

# REPORT

State-of-play on Waste Management in Croatia, Slovenia, and North Macedonia &  
Adult Learners' Needs Regarding Green Topics and Environmental Education



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# Impressum

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**Publication Title:** Report on the State-of-play on the Waste Management in Croatia, Slovenia, and North Macedonia, and on the Adult Learners' Needs Regarding Green Topics and Environmental Education

**Summary:** The report provides a comprehensive analysis of the state of waste management and the learning needs of adult learners in Croatia, Slovenia, and North Macedonia. The desk research conducted examines waste management systems in the European context, legislative frameworks, public awareness initiatives, practices in household waste management, approaches to sustainable waste management, impacts of waste on the environment and health, and best practices and innovations in waste management technology. The survey of adult learners offers insights into their awareness levels, environmentally conscious practices, learning interests, preferred learning styles, motivations, and perceived barriers related to environmental education opportunities. The report serves as a foundation for the development of subsequent educational resources within the RAGT project.



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**Note:** Findings and data presented in this report are more pertaining and relevant to the objectives of the RAGT project. We encourage you to learn more about the topics presented by clicking the link icons in the text or doing your own additional research.

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The Raising Awareness for a Greener Tomorrow (RAGT) is an Erasmus+ small-scale partnership project in the field of adult education that aims to improve the competencies of educators and adult education staff, create learning opportunities for adult learners, foster collaboration and knowledge-sharing on green topics, raise awareness and promote sustainable practices, and develop innovative educational resources. The project will develop a methodological manual for educators, a curriculum for adult learners, and a digital educational-informative tool for sorting waste. The project's primary target groups are educators and adult education staff, as well as adult learners, while the secondary target groups include local communities, stakeholders in the waste management and environmental sectors, partner institutions and their staff, and other adult education institutions and educators.

# Partnership consortium



## **GKP ČAKOM (Croatia)**

GKP ČAKOM is a public service company based in Čakovec whose main focus is on waste management. The organization's main activities include efficient waste collection, disposal, and treatment, emphasizing ecological sustainability. ČAKOM conducts educational campaigns to raise public awareness about proper waste handling and environmental conservation, contributing significantly to the region's ecological well-being.

**WEBSITE**



## **Pučko Otvoreno Učilište Čakovec (Croatia)**

POU Čakovec is renowned for providing a wide range of educational programs in adult education. It offers both formal and informal learning opportunities, targeting diverse audience groups, including vulnerable populations. The institution has a strong commitment to inclusive education and has actively participated in several EU projects, particularly those focusing on environmental issues and sustainability.

**WEBSITE FACEBOOK INSTAGRAM**



LJUDSKA UNIVERZA LENDAVA  
NÉPI EGYETEM LENDVA

### **Ljudska Univerza Lendava (Slovenia)**

Specialized in adult education, LU Lendava provides an extensive range of learning opportunities. Their programs cover a wide spectrum of subjects, accommodating the needs of a diverse adult learner base. The organization is involved in various national and international projects, emphasizing innovative learning methodologies and cross-cultural educational collaborations.

**WEBSITE FACEBOOK**



ПРИВАТНА ОБРАЗОВНА УСТАНОВА  
ОТВОРЕН ГРАЃАНСКИ УНИВЕРЗИТЕТ – ШТИП  
ВАНЧО ПРЌЕ

### **University for Lifelong Learning Vanco Prke (North Macedonia)**

The university is dedicated to adult education, focusing on non-formal education and lifelong learning. Their curriculum includes a variety of programs related to environmental education, such as eco-standards, waste management, and renewable energy, including solar system installation. The organization aims to equip learners with practical skills and knowledge pertinent to contemporary environmental challenges.

**WEBSITE FACEBOOK**

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**First thing in the morning  
you look after yourself, you  
brush your teeth and wash  
your face, don't you?**

**Well, the second thing you  
must do is to look after the  
planet.**

Antoine de Saint-Exupéry

Cover photo: Yakup Ipek, available at <https://pixabay.com/photos/plant-lightbulb-recycled-5740098/>.

# State-of- play analysis



# **1. Waste management in the European context**

The three partner countries of the project "Raising Awareness for a Greener Tomorrow" – Croatia, Slovenia, and North Macedonia – harmonize their national legislatures and waste management systems to adhere to the policies and strategies set by the European Union, most notably the European Green Deal [🔗] which reflects the EU's ambitions of at least 55% less net greenhouse gas emissions by 2030, compared to 1990 levels, and Europe becoming the first climate-neutral continent in the world by 2050. Key components of the realization of those initiatives, with a special emphasis on waste management and reduction, can be observed in the national legislatures of the three partner countries.



**EU's Waste Framework Directive:** *Preventing waste is the preferred option, and sending waste to landfill should be the last resort.*

North Macedonia, as a candidate state, integrates the EU's Waste Framework Directive [🔗] as part of the National Plan for Waste Management and National Waste Management Strategy [🔗], which serve as the overarching legal framework and direct the Plan and the Strategy towards the European policies and strategies, providing a foundation and practice of sustainable waste management by adopting measures to minimize the negative effects of waste management on human health and the environment, and to

reduce the use of primary resources. Both Croatia and Slovenia, as EU member states, actively contribute to the creation of the green EU policies, as well as integrate them into their national legislatures, respectively, which can be best observed in Croatia's Law on Waste Management and the derivative Plan for Waste Management [1], both of which reflect the EU's approach to waste reduction, steps to reuse waste, recycle it, recover it, and properly dispose of it. Similarly, Slovenia has passed the National Environmental Action Programme and its Resolution [2], both of which address the aforementioned topics.

The three countries analysed in this report face some hurdles and obstacles in the optimal implementation of the legislation on waste management. The harmonization of the national waste management system with the European one is influenced by various obstacles and challenges. In terms of legislative obstacles, one of the key challenges is the frequent changes to existing regulations and the adoption of new regulations in the field of waste management at the EU level. The aforementioned also requires continuous adjustments to national legislation, establishment of an information system, development of applications, application of new data collection methodologies, production of new statistics, etc. All of the above requires time for establishment and adjustment. One of the other key obstacles is the lack of financial resources. The above refers to the limitations of the state budget and the budgets of local and regional self-government units. Therefore, the implementation of measures to harmonize the national waste management system with the European one is largely dependent on financial resources from EU sources. There are also technical limitations that are manifested in the lack of infrastructure in the field of waste management (e.g., suitable containers for waste separation and composting, sorting buildings, recycling yards, waste collection vehicles, etc.), but also in the lack of innovative technologies, which makes it difficult to harmonize the national system with the European one.

Available data show that there is a trend of increasing waste production in recent years. North Macedonia reports that a total of 605,638 tons of municipal waste were collected in 2022, 81.7% of which was mixed municipal

waste, while the lowest amount of waste, 0.2%, was rubber waste. In 2020, 1,488,000 tonnes of waste were generated in the economic sector, the largest share of which was from mining and quarrying (35.03%), followed by manufacturing (34.92%) and water supply (17.89%). The municipal waste by site of generation is 84% per household and 16% per commercial waste. In 2020, the total amount of waste produced in Croatia was estimated to be 6,003,759 tons. Waste generated by the site of origin was as follows: construction (24%), household (20%), water supply (16%), mining and quarrying (12%), hospitality (10%), agriculture (9%), manufacturing (7%), electricity supply (1%), and commerce (1%). Slovenia [🔗] reports producing an average of over 8,000,000 tons of waste per year. More than a million tons thereof is municipal waste, amounting to 495 kg of waste per capita. Hazardous municipal waste accounts for 6,700 tons of all municipal waste, but efforts to reduce it have already proven to be successful.

Waste management is a spectrum ranging from preventing waste production on one end to waste deposition on the other. Between these two extremes, there are different methods employed (recycling, landfilling, energy production, etc.). All three analysed countries, as stated before, adhere to European policies, strategies, and goals regarding waste reduction and management. It is worth noting that while Croatia and Slovenia have developed their capacities to collect and process/recycle the collected waste, North Macedonia faces a lack of such facilities and exports the collected waste to be processed in other countries. Several environmental protection objectives are set out in the EU's Waste Directive [🔗], including the need to increase the re-use and recycling of waste materials (paper, metals, plastics, and glass) from households and possibly from other sources, where the flows of waste are similar to household waste, to at least 50% of the total mass by 2020. In the amendment to the 2018 directive, this limit was set slightly higher, gradually increasing to 55% by 2025, to 60% by 2030, and to 65% by 2035.

For the current rates of re-use of recycling, please visit the respective national competent bodies in Croatia [🔗], Slovenia [🔗], and North Macedonia [🔗].

# **2. National legislative frameworks for waste management**

In the previous chapter, it was presented how national frameworks targeting waste management adhere to the wider European framework of policies and strategies. Overall, these include avoiding and reducing the amount of generated waste to the greatest extent possible; utilization of the usable ingredients of waste; sustainable development through the preservation and saving of natural resources; prevention of negative impacts of waste on the environment, life, and human health in accordance with the principles of the circular economy; and disposal of waste in a way that is acceptable to the environment while providing a high degree of protection for the environment, life, and human health. These policies were incorporated into national laws on environmental protection in general and waste management in particular, as well as the appropriate action plans/directives for waste management. The legislation, i.e., laws on waste management, are proposed by the competent ministries and adopted by national parliaments. Sub-act documents, such as implementation plans and strategies, are issued by the national governments and competent ministries. These documents not only reaffirm European policies and goals regarding the reuse and recycling of household waste but also determine other objectives, such as recycling rates for packaging materials, limitation of municipal waste disposal, reprocessing rates, etc.

