



Descriptive part of garden concepts

Developed by a consortium of project partners

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1. Background. Bridging nature and society needs: public gardens as providers of resilience

The lifestyle of today's society with increasing urbanization, technological systems, and extensive consumption habits challenges people's well-being in many ways. People are spending time inside, and with electronic screens. Also, lifestyle diseases are increasing. Health maintenance problems cannot be solved solely through medicines and medical science. The key is to find a lifestyle that offers value and raises life quality to people of all ages and with different abilities.

Nature Health is an emerging concept in public debate. Gardens, green spaces, forests and bodies of water provide opportunities for physical activity, social interaction and relaxation, all of which contribute to health. Recognizing these connections, public health initiatives increasingly use nature and integrate nature-based solutions to social and health care.

The focus here will be on knowledge relevant to local communities and authorities. Three main garden themes will be included: **recreation**, **health** and **education**. These topics are also overlapping; a garden can encompass all of them or be focused on one or more functions.

The Figure 1 describes the main action flow in building Interactive Garden Systems.

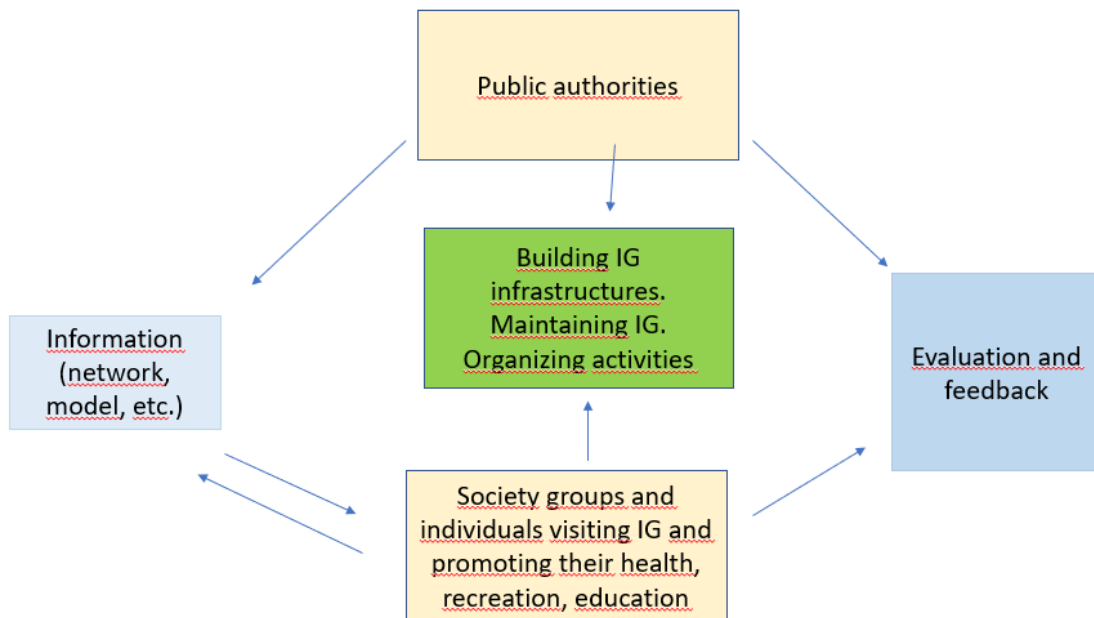


Figure 1. Interactive Garden System.

2. Overall health effects of nature for humans

How green spaces can promote the health? We already know, how nature provides several kinds of health benefits. Hartwig (2014) describes these effects by the following Figure 2.

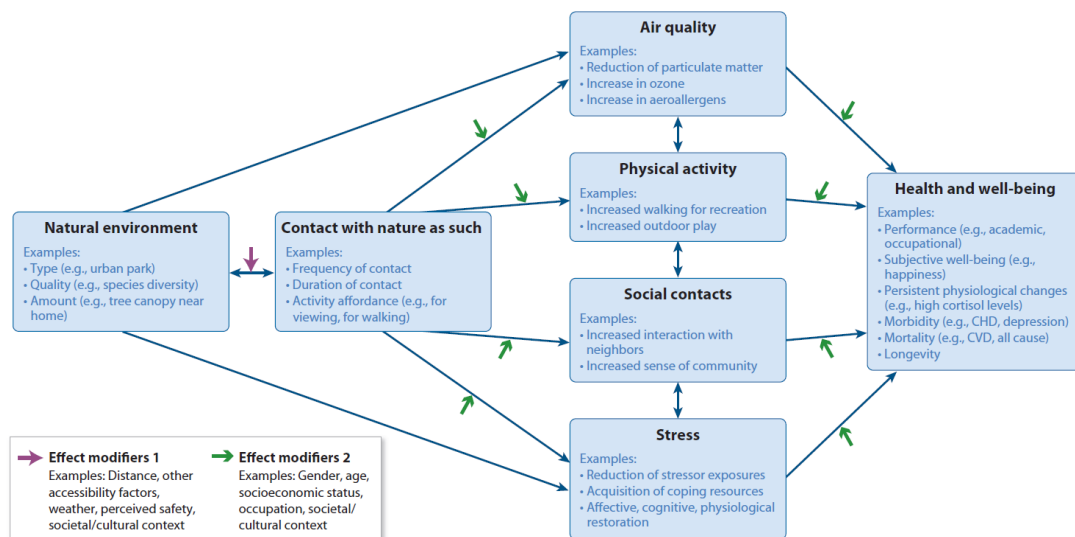


Figure 2. The influence of the natural environment to human health and well-being.

