

# Environmental aspects of the reconstruction process in Garabagh and Eastern Zangezur regions

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The primary objective of this article is to analyse the environmental dimensions of the reconstruction process in Azerbaijan's liberated territories. It begins by examining the environmental impact of the occupation of Armenia, highlighting the extensive damage caused to the ecosystem of the liberated territories, including flora, fauna, and water resources. Following the initial analysis of the environmental repercussions of the occupation, the article delves into the environmental aspects of the reconstruction effort, showcasing various measures and projects aimed at revitalizing the region's flora and fauna, promoting renewable energy sources such as wind and solar energy, establishing 'Green Energy Zones' and 'Smart Villages', and employing smart agriculture techniques. Through these strategies, Azerbaijan demonstrates a comprehensive approach not only to addressing the environmental devastation caused by the occupation but also to proactively creating new ecosystems, which aligns with global sustainable development goals and will have less environmental impact. This indicates Azerbaijan's commitment to not only restoring but also enhancing the environmental sustainability of the liberated territories.

**Keywords:** Azerbaijan, Armenia, Garabagh, Eastern Zangezur, Environment, South Caucasus"



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**Introduction**

Following the dissolution of the Soviet Union in the early 1990s, Armenia’s territorial claims against Azerbaijan escalated into full-scale war. By the end of 1994 when the war ended, Armenia’s armed forces occupied about 20% of Azerbaijan’s territories including the Garabagh region (formerly the Nagorno-Karabakh Autonomous Oblast (NKAO)) and seven surrounding districts (Lachin, Kalbajar, Aghdam, Fuzuli, Jabrayil, Gubadli, and Zangilan). Despite the ceasefire reached in 1994 that ended active hostilities, the [former] conflict remained unresolved, with intermittent skirmishes and periodic escalations until 2020. The conflict caused massive internal displacement, with up to 700.000 Azerbaijanis fleeing the occupied territories for other parts of the country. The occupation has had profound humanitarian, political, and socio-economic impacts on Azerbaijan and the entire region.

Along with its political and economic implications, the occupation has also had significant environmental impacts. Deforestation in the

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occupied territories, intentional setting of fires, destruction of plant and animal species, pollution of rivers and tributaries, degradation of fertile soil, and illegal exploitation of natural resources by Armenia have caused long-term and irreversible environmental damage in Azerbaijan. According to the Ministry of Ecology and Natural Resources of Azerbaijan, the country suffered ecological and natural resource damage amounting to a total of US\$285 billion due to the occupation.<sup>1</sup> Following the end of the occupation in 2020, Azerbaijan initiated rapid restoration projects

in the previously occupied (now liberated) territories.

Recognizing the significant environmental damage caused by the occupation, Azerbaijan places special focus on restoring the environmental balance in these areas. This includes rehabilitating forests, reclaiming polluted lands, and revitalizing ecosystems. Through these efforts, Azerbaijan aims to promote environmental sustainability and resilience in these territories. The main goal of this article is to

1 Center for Analysis of Economic Reforms and Communication of the Republic of Azerbaijan, “New Karabakhnama: Post-Conflict Construction in Karabakh And Eastern Zangezur Economic Regions”, 2022, Available at: <https://ereforms.gov.az/files/publications/pdf/en/11a6f3b74851df261afd1b5bab1f920e.pdf> (Accessed: May 30, 2024)

explore the environmental aspects of the reconstruction process in the liberated territories of Azerbaijan.