At the regional level, the representative body of the regional self-government or its equivalent is obliged to adopt regional waste management plans, collect and forward data on waste, keep registers of collectors and recyclers, registers of by-products, records of reuse centres, records of waste transporters, waste brokers, waste traders, and recycling yards. They also issue waste management permits for non-hazardous waste for all recovery and disposal procedures. At the local level, local self-government units are obliged to ensure separate waste collection in their area through recycling yards and containers for public service users and to adopt relevant strategies and procedures. Public companies owned by local/regional self-government units manage waste management centres and provide public municipal waste collection services. The legal representative of regional/local self-government can entrust the collection and transportation of municipal waste to a legal person by entering into a contract, in a procedure in accordance with the Law

on Concessions and Public-Private Partnership. Communal wardens of the local self-government unit are responsible for implementing measures to prevent the improper disposal of waste into the environment and for the removal of such waste. At the local level, privately owned trading companies (legal entities and natural persons that perform some waste management activities) can be included in the waste management system.

Not adhering to the measures set by the respective national governments yields repercussions in the form of financial penalties. The oldest environmental principle, the "polluter pays principle" [🔗], a term used in Slovenian legislature, stipulates that the polluter covers all the costs of the prescribed measures for the prevention and reduction of pollution and environmental risk, the use of the environment, and the elimination of the consequences of the environmental burden, including the costs of implementing preventive and remedial measures in the event of environmental damage. For the purposes of waste prevention, including the reuse of products and the preparation for reuse, recycling, and other types of waste recovery after the end-of-life of certain products, extended producer responsibility may be stipulated for producers of such products. This determines the producer's obligations throughout the product life-cycle, though users are most familiar with the obligations on products' end-of-life. Waste management under extended producer responsibility is currently in force for the following mass waste streams: packaging, electrical and electronic equipment, portable batteries and accumulators, candles for graves, plant protection products containing hazardous substances, medicinal drugs, and end-of-life tires and vehicles. On a more concrete level, these fines can range from 50 euros for a person who does not perform waste separation and does not dispose of waste in special containers for that purpose, to 250 euros for a person who disposes of, burns, or buries any kind of waste along or in bodies of water. In Croatia, people who do not properly separate or mishandle their household waste will find their monthly waste collection and management receipts increased proportionate to their misdemeanour.

North Macedonia reports that their government does not offer any incentives or programs that promote sustainable practices such as separate household waste collection according to the "door-to-door" model, through "eco-islands" or recycling yards, etc. Slovenia's measures to prevent waste generation [🔗] are a threefold initiative encompassing: Measures affecting the framework conditions related to waste generation; Measures affecting the design, production, and distribution phases; and Measures affecting the consumption and use phases. Actions contained within these measures that have a motivational aspect include Providing information on waste prevention techniques to facilitate the implementation of best available techniques in the industry; Use of awareness-raising or financial aid, decision-making, or other business assistance campaigns; Economic instruments, such as incentives for net purchases or the introduction of mandatory consumer payment for a given product or unit of packaging otherwise provided free of charge; Use of awareness campaigns to inform the general public or a specific group of consumers; and Promoting credible eco-labels. Similarly, to encourage waste prevention activities, the Government of the Republic of Croatia adopted the Plan for the Prevention and Reduction of Food Waste in the Republic of Croatia for the period from 2023 to 2028, which includes measures and activities for the prevention and reduction of food waste in all stages, from production to supplies to individuals and households. Although it is no longer currently binding, Croatia's previously adopted Program of Educational and Informational Activities on Sustainable Waste Management [🔗] can be applied as an advisory tool for public education and raising awareness among citizens, with special emphasis on the following areas: prevention of waste generation, separate waste collection, reuse of items, and composting.

# **3. Public awareness and education about waste management**

Raising awareness about the importance of waste reduction, reuse, and recycling is at the forefront of the European policies, which are integrated into respective national legislatures. In Croatia, for example, waste management laws foresee informational activities on proper waste management, at least one public forum on waste management, and other info-educational publications organized by regional and local self-governing bodies. Similar practices can also be found in Slovenia. In North Macedonia, however, the biggest initiatives for raising public awareness of waste management are done through private entities, Pakomak and Zero Waste, who are trying to influence school children by offering extracurricular activities and workshops, thus aiming to create eco-responsible citizens. The two organizations also provide bins for waste separation in the capital city and several other towns. The information about proper waste management is mainly distributed through various channels, including TV ads, digital campaigns, workshops, flyers, publications, and more. The most commonly reported educational and informative activities related to waste management involved leaflets, posters, public and educational forums, guides (brochures), educational workshops for children, establishment and upgrading of municipal company websites, radio shows, advertisements and media spots, TV shows, as well as educational picture books and colouring books for children.

Some examples of recent initiatives and their key messages:

- This is your planet – Go green: a message sent in a campaign for planting trees where primary and secondary school children were the main focus group. [[🔗](#)]
- E-kapitolijada – Eco parade: First of April parade in dresses made of e-waste organized for primary school children. [[🔗](#)]
- Eco research to Eco solution: a scientific challenge as part of the education of primary school children to think about batteries as a danger or an opportunity. [[🔗](#)]
- Select your future: promotion of different containers for waste separation.

- Select and Win: promotion of recycling plastic bottles and cans with the use of machines and a mobile application to win points and receive a voucher for shopping in supermarkets. [🔗]
- The campaign "Za ljepšu našu / For our more beautiful one": The campaign was aimed at separating waste and reducing waste generation by encouraging reuse, responsible purchasing, and handling of things, as well as exchanging ideas and advice on responsible behaviour towards the environment. The campaign was carried out in radio and television programs by broadcasting five different spots: encouraging waste separation, encouraging reuse, encouraging composting, preventing food waste generation, and "Za ljepšu našu" - a children's video. [🔗]
- The campaign "Even without decorative paper, a gift touches the heart": The campaign was carried out with the aim of increasing awareness of the importance of sustainable waste management and encouraging citizens to handle waste correctly and responsibly. It aimed at reducing waste generation during the holidays and encouraging the reuse and separation of waste. [🔗]
- The campaign "From the old to the new, for a gift from the heart": The campaign was intended for elementary and secondary school children. It tried to encourage children to discover the value of old and discarded things in a fun and interesting way and to reuse them repeatedly, thus influencing the reduction of waste. [🔗]
- The "Don't forget me" campaign: The campaign aimed at reducing the use of single-use plastic bags.
- The campaign "#musthave If you're in fashion, let sustainability guide you": The campaign intended to raise awareness among citizens about the negative impact of excessive use of plastic bags. The campaign conducted research on how many bags are consumed on average at a market in Zagreb on Saturday mornings. Based on the conducted research, an estimate was made for the total consumption of such bags in the Republic of Croatia, all with the aim of pointing out to citizens a

more desirable alternative - reusable bags for fruits and vegetables and reusable bags, PVC or textile in general. [🔗]

In all three partner countries, the component that relates to proper waste management has been identified in the primary and secondary school sectors. Topics such as energy and resource savings, environmentally-friendly behaviours, including composting, waste reduction, reuse, recycling, and management, are treated as part of a curriculum of a school subject, as an entire subject on its own, as inter-subject topics, as extracurricular activities, or in some other mode. The public schools cooperate with local NGOs, waste collection and transport companies, as well as other regional and national regulatory bodies in organizing such activities. At the adult education levels, such activities are mostly carried out by NGOs and waste management bodies. Croatia previously adopted the Program of Educational and Informational Activities on Sustainable Waste Management, which can be used to educate the adult public on topics related to waste management. Today, the importance of education in the area of waste management is recognized in Croatia through the category of green programs financed from the National Recovery and Resilience Plan. In this context, the Education Program for the acquisition of micro-qualifications in waste management [🔗] is implemented. The program is conducted with regular classes lasting 75 hours. Work-based learning takes place in a specialized classroom and a specialized IT classroom where simulations of real problem situations are performed, as well as in employers' premises, recycling yards, and waste disposal sites. The aforementioned education is possible through public and private educational institutions through Croatian Employment Service education vouchers.

# **4. Household waste**

According to the available data, the total amount of municipal waste generated in 2020 in North Macedonia was 856,766 tons, amounting to 467kg of generated municipal waste per inhabitant. In Croatia, the numbers for 2022 show that 1,844,382 tons of municipal waste was generated, which amounts to 474kg of generated municipal waste per inhabitant. Slovenia produces an average of over 8 million tons of waste per year. More than a million tons thereof is municipal waste, amounting to 495 kg of waste per capita. The most often present waste in North Macedonian households, based on national reports, is organic waste (6.65%), plastic (2.16%), paper (2%), textile (1.38%), glass (0.6%), metal (0.4%), rubber (0.25%), and the rest is mixed waste. According to the Croatian Municipal Waste Report for 2022, in the total amount of separately collected municipal waste in 2022, the most was paper and cardboard waste (32.05%), bulky waste (16.21%), biowaste (14.07%), plastics (10.78%), glass (8.49%), wood (6.85%), metal (4.13%), electrical and electronic waste (3.54%), textiles (0.56%), batteries and accumulators (0.05%), and other waste (3.26%). Slovenia follows similar trends, as stated in the 2022 report, where bulky waste took the number one spot (31%), followed by batteries, electrical and electronic waste (16.8%), packaging (9%), biowaste (6.8%), and mixed waste (2.4%) [1]. The most common types of waste collection use the "door-to-door" approaches, with public containers and bins placed for specific and mixed waste types in public places.

