INTERACTIVE GARDENS

From Concept to Practice: Advancing Interactive Public Gardens in the Baltic Sea Region

Report on activities implemented from November 2023 to February 2026

Source of Funding: INTERREG Baltic Sea Region programme 2021-2027

Project No. C036

Beginning of the Project 01/11/2023

End of the project 31/10/2026

Amount of Funding 2 790 120

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Introduction

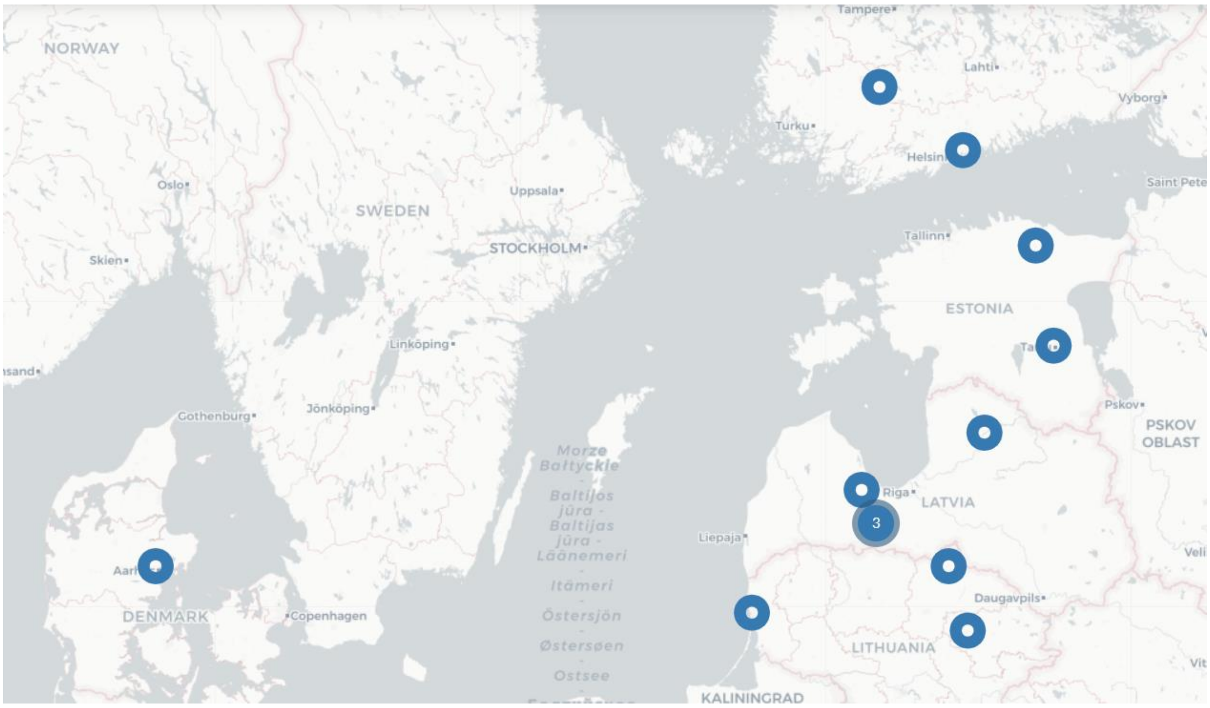
The project INTERACTIVE GARDENS is implemented under the INTERREG Baltic Sea Region Programme 2021–2027, Priority 1 Innovative Societies, Objective 1.2 Responsive Public Services. It brings together public authorities, research institutions, and stakeholders to develop and test innovative solutions that improve public services through nature-based approaches.

The project addresses the untapped potential of public green spaces by transforming traditional gardens into interactive, inclusive, and health-promoting environments. These gardens are designed not only for recreation, but also to support well-being, social interaction, and educational activities for diverse user groups.