### ***Environmental implications of the occupation***

During the occupation, large-scale deforestation occurred as trees (such as walnut, oak, and other species) were cut down for fuel, construction, and export purposes, which led to a loss of biodiversity. Forests used for cattle grazing were also heavily destroyed in some parts of the occupied districts. Several protected tree and shrub species, such as the yew tree, Araz oak, eastern plane, pomegranate, forest grapes, Buasye pear, box tree, Eldar pinewood, persimmon, and willow-leafed pear, are now on the brink of extinction.<sup>2</sup> Between the mid-1980s and the mid-1990s, the forest and woodland area declined by 12.5%.<sup>3</sup> Additionally, Armenia has used natural resources as a weapon by deliberately setting fires to harm Azerbaijani civilians living near the former line of contact. Since 2006, these fires have destroyed over 110,000 hectares of fertile soil, causing significant environmental damage.<sup>4</sup>

Along with deforestation, water resources were also negatively affected by the occupation due to infrastructure damage and lack of maintenance, leading to pollution and disruption of water supplies. Around 120 mineral water wells, crucial for their medicinal properties, were damaged.<sup>5</sup> Additionally, rivers originating from the Lesser Caucasus mountain range, such as the Tartar, Hakari, Khachinchay, and Kondalanchay, which supplied water to low-lying regions, were also affected.<sup>6</sup> Armenia polluted small rivers flowing into the Kur and Araz rivers with chemicals and heavy metals.<sup>7</sup>

According to Azerbaijan's Ministry of Ecology and Natural Resources, the Okhchuchay River, near the border of Armenia in the direction of

2 Huseynov, V., "The environmental costs of the Armenian occupation of Azerbaijani territories", *Aircenter.az*, 2021, Available at: <https://aircenter.az/uploads/8PDGIC231dxV.pdf> (Accessed: May 30, 2024)

3 *Ibid.*

4 Ministry of Foreign Affairs of the Republic of Azerbaijan, *Environmental Damage*, 2022, Available at: <https://mfa.gov.az/en/category/consequences-of-the-aggression-by-armenia-against-azerbaijan/environmental-damage> (Accessed: May 30, 2024)

5 *Ibid.*

6 *Ibid.*

7 *Ibid.*

Zangilan district, had dangerous levels of various metal compounds.<sup>8</sup> This pollution, stemming from Armenia’s Gajaran Copper-Molybdenum Plant and the Gafan Ore Refinery, resulted in heavy metal sedimentation and extinction of rare fish species and posed serious health risks.<sup>9</sup> The contamination of the Okhchuchay River also degraded the water quality of the Araz, the South Caucasus’s second-largest river.<sup>10</sup>

The formerly occupied territories of Azerbaijan are also rich in mineral resources. Among the 155 mineral resource deposits found in these areas are valuable commodities such as gold, mercury, copper, lead, and zinc. These resources, along with abundant building materials such as face stone, block stone, various construction stones, loam, sang-gravel, chromite, lime, marble, and agate have been ruthlessly exploited

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by Armenia.<sup>11</sup> The depredatory exploitation of these resources has led to widespread environmental degradation.<sup>12</sup> Toxic chemicals and heavy metals used in mining operations have contaminated soil, water sources, and the air, posing serious health risks to both humans and wildlife.<sup>13</sup>

The landmines planted during the occupation in the Garabagh and Eastern Zangezur regions also have detrimental effects on the environment. These explosive devices, along with their chemical components, pose a risk of permanent harm to humans, animals, vegetation, water, land, and the overall ecosystem.<sup>14</sup>

8 Ministry of Ecology and Natural Resources of the Republic of Azerbaijan, *The pollution of Okhchuchay by Armenia caused mass death of fish* (translation from Azerbaijani), March 10, 2021, Available at: <https://eco.gov.az/az/nazirlik/xeber?newsID=12102> (Accessed: June 29, 2024)

9 Ministry of Ecology and Natural Resources, *The pollution of Okhchuchay...*, *op.cit.*

10 Azvision, *Armenia’s eco-terror: Facts about pollution of Okhchuchay River*, June 29, 2021, Available at: <https://en.azvision.az/news/146362/news.html> (Accessed: June 29, 2024)

