

# Vulnerability Background Note

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**Armenians face exposure to a variety of natural hazards and climate shocks**, including air pollution, floods, earthquakes, forest loss, air quality, variation in precipitation, and variation in temperature. A vulnerability index analysis conducted alongside this study (World Bank, 2023b) reveals that the northern areas of the country are most exposed to these hazards. People’s ability to handle the impacts of these hazards and shocks depends on their economic resources and institutions. That means that exposure alone is not a problem and it is the combination of exposure with economic concentration and living standards what creates sticking points in the face of these hazards and also offers mitigating factors when economic conditions and living standards are better. When considering this interaction, the most vulnerable locations are Ghukasyan (Ararat), Gugark, Kalinino, Spitak (Lori), Aragats (Aragatsotn), Amasya, and Ani (Shirak) and the least vulnerable are all located in or near major cities, including Yerevan (Capital), Gyumri (Shirak), (Kotayk), Dildijan (Tavush), and Vagharshapat (Armavir).

**Armenians are convinced that climate change is real** and, according to the Life in Transition (LiTS) and Deep Dive Surveys (DDS) (World Bank, 2023a), and 84 percent of Armenian respondents in those surveys believed that climate change will seriously affect them during their lifetime (World Bank, 2023). Moreover, 92 percent of them believed that climate change would affect today’s children during their lifetime, making Armenia the seventh most aware country out of the 37 surveyed from both, Europe and Central Asia. The concerns are such, that 51 percent of respondents believe that protecting the environment is more important than economic growth. Half of respondents see regulations and public investments as important to address climate change, but remain concerned, as only 8 percent of individuals believe hypothetical extra taxes would be spent on climate change by the government.

**Almost a quarter of Armenian households (187,176 out of 800,604 households or 23.4 percent) derive income from the sales of agricultural products.** However, exposure to the climate risks of agriculture is larger, since 41 percent of households use land for

agricultural purposes (owned and/or rented), regardless of agricultural sales, and for almost a fifth of the households (135,360 households), 26.4 percent of their total income also comes from hired employment in the agricultural sector, 20.2 percent from the sale of agricultural products, and 9.5 percent from imputed use of agricultural products for own consumption. For this group, the total exposure to the agricultural sector represents 56 percent of their total income under climate risks faced there.

**Flood risks threaten regional growth in a differentiated manner.** An analysis conducted for this report estimates combined agricultural, buildings and roads losses ranging between 0.1 and 15.4 percent of regional GDP that would result from a 1 in a 100-year flood event in Armenia’s regions for a country total of between USD 167.1 and USD 462 million (Lenoble & Rozenberg, 2024). The worst hit regions would be Vayots Dzor (up to 15.4 percent), Lori (up to 12.0 percent), Tavush (up to 11.1 percent), and Aragatsotn (up to 9.4 percent), while the Yerevan metropolitan region would be the most resilient (up to 1.2 percent). These disparities in vulnerability suggest that different policies and investment public and private strategies are needed at the regional level for flood proofing production zones, infrastructure, and dwellings.

**Homes are perhaps the most important asset owned by households. In 2022, most of the 800,604 Armenian households owned their dwelling (about 89.4 percent),** as shown in Figure 1, with only about 5.9 percent of homes renting and 4.7 percent with other forms of tenure . Also, about 97 percent of households lived in houses or apartments, as opposed to less formal structures. Houses averaged 112.0 m<sup>2</sup>, while apartments averaged 68.3 m<sup>2</sup>. As expected, 96.2 percent of apartments were located in urban areas, with about half of them in Yerevan (55.3 percent). Houses, on the other hand, were located mostly in rural areas (65.8 percent), with about 13.4 percent of them located in Yerevan (ARMSTAT, 2023).

**Owned dwellings are an asset from which households derive welfare.** By not having to spend on housing, more is available as disposable income. The emergent rental market information of Armenia was used to impute rent to non-renters using a log linear modeling approach described by Ceriani, Olivieri, & Ranzani (2019) and it was established that owners derived an average of AMD 53,145.27 (USD 122.8) in monthly imputed rent, with an average dwelling of 89m<sup>2</sup>.

**When this imputed rent is considered a long-term asset of income flows until 2050, its Net Present Value is established at an average of AMD 15.6 million (USD 36,057.7).** This varies by region, with the highest values in Yerevan, Kotayk, Ararat and Armavir and the lowest values in Vayots Dzor, Shirak, and Tavush.

**Heavy rainfall and floods exacerbated by climate variability already have an impact on between 2.1 and 5.4 percent of Armenian structures every year, depending on the region of the country.** If proper adaptation measures were in place, 21,577 Armenian homes (3 percent) would not lose an average of USD 3,226.7 from the imputed rent asset value of their homes each year.

**Agriculture from owned land also provides an income flow that is considered an asset with an average Net Present Value of AMD 13.4 million (USD 30,939.5 )** for households that sell agricultural products. However, depending on the region, between 1.4 and 6.8 percent of these are impacted by heavy rainfall and floods annually. If proper climate adaptation measures were in place, as many as 7,711 households every year would avoid average asset losses of Net Present Value of agricultural income of AMD 2.1 million (USD 4,874.5).

**For households with agricultural income, the combined welfare losses of impacts to their dwellings and crops brought about by exposure to climate related heavy rains and floods represents losses of about 6 percent of their monthly total consumption expenditure.** This means that for these households, appropriate climate change adaptation measures could mean an increase in average monthly income from USD 498.5 to USD 529.6 pushing the entire distribution away from the poverty line. For about 280 of the 7,711 impacted households (about 4 percent), this would mean escaping poverty.

**Depending on the region, between 19 and 57 percent of buildings would be exposed to a 1 in 100 years flood event.** This would mean that a total of 206,591 households (26% of all households) would suffer monthly average losses in consumption expenditure of about 3.5 percent and 5,237 or 2% of them would fall into poverty under such an eventuality.

**Similarly, between 12 and 60 percent of households with agricultural production could be impacted by a 1 in 100 year flood event.** A total of 68,969 households could see an average 6.5 percent of their monthly consumption expenditure lost by this situation. For 7 percent of households impacted (4,873 households) this would push them below the poverty line.

**For this last group, impacts on both buildings and agricultural production would result in average losses of 8.1 percent of monthly consumption.** This would result in 6,418 households (9 percent of those impacted) falling below the poverty line.

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