Through the development of pilot garden sites, digital tools such as virtual reality solutions, and evidence-based methodologies, the project creates a comprehensive system of interactive public gardens across the Baltic Sea Region. This approach enables gardens to better respond to users' needs and enhances their role in public health and community life.

By combining physical infrastructure, digital innovation, and stakeholder engagement, the project contributes to more responsive, user-centred public services and provides transferable solutions for municipalities and organisations across Europe.

Map of project partners



Programme website: https://interreg-baltic.eu/project/interactive-gardens/

Zemgale Planning region (LV)

Two international events have been successfully organized: the project Kick-off meeting in Salaspils and an International Conference in Koknese, Latvia. Both events gathered project partners and stakeholders to strengthen cooperation and exchange knowledge.

Contracts have been concluded for landscaping works in Bauska and Aizkraukle municipalities.

The development of technical designs for the gardens in Jēkabpils Municipality and Jelgava Municipality has been completed. Public procurement procedures for upcoming landscaping and construction works will be announced in the near future.

In addition, a training programme for municipal employees on sustainable and interactive public gardens is currently under preparation.

Institute of Horticulture (LatHort) - what has been done by LatHort until now in the project “Interactive Gardens” (LV)

At the beginning of the project implementation, we - Horticulture Institute (LatHort) - have participated in experience exchange meetings visiting the partners and have organized such meeting also in Latvia. The planning and establishment of new plantings started soon. The existing trials and collections were supplemented by specially designed raised beds with sensory plants, demonstration plantations for decorativeness and nutritional value of plants and green architecture forms for natural improvement of microclimate in resting places for visitors.

The researchers from LatHort gave workshops for stakeholders from the municipalities and museums explaining the establishment and management of new objects as well as showing our collections and visiting historical gardens. In spring, the peculiarities of lilac and crab apple cultivars were explained and demonstrated in our collection. In summer, the topics about green architecture, historical plantations, soft fruit and cherries were covered. To raise society awareness on the connection of human well-being and nature, the guided garden therapy sessions were organized including the group from Senior community association.

A lot of work was invested compiling knowledge focusing on research results in BSR and developing large educational stands on main topics: “Horticultural plants in the historical periods of Latvia”, “Horticultural plants for a healthy food basket”, “Gardens for well-being and health”, “Horticulture growing systems – for biodiversity in climate change”. The main topics were explained in more detail using smaller stands and variety labels. The first installed stands were already used for interactive seeking of answers in public event – Scientific night.

In the 2025/2026 season, our garden became a welcoming destination for visitors even in the winter months for the first time. The dark winter evenings were transformed by art installations and light objects, each dedicated to the themes of garden development. This successful initiative was brought to life in close collaboration with the Dobele municipality. During daylight hours, both visitors and staff were invited to enjoy the cross-country skiing trails woven through the garden.

All the experience gained in the meetings with partners and in garden development and piloting was compiled in garden concept description - in possibly concise way.

The interactive map of partner’s demonstration gardens has been created to facilitate obtaining information about garden activities in BSR. The development of website, piloting of virtual reality garden model and smart watch use in garden therapy has been started and are under development.

In general, the project results and activities were shown for large society. Among the most important international transfer activities, we would like to highlight the introducing and discussing the Interactive Garden project with the participants of the 30th Congress of the European Association of Rural Sociology, and with the participants of international conference ”Challenges in Temperate climate 2025” as well as with the international experts for scientific institution evaluation.

Dobele County Municipality (LV)

In 2024-2025, the Dobele County municipality has participated in events organized by partners (master classes and experience exchange trips to public parks, testing 3D glasses through the senses (reconstruction of a garden model). The municipality has involved residents and project partners in the cleaning of the future Willow Park, in a master class in weaving willow fence. Technical documentation for the improvement works has been developed, procurement documentation has been prepared. Procurement is currently in the process. The work is planned to start in April. An information bildoard for residents has been setting up at the facility. Cooperation with the tourism website has been initiated, where a virtual version of the future park will be posted.