11 Ministry of Foreign Affairs of the Republic of Azerbaijan, *Illegal economic and other activities in the occupied territories of Azerbaijan*, 2016, Available at: [https://geneva.mfa.gov.az/files/MFA\\_Report\\_on\\_the\\_occupied\\_territories\\_1.pdf](https://geneva.mfa.gov.az/files/MFA_Report_on_the_occupied_territories_1.pdf) (Accessed: June 29, 2024)

12 Mustafayeva, A., and Garayev, R., “Legal Aspects of Reparation for Damage Caused to Azerbaijan as a Result of Armenian Aggression”, *IRS Heritage*, 2017, p.56, <https://irs-az.com/new/pdf/201309/1380093954626732529.pdf> (Accessed: May 30, 2024)

13 Karabakh Center, *Ecocide in Karabakh*, 2021, Available at: <https://story.karabakh.center/en/ecocide-in-karabakh> (Accessed: June 29, 2024)

14 Pavlenko, A., “Landmines in Azerbaijan’s Karabakh smashing up environment-

## ***Environmental aspects of the reconstruction***

### *Revitalizing flora and fauna*

The almost three-decades-long occupation of Armenia came to an end in 2020 during the Second Garabagh War, which lasted from September 27 to November 10. In the war, Azerbaijan's army achieved a convincing victory, liberating the territories that had been under occupation for almost three decades<sup>15</sup>. Immediately after the war, Azerbaijan initiated a restoration process under the 'Great Return' programme.<sup>16</sup> This comprehensive programme aims to rebuild and revitalize the liberated territories, focusing on infrastructure development, housing construction, and the restoration of public services. The plan also emphasizes the importance of demining efforts, ecological restoration, and the return of internally displaced persons to their ancestral lands.<sup>17</sup>

Efforts to restore the environment in the liberated territories and address the extensive damage to flora and fauna caused by the occupation have been significant. Key initiatives include rehabilitating forests, reclaiming polluted lands, and revitalizing ecosystems. Afforestation projects launched to combat widespread deforestation involve the planting of native tree species to rebuild forest ecosystems and enhance biodiversity.<sup>18</sup> Wildlife reintroduction programmes aim to restore the fauna ecosystem by reintroducing native species that were adversely affected or displaced during the occupation. These projects are expected to play a crucial role in restoring the region's biological diversity.

To restore the forests damaged during the occupation, several tree-planting campaigns have been initiated since the war. In December 2020, a tree-planting campaign was conducted in Aghali village of

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ANAMA", *Trend*, May 30, 2024, Available at: <https://en.trend.az/azerbaijan/politics/3905906.html> (Accessed: June 1, 2024)

15 Prosecutor General's Office of the Republic of Azerbaijan, *The 44-day Patriotic War (II Karabakh War)*, 2021, Available at: <https://genprosecutor.gov.az/en/page/azerbaycan/i-ve-ii-qarabag-muharibesi/44-gun-suren-veten-muharibesi-ii-qarabag-muharibesi> (Accessed: June 29, 2024)

16 President.az, *Decree of the President of the Republic of Azerbaijan on the approval of the "I State Program on the Great Return to the territories of the Republic of Azerbaijan freed from occupation"* (translation from Azerbaijani), November 16, 2022, Available at: <https://president.az/az/articles/view/57883> (Accessed: June 29, 2024)

17 *Ibid.*

18 Azvision.az, *A program on forest restoration has been prepared in Karabakh* (translation from Azerbaijani), November 4, 2023, Available at: <https://azvision.az/news/343413/news.html> (Accessed: June 29, 2024)

Zangilan, organized jointly by the IDEA Public Union and the Ministry of Ecology and Natural Resources. During this campaign, 500 trees of various species, suitable for the local soil and climate conditions, were planted.<sup>19</sup> Additionally, seeds of oak, oriental sycamore, and mulberry trees were sown, initiating the effort to restore ecological sustainability in Zangilan district.<sup>20</sup> In 2021, an additional 1,000 trees were planted in Zangilan through a joint initiative by the Garabagh Revival Fund and the Ministry of Ecology and Natural Resources to protect ecological diversity.<sup>21</sup> As part of this project, 30,000 trees, including Eldar pine, evergreen cypress, and cypress suited to the local climate were planted on a 30-hectare area at the entrance to Zangilan city<sup>22</sup>. Plans also include planting devil trees and oriental sycamore.