The contrastive analysis shows that the waste management system faces numerous challenges, including a lack of awareness and education among citizens about the importance of proper waste disposal and recycling. Insufficient education and awareness programs lead to improper waste handling, such as illegal dumping and mixing recyclables with general waste. This issue is closely linked to limited recycling facilities, which restrict the ability to recycle a significant portion of household waste, resulting in large amounts of waste ending up in landfills. In some rural areas, there is a lack of proper infrastructure for waste collection, transportation, and disposal, forcing people to find their own ways of dealing with waste, such as open dumping and burning, leading to greater environmental pollution, air quality issues, and the release of harmful substances – practices often driven by a lack of alternatives.

Additionally, there is a slow pace of introducing new infrastructure for waste separation, slow construction of recycling yards and centres, as well as sorting facilities, and differences in the development of separate waste collection systems among local self-government units. Furthermore, there is a lack of financial resources for investing in the necessary infrastructure, a complex system of building management (the ability of buildings to control "doorstep" containers), and an unresolved issue of a reward system for responsible citizen behaviour (motivating citizens to separate waste more effectively).

Although North Macedonia reports only sporadic campaigns for raising public awareness regarding proper waste management, mainly conducted by private companies and certain NGOs, Croatia and Slovenia have incorporated the obligation to raise awareness into their national legislatures. For example, due to the significant share of municipal waste in total waste (approx. 20%) and the continuous trend of growth in the amount of municipal waste, the prevention of the generation of municipal waste is regulated at the national level through the adoption of the Waste Management Plan of the Republic of Croatia, which sets the specific goal of "Preventing the generation of municipal waste." The stated goal is aimed at preventing the creation of biowaste, waste paper and cardboard, plastic waste, and waste textiles and footwear. Measures for the implementation of the goal of preventing the generation of municipal waste refer to educational and informational activities for citizens and the business sector on waste separation at the source, extending the life of materials and products, and an emphasis on product reuse. Activities include the acquisition and distribution of home composters, the creation of educational information materials, and the organization of workshops on the topic of home composting with the aim of reducing the total amount of municipal waste produced, reducing the proportion of biodegradable waste in mixed municipal waste, and reducing the total amount of biodegradable waste that is disposed of at the landfill. One of the measures is the introduction of charging for the collection and processing of mixed and biodegradable municipal waste according to the amount, in order to stimulate users of public services to separate waste, i.e., to reduce the amount of waste that needs to be disposed of.

At local levels, national programs are implemented, and action plans are developed by local self-government units and communal companies aimed at reducing municipal waste, primarily through educational and informative activities - education of the population, distribution of leaflets and brochures, media broadcasts, public forums, educational workshops, etc. Besides the fines for improper waste disposal and management, which represent a negative motivation, the public is also encouraged to be more environmentally conscious through positive actions such as exchanging bottles and cans for in-shop vouchers or money, in turn reducing the amount of packaging that is thrown into the bins or into the environment. Moreover, the price of waste collection can also be regulated by the amount of waste produced, e.g., the less waste produced leads to smaller bills, additionally encouraging individuals to be mindful about their waste production. Other motivational and educational tools include online portals containing useful information about waste and waste management, and also the learning opportunities that household members are given by participating in various projects, forums, events, and activities that encourage waste separation at the source, recycling, and reuse. Croatia, for example, reports that investment projects were co-financed and implemented in the procurement of infrastructure for composting at the point of waste generation (home composters), infrastructure for separate collection of municipal waste such as containers for separate collection with thresholds, containers for separate collection in public areas, construction of recycling yards, procurement of vehicles for separate collection, construction of sorting facilities, construction of infrastructure for biological waste treatment, etc.

# **5. Sustainable waste management practices**

In North Macedonia, the Law for Waste Management and the National Plan for Waste Management provide regulations for businesses to adopt more sustainable methods in waste management, but they are still not applied into force. The main task of the North Macedonian National Plan for Waste Management is to establish the sustainable functioning of the basic infrastructure for municipal waste management in order to improve sustainable waste management by focusing on improving the organizational structures, technical infrastructure, financial structure, and legal framework. The current main obstacles in the implementation of sustainable waste management practices are:

- Unharmonized regulation;
- No monitoring of the implementation of the regulation;
- Insufficiently clear roles of the sectors in policy, decision-making, implementation, etc.;
- Weak capacities of the department for management at the environmental administration for enforcement of legislation;
- Insufficient economic measures and budgets for the establishment of regional systems for waste management;
- Incomplete coverage with the service for collection and transportation of municipal waste;
- Absence of standard landfills according to law;
- Minimal waste selection;
- Minimally established infrastructure for the collection and selection of special waste flows;
- Underdeveloped market for recyclable waste materials (often obstructed by the informal sector);
- Absence of a national strategy for raising public awareness;
- Weak capacities of the non-governmental sector in raising public awareness.

Croatia, on the other hand, reports several different measures and activities that incorporate good waste management practices:

- Separate collection of waste from door to door - the introduced system of separate waste collection from door to door at the doorstep enables separate collection of waste at the source, which positively contributes to increasing the rate of separately collected waste and better recycling opportunities, and consequently reducing the amount of waste that ends up at landfills.
- Waste recovery - in addition to the emphasis on recycling, which processes waste materials into products, materials, or substances for their original or other purposes, there is an increasingly pronounced emphasis on the separation of biowaste and its composting.
- Waste management centres - for the establishment of a complete waste management system, one of the key elements is the Waste Management Centres, which use modern technology and technological processes for processing waste and reducing the negative impact of waste on the environment.
- Public awareness-raising activities - continuous implementation of educational activities on sustainable waste management is included as a legal obligation. Also, from 2017, educational and informative activities have been intensively carried out with special emphasis on preventing waste, separate waste collection, reuse of objects, and composting. Websites and online databases related to the waste management system (e.g., Waste Prevention Portal) were created for the purpose of education and raising public awareness.
- Investments in infrastructure for the further development of the waste management system - at the national level from 2017. Furthermore, significant funds were provided from national and EU sources for the implementation of projects that encourage waste separation at the source, recycling, and reuse. Thus, investment projects were implemented in the acquisition of infrastructure for composting at the point of origin (home composters), infrastructure for separate collection of municipal waste such as containers for separate collection from the

doorstep, containers for separate collection in public areas, construction of recycling yards, procurement of vehicles for separate collection, purchase of shredders, construction of sorting plants, construction of infrastructure for biological waste treatment, etc. In 2022, investment in infrastructure for separate collection of municipal waste will continue.

Examples of best sustainable waste management practices were also identified in Slovenia. A handpicked selection of them is listed below:

### **Slovenian Network - Centres of Reuse CPU [🔗]**

The Reuse Centre Ltd., Social Enterprise is the first social enterprise in Slovenia, established in 2012, with the main objective of solving environmental and social problems. The Reuse Centre developed a new model for implementing socially responsible businesses in Slovenia, which connects municipalities and public waste management companies, allowing the development of new green jobs and promoting resource savings. The USE-REUSE network runs centres across the country, which take in unwanted but viable products before selling them on as second-hand goods. They are also members of the international RREUSE network. Reuse centres within this network carry out:

- Environmental management to support the principles of reuse and recycling;
- Focus on developing awareness about environmental services;
- Facilitate the employment of hard-to-employ and disadvantaged persons;
- Processing, repairing, and innovatively renovating particular types of still useful products, upcycling;
- Selling second-hand goods;
- Working on increasing awareness about waste generation and reusing old things and sustainable consumption;

- Encouraging and promoting the reuse of upcycling products;
- Training and employing people from vulnerable groups with the purpose of returning them to the labour market and ensuring social safety.

The Reuse Centre has an important effect on the general public in raising its environmental awareness and spreading awareness about limited resources, conservation, recycling, and reuse.

### Initiative Zero Waste Hotel [ ]

Hotel Ribno is the first Zero Waste hotel in Slovenia. The hotel aims to provide high-quality services for guests to enjoy and for the benefit of nature. The hotel is planning to sort 90% of all collected waste, reduce annual waste by 30%, and use 30% less water and energy. They will do this by introducing the following:

- Sorting waste through proper collection;
- Reusing towels and bed linen;
- Refillable soap or shampoo dispensers, as well as reusable containers for sugar, jam, honey, and other food in the hotel's restaurant and kitchen;
- Working with local suppliers.

In May 2018, Hotel Ribno was awarded the Zero Waste Hotel certification. A ceremony has marked the completion of an important stage in the series of measures and changes that the hotel had adopted. The changes are visible in every part of the hotel and its surroundings. Waste measurements showed that the total volume of waste decreased considerably, as did the share of mixed waste, which now stands at an impressive 8% of total waste. The change process involved the hotel management and all the staff, who were actively searching for solutions and opportunities for further improvement.

### Flea market Ljubljana: Breg Embankment Antique Market [🔗]

Traditionally held on Sundays in the old city centre of Ljubljana, the Breg Embankment Antique Market, which has a high esteem among the locals, showcases various objects from the recent and distant past, many of which are still fit for use, such as antiques, art pieces, furniture, decorative items, and kitchenware, and all kinds of bric-a-brac of collectible or simply nostalgic value.



Ljubljana market

Source: [Visit Ljubljana](#)

# **6. The effect of waste on health and the environment**

Successful waste management has a positive influence on all three dimensions of sustainability [  ]:

- **Environment:** Minimizing the negative effects of waste, helping in the process of reducing greenhouse gas emissions, etc.
- **Economy:** Creating markets for different methods of waste management, production and consumption of products from "nature-friendly" materials, new jobs, and entrepreneurial opportunities.
- **Society:** Minimizing the negative effects of waste on health, providing a new source of employment, helping in cases of poverty, promoting a more inclusive society, etc.

