it emphasizes the critical situation that Azerbaijan's water management strategies currently face, demanding the implementation of comprehensive and forward-thinking policies to alleviate the intensifying water stress and guarantee the sustainable utilization of this invaluable asset.

[8] https://data.worldbank.org/indicator/ER.H2O.FWST.ZS?locations=AZ

Reasons for Water Scarcity

Water Storage Facilities

A crucial aspect of effective water resource management is having enough and well-distributed water storage facilities in place. Regrettably, Azerbaijan is currently facing a shortage in this aspect. The amount of dam capacity available per person was 2,124.67 m3 in 2020, showing a gradual decrease from 2,627.99 m3 in 2001.[9] This decline in dam capacity per capita highlights a significant concern – the diminishing ability of Azerbaijan to store water.

Irrigation Systems

The issue of water scarcity in Azerbaijan is worsened by the outdated irrigation systems that are prevalent throughout the country. A significant portion of the water that is meant to support agricultural activities, about 26% or 3121.4 million cubic meters,[10] does not actually reach its intended destinations due to these antiquated mechanisms. This inefficiency greatly hinders the agricultural sector, which is a crucial component of the country's economy. As a result, this creates a vicious cycle that further exacerbates the problem of water scarcity.

Climate Change

Over the past ten years, Azerbaijan has witnessed a significant fluctuation in the amount of rainfall. The data collected from 2010 to 2022 provides a compelling illustration of this variation. Specifically, in 2011, there was a noteworthy rise in precipitation, which marked a significant deviation from the previous year. The following years displayed their own unique patterns, highlighting the inconsistent nature of the climate and suggesting the complex dynamics of its change. The

[9] https://knoema.com/atlas/Azerbaijan/topics/Water/Dam-Capacity/Total-dam-capacity
[10] https://www.stat.gov.az/source/environment/

emergence of irregular precipitation remains a looming concern. The irregularity of precipitation patterns presents a gloomy situation for Azerbaijan. Variations in the distribution of rain across various areas, along with periods of heavy rainfall followed by long periods of drought, present significant difficulties in managing water resources. The sustainability of agriculture and water supply depends greatly on consistent and well-distributed rainfall. Droughts are a looming menace. The manifestation of climate change, which is seen in irregular precipitation patterns, leads to the occurrence of long periods of drought. The years 2012 and 2013 particularly exemplify this phenomenon, as the amount of recorded precipitation dropped significantly below the average levels.[11] The consequences of these extended dry periods affected various areas, putting strain on surface water sources, underground water reserves, and agricultural output. The evident impact on both surface and groundwater resources shows the complex connection between changing precipitation patterns and water availability. Irregular precipitation disturbs the replenishment of surface water bodies, putting their sustainability at risk. At the same time, insufficient rainfall fails to penetrate and recharge groundwater reserves, worsening their depletion.

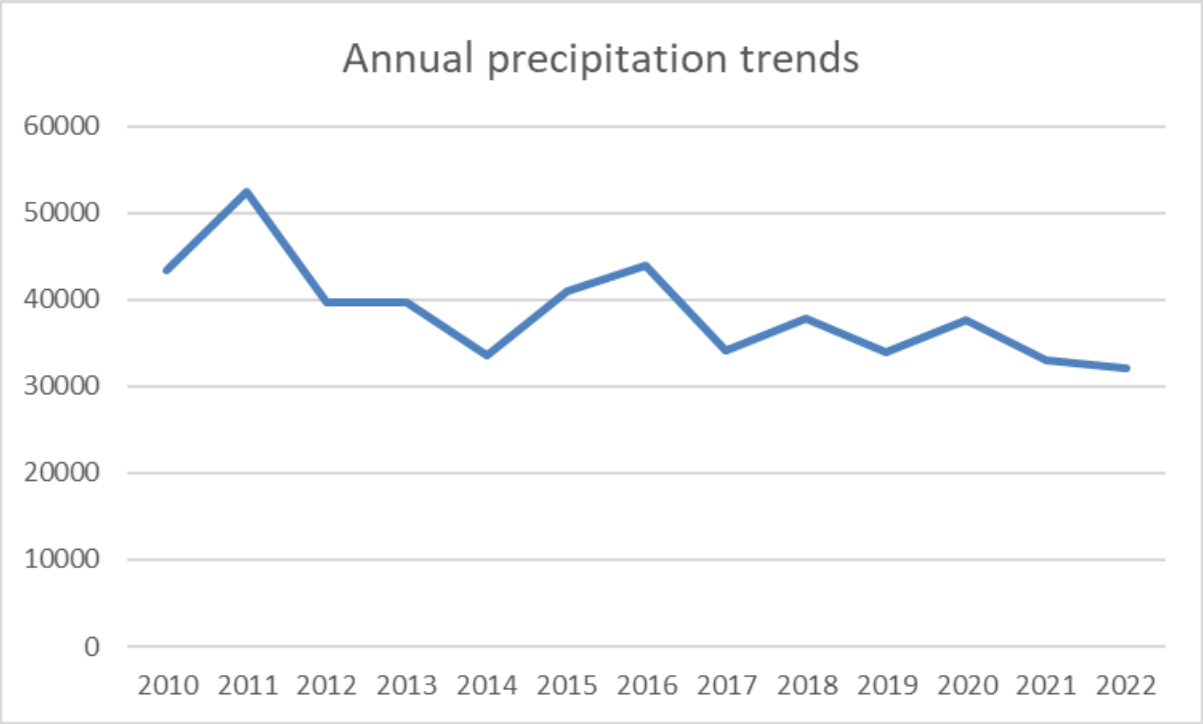

Fig. 6 Annual precipitation trends

[11] https://www.stat.gov.az/source/environment/

Conclusion & Recommendations

The rural population in Azerbaijan depends heavily on agriculture for their livelihoods and socio-economic progress. Agriculture makes up 34% of the labor force in rural areas and plays a crucial role in shaping local economies and supporting communities. However, the agricultural sector's stability and the well-being of rural areas are threatened by challenges such as water scarcity, changing nutrient levels, and the effects of climate change. To tackle these challenges, a comprehensive approach is required that integrates innovative strategies, community participation, and government backing.

Improving water management practices is essential for maintaining agricultural sustainability. Implementing advanced irrigation systems like drip irrigation can significantly decrease water waste and enhance crop production. Investing in water storage facilities like reservoirs can also help address water scarcity during periods of drought. Additionally, community-based water management strategies can promote fair distribution of water resources and promote responsible water usage.

Promoting sustainable agricultural practices is crucial in order to minimize the adverse effects of nutrient concentrations on water quality. Educating farmers about the importance of balanced fertilization and correct fertilizer application can aid in decreasing nutrient runoff and contamination. The implementation of organic farming techniques, such as cover cropping and crop rotation, can enhance soil health, reduce reliance on chemical inputs, and improve water retention abilities. To maintain water quality, it is essential to regularly monitor the levels of nitrates and phosphorus in water sources. Strict enforcement of regulations is necessary to restrict fertilizer usage near water bodies and prevent pollution. By fostering collaborations between local communities, farmers, and authorities, adherence to water quality standards can be ensured, thereby safeguarding both human health and the environment.

Research and innovation play a crucial role in promoting sustainable agricultural development. Azerbaijan can reduce the negative effects of water scarcity by

funding initiatives that prioritize the cultivation of crops resistant to drought, the implementation of water-efficient methods, and the adoption of climate-resilient practices. Furthermore, the utilization of data-driven strategies such as precision agriculture and remote sensing can improve resource utilization and boost productivity.

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