To date, more than 40,000 saplings, including species such as Eldar pine, goryush, elm, and dagdagan, have been planted across the Jabrayil, Zangilan, Gubadli, Fuzuli, Lachin, Kalbajar, and Aghdam districts, and the city of Shusha.<sup>23</sup> Additionally, more than 2 tons of oak seeds have been sown.<sup>24</sup> Ongoing tree planting efforts include plans for new green areas in Zangilan (around 55 hectares), along the right side of the Jabrayil–Hadrut highway (15 hectares), and in Fuzuli district (approximately 200 hectares).<sup>25</sup>

Simultaneously, the Ministry of Ecology and Natural Resources

19 Azerbaijan-news.az, *The forests of Karabakh are being restored* (translation from Azerbaijani), March 20, 2022, Available at: <https://www.azerbaijan-news.az/az/posts/detail/qarabagin-meseleri-berpa-olunur-1647724800> (Accessed: June 29, 2024)

20 Saftarov, E., “1,000 trees were planted in Zangilan city in connection with the establishment of the «From Triumph to Revival» forest massif” (translation from Azerbaijani), *Azertag*, December 17, 2021, Available at: [https://azertag.az/xeber/zengilan-seherinde\\_\\_quotzeferden\\_dirchelise\\_\\_quot\\_mese\\_massivinin\\_salinmasi\\_ile\\_elaqedar\\_1000\\_eded\\_agac\\_ekilib-1954168](https://azertag.az/xeber/zengilan-seherinde__quotzeferden_dirchelise__quot_mese_massivinin_salinmasi_ile_elaqedar_1000_eded_agac_ekilib-1954168) (Accessed: June 1, 2024)

21 Respublika-news.az, *1,000 trees were planted in Zangilan city in connection with the establishment of the «From Triumph to Revival» forest massif* (translation from Azerbaijani), December 18, 2021, Available at: <https://respublika-news.az/news/zengilan-seherinde-zeferden-dirchelise-mese-massivinin-salinmasi-ile-elaqedar-1000-eded-agac-ekilib> (Accessed: June 1, 2024)

22 *Ibid.*

23 Azertag.az, *To date, 40,000 tree seedlings have been planted in Karabakh* (translation from Azerbaijani), January 6, 2023, Available at: [https://azertag.az/xeber/bu\\_gune\\_qeder\\_qarabagda\\_40\\_min\\_agac\\_tingi\\_ekilib-2435843](https://azertag.az/xeber/bu_gune_qeder_qarabagda_40_min_agac_tingi_ekilib-2435843) (Accessed: June 28, 2024)

24 *Ibid.*

25 Azerbaijan-news.az, *The forests of Karabakh are being restored* (translation from Azerbaijani), March 20, 2022, Available at: <https://www.azerbaijan-news.az/az/posts/detail/qarabagin-meseleri-berpa-olunur-1647724800> (Accessed: June 1, 2024)

developed the ‘Restoration of the Forest Fund’ programme for 2022–26.<sup>26</sup> This programme aims to restore a total of 30,000 hectares of forest fund area through forest restoration, planting, and natural regeneration efforts. Once the landmines are fully cleared in the Kalbajar and Lachin districts, tree-planting initiatives are planned for 455 hectares.