Waste is created as a consequence of all our activities, and its improper disposal can cause undesirable emissions into the air, soil, and water. The aforementioned has a harmful effect on people's health. How significant this impact will be depends on the amount and properties of the waste and the way it is managed. The increase in the amount of waste and poor waste management lead to pollution, negative climate changes, and directly affect many ecosystems and species. Inadequately disposed waste, e.g., in illegal landfills, etc., becomes an ideal habitat for various pests but also a suitable environment for the development and spread of various infectious diseases, emissions of harmful gases into the air, soil contamination, pollution of underground and surface water, the spread of unpleasant odours, and wind blowing light material into the environment. In addition to the above, areas of inadequately disposed waste represent a constant and potential danger for the occurrence and spread of fires, as well as the occurrence of explosions. All of the above spread through ecological networks and ultimately harm people's health.

Landfills represent a possible source of air, water, and soil pollution due to the emission of undesirable landfill gases. Waste processing and disposal activities lead to the emission of greenhouse gases carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrogen oxide (N<sub>2</sub>O), and various other gaseous organic compounds, some of which have intense unpleasant odours. The intensity depends on the physical and chemical parameters in the body of the landfill,

the time of waste decomposition, and the coverage of the waste. Depending on the temperatures, the wind, and the previously mentioned parameters, unpleasant odours and gases can manifest even several hundred meters from the landfill. Airborne pollutants know no boundaries but spread depending on air currents and climatic conditions. The main source of pollution associated with waste management, particularly in North Macedonia, is the illegal and legal landfills. Currently, there are about 54 legal landfills in North Macedonia. There are another 200 illegal landfills throughout the country where the greatest damage is done, and where tires, used oils, and industrial waste are burned uncontrollably. Quite often, the spot of the landfill is moved, and the leftovers are disposed of in different places, not leaving out the fields for growing crops. Another great source of waste-related pollution is industrial and medical waste. Again, this problem is connected to the fact that this waste is not handled properly, i.e., the greatest part is burned in the same landfills as all the other waste.

Disposing of waste also has an adverse effect on the soil. The decomposition of mixed municipal waste produces products of aerobic and anaerobic decomposition of organic substances, and if they are not under adequate control, soil contamination can occur. Disposing of waste on the ground can lead to the emission of undesirable landfill gases that seep out and can cause pollution of surface and underground water. Moreover, the inappropriate burning of waste without selection, separation, and processing leads to pollution of the land, which further pollutes the water and air. This inappropriate burning of different waste, in addition to industrial activities, has placed North Macedonia among the 34 most polluted countries in the world regarding air pollution in the last 10 years. In this period, the number of lung diseases and people who died from this kind of disease has greatly increased.

One of the sources of waste-related pollution is improper waste management, the so-called "black spots" and wild landfills. As a result of inadequate waste disposal, undesirable emissions of gases into the air, soil, and water can occur. The aforementioned has a harmful effect on people's health. Inadequately disposed waste, e.g., in illegal landfills, etc., becomes an ideal habitat for various pests but also a suitable environment for the

development and spread of various infectious diseases, emissions of harmful gases into the air, soil contamination, pollution of underground and surface water, the spread of unpleasant odours, and wind blowing light material into the environment. In addition to the above, areas of inadequately disposed waste represent a constant and potential danger for the occurrence and spread of fires, as well as the occurrence of explosions. All of the above spread through ecological networks and ultimately harm people's health.

Croatia reports several examples of how to raise public awareness:

- For the purpose of comprehensive management of environmental protection and monitoring of environmental burden, within the framework of the Environmental Protection Information System, the Waste Management Information System was established as a basis for the creation and adoption of sustainable development and environmental protection documents, monitoring of the implementation of measures in these documents, and other documents in accordance with the provisions of the Law on Environmental Protection. [[🔗](#)]
- The Environmental Protection sign "Friend of the Environment" can be awarded to legal and natural persons for promoting products and services that, compared to similar products and services, are characterized by a less negative impact on the environment in the entire life cycle and thereby contribute to the efficient use of environmental components and a high degree of environmental protection. [[🔗](#)]
- In the business system, green public procurement practices are applied and promoted as an important tool that encourages sustainable consumption and production, thereby influencing the reduction of environmental pressures, among other things, the generation of waste. [[🔗](#)]

# **7. Best practices in waste management**

Some of the best practices in waste management have already been presented in the previous chapters. We will revisit those shortly; however, it is very impactful that such practices are widely incorporated into Croatia's and Slovenia's waste management systems. Although North Macedonia may lag a bit behind, they have set legislation that will allow, when other capacities are increased, opportunities to catch up with the other two analysed countries. More specifically, they have set a foundation in their Law for Waste Management (Articles 11 – 14):

### **Principle of closeness**

Waste should primarily be collected and processed at the place where it is created. Waste that, due to justified technical or economic reasons, cannot be processed at the place where it was created, i.e., originally in the region in which it has been created, must be transferred for processing or removed as soon as possible to a designated place.

### **Principle of producer responsibility**

The producer, the importer, or the legal person who puts certain products on the market of the Republic of North Macedonia that, at the end of their lifetime, create waste belonging to the special streams of waste following this law, as well as by the regulations for the special streams of waste, which burden the environment, are responsible for its management under the law.

### **Common principles**

The bodies of the state administration, the municipalities, the municipalities in the city of Skopje and the city of Skopje, and the legal and natural persons who manage the waste are obliged to undertake the measures and activities related to waste management to be managed according to the principles and provisions of this law, as well as according to the principles specified in the Law on the Environment.

### Hierarchy in waste management

To achieve the goals of environmental protection and health, a hierarchy is applied in waste management in the following order and priority:

- Prevention of waste generation
- Preparation of waste for reuse
- Waste recycling
- Other types of waste processing, including waste processing to obtain energy, and
- Waste disposal.

Some recognized good practices in the field of waste management refer to the following:

- **Separate collection of waste from door to door:** The introduced system of separate waste collection from door to door at the doorstep enables separate collection of waste at the source, which positively contributes to increasing the rate of separately collected waste and better recycling opportunities, and consequently reducing the amount of waste that ends up at landfills.
- **Waste recovery:** In addition to the emphasis on recycling, which processes waste materials into products, materials, or substances for their original or other purposes, there is an increasingly pronounced emphasis on the separation of biowaste and its composting.
- **Waste management centres:** For the establishment of a complete waste management system, one of the key elements is the Waste Management Centres, which use modern technology and technological processes for processing waste and reducing the negative impact of waste on the environment.
- **Public awareness-raising activities:** Continuous implementation of educational activities on sustainable waste management is included as a legal obligation. Also, from 2017, educational and informative activities have been intensively carried out with special emphasis on the

prevention of waste generation, separate waste collection, reuse of objects, and composting. Websites and online databases related to the waste management system (e.g., Waste Prevention Portal) were created for the purpose of education and raising public awareness.

- **Significant funds were provided from national and EU sources for the implementation of projects that encourage waste separation at the source, recycling, and reuse.** Besides Erasmus+, some other examples of EU programmes and initiatives include:

- ❖ The new European innovation agenda aims to position Europe at the forefront of the new wave of "deep-tech" innovations and start-ups. Driven by this strategy, innovation should develop new technologies to address the most pressing societal challenges and bring them to market. [[🔗](#)]
- ❖ The European Green Deal aims to transform the EU into a modern and competitive economy. [[🔗](#)]
- ❖ Horizon Europe 2021-2027, as the most ambitious program for research and innovation, offers a wide range of opportunities for researchers, innovators, and companies of all sizes in search of discoveries, scientific and technological progress, and innovation. Smart specialization strategies are key to developing synergies between Horizon Europe and other EU instruments related to smart growth. [[🔗](#)]
- ❖ The LIFE program aims to facilitate the transition to a sustainable, circular, energy-efficient, renewable energy-based, climate-neutral, and resilient economy to protect, restore, and improve the quality of the environment, including air, water, and soil. [[🔗](#)]
- ❖ The Green Agenda for the Western Balkans is a regional strategy that focuses on a sustainable economy in line with the European Green Deal. The objectives of the Green Agenda for the Western Balkans are focused on the transition to a circular economy and building sustainable agriculture and food systems. [[🔗](#)]

# **8. Innovations and technological progress in waste management**

The implementation of new technologies in the waste management system contributes to the improvement of the entire waste management system and a greater possibility of achieving the set goals in the field of waste management, especially in terms of greater waste separation, a higher rate of waste recycling, and consequently a reduction in the amount of waste that must be permanently disposed of in landfills. The application of new technologies in waste management is aimed at higher standards in the protection of the environment and human health. Please find selected examples of innovations in waste management in Croatia, Slovenia, and North Macedonia below:

- Kanta.mk - is a mobile application that uses crowdsourcing to collect data on the state of waste in Skopje. The goal is to establish a basis for measuring the situation in the future and further for defining actions and making informed decisions for dealing with waste. In addition, it aims to provide citizens with the opportunity to get involved in solving this social problem for a more beautiful and cleaner city. The application allows users to:
  - ❖ map the locations of existing containers and the type of waste collected;
  - ❖ map potential new locations for placing containers and the type of waste that would be collected;
  - ❖ map wild dumps and the type of waste;
  - ❖ review the mapped locations for all previous options.