Public green spaces provide ample **opportunities for physical activities**. Movements in the natural environment promote balance, agility, endurance and muscle strength. Optimally, nature keeps you active all year-round and under various weather conditions.

In addition, regular exposure to nature **boosts the immune system** and reduces the risks for allergies and other autoimmune diseases. Exposure to sunlight, also, boosts serotonin, a hormone that stabilizes our mood, feelings of well-being, and happiness. Furthermore, green spaces provide an environment for physical activities, such as improved air quality, shelter from the sunshining and excessive heat.

Social contacts. Outdoor places enable a great number of social activities and cultural events. Socializing needs to be balanced: some people need time to relax from crowding and rejoin nature, others have lack of social contact and need better social engagement. For people experiencing social exclusion (e.g. migrants), public green spaces can serve as inclusive platforms for positive encounters with people from different cultural backgrounds. These interactions support health and alleviate loneliness.

Gardens and green areas are indispensable for **stress reducing** and maintaining health and in a hectic lifestyle. Much evidence exists about the *calming and relaxing effects* of nature. These effects can be revealed by detecting the heart rate, blood pressure, muscle tension and stress hormones. The positive effects of nature can also be seen by the increase in positive emotions and by the recovery of the body and mind.

Thereby, we are already recognizing several subprocesses that are involved with nature-based health effects. However, we are still missing the overall understanding, how human health is built and maintained in an interaction between individuals and their environment. Furthermore, the question is how this information should be utilized in professional working, e.g. social and health care.

How human nervous system regulates stress and recovering? Certain new insights to this challenge have been provided by Polyvagal theory, which was created and developed by Stephen Porges (2017). Theory explains how the autonomic nervous system regulates human behavior under stressful situations. In principle, the autonomic nervous system has a repertoire of 3 principal states. These states adaptively shift according to how safe we feel at the given moment. They support the continuum of behavioral reactions and underlying foundation for our feelings and emotions.

These three states include the activation of the sympathetic nervous system, as well as the activation of two branches in the parasympathetic nervous system: dorsal and ventral branches of vagus nerve (Figure 3).

- *The sympathetic nervous system* arouses our bodies, mobilizing us to move and act. This happens e.g. via adrenal glands that release epinephrine into the bloodstream.
- *The parasympathetic nervous system* is calming our bodies by slowing the heart rate, lowering blood pressure and regulating digestion. The *dorsal vagus* is

related with shutdown responses, leading also to feelings of disconnection. *The ventral vagus* supports social connection, engagement and co-regulations of emotions enabling us to feel safe and better regulated.

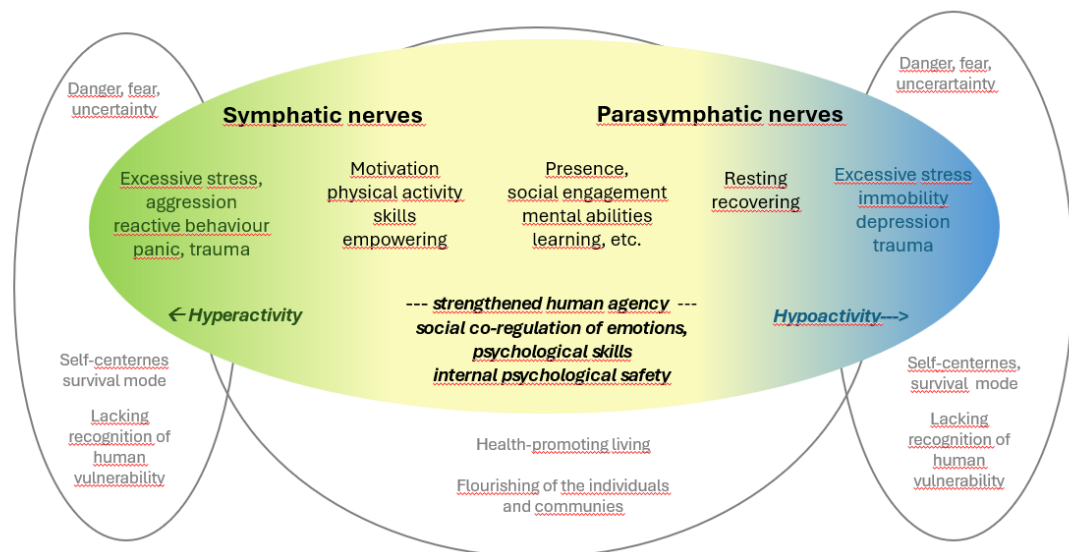


Figure 3. Automatic nerve system regulates human alertness and stress reactions.

When these states run in balance, they are working in harmony (Bridges & Porges, 2015). People can manage their challenges and are supported by the inner sense of psychological safety. Too high or prolonged stress disrupts the balance, weakens the immunity and results in several kinds of diseases (e.g. cardiovascular diseases). Human behavior gets reactive and aggressive (hyperactive), but also, depression (hypoactivity) is a possible reaction to the excessive stress.

How nature interact with human nervous system? We can observe how the subprocesses of nature health are essentially interlinked with these underlying mechanisms of human health and behavior. Nature provides us with a wide range of opportunities to support both the activation as well as the states of rest, connection and co-regulation of emotions and behavior. Too narrow approaches and methodologies may easily miss this dynamism. Best results will be achieved, when nature activities are tailored to specific needs and potentials of each participant.