🌿 TALKA TOPOŠAJĀ VĪTOLU PARKĀ... - Dobeles novada pašvaldība | Facebook

Information about the project provided in Projekts "Integrated system for interactive public garden development in Baltic Sea Region" | Dobeles novada pašvaldība

Tukuma County Municipality (LV)

[Projekts “Interactive Gardens” | Tukuma novada dome]

Within the project “Interactive Gardens”, Tukums County Municipality is developing a pilot site – Ziedonis’ Garden on Mālkalns Hill in Tukums. The garden is designed as an interactive and educational green space, integrating nature, culture and literature, inspired by Latvian poet Imants Ziedonis.

The concept focuses on the creation of a demonstration garden for colour senses and experiments, including thematic garden expositions, a future “Garden School”, and multifunctional spaces for education, recreation and community activities.

Significant progress has been achieved in the planning and implementation phase. Technical documentation for the Water Garden has reached 95% completion and is planned to be finalised in 2026. The development of the School Garden (children’s playground “Ziedonis’ Fairy Tales”) is in progress, with additional funding application submitted.

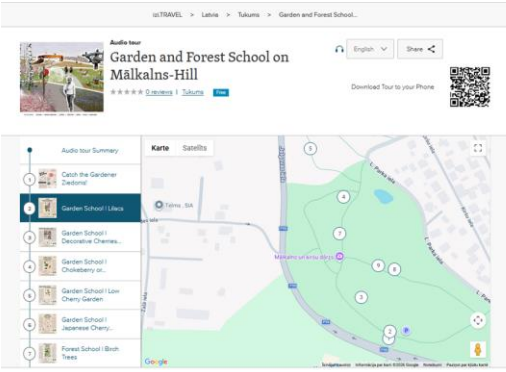
Initial improvement works have been started in the territory, including assessment of natural grassland areas, overseeding with native species and introduction of sustainable meadow management practices such as mosaic mowing. Methodological materials for meadow maintenance have been developed, and tactile information stands have been installed.

Infrastructure development is ongoing. Electrical installation works have been carried out, and the video surveillance system is almost completed.

As part of digital solutions, interactive information stands with an audio guide have been created, including the voice of Imants Ziedonis developed using artificial intelligence. The audio guide is available on the izi.TRAVEL platform in Latvian and English. Development of a virtual garden exhibition and a Gardener’s House with a museum-type exposition is in progress.

Community engagement plays an important role in the project. Educational and recreational events, including gardening seminars, have been organised, as well as public exhibitions about the project. The site is included in cultural events and tourism routes, and community involvement is ensured through planting activities and maintenance events.

The project contributes to the development of an innovative, interactive public green space, combining environmental sustainability, cultural heritage and digital solutions, while promoting Tukums as a tourism destination.



Vidzeme University of Applied Sciences (LV)

Vidzeme University of Applied Sciences in the project participates with two activities: To develop an **interactive VR garden** that acts as a digital twin of real green spaces for planners, researchers, healthcare providers, NGOs, and the public, it includes features such as seasonal and weather changes, plant growth simulation, and interactive tools for both professional editors and general users, major technical progress was made through 3D modelling, plant databases, GIS integration, weather systems, user interface development, and performance improvements.

To develop **research methods** to evaluate both real and virtual garden experiences using surveys and wearable devices. Pilot testing in real gardens helped refine the tools, data collection process, and overall methodology for future research and development.

Creating a virtual garden prototype.

A key outcome of the project is the creation of an interactive virtual reality (VR) garden, serving as a digital twin of real-world green spaces. This solution is intended for use by spatial planning authorities, decision-makers, researchers, NGOs, healthcare providers, and the wider public. The concept is adaptable to regional and local conditions and is being developed in collaboration with land-use authorities, research institutions, and end users. It also has the potential to inform policy development at regional, national, EU, and Baltic Sea levels.