The mobile application is easy to use and designed according to the needs of the users – fast navigation, data entry, and a feedback system. The data collected through the application can further be transformed into a suitable form for review and sent to the institutions responsible for waste management in the city to take quick actions and make informed decisions. There are several municipalities that were included in a project for selecting household waste, but although selected, the waste ends up at the same landfill, not processed appropriately.

- Several cement plants in Croatia, for example, NEXE d.d. Našice, Holcim - Koromačevo, carry out heat treatment procedures by co-incineration of

waste in their plants. With the application of high technologies and in accordance with the obtained permits, in the process of cement production, they use different types of waste to obtain fuel/energy for plant operation. In this way, they reduce the share of fossil fuels in the production process and achieve a positive impact on the environment, but also reduce the amount of waste that would be disposed of at the landfill.

- The town of Daruvar implemented a pilot project of separate collection and utilization of biowaste in a biogas plant. The purpose of the pilot project was to point out the importance of separate collection of bio-waste in the city and the possibility of recovering it to gradually reduce the amount of waste at the local landfill.
- The town of Virovitica, with the co-financing of the Fund for Environmental Protection and Energy Efficiency, is implementing a pilot project of installing mini crushers in kitchen sinks. The goal of the pilot project is to solve the problem of separate collection of bio-waste where it is most difficult - in multi-apartment buildings, and thus reduce the generation of bio-waste in households. The pilot project also includes a scientific community that will analyse the effectiveness of a potentially new way of disposing of kitchen biowaste and analyse the impact of such a way of disposing of waste on the operation of the wastewater treatment device itself.
- The company Premifab, since 2020, in cooperation with the Faculty of Geotechnical Engineering, has been carrying out a research, development, and innovation project that develops an innovative technology for refining the distillation residue into a useful raw material for further products, which can be used in the construction industry and road construction in the form of additives for asphalt bases and bituminous pastes, as well as in the paint industry and lacquers in the form of coatings for anti-corrosion protection and additives for nitro-paints. In this way, the amount of distillation residue that will need to be disposed of will be reduced, thus contributing to the preservation of the environment and the reduction of waste.

- Ljubljana was the first European capital to declare a zero-waste goal. This ambitious target is not just about recycling; it's about preventing waste generation in the first place. Ljubljana's green credentials are widely known, and the city was named Europe's Green Capital in 2016. Based on a strategy of green development, Ljubljana promotes the regeneration of derelict areas, encourages development along main access routes, and actively protects its natural resources and green space. In 2017, Ljubljana adopted an integrated transport strategy with an emphasis on sustainable mobility and less car dependence. Ljubljana is active in the European Mobility Week initiative and is the only city to win the European Mobility Award twice. In cooperation with Avantcar, Ljubljana introduced an electric car-sharing initiative to reduce mobility costs, harmful emissions, and noise pollution. An Avant2Go mobile app delivers a full range of customer-centric services from reservation to final payment. [[🔗](#)]



# Adult learners' needs analysis

A total of 154 adults participated in a digital survey administered in all three partner countries – Croatia, Slovenia, and North Macedonia. An optional ready-to-print survey form was created to accommodate adults with low digital literacy skills and/or limited internet access. Limited but necessary sociodemographic data were collected (age, gender, education, employment) to aid further steps in analysing the data pertaining to learners' needs. The entire data collection process was designed with participants' privacy and well-being in mind, adhering to the best practices and strategies when implementing surveys of this type and scope.

An executive summary of the results, grouped by categories, follows.

### **Sociodemographic data**

A total of 154 individuals completed the survey: 40 in Slovenia (SI), 54 in Croatia (HR), and 58 in North Macedonia (MK). Age-wise, the majority of participants fall within the age ranges of 35-44 (17.50% SI, 37.04% HR, 44.83% MK) and 45-54 (20.37% SI, 24.14% HR, 37.50% MK). Additionally, the data show that women predominantly participated in the survey, comprising, on average, more than two-thirds of the total participants (63.79% MK, 74.07% HR, 75.00% SI). More heterogeneity is observed in the highest education levels of the participants. While individuals with secondary school education are predominant in Slovenia (42.50%) and Croatia (48.15%), those with a Bachelor's degree are most common in North Macedonia (75.86%). It is also noteworthy that neither Slovenia nor North Macedonia included participants who had not completed primary school, whereas Croatia had 7.41% of participants surveyed with this level of education. More homogeneity is seen in the employment status of participants across the three countries, with the majority working full-time (48.15% HR, 67.50% SI, 86.21% MK). A significant fact is that almost a quarter of Croatian participants (24.07%) report being unemployed, while Slovenian part-timers constitute the second most represented employment group (12.50%).

### **Awareness and knowledge of environmental issues and topics**

The participants were asked to assess their levels of awareness and their knowledge levels on selected environmental topics and issues, using a 5-point Likert scale in both instances.

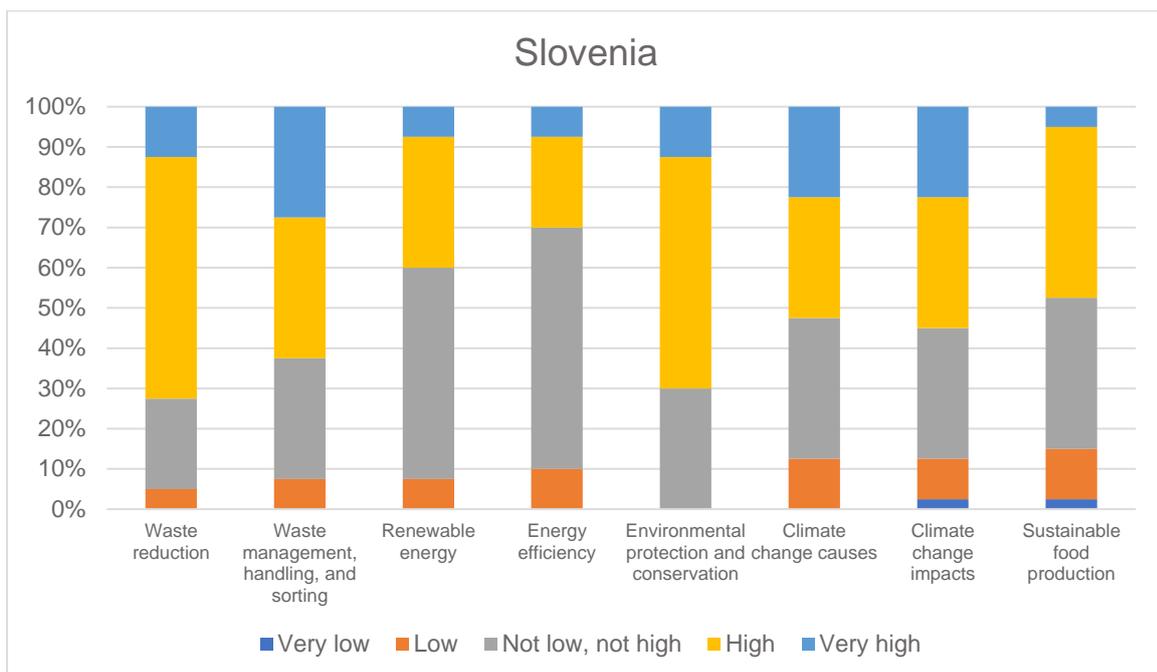
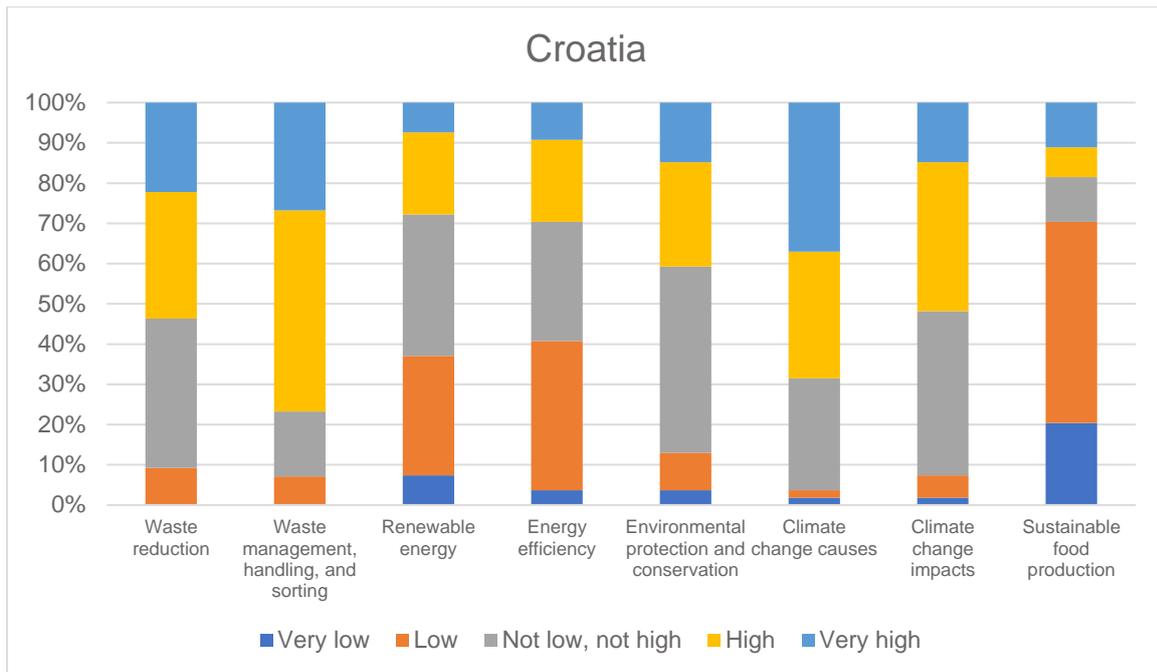
They assessed their levels of awareness of the following eight environmental issues: **climate change, loss of biodiversity, deforestation, water scarcity, air pollution, water pollution, soil degradation, and waste management.** Climate change is the environmental issue that participants from the three partner countries are most aware of, with the combined answers for "aware" and "very aware" totalling 70.00% in Slovenia (SI), 72.41% in North Macedonia (MK), and 75.96% in Croatia (HR). A close second is the issue of waste management, with combined answers for "aware" and "very aware" at 63.73% in MK, 75.00% in SI, and 79.63% in HR. Higher awareness levels were observed for the remaining six environmental issues, where Slovenia and North Macedonia share similar results, while Croatian participants trail slightly behind in their self-assessed awareness levels.

