Health Tourism Guide using Garden and Bee Therapy

2025

Health Tourism Guide
using Garden and Bee Therapy

Garden and Bee Therapy
by
Alej na Prameni

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This publication covers both practical and theoretical aspects of garden therapy, apitherapy, psychological support, and ecological healing, developed during the internship held in Nitra, Slovak Republic, in August 2025. The content is based on interdisciplinary sessions, workshops, excursions, aroma practices, yoga, and the lived experience of Ukrainian women beekeepers.

The guide is intended for professionals in health care, eco-tourism, social work, and for community initiatives working with women and children affected by trauma.

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CONTENT

INTRODUCTION

Creating a space that feels pleasant, offers to relax and helps you recharge energy for everyday life may seem relatively simple at first glance. One might imagine that playing with colours, fragrances, and textures, adding a water feature, a sensory pathway, or even insect habitats is sufficient to achieve this goal. While these features make a space enjoyable and inviting, they alone do not make it a therapeutic garden or apiary. A space becomes truly therapeutic only when its components are used intentionally, regularly, and systematically for therapeutic purposes, tailored to a specific target group and implemented under the guidance or supervision of a qualified professional – one with expertise relevant to specific need, disability, or medical condition.

A therapeutic garden and apiary designed for seniors living with Alzheimer's disease will differ significantly from one created for individuals recovering from physical trauma, injury, or paralysis. Likewise, the structure, elements, and activities of a garden intended for children with ADHD, behavioural disorders, or social anxiety will reflect very different therapeutic objectives. The rising prevalence of mental health conditions among children – including ADHD, anxiety disorders, depression, bipolar disorder, and others – highlights the need for increased attention from adults. It is essential to identify effective and compassionate support strategies to ensure children are equipped with a solid foundation for a successful transition into adulthood.

Garden-based and apitherapy offers a variety of benefits for children, including enhanced sleep quality and attention span, greater self-confidence, and the advancement of both fine and gross motor skills. This approach also promotes self-discipline, effective communication, and social development, alongside fostering independence, responsibility, and collaboration. Nature therapy can reduce anxiety, alleviate everyday stress, and mitigate feelings of inadequacy or fear of failure, thereby supporting overall emotional well-being.

CHAPTER 1

THE PHILOSOPHY OF HORTICULTURE AND APITHERAPY AT ALEJ NA PRAMENI

Jana Vernarcova

1.1. Definition of Basic Concepts – Therapy, Horticultural Therapy and the Specifics of Gardens Providing Horticultural Therapy

In its broadest sense, horticultural therapy can be implemented across a variety of environments, both indoors and outdoors - in gardens, parks or designated sections within these spaces. The range of activities includes not only active engagement, such as planting and caring for plants, seed sorting, flower pinching or moving through terrain of varying difficulty, but also passive forms of involvement, such as resting, nature observation or staying in the shade of a pergola.

In a more narrowly defined, professionally context, horticultural therapy represents a systematic set of deliberately designed therapeutic interventions carried out with a clearly defined therapeutic objective and tailored to the specific needs of a target group. Ideally, these interventions are conducted under the guidance of, or in cooperation with, a certified horticultural therapist and are intended to support, alleviate or treat physical, psychological, cognitive or social limitations of varying degrees of severity (Simson & Straus, 1998; Haller & Kramer, 2006).

According to leading representatives of the field, horticultural therapy is grounded in biopsychosocial, socio-ecological, and positive-psychological models of health and treatment. Various therapeutic approaches are applied in practice, particularly psychodynamic therapy, client-centered therapy, and relationship-oriented therapeutic models. Specific therapeutic strategies and interventions are shaped by the individual life stories, abilities, and needs of clients, thereby strengthening their active participation in the therapeutic process (Haller & Kramer, 2006).