The VR garden system includes advanced functionality such as seasonal and weather-based visualization, plant growth simulation (age and size over time), and timeline navigation. Users are divided into two main roles: professional editors, who can design and manage garden environments, and general users, who can explore the space through interactive and gamified features. The system architecture is being designed to enable scalable creation of digital twins for various gardens in the future.

So far in project implementation significant technical progress was achieved. This included the finalization of 3D asset and scene modelling (textures, shaders, animations, and effects), development of a plant model database with at least 10 growth stages for 20 plant species, and creation of automated scripts for integrating plant assets into Unreal Engine. User experience design was completed, including implementation of in-environment dialogue systems and settings interfaces. Weather simulation scripts were finalized, and an initial project build was compiled. Early user testing was conducted, and feedback was documented for further improvements. Additional ongoing work included GIS integration, audio development, debugging, and performance optimization. Technical refinements addressed shader complexity, collision handling, plant placement logic, and interaction feedback, alongside enhancements to demo scenes and environmental effects.

The project advanced further in developing and refining the 3D simulation environment. The team analysed plant spacing requirements and integrated this data into simulation logic, enabling automated detection of plant proximity and visual feedback for optimal placement. Improvements were made to data handling workflows through structured data tables and enhanced import capabilities from Excel and Google Sheets.

Visual and interactive elements were significantly enhanced through vegetation optimization (including billboard techniques), implementation of wind effects, and improvements in animal behaviour, animation, and sound. The user interface was refined, and new interaction features, such as distance-based validation for planting actions, were introduced and tested.

Further developments focused on realism and system performance. A predesigned garden environment was created, with both automated and user-controlled viewing modes. Terrain generation incorporated GIS-based polygon data, and interactive components were extended to web environments using Unreal Engine tools. Additionally, three simplified therapeutic garden environments were developed to provide accessible and calming virtual experiences.

Ongoing efforts in project planning, communication, and workflow automation have supported efficient development and testing processes. The project continues to evolve as a comprehensive digital solution for interactive green space design, management, and user engagement, co-funded by the European Union Interreg Fund for the Baltic Sea Region.

Methodology elaboration for two-level evaluation of interactive public garden systems.

During the project implementation periods, significant progress was made in developing and refining the research methodology for assessing visitors' experiences in the gardens. Building on earlier work, the questionnaire for surveying garden visitors was finalised after multiple rounds of discussion with project partners. A clear framework for collaboration was established: based on a template developed by ViA, garden managers will adapt and distribute the questionnaire locally, while collected data will be entered into a standardised dataset provided by ViA. To ensure consistency and efficiency, detailed implementation guidelines were prepared. The questionnaire includes several thematic blocks, covering visitor motivation, satisfaction with garden services, and perceived impacts of the visit. It combines newly developed questions with an adapted measurement scale - the Restoration Outcome Scale - selected after a review of existing methodologies. The survey has been translated into national languages by project partners.

In parallel, a complementary methodology for evaluating virtual garden experiences was developed to ensure comparability between physical and digital environments. Several established instruments, including the Cybersickness in Virtual Reality Questionnaire (CSQ-VR), Simulator Sickness Questionnaire (SSQ), and System Usability Scale (SUS), were reviewed and compared; the final selection will be agreed upon with project partners.

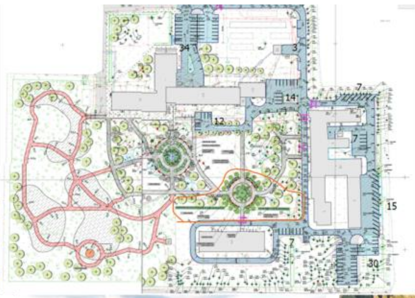
Testing focused on using wearable devices to capture physiological data during garden visits. The D2 Smart Watch was evaluated, with particular attention to its data export capabilities and access to raw data such as heart rate, stress indicators, and movement patterns. Since direct export from the native system was limited, alternative solutions, such as Google Health and Health Sync, were tested. A comparative assessment between the D2 Smart Watch and the Suunto Spartan Sport Watch was also conducted, focusing on data accuracy, responsiveness, and user comfort. The findings supported the suitability of the D2 device for research involving subtle physiological responses in natural environments.