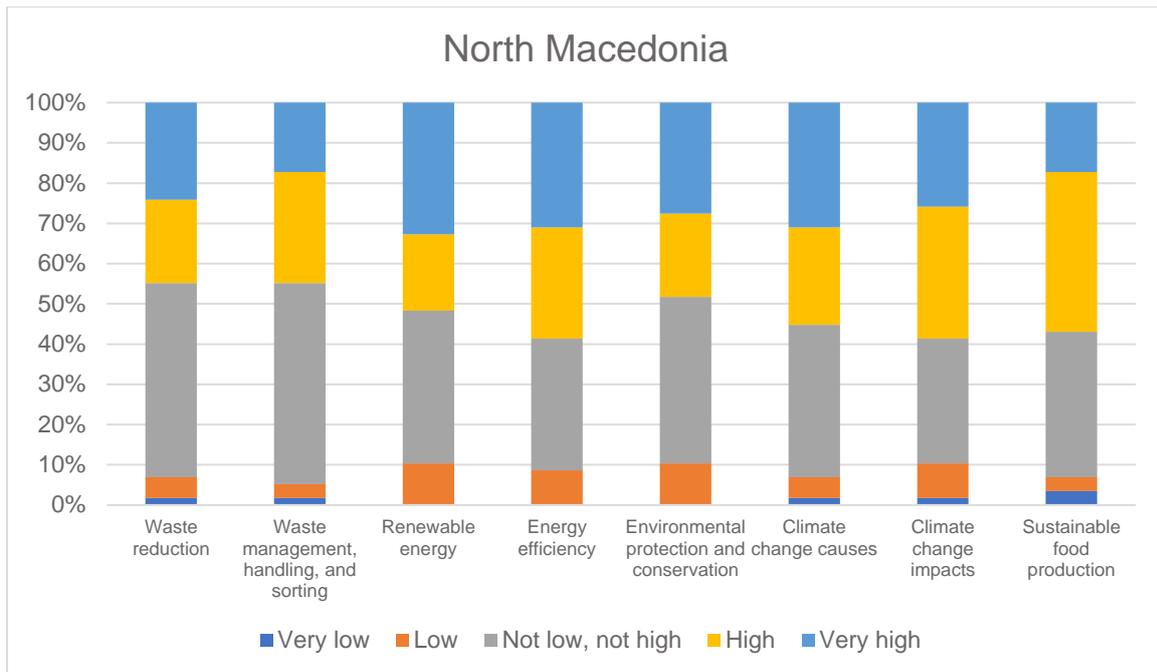
- Water pollution: 75.86% MK, 70.00% SI, 33.33% HR
- Air pollution: 79.31% MK, 65.00% SI, 37.04% HR
- Water scarcity: 68.96% MK, 65.00% SI, 33.33% HR
- Loss of biodiversity: 68.97% MK, 50.00% SI, 37.04% HR
- Deforestation: 58.62% MK, 50.00% SI, 29.63% HR
- Soil degradation: 60.35% MK, 40.00% SI, 22.22% HR

The heterogeneous results derived from the collected data on the levels of awareness of selected environmental issues reflect the variety and richness of the sociodemographic profiles of the individuals who participated in the survey. This diversity underscores the complexity of environmental awareness and highlights the importance of tailoring educational and awareness campaigns to meet the varied backgrounds and knowledge levels of the target audience. Similarly, the participants were asked to rate their knowledge level of eight selected environmental topics on a 5-point scale, ranging from very low to very high. The results of these assessments for the eight selected environmental topics are presented in diagrams below.

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### Environmental conscious practices and barriers

Participants were asked to indicate how often they undertake selected environmentally conscious actions and to self-identify barriers that prevent them from taking these actions. A 5-point Likert scale was employed (ranging from 1 for "never" to 5 for "always"), in conjunction with a checklist of possible barriers, including a write-in option for surveyed participants. Eight major areas of environmentally conscious actions were identified:

1. **Waste reduction.** This includes cutting excessive consumption and needless purchases, reusing containers, shopping bags, and household items, and buying non-perishable groceries in bulk to reduce packaging waste.
2. **Correct waste sorting and recycling.** Participants were asked about their consistency in separating paper, cardboard, glass bottles and jars, aluminium cans, plastic containers, food scraps, and yard waste, where local infrastructure permits.
3. **Saving energy.** Actions such as turning off lights when not in use, adjusting thermostat temperatures during heating/cooling seasons, and using efficient appliances and light bulbs were evaluated.
4. **Using renewable energy.** This area covers installing rooftop solar panels to generate electricity, driving an electric car, and/or using public transport run on renewable energy.
5. **Environmentally conscious purchasing.** Choosing locally produced foods to reduce transport miles, buying organic produce to support land conservation practices,

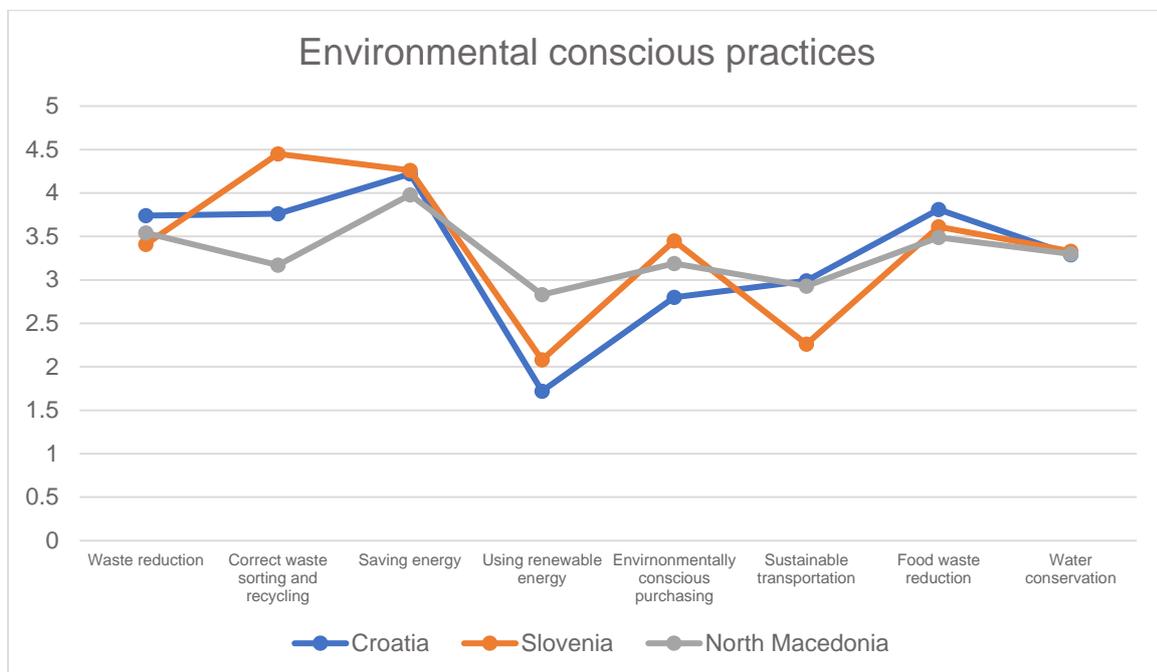
## Raising Awareness for a Greener Tomorrow

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purchasing products in recycled/reusable packaging, and buying eco-friendly cleaners and personal care items were considered.

6. **Sustainable transportation.** This involves riding public buses and trains to reduce emissions, walking and biking for shorter trips, and driving electric or hybrid vehicles.
7. **Food waste reduction.** Planning grocery purchases, properly storing fruits and vegetables, finishing leftovers, and composting food scraps were areas of focus.
8. **Water conservation.** Participants reported on fixing household leaks, installing water-efficient fixtures/appliances, and reducing irrigation water use through soil improvements and landscaping.

A point-average usage rate (from 1 for "never" to 5 for "always") was calculated for each of the eight identified areas. The results are presented in the diagram below.