For restoring biodiversity in the liberated territories, alongside the tree-planting campaigns, the Biodiversity Conservation Service of Azerbaijan Republic has announced plans for the reintroduction of fauna species such as gazelle, bezoar goat, Dagestan tur, red deer, fish, and raptor bird species.<sup>27</sup> Plans are in place for the return of gazelle populations to Jabrayil and Zangilan districts.<sup>28</sup> The reintroduction of 293 gazelles to natural areas has been completed, with over 7,000 gazelles recorded in Azerbaijan according to the latest survey.<sup>29</sup> Substantial progress has been made in restoring fish populations, exemplified by the release of golden-throated trout in rivers within the liberated territories.<sup>30</sup>

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### *Development of renewable energy sources*

From an environmental perspective, the reconstruction process in the liberated territories has focused not only on rehabilitating the flora and fauna, which were heavily damaged during the occupation, but also on creating a self-sustaining environment. This approach aligns with sustainability goals and ensures future environmental protection in these areas. One of the main features of this approach is the development of

26 Tv.ikisahil.az, *A clean environment means a healthy life* (translation from Azerbaijani), September 23, 2022, Available at: <https://tv.ikisahil.az/post/348189-temiz-etraf-muhit-saglam-heyat-demekdir> (Accessed: June 2, 2024)

27 Ministry of Ecology and Natural Resources of the Republic of Azerbaijan, “Biodiversity components are being returned to their historic areas in the areas freed from occupation” (translation from Azerbaijani), May 27, 2023, Available at: <https://eco.gov.az/az/nazirlik/xeber?newsID=17938> (Accessed: June 27, 2024)

28 Sesqazeti.az, *Biodiversity in Karabakh: How to restore it?* (translation from Azerbaijani), December 28, 2023, Available at: <https://sesqazeti.az/news/mia/1118070.html> (Accessed: June 2, 2024)

29 *Ibid.*

30 *Ibid.*



renewable energy sources and their transformation into a main energy source for the liberated territories, thereby increasing energy efficiency and minimizing environmental impact.

The liberated territories possess significant potential for renewable energy production. The southern plains, including the districts of Fuzuli, Jabrayil, and Zangilan, have particularly high solar radiation levels.<sup>31</sup> These areas receive an annual average of between 1,600 and 1,700 kilowatts of solar radiation per square meter of horizontal surface, with a total solar energy potential of 3,000 to 4,000 megawatts.<sup>32</sup> Eight promising sites with a combined potential of over 4,000 MW have been identified for solar power plants (SPP) in six districts: Fuzuli, Jabrayil, Zangilan, Gubadli, Lachin, and Kalbajar.<sup>33</sup> Additionally, Kalbajar and Lachin districts have significant wind energy potential.<sup>34</sup> According to preliminary estimates by the International Renewable Energy Agency, the liberated areas have a solar energy potential exceeding 4,000 MW and a wind energy potential of up to 500 MW.<sup>35</sup>

Hydroelectric power plants (HPP) are expected to be instrumental in boosting renewable energy production in the recently liberated territories, which are rich in water resources, accounting for roughly 25% of Azerbaijan's total water reserves.<sup>36</sup> Following the liberation, Azerbaijan has launched extensive projects aimed at rebuilding and enhancing HPP infrastructure in these areas. A significant focus has been placed on these initiatives due to the strategic importance of harnessing

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31 The Ministry of energy of Azerbaijan, *Energy Potential of Nagorno-Karabakh And Surrounding Regions*, November 2, 2020, Available at: <https://minenergy.gov.az/en/xeberler-arxivi/dagliq-qarabag-ve-etraf-regionlarin-enerji-potensialini> (Accessed: June 28, 2024)

32 *Ibid.*

33 Azerbaijan Renewable Energy Agency under the Ministry of Energy of the Republic of Azerbaijan, *The work to be done to calculate the exact potential for renewable energy in the liberated territories was discussed*, December 8, 2020, Available at: <https://area.gov.az/en/news/34/isgaldan-azad-edilmis-erazilerde-berpa-olunan-enerji-uzre-deqiq-potensialin-hesablanmasi-sahesinde-gorulecek-isler-muzakire-edilib> (Accessed: June 30, 2024)