Further work included developing user experience assessment tools and preparing for empirical data collection. Smartwatch testing validated reliable physiological data capture, and initial technical challenges related to data synchronisation and privacy were resolved. Field testing was subsequently conducted in Dobele, where physiological data and qualitative feedback were collected during real garden visits with garden staff. Following the pilot study, datasets were processed, synchronisation issues were addressed, and the survey instrument was further refined based on the insights gained.

Birzai district municipality (LT)

A garden with interactive elements is being created on the grounds of the Biržai Hospital

A therapeutic and educational space. A calm, healing environment for patients, their loved ones, medical staff, and visitors



The following will be installed: benches, trash cans, a display stand, wind chimes, paths with flower beds and herb beds. The following will be planted: trees – 31 shrubs – 21, flower beds – 175 sq. m.
A construction contract was signed on September 8, 2025, for Phase I of the renovation of the courtyard area at Biržai Hospital.

Building works in progress near Biržai hospital

Klaipeda Pedagogical Psychological Service (LT)

Since the project began, Klaipeda Pedagogical Psychological Service has focused on advancing the Japanese-style garden, particularly enhancing its pedagogical-therapeutic impact across various social groups.

The basics of the Japanese-style garden were created during the former Interreg Latvia-Lithuania Cross-border program, replacing the building's previously abandoned inner yard. The current project, in collaboration with other partners, allowed us to elaborate on how to apply the garden’s cultural aspects to meet the needs of our clients, social partners, and other stakeholders. Employed interactive measures will provide us with feedback opportunities, also through remote and virtual visualization.

Following the action plan described in the project proposal, there were activities taken by the project team of the Klaipeda Pedagogical Psychological Service:

- Renewal/rearrangement of the plants, as some of them were not succeeding during the very dry summer.
- Participating in the meetings arranged by the Latvian, Estonian, Danish, Finnish, and Lithuanian partners, sharing experience and innovative ideas.
- Preparing material for the virtual sample garden.
- Installing the roofing around the terrace, so the garden would be accessible even in bad weather.
- Preparing the questionnaire in Lithuanian and surveying the visitors about the garden’s impact on them.
- Preparing the information network (map).

- Presenting all information on the website https://klaipedosppt.lt/index.php/veiklos-sritys/projektas-interactive-gardens/project-interactive-gardens.

- Collaborating with the associated partner – association "Aidas" to meet the needs of persons with hearing impairment.

- Collaborating with the stakeholders – Klaipeda Municipality, schools, kindergartens, etc., to assist the pedagogical, psychological, and therapeutic needs in the Japanese-style garden


Cosy shelter from bad weather


The moment of relaxation

Directorate of Aukštaitija Protected Areas (LT)

Implemented works in the project #C036 Interactive gardens year 2023-2026. Implemented works in Širvena landscape reserve, Biržai regional park:

- Planting of lilac (siringa vulgaris) alleys and beach trees near Širvena lake
- Installation of bridge
- Fence around resting place
- Cleaning of the trees the territory for cognitive trail
- Meeting with Lithuanian partners in Klaipėda. To share experience between partners, discuss implemented works and visit project related site and good examples of interactive gardens in Klaipėda district.
- Project for information stands.
- Meeting community groups for the opening event.

Works which will be implemented by the end of the project: building of recreational path 600 m, installation of parking place 95m2, 2 benches, 2 information stands, 4 events for Third Age University and society, 1 path opening event.

All information about project can be reached in:

- INTERACTIVE GARDENS – „Integruota sistema interaktyviam viešųjų sodų vystymui Baltijos jūros regione" (Nr. #C036) - Aukštaitijos saugomų teritorijų direkcija
- INTERACTIVE GARDENS – „Integruota sistema interaktyviam viešųjų sodų vystymui Baltijos jūros regione" (Nr. #C036) – Biržų parkas

Some photos presenting implemented works in Širvėna landscape reserve.

