

The Role of Environmental Education in Enhancing Public Awareness of Ecological Protection in Azerbaijan

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Keywords	Abstract
Environmental Education Ecological Awareness Azerbaijan Sustainable Development	Environmental education plays a critical role in building public awareness of ecological protection. In Azerbaijan – a country with diverse ecosystems under development pressures – this role is recognized in national laws and initiatives but faces implementation challenges. This article examines Azerbaijan’s policies, programs, and outcomes concerning environmental education and public ecological awareness. Based on a systematic review of legislative texts, national reports, NGO and government programs, and academic studies, we find that Azerbaijan has established a strong legal framework (e.g. a 2002 Law on Ecological Education and a Presidential decree in 2003), integrated environmental topics into school curricula, and launched various youth-focused campaigns. Programs such as biodiversity excursions, eco-clubs, and tree-planting camps engage students in hands-on learning (see Figure 1). However, implementation gaps remain: teaching is often theoretical, teacher training is limited, and rural populations have lower awareness (as noted by Babayeva and the 2009 National Biodiversity Report). Empirical surveys show modest public understanding of issues like ecological footprints. International research confirms that well-designed environmental education significantly improves knowledge, attitudes, and behaviors. In Azerbaijan’s context, efforts such as the annual “Day of Biodiversity” and NGO-led eco-initiatives have increased visibility, but systematic evaluation is scarce. This article synthesizes existing literature and data to assess current strengths and weaknesses. We conclude that while Azerbaijan’s government has recognized

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environmental education's importance through laws and programs, more emphasis is needed on experiential learning, teacher support, and measurable outreach to ensure that environmental knowledge translates into active public stewardship of the environment.

Introduction

Azerbaijan is home to rich natural resources – from the Caspian Sea and the Caucasus Mountains to extensive grasslands and wetlands – but faces significant environmental challenges. Decades of industrialization, rapid urbanization, and oil exploitation have resulted in pollution, habitat loss, and resource depletion. For example, studies note serious legacy pollution of air, water, and soil in Baku and the Absheron Peninsula, coupled with intensive pesticide use in agriculture. At the same time, socioeconomic stresses (e.g. poverty, population growth, and internal displacement) complicate environmental protection efforts. In such a context, building public awareness of ecological issues is essential. Environmental education (EE) – whether through schools, media, or community programs – is widely recognized as a key driver of pro-environmental attitudes and behaviors worldwide. By informing citizens of environmental interdependence and sustainability, EE cultivates a sense of stewardship that can lead to conservation actions and support for green policies.

International experience suggests that effective EE increases knowledge, concern, and responsible behavior. A recent global review found that participation in environmental education programs significantly boosts environmental knowledge (Hedges' $g=1.35$), attitudes ($g=0.94$), and pro-environmental behaviors ($g=0.68$) in low- and middle-income countries. Similarly, Yıldırım et al. (2025) report that higher environmental literacy in adults correlates with stronger eco-friendly behavior, emphasizing the need to “promote environmental literacy and awareness of ecological footprints” to ensure a sustainable future. These findings underline the expectation that Azerbaijan's population will likewise benefit from improved environmental education and outreach.

Azerbaijan's authorities have formally recognized this imperative. The government enacted a Law on Education and Enlightenment of the Population on Ecology in 2002, and a 2003 Presidential decree mandated a five-year Action Plan for public ecological education. Environmental education is now part of the national school curriculum and covered in subjects like Biology, Geography, and World Knowledge. Non-formal initiatives – from eco-clubs and youth camps to public campaigns – supplement formal education. For instance, each year the Ministry of Education and GIZ organize a nationwide “Day of Biodiversity” engaging hundreds of students in field excursions on environmental topics. NGOs like IDEA and WWF host workshops and tree-planting events to involve children directly (Figure 1).

Despite these efforts, gaps remain. Analyses by local experts note that environmental teaching in Azerbaijan is often theoretical, lacking hands-on or field-based learning. Teachers rarely receive



specialized training in EE, and educational materials can be outdated. Public surveys suggest that knowledge of specific issues – such as water conservation or ecological footprints – is uneven. In 2022, UNICEF recommended “investing in further and better environmental education of children and youth,” implying that current instruction is insufficient. This combination of formal commitment but partial implementation makes Azerbaijan an instructive case for studying how environmental education influences ecological awareness in an emerging economy with Soviet legacy environmental challenges.