Personal commitment is also needed to reach routines for health promoting lifestyles. Even a single nature visit offers enjoyment and recreation. These effects will be turned into health impacts, if an individual is able to find his or her personal way to connect with nature regularly and continue living a healthy and balanced life (Norwegian Ministry of Environment 2009).

How public garden design promotes the overall society needs? There are four overall guiding principles to be highlighted while targeting green area design for society needs, first expressed by Ulrich (1999).

- *Nature contact.* Human well-being is by physical surroundings that provide positive stimulation. Essentially, the perception of nature is multi-sensory.

Gardens may engage senses with landscape, diverse textures, colors, fragrances and sounds, helping individuals to relax and reconnect with nature.

- *Social support and interaction.* Individuals with high social support compared to those with low support, experience often less stress and have higher levels of wellness.
- *Sense of control.* Humans have a strong need for control and self-efficacy. Accessible design makes green areas accessible to all, including individuals with various disabilities.
- *Opportunity for the activities.* Various kinds of physical and mental activities for individual and groups are supporting human health.

In the next sections, these principles will be outlined from the perspective of our key topic in recreation, health and education.

3. Gardens for society needs – using and design

3.1. Recreational gardens

3.1.1. Garden concepts in relation to social needs

People have a wide range of wellbeing needs therefore, also various types of public gardens and other green spaces are needed. Neighborhood parks are important for people with limited opportunities to travel, such as children, youth, elderly people (Fig.4.), immigrants, people with physical disabilities, or those with low income. A wilder nature (with lower maintenance level) is needed by people who want to have more physical and mental challenges.



Figure 4. The exercise program for seniors in Humppila (public service) includes multiple activities both indoors and outdoors. Photo: Marina Alapere.

Our piloting with various groups of people showed how people enjoyed the interactivity with nature and experienced plenty of positive feelings. (more precisely: what impacts?). Often, the hardest thing is getting started with nature activities. The fellow participants can offer inspiration and support. Communities need to be flexible, testing various kinds of nature activities and going on with the most favored ones.

3.1.2. Designing elements and layouts

Recreational use of nature in gardens and green areas can be supported by following *design elements and infrastructure*:

A. Nature contact

- *Nature in such*, provides all-year-round attractive and inspiring objects to experience. In purposefully designed gardens, these experiences can be still enriched by variant landscape elements and multi-layered vegetation. Variable terrains and areas are raising specific excitement such as winding paths and labyrinths.
- There are *plants that stimulate different senses* with their colors, sounds, touch, aroma and taste. Visitors in wheelchairs need to have the path close to planting to experience aromas and touch the plants.
- *Large trees* are maintaining the history and life stories, being also home to many living creatures.
- *Water objects* with their sound and reflection are often perceived as pleasant for people, but safety issues must be especially considered near deep or fast waters.
- *Various tools and art objects* help the discovering the garden: raised beds, light, sound and visual effects. Attractive additional information can be provided: audio guides, informational stands, QR codes, real-time data on the environment. A guide can highlight interesting objects and help people to focus on the present moment. Stories about the importance and history of the neighborhood, nature, and gardens create a connection to the environment and foster a sense of belonging.

B. Facilitation of social support

- *Socializing activities* can be many: picnics, playing, sporting, and gaming. By allowing and empowering these, we are building inclusive communities.
- *Shared seating or activity areas* are encouraging people to gather, interact, and participate. Some people also need peace and solitude and may enjoy separate resting places.

C. Sense of control

- *Good accessibility is essential*. WHO recommends that all people reside within 300 meters of green space. Ensuring good accessibility is especially important for groups with special needs.

- The personal sense of control is promoted by allowing individuals to participate in the activities and be part of the community.
- *Clear information* includes garden maps, navigation signs or navigation tools with electronic devices. Providing advance communication about the visiting programme helps to meet participant expectations. Visting schedules needs to be followed, while maintaining the relaxed pace for enjoyment. Backup plans are made for bad weather or other disruptions.
- *Infrastructure*. Inviting entrances with a view to the garden offers a safe and convenient place for group gathering. There can also be the option to obtain water, snacks, toilets, equipment for battery charging (for telephone, bike, car), and information about services, route network, and types of spaces.
- *Shields against noise and human crowds* may be needed. Plantings of trees and bushes, hedges, hills, and earth walls can be used for these purposes. Sheltered places are needed also for various weather conditions – large trees, green architecture, combined also with artificial sheds to hide from the sun, rain, and wind.
- Special needs:
 - *Tailored information*, such as easy-to-read texts and audio guides, for various groups of visitors with disabilities and for immigrants
 - *Well-defined paths and marker stones* to help people with vision impairment navigate through the area. Poorly visible fencing is dangerous – small, low, barely visible fences or enclosures made of ropes must be avoided.
 - *Stable path surfaces suitable* for wheelchairs and rollers, such as stone dust, asphalt, and low-cut lawn (not the gravel and woodchips)
 - Equipment for easier mobility (rollators) for elderly people, children, people with disabilities.

D. Facilitation of physical activities

- *Guidance and visiting programs* are useful for introducing the potential of green spaces and supporting people to find their own nature hobbies. Activities such as park construction, maintenance and event organization can be included among these activities.
- *Sport and playing equipment* are interesting for several groups of people.