Figure 1.1. Alej na Prameni – Garden shed used for activities in adverse weather conditions. Photo: archive Alej na Prameni, 2025

Current approaches in supporting child development and mental health care place strong emphasis on sensory stimulation and maintaining close contact with the natural environment as key factors for healthy physical, psychological, and social development of children. At the same time, systematic efforts are being made to identify and implement effective strategies aimed at helping children acquire essential adaptive skills, emotional regulation, and social competence, thereby contributing to their successful transition into adulthood.

Despite these efforts, an increasing prevalence of mental health disorders can currently be observed among children and adolescents, particularly attention-deficit/hyperactivity disorder (ADHD), anxiety and depressive disorders, and bipolar disorder. These challenges are especially evident in regions affected by armed conflict, social instability, and long-term stress, such as Ukraine, where the negative consequences of the COVID-19 pandemic and war-related violence are cumulatively deepening.

In this context, the World Health Organization (WHO) and UNICEF emphasize the importance of a safe, stable, and supportive environment that fosters children's strengths, psychological resilience, and overall quality of life. Special emphasis is placed on close

cooperation with the family environment, strengthening parental competencies, and creating conditions for healthy psychosocial development of children in a natural and accepting environment (WHO, 2022; UNICEF, 2021).

1.2. A Brief History of Therapeutic Gardens

Although the concept of nature and gardens exerting a healing influence has its roots in ancient civilizations, the first documented reference to the creation of therapeutic gardens dates back to 1817, when Benjamin Rush, considered the father of American psychiatry, established a psychiatric institution that, among other treatment programs, incorporated the use of a garden as part of therapeutic intervention. Rush highlighted the positive impact of physical work in a natural environment on patients' psychological well-being and social functioning (Rush, 1812; Simson & Straus, 1998).

Figure 1.2. Alej na Prameni – Sensory contact with plants is an integral component of a therapeutic activity. Photo: Klára Vernarcová, 2025

These principles were further developed in the mid-19th century by Dorothea Dix, an American teacher and social reformer, who advocated for more humane conditions in psychiatric institutions and supported the inclusion of horticultural activities in the treatment of patients with psychiatric disorders. Her efforts significantly contributed to the wider adoption of natural environments as a therapeutic tool in healthcare facilities across the United States.

Substantial development in horticultural therapy occurred after World War II, when it began to be systematically employed in rehabilitation programs for war veterans in the United States and Europe. Gardening activities proved effective not only for physical rehabilitation but also for addressing psychological consequences of war-related trauma, including post-traumatic stress disorder (PTSD) (Davis, 1998; Haller & Kramer, 2006).

An important milestone in the professionalization of the field was the establishment of the American Horticultural Therapy Association (AHTA) in 1973. This organization plays a central role in defining ethical principles, standards of practice and educational requirements in horticultural therapy and has significantly contributed to its international development. Today, horticultural therapy is recognized as an interdisciplinary therapeutic approach integrating knowledge from medicine, psychology, occupational therapy, social work and environmental sciences (AHTA, 2022).

Therapeutic gardens are currently being established in various types of healthcare, social and community facilities. They are found at psychiatric clinics, rehabilitation and military hospitals (particularly in regions affected by armed conflict), rehabilitation centers, palliative care facilities, hospices, community centers, facilities for individuals with addictions, senior homes, as well as in botanical gardens and public parks.

Research confirms that therapeutic gardens bring benefits to a wide range of users, including: children, adolescents, adults, and seniors, individuals with intellectual, sensory or physical disabilities, individuals with acute or chronic illnesses, as well as those suffering from "invisible" diseases (e.g. fibromyalgia, chronic Lyme disease, social phobias, autism spectrum disorder, various forms of addictions), people

experiencing trauma or violence, persons in the final stages of life, and many others (Farrell, H. 2020; Ulrich et al., 1991).

The nature of therapeutic gardens varies across countries depending on cultural context, healthcare systems and target groups. They are most often oriented toward children, seniors and patients undergoing rehabilitation after injuries or serious illnesses. The concept of therapeutic gardens is well- established in countries such as Canada, Australia, New Zealand, Japan, Germany and Austria, where it is firmly integrated into healthcare and social care systems.