Planting of lilac, beech trees

Bridge for future path in Širvėna landscape reserve

Cleaning territory for recreational path

Lithuanian project partner meeting in Klaipėda 25/26 of November 2025

All implemented solutions will bring improved society health, with the possibility to know more about nature and it’s protection in Biržai regional park in an interactive way.

Estonian University of Life Sciences (EE)

In 20024, during the first project year, Estonian University of Life Sciences participated in the experience exchange meetings held in Latvia, Lithuania, Finland and Denmark. In July 2024, Estonian University of Life Sciences held an experience exchange meeting in Tartu. During the meeting we visited the Estonian University`s Rõhu Research Centre and met the associated organisation partner Tartu Gardening and Beekeeping Society in the Timuti community garden (picture).

Project partners participating in the experience exchange meeting at the Timuti community garden on 10th July 2024. Foto: Ilze Lujāne.

In 2025, Estonian University of Life Sciences participated in the Interactive Gardens conference held in Latvia. Together with project partner Rakvere Municipality we presented an overview of inspiring and good practices of different gardens and green areas located in Estonia.

Rakvere municipality Rakvere Linnavalitsus (EE)

During the first project year, Rakvere municipality has participated in kick-off meetings in Latvia as well as in experience exchange meetings with the other partners in Latvia, Denmark and in Finland. We have also organized an experience sharing meeting in Rakvere and Tartu (together with Estonian University of Life Sciences). Partners had a chance to visit Universities Research Field, Municipality Garden and different recently built areas in Rakvere with environmentally sustainable solutions and natural vegetation.




Rakvere municipality has organized meetings with NGO partner Tartu Horticultural Society of Beekeeping and Gardening, Association of Pensioners of Lääne-Viru County and with members of Eco-School Programme to gather information needed for a new solution.

During the idea development phase, we held several meetings with researchers from the Estonian University of Life Sciences.

Our design team has worked out a new solution for the project area and public procurement procedures for upcoming construction works will be announced in the near future.

Natural Resources Institute Finland and Elonkierron Ystävät (FI)

In Finland, Natural Resources Institute Finland (Luke) has worked closely together with Elonkierto Park (Jokioinen) and Loue Park (Tervola). We did not have any building activities but focused instead on the various groups that have interest in visiting and using the park.

Particularly, the needs of working communities and immigrants were considered. In Elonkierto, we made a model for "Good Mood Trips". This model offers a selection of nature-related activities, and each group can choose the most interesting themes for themselves. They could, for instance, focus on mental and physical recovery, or have active exercises and cheerful joint doing. Trips always included encounters with animals as they were particularly favored by all groups. Also the joined moments for refreshing snacks were important. In the photo, the group learns about natural herbs and their culinary uses.

In Loue, immigrants were able to participate in a horticultural program with several assemblages. The growing season finished with the harvest festival, where the participants themselves created the joyful program.

In addition, we have arranged other nature-related activities. There have been public events where people spend time together. For instance, Christmas Path and Easter Path, and Halloween Evening have been very popular. We also arranged an activity week for Elderly people, including various programs for each weekday. In addition, there have been groups and open days volunteering with the park management and building.

For the schools, we arranged A Science Week, where school classes could visit the parks and experientially learn about various issues of food production and rural environments.

Besides these visits, we have created an educational game about agri-food diversity that will be used in a virtual room with 360° views. The materials have been recorded from Elonkierto Park (Fig.), and therefore, the game works also as 'virtual twin' for Elonkierto.

In 2025, Elonkierto received a Mental Health Award. This award was a recognition of Elonkierto's free events aimed specifically at children and families, which have offered joy, togetherness and nature experiences for years. The justification emphasizes Elonkierto's importance as a supporter of family well-being.