3.1.3. Risks and their solutions

- Plants can be damaged when visitors seek sensory experiences.
Solutions. Planned activities. Planned replacement of plants.
- Allergic reactions.
Solutions. Planned activities and flexibility. Actual information about flowering plants and air quality. Mobile medical aid station in the garden in seasons with intensive visitor flow. Information about medical aid options in less intensive seasons.

- Risky contacts with nature (mites, ticks, wasps, poisonous plants, water rats). In wilder areas, potential encounters of large predators. In addition, there exist natural fears of harmless fauna (spiders, grass snakes).
Solutions. Knowledge about safety and the skills for nature encounters.
- Unsafe surfaces (uneven or slippery) in extreme weather conditions.
Solutions. Property maintenance, advance information

3.1.4. Examples of gardens for recreation

Project partner's gardens and green areas

- *Aukstaitija Protected Areas:* Development of the landscape in previously degraded areas. Recreation Park, information, lilac plantations, events, protective fence against beavers.
- *Rakvere: Parkali Promenade* in the city center: designing new types of soil as a pilot, exchanging high maintenance plants with lower maintenance or native plants, increasing species diversity. Surveying weather, air pollutants, mobility. Information and education.
- *ZPR, Aizkraukle:* Garden near the river, landscape, natural colors for nature observing. Workshop for building a wicker fence. Place for active recreation with an outdoor drum set.
- *ZPR, Bauska:* The areas for active rest and recreation in the city separated by plantings.
- *ZPR, Jelgava:* Manor Park with tree stories, brail elements, sounds, touch, nature observing.
- Tukums: Mālkalns Garden
- *Elonkierto:* Elonkierto includes several recreational parts of the park such as forest paths, and edible forest garden. Additionally, seasonal herb and medical plant plantations, traditional perennial flower garden, riverside path and canoe path offer several kinds of options for recreation. The nudging activity in the Elonkierto cafeteria enables possibilities to feel, smell and taste.
- *Dobele:* Garden with esthetic, functional and health value for all age inhabitants. A rest area with benches will be created. Fireplace, willow arches and relaxing elements, which will be integrated into the thematic willow park. Involvement of the residents in the creation.

Other examples in BSR countries

- *Terapihaven Vestre Kirkegaard*, Copenhagen, Denmark, <https://www.kk.dk/brug-byen/byens-groenne-oaser/terapihaven>

- *Bangsbo Botaniske Have*, Frederikshavn, Denmark, <https://bangsbobotaniskehave.dk/sansehaven/>
- *National Urban parks* In Finland there are ten national urban parks with the aim to preserve urban nature and the built cultural environment as integrated entities. They are living rooms of city residents.

3.2. Gardens and green areas for health interventions - healing and therapy

3.2.1. Garden concepts in relation to social needs

In many regions, there are attractive gardens and other nature areas, while their use in health care is still minimal. There exist major potentials still to be discovered with nature-assisted methods for rehabilitation and social services (integration e.g.). These methods are especially suitable for strength-oriented working and mental health support that may be needed along the acts of medical care (Fig.5).



Figure 5. Nature offers “distraction” shifting focus away from stressful thoughts and negative emotions, allowing the mind to rest and be restored. Elonkierto.

Gardens for health promotion have ancient roots, dating back to Greeks focusing on the medicinal utilization of herbs and aromatic plants. The concept has evolved through history -in the cloister gardens of the Middle Ages, the medical plants were cultivated intentionally cultivated for healing and practical use. During the Victorian era recommending the use of fresh air and sunlight for recovery. Since the 18th century, the gardens used to be integrated into hospital settings. After a decline in the mid-20th century, the benefits of being close to nature resurged in the 1990s, leading to the incorporation of gardens in patient-centered hospitals due to their therapeutic benefits. Today, healing gardens and other nature-based activities are essential elements in many parts of social and health care.

The effectiveness of nature-assisted interventions is based on multiple interconnected processes.

- Being in nature reduces stress caused by illness, hospitalization, or treatment, and facilitates recovery. Besides the patients, it is equally important to give the opportunity for stress relief also for the companions of patients and the medical staff.
- Therapeutic activities in the natural environment can be used to promote motor skills, social inclusion, management of sensory processing disorders, cognition and problem-solving in people with special needs.
- Beneficial effects are related also with social participation and meaningful activities, which enable people to attach themselves to their immediate environment and the community. People feel seen and acknowledged, and their social bonds get strengthened. The effects are further reflected by the person's self-esteem and ability to manage their own everyday responsibilities.

Various terminology and approaches can be used to describe nature-assisted garden activities. The therapeutic activities could be led by the therapist with a medical education and with specific rehabilitation goals in the garden which serves as a favorable environment for these activities. By another approach, therapeutic effect is given by nature and the garden, mainly reducing the impact of stress. There are trained nature guides (e.g. from the Association of Nature & Forest therapy) who help to connect and facilitate the intrinsic healing processes with nature.

Important: the national regulations of using terms “garden therapy”, “therapeutic gardens” and “garden therapist” differ in each country, and current legislation must be followed.

The term “healing” is used in a broad sense to characterize a process that promotes overall well-being (Stigsdotter and Grahn 2002). In another approach, the terms “healing” and “healing gardens” are related to recovery after physical and mental trauma (Yang, 2010). In such cases, the healing garden needs to be purposefully chosen and designed, and the process must be guided by a therapist. There is a significant overlap among these garden properties, and the nature impact and favorable effects may refer both to well-being, therapy and healing.