A significant example of good practice is the Horatio's Garden network in the United Kingdom, which comprises eight therapeutic gardens located near specialized spinal injury treatment centers. These gardens are designed with a strong emphasis on accessibility, safe movement for wheelchair users or patients on mobile beds and the support of social interaction. Each garden is staffed by its own interdisciplinary team, including a horticultural therapy specialist. The positive outcomes of time spent in these gardens are confirmed not only by patients themselves but also by their family members (Horatio's Garden, 2023).

Australia is among the countries with a high level of implementation of therapeutic gardens. According to the Australian Therapeutic Landscapes Network, their benefits include particularly the support of social integration of people with disabilities or traumatic experiences, improvement of overall quality of life, reduction of stress and anxiety, faster wound healing, decreased pain intensity and medication use, as well as increased concentration and work performance (Australian Therapeutic Landscapes Network, 2021).

In Slovakia, horticultural therapy is a relatively young field. The first initiatives emerged in the 1990s, primarily in social service facilities and healthcare institutions for seniors and people with intellectual or physical disabilities. In the last decade, its application has expanded to community-based projects focused on the social reintegration of disadvantaged population groups, including homeless individuals and war veterans. Contemporary Slovak practice in horticultural therapy is based on international methodological approaches and standards that combine therapeutic, rehabilitative and educational aspects of horticultural activities.

1.3. Professional and Therapeutic Competencies

A fundamental principle of horticultural therapy is the support of healing, developmental and adaptive processes through systematically planned horticultural and nature-based activities, which may be effectively combined with other therapeutic, healthcare, or educational approaches.

A key aspect of this process is relationship - between the therapist and the participant, the participant and the environment, as well as among the participants themselves. The quality of this relationship is recognized as one of the essential healing factors of therapy. The outcomes of gardening activities, such as germination success, plant growth or the aesthetic quality of plantings, are not the primary objectives of the intervention but serve as tools within the therapeutic process and as indicators of participants' engagement, motivation and relational dynamics (Simson & Straus, 1998; Haller & Kramer, 2006).

Figure 1.3. Alej na Prameni – Children playing on tactile stones to support sensory perception development
Photo: Klára Vernarcová, 2025

The purpose – whether therapeutic, social or educational - of horticultural therapy shapes each program, which is always tailored to suit participants' individual needs, capacities and situations. Activities and goals can range from straightforward, short-term sessions to in-depth, extended programs, like those aimed at prevention or ongoing support in geriatric and rehabilitation settings. The design, frequency and aims of these therapies depend on the group's health status, age, functional skills and psychosocial background (Sempik, Aldridge & Becker, 2003).

To practise horticultural therapy effectively and safely, professionals need to draw on expertise from several fields. Practitioners should have suitable horticultural qualifications – such as knowledge of botany, plant care and experience working in nature – and therapeutic skills tailored to participants' specific needs. Being well prepared also means deeply understanding the principles behind horticultural therapy, the functions and applications of therapeutic gardens and being aware of their methodological and practical limits (American Horticultural Therapy Association [AHTA], 2022).

Figure 1.4. Alej na Prameni – Colourful floral planting serving as both an aesthetic feature and a relaxation zone of the garden.
Photo: Klára Vernarcová, 2025

Ideally, horticultural therapy is conducted by professionals with formal academic education and specialized training in this discipline. Nevertheless, practitioners in the field often possess diverse professional backgrounds. Individuals such as gardeners, psychologists, psychotherapists, special educators, physiotherapists or occupational therapists may engage in horticultural therapy, provided they have completed relevant additional training, certification or retraining in the area. The selection of an appropriate practitioner should be guided by the specific requirements and characteristics of the target population, as well as the nature of the therapeutic setting (Haller & Kramer, 2006; AHTA, 2022).