Among the presented practices, several sub-actions stand out as being never or rarely practiced (combined answers) in specific contexts:

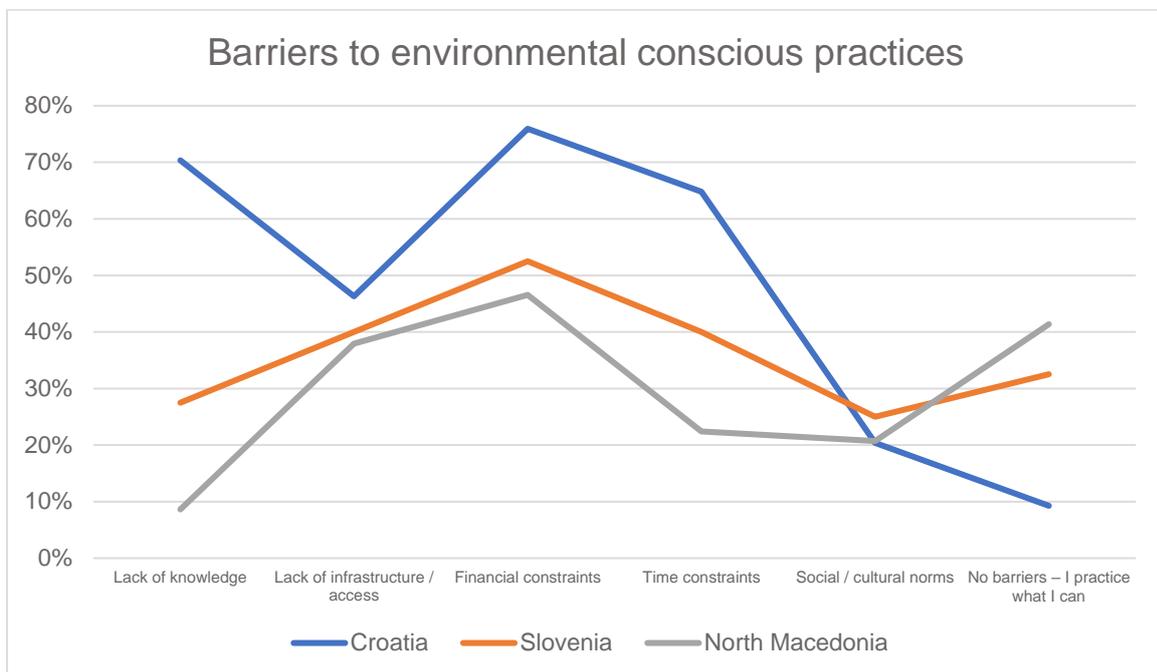
- buying non-perishable groceries in bulk to reduce packaging waste (51.85% HR)
- installing rooftop solar panels to generate electricity (65.00% SI, 77.78% HR)
- driving an electric car and / or using public transport run on renewable energy (53.45% MK, 67.50% SI, 83.34% HR)
- buying organic produce to support land conservation practices (51.85% HR)
- purchasing products in recycled / reusable packaging (62.96% HR)
- riding public buses and trains to reduce emissions (50.00% SI)
- walking and biking for shorter trips (55.00% SI)

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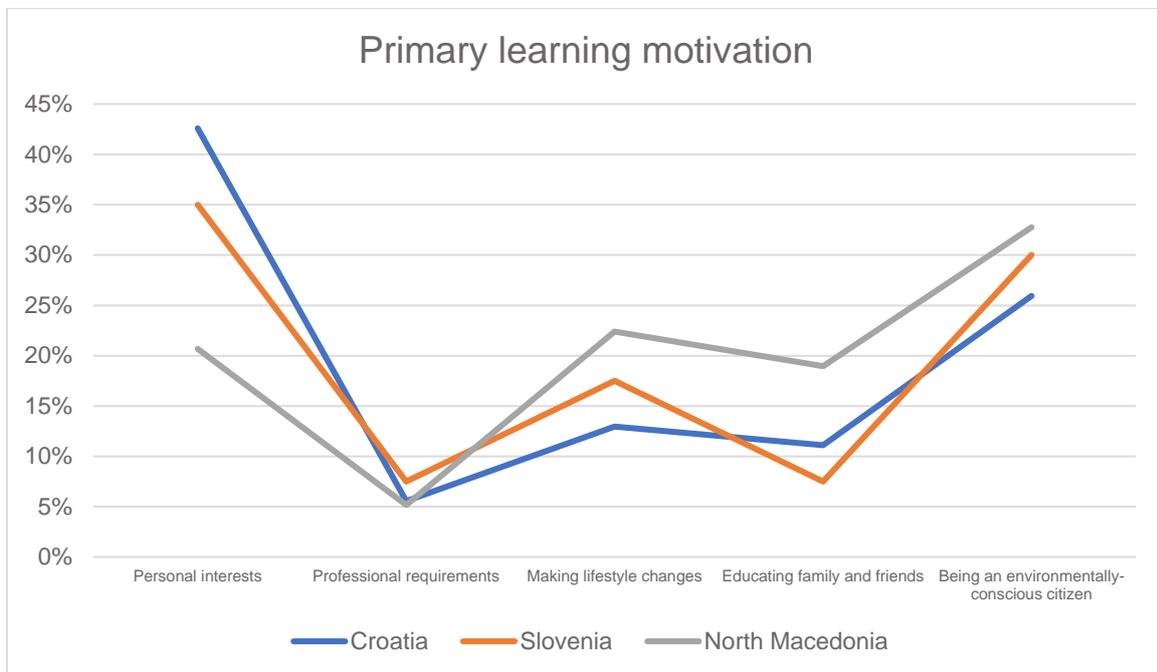
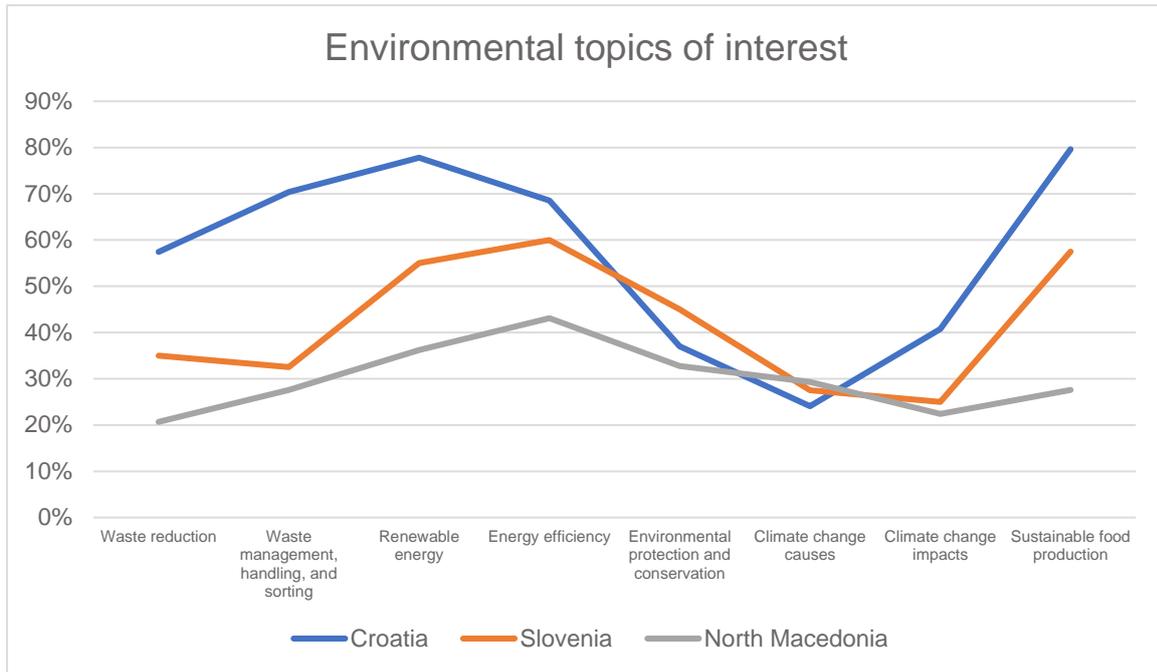
- driving electric or hybrid vehicles (58.62% MK, 82.50% SI, 85.17% HR)
- composting food scraps (68.52% HR)
- reducing irrigation water use through soil improvements and landscaping (68.52% HR)