3.2.2. Designing elements and layouts

Here are the suggestions for designing therapy gardens. Patients may have diverse needs for their therapeutic activities; calming and relaxing experiences to slow down, but also, meaningful physical activities to strengthen their abilities and engage with their life.

A. Nature contact

- *Inviting and empowering nature contacts.* Positive “distraction” shifts focus away from stressful thoughts and negative emotions, allowing the mind to rest and be restored.
- Many *plants attract attention*, for instance, by colors, aroma, distinct height and form, edible and tasty fruits and fragrance. All the senses are present also in natural areas and with local plants, but they might be less noticeable. Informative materials and guidance can promote the awareness and sensory experience with these plants. Also aging and

dying plants are interesting and valuable showing the life cycle as senescent flowers after blooming time with seeds, fallen leaves, fallen trees and stumps.

- *Symbols and metaphors.* Paths and bridges, a view to the horizon line, old, large trees, etc. are provided to be attached with metaphoric meanings.
- *Domestic animals,* as people may need engaging activities with animals, combining the potentials of animal therapies.
- *Tactile elements,* such as bare-foot paths with different textures (stones, sand etc.), especially for visible impaired visitors for sensory experiences and motor skill promotion

B. Facilitation of social support

- *Offering a space to connect, interact, and support one another* is vital for patients and the staff. Supporting psychological safety in the group or individual sessions with a guide or therapist.
- *Seating areas for meditation* and other emotional activities—whether alone, with a therapist, or in group sessions.
- *Width of paths* sufficient for at least two people to walk side by side, enabling the presence of a companion, especially for visually impaired visitors in unfamiliar environments
- *A designated area for preparing and enjoying tea or coffee,* with benches and tables designed to accommodate people of varied abilities.

C. Facilitation of sense of control and accessibility

- *Physically and psychologically safe environments* supported by a guide or therapist. Private spaces for therapeutic sessions. Fences or built walls to protect against external disturbances.
- *Navigation is also* available for individuals who are only visiting the area.
- *Clarity in garden design* (clear lines) support safe moving and have a calming effect on a stressful mind.
- *Virtual nature elements* cannot replace real experiences, but they are needed to provide nature experiences also for patients with poor mobility.

D. Facilitation of physical activities

- *Activities that* are easy to participate in and are adapted to the person's own abilities, providing experiences of personal success and empowerment.
- *Variety of path lengths, elevations and difficulty levels* to accommodate the physical condition of each client. Spacious design of environment enough for people with limited mobility. Other patients may enjoy the elements of adventure and opportunities for reasonable risk-taking.
- Some people need more *engaging and empowering activities* in which animals are involved. The health promoting activities in green areas can be combined with the canine therapy, equine therapy etc.

3.2.3. Risks and their solutions

- Lost nature relationship and inabilities to find the health potentials of nature .
Solution: starting with easy activities and finding also other tools than nature-based methods.
- Noisy management activities or too many groups can disturb each other.
Solutions: planned activities.
- Coping with the changing weather conditions.
Solutions: using appropriate clothing, flexible activities.
- Costs of park maintenance.
Solutions: cost-efficient solutions are needed, e.g. co-operation with local actors.
Voluntary activities.

3.2.4. Examples of gardens for health promotion

Project partner's gardens and green areas

- *Klaipėdas* Japanese style garden (Fig.6) provides educational and recreational activities, supported by specialists. Improved shading with sound and sense elements improve the garden potentials.



Figure 6. Klaipėdas Japanese garden, Lithuania.

- *Birzai*: Garden near the hospital, green area for stress release and mental health, also digitally.
- *LatHort*: Healing garden activities lead by an educated guide.
- *Loue*: Therapeutic garden for social working and integration programs.

Other examples in BSR countries

- *Terapihaven Moellebaek*, Kolding, Denmark, <https://selvvaerdogsammenhaeng.dk/terapihaven-mollebaek/>
- *Stensbæk Terapihave*, Gram, Denmark, <https://www.stensbaek.com/terapihaven/>
- *Hildegards Have*, Nyborg, Denmark, <https://abildgaardjensen.dk/hildegards-have/>
- *Health forest of Kouvola City Centre*, Finland, (located next to new Ratamo hospital), <https://www.kouvola.fi/asuminen-ja-ymparisto/luonto-ja-ymparisto/luontopolut/ratamon-terveysmetsa/>

3.3. Gardens for education

3.3.1. Garden concepts in relation to society needs

Exploration and learning are life-long activities, necessary for individuals and the society. Besides knowledge and practical skills, they maintain brain functions and give an ultimate sense of joy and satisfaction (Fig.7).



Figure 7. Learning by active doing. Children are here getting acquainted with a native Finnish cow. Photo: Elonkierto.

Educating adults. Home gardening and community gardening are common and popular hobbies- Many citizens wish to learn gardening to improve their everyday life. Some gardeners are still lacking environmental management activities and could learn about these. Gardening skills also strengthened society's resilience, when people become more self-sufficient by supplementing their diet with fresh ingredients and preserving garden produce that carries flavors of childhood. Their activities also contribute to creating beautiful and inspiring home surroundings. In total, this means the maintenance of local cultural heritage. Various public garden types are suitable for community education as described below.

Urban gardens make use of small or unconventional spaces and can take many forms, ranging from small community gardens to personal container gardens, rooftop farms, and vertical gardens. Communities are emerging around these urban gardens where people meet and grow vegetables, fruit and other plants together. They can also be considered as educational, as garden users learn together and from each other.