"Elonkierto offers an environment where nature, animals, culture and working together meet in a peaceful and approachable way. Free of charge is a central part of the activities: you can participate in the events without financial obstacles." https://www.facebook.com/elonkierto/posts/maaseutu-ja-kotiel%C3%A4inpuisto-elonkierto-on-saanut-merkitt%C3%A4v%C3%A4n-tunnustuksen-lounai/1278590090970616/

We organized an event on 3 Mars 2026 which we examined how public parks can be developed into interactive and participatory environments that support people's well-being, community, and learning. At the event, the key contents of the project were presented, and expert presentations as well as a panel discussion on the development of nature-based services and their future opportunities were held.

In this project, we have further studied the Nature Health -concept, and the range of potential nature activities with their key processes for promoting human health. Also, the design of health-promoting gardens has been highlighted, and the guidelines for health-promoting gardens have been developed.

On 12 March 2026, Finland's new Nature for Health programme was published. The programme aims to increase health and well-being by strengthening people's exposure to nature in everyday life and across different sectors of society. The programme is based on extensive research evidence on the health benefits of natural environments. The programme is coordinated by the Finnish Institute for Health and Welfare. The Interactive Gardens project is involved as a partner.

Aarhus University (DK)

During the first project year, we - Aarhus University (AU) – have participated in Kick-off Meeting in Latvia as well as in Experience Exchange Meetings with the other partners. We have also organized an Experience Sharing Meeting in Aarhus, Denmark with visits to our own Education and Research Garden and Facilities as well as excursions to four other types of gardens:

- Farmer's Education – Jordbrugets Uddannelsescenter.
- Regenerative - Myrrhis, a private experimental garden focused on permaculture-based production of fruits and vegetables.
- Historical – the garden of the associated organization of Interactive Gardens, The Green Museum.
- Botanical Garden in Aarhus.


Experience sharing meeting in Aarhus Area, June 2024

We have also participated in International Conference in Latvia September 2025

During the project, we have further developed our Education and Research Garden and maintained and prepared the research vegetable fields and the orchard for dissemination and education activities.

Left: One of the research fields established with a wide range of pea varieties. Right: The research orchard, first year's harvest - 2024.

Our garden is not open to the public. However, we have planned and carried out a wide range of garden and horticultural activities in the areas of training (students of various kinds) and dissemination (interactive platform, field walks, oral presentations, demonstrations etc) to local and regional citizens, NGO, business and municipality stakeholders. Examples include the use of the Garden in our undergraduate and graduate programs, and the dissemination of research findings to the horticultural industry and interest groups. We have also used the Garden and the crops grown there for educational activities at the Aarhus Food Festival 2025.

We are currently in the planning stages for a major Open House/Fruit Picking Event in September 2026 targeted local citizens.

Conclusion

The project has successfully transitioned from planning to implementation, delivering measurable progress in line with EU objectives for sustainable development, innovation, and territorial cooperation. Concrete outputs include the development of interactive public garden infrastructure, deployment of digital solutions (including VR-based tools), and establishment of joint research methodologies.

The partnership has ensured strong transnational cooperation and knowledge transfer, enabling the exchange of best practices and fostering capacity building among municipalities, research institutions, and stakeholders across the Baltic Sea Region.

Project activities contribute directly to EU priorities by:

- Promoting health and well-being through nature-based solutions
- Enhancing environmental sustainability and biodiversity
- Supporting digitalisation via virtual and interactive tools
- Strengthening social inclusion and community engagement

The integration of physical gardens with digital innovations and evidence-based evaluation methods demonstrates a high level of innovation, replicability, and scalability. Developed guidelines, tools, and methodologies provide a solid foundation for long-term use and transferability beyond the project partnership.

Overall, the project delivers clear European added value, contributing to policy development and supporting the wider uptake of interactive, health-promoting green spaces. With ongoing implementation and scaling of activities, the project is well-positioned to ensure sustainable impact and continuity beyond its lifetime.