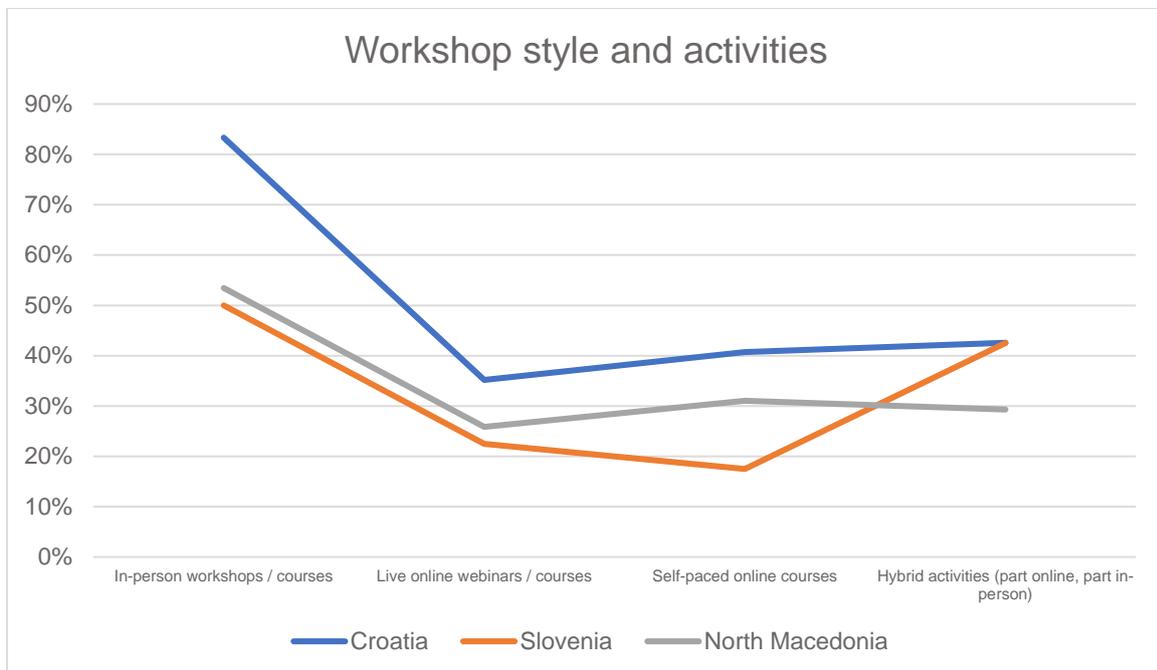
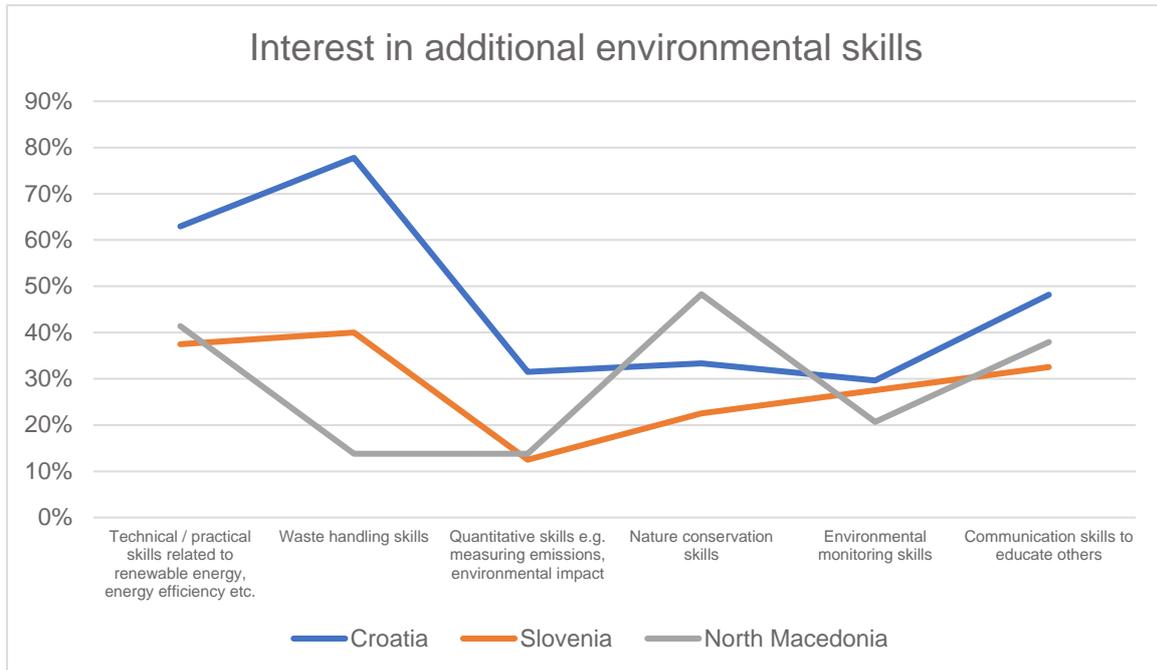
The participants were also asked to identify possible barriers to taking environmentally conscious actions. They were provided with a list of possible barriers and were also allowed to write in additional barriers. As there were only two write-in entries, only the data on preselected barriers will be presented.

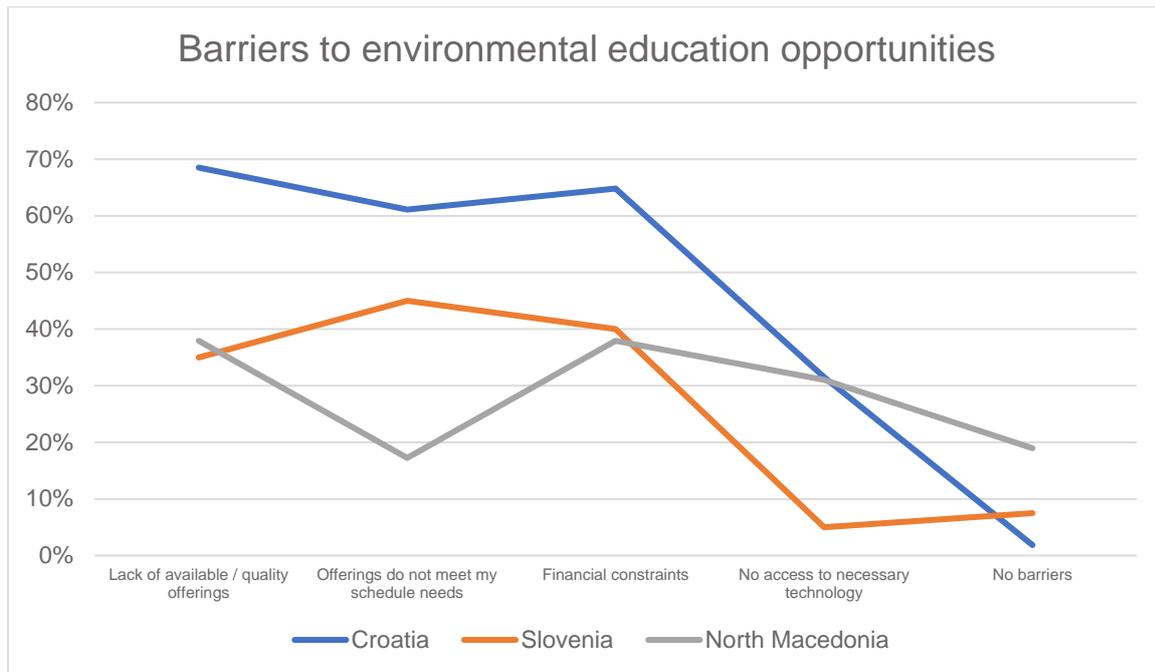


### Learning interests, styles, and motivation

The participants were presented with a series of questions about which topics they would like to gain more knowledge of, their primary motivation for learning about environmental topics, which additional environmental skills they would like to gain from learning opportunities, which workshop styles and activities help them learn effectively, and what barriers to environmental education opportunities they face. The results are presented below.







### Final thoughts

The executive summary of the data collected and analysed clearly demonstrates a need for environmental education activities designed to address knowledge gaps among adult learners from diverse backgrounds, demographics, and educational levels. The data presented so far has been primarily quantitative in nature. However, participants were also asked to provide qualitative data by responding to open-ended questions. The first question sought to identify any additional potential barriers, concerns, or suggestions related to environmental education opportunities. Similarly, the second question invited participants to share their thoughts on potential barriers, concerns, or suggestions specifically related to environmental education opportunities for adult learners. Their responses were analysed and thematically grouped into relevant categories, which are as follows:

**Time constraints and scheduling conflicts.** A significant barrier across all three countries is the lack of time, which includes busy schedules, the duration of training sessions, and the challenge of coordinating time for education alongside work and family commitments.

**Financial barriers.** Financial issues are a recurring concern, from the cost of participating in eco-friendly practices to the expenses associated with educational

opportunities. This theme encompasses comments on the high cost of eco-friendly products (like electric vehicles), financial barriers to education, and the perceived prioritization of profit over environmental conservation.

**Educational and awareness gaps.** Participants across the three countries highlighted a lack of awareness and education on environmental issues. This includes a general disinterest or belief that current knowledge is sufficient, low levels of primary education, and specific gaps in knowledge about practical eco-friendly practices (e.g., proper use of eco-friendly bags).

**Accessibility and inclusivity.** Several participants underline the need for environmental education and opportunities to be more accessible and inclusive. Challenges include reaching the elderly in rural areas without transport, individuals with low levels of technical knowledge, and those living in urban settings who feel excluded from ecological lifestyles.

**Quality and trust issues.** The concern over the unverified quality of domestic producers and the authenticity of eco-friendly products was specifically mentioned in Croatia. This reflects broader issues of trust and credibility in environmental initiatives and products.

**Global environmental issues and local action.** The mention of global warming and pollution highlights awareness of global environmental issues, but there is a perceived lack of local action or opportunities to apply know.

**Accessibility and flexibility.** Across all three countries, there is a strong demand for educational offerings that accommodate adult learners' schedules and responsibilities. Suggestions include short courses and live workshops that allow for participation despite day jobs and other commitments.

**Practical and applied learning.** Respondents express a desire for practical, hands-on learning experiences. This includes live workshops and the application of new technologies, such as making smart bins with AI. Emphasizing real-world application through examples of good practice and practical projects (like pollution measurement) can enhance learning outcomes.

**Financial considerations.** The financial aspect of being eco-friendly is a significant concern, with several respondents highlighting the cost associated with eco-friendly products and practices. Educational programs should address how to be environmentally responsible on a budget, potentially including information on cost-saving strategies and the long-term financial benefits of eco-friendly choices.

**Digital learning opportunities.** There is a clear interest in leveraging technology for environmental education. Suggestions include Zoom lectures, online courses, and

web-based resources, indicating a trend towards digital platforms as a preferred means of accessing information and learning opportunities.

**Engagement and motivation.** Suggestions such as incorporating social elements (e.g., picnics after lectures) and focusing on motivation highlight the importance of creating engaging and enjoyable learning experiences. This could help in attracting and retaining the interest of adult learners in environmental topics.

The findings derived from the administered survey forms will be crucial in designing subsequent educational materials, such as the methodological guide for educators and the environmental curriculum for adult learners. Having the direct input of the project's target groups, i.e., adult learners, will add another layer of relevancy, quality, and practicality to the materials and resources produced within the "Raising Awareness for a Greener Tomorrow" Erasmus+ project.