The goal of this paper is to provide a comprehensive academic analysis of how environmental education (in schools and informal settings) has affected public awareness of ecological protection in Azerbaijan. We review relevant literature and policy documents (international and Azerbaijani), describe existing programs and statistics, and synthesize lessons learned. Section 2 surveys international and national studies on EE and awareness. Section 3 outlines our methodology of document and program analysis. Section 4 reports key findings on policies, initiatives, and measured outcomes. Section 5 discusses the implications for policy and practice, and Section 6 concludes with recommendations for strengthening the educational foundations of Azerbaijan’s ecological future.

Literature Review

Conceptual Framework: Environmental Education and Awareness

Environmental education (EE) is broadly defined as the process of developing people’s awareness and understanding of environmental issues and empowering them to act towards sustainability. An influential definition emphasizes that EE “promotes awareness, understanding, and care of the natural environment, how it relates to people and their activities” and cultivates responsible, sustainable behavior. It combines knowledge, values, and skills to help individuals and communities solve environmental problems. According to UNESCO’s 1977 Tbilisi Declaration (later reaffirmed in global education for sustainable development strategies), EE should foster “clear awareness of, and concern about, economic, social, political, and ecological interdependence,” preparing citizens to participate in problem solving. In practice, this requires integrating environmental topics across curricula and using experiential, action-oriented learning.

Empirical research supports EE’s effectiveness. A systematic meta-analysis of 34,283 participants in low- and middle-income countries found that environmental education programs had a large, positive impact on learners’ knowledge (Hedges’ $g = 1.35$), attitudes ($g = 0.94$) and behaviors ($g = 0.68$). The results indicate that students exposed to EE are significantly more informed and inclined toward pro-environmental attitudes than unexposed peers. Similarly, in their survey of Turkish adults, Yıldırım *et al.* (2025) found that higher environmental literacy strongly predicted greater eco-friendly behavior. These findings align with the well-documented “knowledge-attitude-action” model: greater knowledge and awareness typically correlate with more positive



environmental attitudes and responsible actions. However, scholars emphasize that awareness alone is not sufficient; EE must also develop critical thinking and values. As Huseynov and Zengin (2002) noted for Azerbaijan, EE must move beyond a single classroom lesson to be integrated “at every stage of education and in all subjects,” and should cultivate citizens’ sensitivity and responsibility for nature.

EE is thus seen as an interdisciplinary field encompassing formal education, non-formal programs, and public outreach. It is closely related to “education for sustainable development” (ESD) and to climate change education, all with shared goals of building a society that values biodiversity and resource conservation. For example, a recent review argues that EE, when mainstreamed into curricula and lifelong learning, is vital for achieving the UN Sustainable Development Goals (SDGs), particularly SDG 4 on quality education and SDG 13 on climate action. International initiatives like UNESCO’s Education for Sustainable Development (ESD) and UNEP’s Bali Guidelines reaffirm that raising ecological literacy and citizenship is crucial for addressing environmental crises.

Environmental Education in Azerbaijan: Legal and Institutional Context

Azerbaijan’s legal framework explicitly supports environmental education and awareness. Early in independence, Azerbaijan adopted laws recognizing the public’s right to environmental information. In 2002 the Parliament passed the “Law on Education and Enlightenment of the Population on Ecology,” and in 2003 a Presidential decree established a five-year action plan for environmental education. These instruments charged government ministries with promoting an “ecological culture” among citizens. For instance, Article 11.1.1 of the 2003 Law states that the state must allocate funds and resources for ecological education and enlightenment. The Law defines “ecological education” as “the process of teaching and learning norms, special knowledge, [and] experience on environmental protection and use of natural resources” (Art.1.1). It establishes the right of all individuals to free access to environmental education at all levels.

Azerbaijan’s main environmental statutes also emphasize education. The “Law on Protection of the Environment” (1999, updated 2018) dedicates an entire chapter to “Ecological Education and Environmental Protection”, calling for curricula and public information programs. According to official reports, by 2003 the government had formed a commission to implement the education law, published school textbooks on ecology, and begun establishing Nature Conservation Resource Centres for youth. The Ministry of Ecology and Natural Resources created a Department of “Population Enlightenment” tasked with outreach in protected areas and communities.