Eco Parks are designed to demonstrate interactions between humans and nature. They provide information and practical models on how people can learn to live in harmony with ecological principles. For instance, Elonkierto Park (in Finland) teaches about sustainable food production and management of rural natural resources.

For the schools, the gardens and green areas provide opportunities for obtaining practical skills and learning about life sciences. Outdoor education engages children with their own senses making learning more vivid and memorable. The alternative nature environments for learning need to be closely located in order to be used regularly.

In Finland, “forest-preschools” are common. Besides the academic skills they are also providing valuable support for the physical and psychological growth of the children.

In Denmark, ‘school gardens’ in the big cities have been a part of education for over a century. A school garden is an educational space where preschool and young school children engage in hands-on learning about gardening, nature, and sustainability.

Alternative learning environments are specifically needed by those pupils who lack school motivation and run an elevated risk of exclusion. They are not always motivated by traditional teacher-led ways of learning, but rather, benefit from learning by doing. Versatile learning environments can include learning camps and field trips which strengthen the sense of belonging.

An education garden can be built also with universities, community centers, botanical gardens, museums or environmental organizations complement their informative offerings.

3.3.2. Designing elements and layouts

An educational garden for a school can be quite simple and compact—just growing vegetables, herbs, or other plants to introduce the basic processes of growing.

When designing large areas for lifelong learning and community education, a well-designed spatial structure of the park plan and professional management are essential. Such gardens usually, also, require strategic co-operation with other local actors and wider community.

Elements for educational gardens

- A. Facilitation of nature contact and learning about human-nature relationship
 - *Becoming familiar with local nature and sustainable ways of living.* Plant collections can provide material for learning (food production, horticulture, forestry, etc.).
 - *Animals* always foster human’s intrinsic interest ranging from small insects in nature to larger farm animals either domesticated for the food system, living as pets or living in the wilderness.
 - *Doing environmental studies with real-world examples* of biodiversity, nature cycles and resource saving for instance observing bees, butterflies, and other pollinators as well as composting and recycling processes.
 - All kinds of *nature provide diverse sensory experiences*. Let’s engage the senses in the learning process – e.g., when learning plants, touch a surface of a leaf or stem; raise an attention on bird voices while learning about biodiversity etc.
 - Smart *technologies* can be integrated, such as QR codes linking to informational websites, 3D garden plans, and virtual garden models.

B. Facilitation of social support

- Supporting *social contacts and team building*, promoting social skills.
- Providing designated areas and tools for *educational games* suitable for various age groups.

c. Sense of control

- Locating areas close enough to community with safe and easy access
- Providing guiding material suitable for different types of visitors and tailored guiding tours for various groups from communities
- Providing safe spaces and equipment that can, also, be used independently for exploration and study.

D. Facilitation of physical activities

- Providing *play and learning activities* appropriate for the participants' age and educational level. Free space for creativity. Supporting, also, learning to manage risks and perform tasks independently, when allowing mistakes and encouraging to learn about them.
- Offering tools and storage sheds that support voluntary garden maintenance. Teaching the purpose and impact of gardening techniques, such as mulching, using of green manure; and introducing practical tasks that contribute to mitigate climate change.

3.3.3. Risks and their solutions

- Pollution affects the quality of edible plants if the garden is located near to traffic lines.
Solution: in these areas, using other than edible plants; edges or other boundaries; plant biochemical analysis for harmful residues – often the danger is overestimated.
- Work safety while using garden tools and equipment.
Solution: provide clear safety instructions and proper guidance, and supervised practice. Ensuring that all equipment is kept in safe working condition.
- Damage of vegetation.
Solution: Anticipating potential mistakes by trainees during garden planning; avoiding of too sensitive plants, increasing plant numbers and varieties to ensure resilience
- Plant protection.
Solution: Separating the treated areas from visitors and informing risks with warning signs.
- Differences in background, interests, and expectations of learners within a group.
Solution: Offering flexible tasks and differentiated guidance to accommodate diverse needs.
- Risk of providing unreliable, one-sided, or outdated information.
Solution: Maintain awareness of the potential informative pitfalls or hazards. Recognizing the subjects with contradictory aspects and viewpoints and continuous evolving knowledge basis and addressing them transparently

3.3.4. Examples of education gardens

Project partner's gardens and green areas

The Garden of the Agricultural University, Denmark, <https://plen.ku.dk/pfv/haven>. Focus was on plants and landscape elements. Green transition and biodiversity as well as well-being that is very relevant to the students (Fig. 9).



Figure 9. *Garden of the Agricultural University, Denmark.*

Aarhus University, Food Science, research station AU Auning (Fig. 10). This is a 37 hectares field research site and garden for organic and conventional plants. The garden is used for teaching and for training horticultural students. <https://food.au.dk/research-and-innovation/facilities>. The current focus was on peas and faba bean cultivars for production of plant-based proteins. Sustainable vegetable production also requires nutrient recycling, reducing nitrate leaching and greenhouse gas emissions.



Figure 10. *AU Auning*

The Green Museum, Denmark, <https://detgroennemuseum.dk/viden/den-levende-kulturarv/> is national open-air museum for agricultural, hunting and fishing with focus on plant's history, importance for lives and society development (Fig. 11.). The museum includes educational in-house activities (cooking and kitchens, plant breeding history).