34 *Ibid.*

35 Aircenter.az, *Main Directions of the Restoration Process in the Liberated Areas* (translation from Azerbaijani), March, 2020, Available at: <https://aircenter.az/uploads/files/orxan%20tehlil%20mart.pdf> (Accessed: June 29, 2024)

36 Abc.az, *We now have full possession of our water resources*, April 16, 2024, Available at: <https://abc.az/en/news/144124/we-now-have-full-possession-of-our-water-resources> (Accessed: June 27, 2024)



hydroelectric power. The abundance of rivers and other water bodies in these territories offers a substantial opportunity for sustainable energy generation. Azerbaijan's commitment to renewable energy is evident in the vigorous reconstruction efforts, which include modernizing existing HPPs and developing new facilities.

Since the onset of these initiatives, considerable progress has been achieved, with the construction or reconstruction of a total of 26 HPPs.<sup>37</sup> Currently, active construction is under way at nine additional sites, reflecting a robust dedication to maximizing the hydroelectric potential of these regions. These efforts are part of a broader strategy to diversify Azerbaijan's energy portfolio, reduce reliance on fossil fuels, and promote environmental sustainability through the increased use of renewable energy sources.

Additionally, in 2021, Azerbaijan passed a law "*On the use of renewable energy sources in the production of electricity*". This legislation, along with other reforms and legal measures, is anticipated to boost the development of renewable energy in the Garabagh region and strengthen its role in ensuring the energy security of the country. The goal is to increase the share of renewable energy sources in the country's total electricity production to 30% by 2030.<sup>38</sup> Currently, renewable energy accounts for 17% of the country's electricity production, highlighting a strong commitment to significantly enhancing the use of renewable energy in the region.

### *Creation of Green Energy Zones*

The main goal of the energy policy for the liberated territories is to transform these areas into Green Energy Zones, prioritizing the use of renewable energy sources and the implementation of environmentally friendly technologies. In line with the order signed by the President<sup>39</sup> of

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37 Trend.az, *Azerbaijan discloses number of hydropower plants on its liberated territories*, October 16, 2023, Available at: <https://en.trend.az/business/energy/3812374.html> (Accessed: June 27, 2024)

38 The Ministry of energy of Azerbaijan, *The Use of Renewable Energy Resources in Azerbaijan*, March 6, 2024, Available at: <https://minenergy.gov.az/en/alternativ-ve-berpa-olunan-enerji/azerbaycanda-berpa-olunan-enerji-menbelerinden-istifade> (Accessed: June 28, 2024)

39 President.az, *Decree of the President of the Republic of Azerbaijan on measures related to the establishment of a "green energy" zone in the liberated territories of the Republic*

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the Republic of Azerbaijan in 2021 to establish a Green Energy Zone in the liberated territories, an international consulting firm has been engaged and a concept document has been prepared in collaboration with the Japanese company TEPCO.<sup>40</sup> This document aims to supply the region with eco-friendly green energy by leveraging the substantial renewable energy potential in the liberated territories and developing proposals for the application of environmentally friendly and energy-efficient green technologies.

The Green Energy Zone initiative includes plans for electricity generation from renewable sources, implementing energy efficiency measures, promoting the use of electric vehicles, installing solar panels on building rooftops, using solar-powered LED lamps for street and road lighting, employing renewable energy technologies for heating, cooling, and hot water supply, applying smart energy management systems, and managing waste energy effectively. These plans would collectively protect the environment and promote sustainable development in the region by reducing greenhouse gas emissions and minimizing air pollution in the liberated territories.