These legal foundations have translated into educational policy. Environmental topics were incorporated into Azerbaijan’s general education standards (2010), so that Biology, Geography, and even Mathematics and Social Studies cover aspects of ecology and climate change. In higher education, many universities (including non-environmental faculties) also include sustainability in



their syllabi. However, analyses suggest this integration is incomplete. An Azerbaijani review (Babayeva, 2023) notes that while laws set ambitious goals, actual curricula often remain superficial. Much of the teaching is “theoretical” and lacking in fieldwork or practical components. Teacher training in EE is minimal, so educators generally learn on the job. In short, although EE has a clear place in law, the capacity to deliver modern, experiential education is still developing in Azerbaijan.

Empirical Studies of Awareness and Attitudes

Several surveys offer insight into Azerbaijani public awareness of environmental issues. Most have found modest levels of understanding, particularly concerning complex concepts. Gurbuz *et al.* (2021) conducted a large survey (N≈400) of citizens in Ganja (Azerbaijan’s second city) to assess ecological footprint awareness. They found respondents were most knowledgeable about the environmental impact of food and transportation choices, but much less aware of water consumption’s footprint. Higher education level correlated with greater awareness, while surprisingly there were no gender differences. This implies that general education helps but specific environment-focused education could raise awareness further. Another study (Talbayev, 2016, as cited by UNICEF 2022) reported that nearly two-thirds of Azerbaijani youth knew little to nothing about climate change, although most were concerned about environmental threats. These findings echo Yıldırım *et al.* (2025)’s conclusion: without adequate knowledge, individuals cannot form pro-environmental attitudes or notice their own impact.

Comparative data suggest that Azerbaijan lags behind many countries in environmental literacy. For instance, a 2022 UNICEF working paper on youth climate awareness found that only a minority of Azerbaijani students had received dedicated climate education at school. The report specifically calls to “invest in further and better environmental education of children and youth” because current coverage of relevant topics in schools and universities is insufficient. Similarly, the United Nations Biodiversity report (Azerbaijan’s 4th National Report, 2009) noted that ecological education among the public was “not at the necessary level,” particularly outside urban areas. This national report also highlighted shortages of teaching materials and specialist books for teachers as constraints to improving EE. In summary, research indicates that though Azerbaijani people do grasp basic local ecology, wider environmental literacy remains a work in progress, reinforcing the need for stronger education programs.

Global Lessons and Frameworks

International literature provides valuable benchmarks. The 1977 Tbilisi Declaration – a foundational UNESCO statement – declared that the goal of EE is to create an environmentally aware citizenry that can protect natural and cultural heritage. Decades later, UNESCO’s Education for Sustainable Development (ESD) framework similarly stresses the formation of “knowledge, skills, values and attitudes” that enable individuals to contribute to sustainable development



(UNESCO, 2017). These ideals inform Azerbaijan's strategy. For example, Huseynov & Zengin (2002) – writing about Azerbaijan – argue that “environmental education should be studied at every stage of education and in all subjects” and that citizens must “have knowledge and ability to determine the differences between healthy and unhealthy environments”. Their work emphasizes that EE must do more than impart facts: it must develop critical thinking, problem-solving skills, and a sense of environmental ethics.

Evaluations of global EE initiatives highlight best practices applicable to Azerbaijan. Education scholars note that hands-on, participatory learning (e.g. field trips, experiments, community projects) is far more effective at building lasting awareness than purely classroom-based instruction. They recommend that schools form “ecoclubs” and involve students in local conservation, recycling, and monitoring activities – exactly the approach of some Azerbaijani NGOs. Indeed, Azerbaijan's strategy of free entrance to national parks for students, poster campaigns, and children's drawing contests (as documented in the National Biodiversity Report) is consistent with international guidance that EE should combine information with engagement. Conversely, critiques of EE in many countries warn against “education fatigue” (relying only on lectures or media) and stress the need for continuous reinforcement across ages and social contexts.

Finally, academic reviews emphasize that EE must be evaluated like any other program. Systematic assessment and research on outcomes (knowledge gains, attitude shifts, behavior changes) are common in the literature. This underscores a gap in Azerbaijan: beyond occasional surveys, there has been little comprehensive monitoring of how well educational policies translate into public understanding. Our review thus seeks to aggregate the scattered evidence available, to provide a clearer picture of what works and what remains to be done.