Figure 11. *The Green Museum, Denmark*

Elonkierto Park. Exhibition Park for rural natural resources where you can learn how humans and nature work together. <https://www.elonkierto.fi/en/>

ZPR, Jekabpils: School Garden with flowers, bushes, herbs for experiments and education.

Rakvere: Native plants for health, biodiversity, pollinators, resource saving.

Dobele: Native plants for health and water quality, wastewater treatment.

Tukums: Water Garden and Garden School. Permanent and thematic expositions – colors, patterns, herbs. Joint garden management, events.

LatHort: Horticultural plants at different times, growing systems for biodiversity and climate resilience. Food baskets from local plants.

Other examples in BSR countries

- *Copenhagen Botanical Garden*, Denmark, <https://www.nucleus.dk/files/docs/regnskoven/3BrugBotaniskHaveiundervisningenmf.pdf>
- *Oestergro Roof Farm*, Copenhagen, <https://www.oestergro.dk/>
- *Moellevangens Byhave*, Aarhus, <https://mollevangensbyhave.dk/>
- *Kamu nature-oriented day-care*, Helsinki, Finland. <https://www.kamueducation.fi/nature-daycare>

4. Interactivity with users and visitors: getting feedback

Evaluation is needed to enable the constant improvement of garden concepts. Input from the various user groups is invaluable.

There are plenty of ways and tools to collect feedback information. In our project, these were developed by ViA and other partners.

Contact address will be provided to give direct feedback. Also, the garden workers are constantly meeting visitors and receiving their feedback.

User statistics can be traced for by radar and infrared sensors that count people in real-time. Also, the share of various groups can be traced for. Are there sufficient options for children and youth, elderly people and for people with various vulnerabilities?

User-provided feedback. In social media, it is easy to carry out various studies and collect user-provided feedback. In the park, surveys can be done with dichotomous statements (yes/no answers) that are simple to fill out. It can be organized by printed formulars, or by active methods - e.g. by voting with pinecones or other nature elements. Surveys need to be fast, not burdening the customers, and maybe even supporting the recognition of wellbeing effects. In our project, the following statements were used.

- The statements:
 - I got useful information and ideas for my own life and hobbies.
 - I got general information on nature, environment and food producing.
 - My mind is refreshed. This was a nice break to my everyday life.
 - It was great to experience nature and animals.
 - I could calm down and gain peace of mind.
 - I got nice daily exercise. My body thanks me!
 - It was nice to contact other people.
 - Good food (picnic, cafeteria) was an important part of the trip.
 - The weather of the day was good and suitable for my activities.
 - There were enough services in the park (e.g. toilet, cafe, parking space, guidance).
 - Actually, there was nothing special for me

QR codes help with answering mobile-based inquiries. They can support involvement and interest raising for instance with changing questions and places that are surveyed. If wished for, the respondents can also be rewarded by some benefits (snack, coffee etc.).

Group interviews and observation can be made using e.g. standardized protocols. The survey can also include mapping tasks (Public Participatory GIS) or GPS location applications that can be utilized to find the spaces accessed, preferred or disliked by the users. The virtual garden model can be introduced to explain the dynamics of garden development over the time and seasons and then discussed with the groups. In our project, we also invited garden specialists and asked about their opinions to support the overall evaluation.

With therapeutic activities, the feedback and response can be provided by patients, but also from therapists and other specialists, who are able to assess the feasibility of the entire healing process. This information will be used for improving the activities and the spaces.

There are also plenty of physical measurements. Physical activation can be traced for by smart watches. Information will be obtained from psychological surveys with psychometrically robust scales, such as Perceived Restorativeness Scale (Korpela et al., 2008). This is relevant especially for post-only measurements of interventions (Rai et al., 2023).

In our project, we piloted two types of surveys: the general one with dichotomous statements and getting qualitative answers with open questions. More specific results will be achieved, when the inquiries are planned according to the specific conditions and targets of each visiting group.

The survey with open questions:

1. Why did you apply for wellbeing practice in the garden and what did you expect from it?
2. How would you describe how you felt before the wellbeing practice in the garden?

3. What is the most vivid thing you remember and what do you want to take with you in your everyday life?
4. Did you notice any changes in yourself after the wellbeing practice in the garden?
5. What were the most important benefits for you personally and for your well-being?
6. What do you think are the common benefits of the group?

After the garden therapy session, the participants may need some peaceful time to settle down with their feelings. Some people may need “digital detox”, and prefer therefore, printed surveys. Feedback can also be asked, later on, although the time lags may decrease the number of responses.

Schools and nurseries are regularly following their results by testing and thereby, also the impacts of alternative learning environments will be soon observed. Improved social and psychological skills will be shown by the decreasing amount of problematic behavior and conflicting situations. Other tools for collecting feedback may include discussions with the teachers, observation of the group engagement and use of interactive software (e.g. Mentimeter, Quick quiz).

Self-evaluation is also a valuable tool for improving the park activities. By joint discussion it is possible to recognize the prevailing strengths of the garden as well as the challenges and consider the possible solutions for these shortcomings.

The evaluation data will be needed, while decision-makers are making their choices using public funding. They need to acknowledge the provided benefits and be able to compare them with the costs for maintenance. Quite often, the wellbeing impacts of nature, garden and parks remain still poorly noticed and addressed. Therefore, it is also important for decision-makers to personally participate and experience the inspiring atmosphere of the garden events. Local actors must also actively communicate about the value and importance of green spaces with several public forums and media.