### *Smart Villages*

The reconstruction of the Garabagh region underscores a dedication to environmentally cleaner approaches in agriculture, manufacturing, construction, and daily life that align with sustainable development principles. The initiative of transforming the liberated territories into environmentally cleaner regions is framed within the context of the internationally established Sustainable Development Goals.<sup>41</sup> The efforts to employ eco-friendly practices particularly aim at achieving Goal 11, “ensuring ecological sustainability of cities and settlements,” and Goal 9, “enhancing resource efficiency and modernizing industrial

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*of Azerbaijan* (translation from Azerbaijani), May 3, 2021, Available at: <https://president.az/az/articles/view/51355> (Accessed: June 27, 2024)

<sup>40</sup> Azerbaijan Renewable Energy Agency under the Ministry of Energy of the Republic of Azerbaijan, *Green Energy Zone (GEZ) in the liberated territories*, 2021, Available at: <https://area.gov.az/en/page/layiheler/yasil-enerji-zonasi/yasil> (Accessed: June 27, 2024)

<sup>41</sup> United Nations, *The 17 Goals*, 2024, Available at: <https://sdgs.un.org/goals> (Accessed: June 29, 2024)

production through the application of clean technologies”.

To achieve the above-mentioned goals in the specified areas, the reconstruction process in the liberated territories is incorporating Smart Village and Smart City concepts. These innovative approaches could bring a multitude of benefits, including sustainable economic development, efficient resource utilization, and environmental protection. By integrating advanced technologies and intelligent systems, these concepts also enhance public services, improve the quality of life, and promote ecological balance.

One of the primary benefits of implementing smart technologies is the efficient use of available resources. Through advanced data analytics, monitoring, and optimization, cities and villages can better manage resources such as energy, water, and waste. This leads to sustainable economic development by reducing waste and lowering the environmental impact of human activities. Additionally, integrating smart technologies promotes environmental protection by enabling eco-friendly practices such as utilizing renewable energy sources, initiating waste recycling programmes, and creating green spaces. By focusing on sustainability, smart cities and villages support global efforts to combat climate change and ensure a healthier environment for their residents.

The inauguration of the first Smart Village took place in Aghali village in the Zangilan district of the liberated territories.<sup>42</sup> This initiative to establish a settlement based on the Smart Village model, launched in April 2021, achieved rapid completion; by July 2022, the first families had already resettled there.<sup>43</sup> The pilot project for Aghali village focused on five main components: housing, manufacturing, social services, ‘smart agriculture’, and alternative energy. Innovative building materials were used in the construction of 200 private homes in the village. Currently, 41 families, totalling 201 individuals, have relocated to Aghali in four successive stages.<sup>44</sup>

42 Trend.az, *The “Great Return” process was started with the opening of the first “Smart Village” project in Zangilan* (translation from Azerbaijani), May 28, 2022, Available at: <https://az.trend.az/azerbaijan/politics/3601723.html> (Accessed: June 29, 2024)

43 Trend.az, *Former IDP of Karabakh’s Aghali village happy to return to native land*, August 12, 2023, Available at: <https://en.trend.az/azerbaijan/society/3783533.htm> (Accessed: June 29, 2024)

44 News.az, *Residents of Zengilan’s Agali village start to return to their homes today*, July 19, 2022, Available at: <https://news.az/news/residents-of-zengilans-agali-village-start-to-return-to-their-homes-photo> (Accessed: June 29, 2024)

Building on this success, the development of the next Smart Village is under way in Devletyarli village in Fuzuli district. These projects are part of a broader strategy to create sustainable, technologically advanced communities that enhance quality of life while promoting environmental stewardship. The Smart Village concept integrates modern infrastructure, efficient resource management, and eco-friendly practices, setting a benchmark for future developments in the region. Through these efforts, Azerbaijan is demonstrating a commitment to innovative reconstruction that aligns with global sustainability goals.

Among the primary factors impacting the environment are human economic activities such as agriculture and farming. Given that the liberated territories will host large agricultural farms and activities, it is crucial to minimize their environmental impact. To achieve this, Azerbaijan plans to implement smart agriculture and farming techniques in these areas as part of the Smart Village concept.<sup>45</sup> As a significant portion of the population is involved in farming, the use of smart agriculture is deemed essential for improving efficiency, boosting productivity, and promoting rapid development in the agricultural sector. Various aspects of smart agriculture are already being integrated into the smart villages established in these regions.