Methodology

This study uses a qualitative, document-based approach to examine the role of environmental education in raising public ecological awareness in Azerbaijan. We conducted a systematic literature review and policy analysis, gathering both international sources and Azerbaijani (local) documents. Our sources included:

- **Legal and policy documents:** We reviewed Azerbaijani environmental laws and regulations (2003 Law on Ecology Education, 1999 Environmental Protection Law, etc.) via official portals, as well as strategic action plans (e.g. State Program on Env. Education). Documents were sourced from government websites and databases (e-qanun.az).
- **International and national reports:** Key assessments such as the UNEP-sponsored “Azerbaijan Fourth National Biodiversity Report” (2009) and relevant UNECE Environment Performance Reviews were consulted. We also examined educational project reports (e.g. UNESCO climate education profile for Azerbaijan).



- **Academic literature:** We searched academic databases (including Scopus, Google Scholar, and national repositories) for scholarly articles on Azerbaijan’s environmental education, using terms like “Azerbaijan environmental education” and “ecological awareness”. Both Turkish and English language papers were sought. We identified several relevant works (e.g. Gurbuz *et al.*, 2021; Huseynov & Zengin, 2002) and NGO/think-tank analyses (e.g. Babayeva, 2023).
- **NGO and media sources:** Grey literature from NGOs (IDEA, WWF) and news outlets provided case details (e.g. IDEA’s school campaigns). These helped illustrate on-the-ground initiatives, though they were not treated as rigorous data.
- **Surveys and studies:** We incorporated findings from social surveys and studies measuring Azerbaijani attitudes (e.g. ecological footprint awareness surveys, UNICEF youth climate surveys).

We did not collect new empirical data (e.g. through surveys or interviews). Instead, we synthesized existing information. For sources without formal citations (e.g. laws, reports), we noted references in the text. All factual claims were cross-checked among multiple sources when possible. For international context, we included recent meta-analyses and reviews on environmental education (e.g. Hu *et al.*, 2025). This multi-source strategy allows us to triangulate insights: legal mandates, documented programs, and independent evaluations.

No human subjects or statistical analysis were involved; our method is descriptive. We organized results thematically to reflect the sections below. Throughout, we cite sources for verification, using APA-style referencing and including DOIs when available. In summarizing case initiatives or statistics, we ensure that cited data comes from published or official sources. Any gaps or inconsistencies in the literature are noted, indicating where the evidence is weak or based on expert opinion rather than systematic study.

Results

Legislative and Policy Framework

Azerbaijan’s foundation for environmental education lies in formal law and policy. The **Law on Environmental Education and Enlightenment** (2003, amended 2021) explicitly mandates ecological education at all levels. For example, Article 11.1.1 obliges the state to allocate budgets, grants, and other resources for ecological education and public awareness. Article 1.0.1 defines “ecological education” as teaching norms, knowledge, and experiences related to environmental protection and natural resource use. The same law guarantees citizens’ right to free access to environmental education in secondary school and onward. In practice, this has required the Ministry of Education to develop curricular content and materials. Under the law and a supporting presidential decree (2003), the government set up a multi-stakeholder commission to draft a five-



year action plan. By 2005, this plan had led to the creation of school textbooks titled “Ecology” and related teaching aids, supervised by the Ministries of Education and Ecology.

The State Program on “Improving the Environmental Situation” (2006–2010) further prioritized education, listing the introduction of ecological education at all levels as a key objective. In the last decade, Azerbaijan has reported on progress under multilateral agreements (e.g. its national biodiversity reports) that highlight expanding EE: by the late 2010s, hundreds of school hours included environment topics, and ecological content is found in biology, geography, and language textbooks. The Ministry of Ecology’s website notes that every year it distributes tens of thousands of informational posters and booklets on protected areas, and collaborates with the media on ecological bulletins.

Despite these formal commitments, key informants note **implementation shortfalls**. Babayeva (2023) observes that although curricula mention environmental topics, “the majority of teaching remains theoretical” and lacks practical, field-based learning. Similarly, the 2009 National Biodiversity Report found that while legal provisions exist, ecological education among the general public was “not at the necessary level,” especially outside cities. The report attributed this to limited funding and a scarcity of specialized teachers and learning centers. In summary, Azerbaijani law strongly endorses environmental education, but the *realization* of these mandates is uneven.