5. Developing and marketing the wellbeing services— in progress

-Elonkierto: networking with local actors.

Feedback of public authorities. Workshop. Innovation potentials.

6. Conclusions: gardens, parks and other nature areas matter!

Public gardens are treasures in our cities and towns, yet their full potential remains untapped. They are beautiful, but frequently in passive use. At the same time people are facing health challenges due to the missing physical activities and range of mental disorders. So far, the current solutions have been ineffective in solving all these health problems. We may still lack the overall understanding, how human health is built and

maintained through a continuous interaction between the individuals and their physical and social environments.

Maintaining an active relationship with nature is one of solutions that provides multiple positive health impacts for people. It also supports children in developing their physical and mental strength.

Our main attention was in **recreation, health interventions, and education**. We are noticing how the prevailing activities of gardens, parks and other green areas are already contributing to societal resilience. However, these activities could be further expanded and diversified, allowing societal outcomes to be multiplied.

Recreation. 'Nature health' should be further promoted by replacing the current indoor activities with outdoor experiences and engaging with nature. Motivation is achieved best by respecting the personal needs of interests. Also, the support of other people that already have nature skills, is valuable. Nature visits can begin with small and close to home experiences and gradually get more challenging as the personal skills and confidence is growing.

Social and Health Care. Nature-based activities are important, especially, when strength-oriented approaches for patients are needed. The wide range of nature's potentials allows the rehabilitation to be personalized and supported by plenty of health-promoting nature impacts.

Schools and education. Lifelong community education benefits greatly from the potential of outdoor education, where learning takes place in an interaction of the whole body, mind and surrounding environment. Regenerative nature education is the key capability for building resilience in the socio-ecological system.

7. References

Bridges, H., & Porges, S. W. 2015. Reframe your thinking around autism: How the polyvagal theory and brain plasticity help us make sense of autism. Jessica Kingsley

Hanson, H. I., E. Eckberg, M. Widenberg and J. Alkan Olsson. 2021. "Gardens' contribution to people and urban green space." Urban Forestry & Urban Greening 63: 127198.

Hartig T., Mitchell R., de Vries S., Frumkin H. 2014. Nature and health. Annual Review of Public Health 35, 207–28. <https://doi.org/10.1146/an>

Korpela, K., Ylén, M., Tyrväinen, L., Silvennoinen, H. 2008. Korpela et al., 2008). Determinants of restorative experiences in everyday favorite places. Health & Place **14** (4) 636-652.

Lawrence RJ, Forbat J, Zufferey J. Rethinking conceptual frameworks and models of health and natural environments. *Health: An Interdisciplinary Journal for the Social Study of Health, Illness and Medicine*. 2019;23(2):158-179. doi:[10.1177/1363459318785717](https://doi.org/10.1177/1363459318785717)

Norwegian Ministry of Environment. 2009. The nature experience and mental health. Outdoor Life and Mental Health -project. Norwegian Ministry of the Environment, Nordic Council of ministers. <https://www.regjeringen.no/globalassets/upload/md/vedlegg/rapporter/t-1474e.pdf>.

Porges, S. 2017. The pocket guide to the Polyvagal Theory. The transformative power of feeling safe. NY: W.W: Norton & Company, Inc.

Rai, S., Kangas, K., Turtiainen, K., Stamm, I., & Tolvanen, A. 2023. Nature-based integration of migrants : A cross-national systematic literature review. *Urban Forestry and Urban Greening*, 88, Article 128089. <https://doi.org/10.1016/j.ufug.2023.128089>

Stigsdotter, U. and P. Grahn. 2002. What Makes a Garden a Healing Garden?" *Journal of Therapeutic Horticulture* 13: 60-69.

Ulrich, R. S. 1984. View through a window may influence recovery from surgery. *Science* 224(4647): 420-421.

Winterbottom, D. & A. Wagenfeld. 2015. Therapeutic Gardens: Design for Healing Spaces.

Yung Chin Yang. 2010. A healing garden for adults with posttraumatic stress disorder in Shiaolin Village, Taiwan. Thesis. Washington State University. ex.libraries.wsu.edu/esploro/outputs/graduate/A-healing-garden-for-adults-with/99900525030101842.

Appendix. Available planning materials

Plants with sensory qualities. Links to suggestions:

- <https://www.growjoy.com/therapeutic-garden>
- <https://discoverandshare.org/2021/03/16/top-10-plants-for-a-sensory-experience/>
- <https://schoolgardening.rhs.org.uk/resources/info-sheet/plants-for-a-sensory-garden>
- https://www.gvsu.edu/cms4/asset/41BD4140-E833-EC59-3F25827028CDBF83/ian_warnock_sensory_garden_ideas_and_plant_lists_2017.pdf
- <https://naturejobs.squarespace.com/sensory-plants-list>
- <https://www.kew.org/read-and-watch/how-to-create-a-sensory-garden>
- <https://terrafirmalandscapes.co.uk/latest-news/a-guide-to-sensory-garden-design>
- https://fireflyfarmandmercantile.com/collections/sensory-garden-collection?srltid=AfmBOoq5ilB5apMqdYEBKoruUph4rTyYA187xT1DpL-ZUQce-_Cv2LAr&page=3
- <https://www.gardeners.com/how-to/create-a-sensory-garden/9673.html?srltid=AfmBOOpXcLcgVzHcZjFGgrdFM7XRbZE7FybS6pKRU6mT3RRldo7DV4in>