For example, the government of Azerbaijan is actively investing in the establishment of climate stations within smart villages.<sup>46</sup> These stations are critical as they electronically transmit vital information, such as soil conditions, air temperature, wind speed, and humidity, directly to farmers. This real-time data allows farmers to quickly assess the needs of their fields and identify potential risks, enabling immediate and precise interventions.

The initiative also includes scanners equipped with artificial intelligence and predictive analysis capabilities to efficiently manage various agricultural operations. These advanced tools help farmers make informed decisions, enhance crop yields, and reduce waste. Additionally, drone technologies are deployed for the timely detection

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45 N. Baghirova. *Smart Farming for Sustainable Agriculture in Karabakh*. Institute for Development and Diplomacy. 6 November 2023, [https://idd.zeroline.az/media/2023/11/07/summary\\_of\\_round\\_table\\_-\\_baghirova\\_6\\_november.pdf](https://idd.zeroline.az/media/2023/11/07/summary_of_round_table_-_baghirova_6_november.pdf) (Accessed: June 29, 2024)

46 Azernews.az, *Great Return in progress: Aghali village 1 year with new residents*, July 20, 2023, Available at: <https://www.azernews.az/analysis/212498.html> (Accessed: June 30, 2024)

of issues during crop cultivation.<sup>47</sup> Drones provide valuable insights, enabling proactive measures to address challenges in the fields before they escalate.

Furthermore, the widespread adoption of pivot irrigation systems is planned for implementation in smart villages.<sup>48</sup> These systems are designed to optimize water use and improve crop management, aligning with smart agriculture's broader goals of maximizing resource utilization and ensuring sustainability. By integrating these advanced technologies and practices, the smart villages aim to create a more resilient, productive, and environmentally friendly agricultural sector in the liberated territories.

### ***Conclusion***

The analysis in this article underscores Azerbaijan's strong commitment to fostering a more sustainable, eco-friendly, and environmentally conscious environment in the Garabagh region. Beyond merely addressing the environmental damage inflicted during the occupation, Azerbaijan is actively engaged in creating entirely new ecosystems that align with sustainable development objectives. This comprehensive approach encompasses various initiatives aimed at restoring environmental balance, such as combating deforestation, mitigating water pollution, and preserving habitats.

Moreover, Azerbaijan is pioneering efforts to transform the liberated territories into exemplars of sustainability by leveraging renewable energy sources. By tapping into the renewable energy potential of these areas, Azerbaijan seeks to bolster environmental sustainability while simultaneously establishing designated Green Energy Zones. This strategic move not only reduces dependence on fossil fuels but also fosters a cleaner, greener energy landscape.

In addition to energy-focused endeavours, Azerbaijan is integrating

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47 Xalqcebhəsi.az, *For the first time in Azerbaijan, drones will be used for fertilizer and seed sowing* (translation from Azerbaijani), June 9, 2021, Available at: <https://www.xalqcebhəsi.az/news/economy/79866.html> (Accessed: June 30, 2024)

48 Oxu.az, *In Azerbaijan, the area of land where pivot irrigation is applied will be increased four times* (translation from Azerbaijani), January 26, 2023, Available at: <https://oxu.az/iqtisadiyyat/azerbaycanda-pivot-suvarma-tetbiq-olunan-torpaqlarin-sahesi-dord-defe-artirilacaq> (Accessed: June 30, 2024)

innovative concepts such as Smart Village and Smart City into its reconstruction efforts. By incorporating advanced technologies and intelligent systems, these initiatives aim to optimize resource utilization, enhance efficiency, and minimize environmental impact. Through the adoption of such forward-thinking approaches, Azerbaijan is poised to achieve its sustainable development goals while mitigating environmental degradation and ensuring a brighter, more eco-friendly future for the liberated territories.