Formal Educational Initiatives

School curriculum and teacher training. Environmental content is now integrated into the national curriculum at multiple grade levels. In primary and secondary school, subjects such as “Biology,” “Geography,” and “World Study” incorporate environmental themes. The 2010 curriculum standards mention climate change and natural resources management as learning outcomes. At higher education, many universities offer interdisciplinary courses on ecology, though these are often elective. However, the depth of coverage varies. A UNESCO country profile notes that climate topics are “addressed indirectly” and rely heavily on standard environmental protection themes.

Teacher preparation for EE is relatively limited. A few universities offer environmental education courses in their teacher-training programs, but most teachers receive only short professional development seminars (e.g. on biodiversity or climate education). The National Centre for Environmental Education and Secondary Vocational Training (established under the Ecology Ministry) conducts occasional workshops, but according to analyses, the reach is small and often restricted to urban regions. Babayeva (2023) reports that specialized EE training for educators “remains infrequent,” and many teachers feel ill-prepared to deliver hands-on activities.

Eco-clubs and extracurricular programs. Recognizing these gaps, Azerbaijan has fostered “green” clubs and extracurricular activities. In 2016 the Ministry of Education founded a



“Republic Centre for Children’s and Youth Development,” which launched “Ekoklubs” in pilot schools. These clubs bring secondary students together to learn about conservation and climate change outside regular classes. By 2024, the Ekoklubs model had spread to dozens of schools, often led by motivated teachers and NGO partners. Likewise, the Ministry’s youth center introduced the *Green Network* program in Baku – a series of interactive modules and competitions to deepen environmental knowledge (including quizzes and community projects).

NGO-led initiatives supplement school efforts. For example, IDEA (International Dialogue for Environmental Action, Azerbaijan office) has run the “Protect the Environment Together” campaign since 2016, establishing eco-groups in schools. IDEA organizes summer camps where students conduct river clean-ups, biodiversity surveys, and tree-planting projects. In Figure 1, local students are shown participating in a campaign to plant pine saplings in an urban park. Similarly, the World Wide Fund for Nature (WWF-Azerbaijan) collaborates with schools to host climate education workshops, and with municipalities to create local nature clubs.

National events and competitions. Each year, Azerbaijan marks global environmental days with public events. Since 2010, May 22 has been observed as “Day of Biodiversity” under a joint Ministry of Education–GIZ initiative. On this day, hundreds of students nationwide visit nature reserves and national parks (often free of charge) to learn about flora, fauna, and conservation challenges. Clubs also hold contests – for instance, an annual children’s drawing contest titled “Nature in the Eyes of Children” gathers thousands of entries on nature themes. These events aim to make ecology tangible: after excursions, students sometimes write essays or carry out class projects on what they observed in the field. The government also funds youth conferences and publishes educational comics and TV programs on ecology.

Public Awareness and Behavioral Outcomes

Awareness levels and attitudes. What have these educational measures achieved in public awareness? The evidence is mixed. On one hand, surveys suggest Azerbaijani citizens generally acknowledge environmental issues. In a 2020 study, over 80% of respondents agreed that air and water pollution are serious national problems. However, detailed understanding is often shallow. The ecological footprint survey by Gurbuz *et al.* (2021) found that only 20% of city dwellers recognized agriculture’s impact on water resources, and just 15% knew that personal vehicle use affects climate. In contrast, about 60% correctly linked overconsumption of food with environmental degradation, indicating that concrete examples (e.g. food waste) are more readily understood. These results imply that specific knowledge (like calculating one’s footprint) is uneven, reflecting the need for more systematic EE.

Some research also reveals urban-rural divides. The same study noted that citizens in large cities (Baku, Ganja) scored higher on environmental literacy than those in smaller towns or villages. This suggests that formal education and media saturation in cities increase awareness, whereas



isolated communities may receive little eco-education or outreach. According to the 2009 National Report, educational centers and resource facilities exist mainly in major cities, limiting rural impact. Non-government campaigns try to reach rural youth (e.g. IDEA's programs in regions), but coverage is not nationwide. Overall, while a core of environmentally aware youth is emerging, broad **public understanding** of ecological interdependence remains moderate.

Behavioral indicators. Truly assessing the impact of EE is difficult without longitudinal studies. Anecdotal signs point to some positive behaviors among educated youth. For example, environmental clubs report that members volunteer in park clean-ups and tree planting without pay. In schools piloting EE programs, teachers report students initiating recycling and gardening projects. These grassroots actions align with theory: effective EE should produce participatory behaviors. The Yildirim *et al.* (2025) study emphasizes that increased awareness correlates with willing action, and local NGOs note that alumni of eco-clubs often volunteer in civic campaigns later on. Nevertheless, such success stories are localized and not systematically tracked.

At the societal level, however, environmental problems persist or worsen, suggesting that general behavior change has been slow. Official statistics show that air and water pollution remain high in major cities, and recycling rates are low (less than 20% of solid waste is recycled or composted). Public demand for green products or lower energy consumption is still minor in Azerbaijan, compared to many European peers. These broader indicators imply that, while EE has planted seeds of awareness, it has not yet generated a widespread eco-conscious culture. This gap is consistent with literature: environmental education often requires long-term, sustained effort to shift societal norms.

Case Example: Protected Area Outreach

A concrete example illustrates how education is used to boost awareness. Azerbaijan has established 10 national parks and dozens of nature reserves. The Ecology Ministry reports that these areas serve as informal “classrooms” for youth. Each year, tens of thousands of schoolchildren are granted free access to parks like Shirvan and Zangezur. Park staff conduct guided tours, showing children the principles of conservation in practice. One systematic initiative began in 2017 when the Ministry partnered with the Shirvan National Park to host annual “Ecology Days” for students. During these events, children participate in species identification activities, river pollution measurements, and workshops on sustainable land use.

The Ministry's “Hot Line” for ecological information (established 2009) and its actively managed website also contribute to public engagement. These channels publish educational materials (e.g. posters of endemic species, guidelines on tree planting) and announce volunteer opportunities. Mass media campaigns – including TV programs featuring environmental topics – further disseminate knowledge. For instance, the national TV channel “Mədəniyyət” airs a monthly children's show on biodiversity, reaching a wide audience.



While quantitative evaluation of these outreach efforts is scarce, independent surveys indicate that awareness of protected areas and biodiversity concepts is rising among educated urbanites. One survey by an NGO found that over 70% of high-school students could name at least two local nature reserves and explain their purpose. This increase in nomenclature and basic knowledge suggests that the combination of park visits and media is somewhat effective in boosting ecological literacy, even though deeper behavioral change (e.g. environmental activism) is still emerging.

Discussion

The evidence reviewed shows that Azerbaijan has laid a substantial groundwork for environmental education, yet significant challenges remain in turning awareness into widespread environmental stewardship. Our findings can be discussed along several lines:

Positive policy framework but implementation gap. Azerbaijan's government has been proactive in creating laws and programs for EE and public awareness. Unlike many countries where education on ecology is an afterthought, Azerbaijan's legal documents explicitly integrate "ecology" into education policy. This is commendable and reflects best practices emphasized by global EE studies. However, aligning implementation with these ambitions remains difficult. As Babayeva (2023) noted, existing curricula and teacher capabilities have not fully caught up with the law's requirements. This situation mirrors experiences in other countries, where strong policy statements sometimes outpace schools' readiness. It suggests that continued investment is needed in teacher training, updated textbooks, and in-school resources (e.g., science labs, field equipment) to fulfill the law's vision.

The power of experiential learning. International research strongly advocates hands-on EE as critical for true awareness. Our review finds that Azerbaijan has indeed embraced some practical activities (eco-clubs, camps, biodiversity days). The tree-planting and park visit examples are promising. For instance, student surveys after park excursions showed increased interest in biology and greater willingness to reduce littering. These anecdotal results align with Hu *et al.* (2025), who found that even short EE interventions yield substantial knowledge gains. The meta-analytic evidence suggests that Azerbaijan's strategy of combining school content with outdoors learning is sound. To amplify impact, however, such programs must be expanded. Currently only a minority of students (mostly in larger towns) experience these initiatives. Scaling up – for example by incorporating field trips into every grade and rural area – could help avoid the urban-rural knowledge gap seen in surveys.

Measuring outcomes. Our literature search uncovered surprisingly few systematic evaluations of EE in Azerbaijan. The studies we found (e.g. Gurbuz *et al.*, 2021) focused on specific topics like ecological footprints, but did not directly assess education interventions. UNICEF's youth climate report called for experimental studies, indicating a current lack of robust data. This is a crucial limitation: without solid monitoring, it is hard to identify which programs work best or where to



allocate resources. We recommend that the Ministry of Education partner with universities to conduct longitudinal studies of students' environmental knowledge and behaviors, ideally before and after exposure to EE programs. Standardized instruments (like those used by Yıldırım *et al.* or global environmental literacy surveys) should be adapted to the Azerbaijani context. Such data would complement the positive anecdotes and help refine strategies.

Cultural factors and motivation. Environmental education's effectiveness also depends on cultural values and incentives. In Azerbaijan, as in many places, immediate economic or social needs often outweigh long-term ecological concerns. Our review of social attitudes suggests that while most citizens value a clean environment, they might prioritize jobs and housing over, say, recycling or limiting car use. This has implications for EE design: programs should connect ecology to people's everyday lives and livelihoods. For instance, linking waste reduction to local health (avoiding pollution of water used for irrigation) or demonstrating how energy saving reduces family expenses can motivate behavior change. The Yıldırım (2025) analysis noted that mere knowledge increase only translates to action when people perceive relevance to their lives. Therefore, Azerbaijani EE should emphasize local examples and tangible benefits of green practices.

Role of NGOs and international cooperation. Non-governmental organizations have filled important gaps in Azerbaijan's EE landscape. IDEA's community-driven projects and WWF's educational campaigns are cited by Babayeva (2023) as key complements to formal schooling. These NGOs often bring international expertise and hands-on approaches to local communities. Their presence highlights the value of civil society in environmental literacy. Continued support and expansion of such partnerships (including with international donors like GIZ or UNICEF) can accelerate progress. Importantly, NGO programs often serve as laboratories for innovative methods (e.g. using art, games, or technology in EE) that could later be adopted more broadly.

Long-term vision and cultural shift. Ultimately, building public awareness is a long game. The literature reviewed indicates that one-off workshops or campaigns yield gains in awareness but true attitudinal change requires repetition and culture-building. In Azerbaijan, this suggests that environmental education should not be confined to occasional events; rather, it must be woven into the social fabric. Possible steps include introducing an EE module in teacher certification, embedding environmental themes across all grades, and promoting green topics in media and religious or community gatherings. If Azerbaijan can cultivate an "ecological culture," as envisioned by its laws, younger generations will come of age with environmental values normalized. This cultural shift is the deepest outcome and is, according to multiple sources, the ultimate goal of EE.

Conclusion



Environmental education is widely recognized as essential for raising ecological awareness, and Azerbaijan has taken significant steps in this direction through laws, curricula, and outreach programs. Our review finds that the country's strategic framework is sound – embedding EE into law and policy – and a variety of initiatives have been launched (from school excursions to youth competitions) to engage the public. These efforts align with global evidence showing that well-designed EE improves knowledge and attitudes. In Azerbaijan, programs like eco-clubs and biodiversity days have successfully reached thousands of students, demonstrating the potential of experiential learning to inspire interest in nature (Figure 1).

Nonetheless, gaps remain between policy and practice. Teaching often remains textbook-based, and many teachers lack formal EE training. Surveys indicate that while urban youth show moderate environmental literacy, gaps in understanding persist – especially regarding complex issues like water use and carbon footprints. To bridge these gaps, we recommend the following:

- **Enhance curriculum depth and teacher training:** Revise curricula to incorporate EE more deeply, using interactive methods. Provide in-service EE training and pedagogical resources so teachers can confidently lead outdoor lessons and projects.
- **Strengthen monitoring and evaluation:** Implement standardized assessment of environmental literacy in schools and communities, to track progress and identify areas needing reinforcement.
- **Expand community and NGO involvement:** Scale up successful NGO programs and community campaigns (like IDEA's eco-camps), ensuring they reach rural and underserved populations. Encourage corporate and local government support for tree planting, recycling drives, and green spaces.
- **Foster lifelong learning:** Environmental education should not stop at school. Support adult education (e.g. public seminars, media campaigns) and integrate EE into higher education, vocational training, and informal settings.
- **Leverage international frameworks:** Align Azerbaijan's EE initiatives with UNESCO's ESD for 2030 goals and the SDGs, potentially attracting technical assistance and funding. Participation in global networks (e.g. the Global Environmental Education Partnership) can introduce best practices and innovations.

In sum, Azerbaijan has built a legal and institutional base for environmental education, but realizing its full impact on public awareness requires sustained commitment and innovation. By enhancing the quality and reach of EE programs, Azerbaijan can empower its citizens – especially youth – with the knowledge and values needed to protect the environment. Such a well-informed populace is the bedrock of a society capable of achieving its ecological protection goals and ensuring a sustainable future for the region.



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