No matter their background, specialists need to be familiar with clinical, safety and social considerations when working with the target group. They should understand how diseases progress, recognise symptoms, assess risks and have strong communication and people skills. Effective, ethical, and standards-driven horticultural therapy is built on professional expertise, hands-on abilities and thoughtfully designed treatment programmes working together (Simson & Straus, 1998; Sempik et al., 2010).

1.4. Target Groups and Benefits of Horticultural Therapy

Horticultural therapy is a structured rehabilitative, therapeutic and psychosocial intervention that employs interaction with the natural environment and intentional gardening activities to promote both physical and mental health. Due to its adaptable and interdisciplinary approach, horticultural therapy is suitable for a broad spectrum of populations with varying medical, social and developmental needs. Its effectiveness is consistently supported by empirical research and extensive therapeutic practice across European and international settings (Heród A. et al., 2022; Kaczmarczyk A.L., Pizzuti Piccoli A., 2025, etc.).

Importantly, horticultural therapy is regarded as a complementary and supportive component within comprehensive care frameworks, rather than a replacement for professional medical treatment.

Figure 1.5. Alej na Prameni – A tree with a bench creates a space for rest, calm reflection and sensory stimulation
Photo: Klára Vernarcová, 2025

Individuals in Rehabilitation

Patients with brain and spinal cord injuries: For those recovering from brain or spinal cord injuries, horticultural therapy serves as a valuable supplement to rehabilitation. Working in the garden helps improve gross and fine motor skills, enhances coordination and physical strength and offers opportunities to engage cognitive functions like attention, memory and planning. Performing purposeful, repetitive tasks in a natural setting can gradually help restore important functional abilities.

Individuals after stroke: Horticultural therapy may assist stroke survivors in regaining both physical and cognitive capabilities. The combination of appropriate physical activities and mental engagement aids balance, motor control and concentration. This approach also helps strengthen self-confidence and motivates individuals to continue their rehabilitation.

People recovering from surgery or serious illness: Horticultural therapy offers a gentle way to stay physically and mentally active during recovery. It not only provides physical benefits but also helps

ease fatigue and stress, supports emotional health and can help enhance overall quality of life while healing.

Individuals with Mental Health Disorders

Those experiencing depression, anxiety, or stress: Spending time in nature and engaging in meaningful activities can promote calmness and stability. Regular involvement often helps lift mood, foster a sense of purpose and support psychological well-being, serving as a beneficial supplement to professional mental health care.

People affected by post-traumatic stress disorder (PTSD) or trauma: Gardens may provide safe, consistent environments that help individuals feel more regulated. Exposure to sensory elements, repetitive tasks and caring for plants can aid emotional balance, alleviate tension and build a greater sense of personal agency.

People with autism spectrum disorder (ASD): Horticultural therapy provides an organized environment with defined guidelines and controlled sensory input. Participating in regular gardening tasks can help develop skills such as social engagement, communication, teamwork, concentration and sensory integration.

Individuals with Disabilities

People with intellectual disabilities: Horticultural therapy helps build fine motor skills, basic thinking abilities and social interactions. It also offers opportunities for achievement, responsibility, and purposeful activities, which boost self-esteem and foster a positive self-image. Working together in groups encourages teamwork and creates a sense of community.

People with physical disabilities: By incorporating raised beds, accessible walkways, and ergonomic tools, gardening activities can be made fully inclusive and safe. These settings support independence and autonomy, enhance both physical and mental well-being and make a meaningful contribution to social integration.

Seniors and Individuals with Neurodegenerative Diseases

People living with dementia or Alzheimer's: Horticultural therapy can help improve spatial awareness, focus and certain cognitive abilities.

Engaging in simple, meaningful activities outdoors often eases agitation, anxiety and tension, increases feelings of safety and can enhance overall quality of life.

Figure 1.6. Alej na Prameni – Engagement with flowers develops children's aesthetic sense, as well as fine motor skills, perseverance and creativity. Photo: archive Alej na Prameni, 2025

General Population and Socially Disadvantaged Groups

Spending time in gardens and nature can benefit everyone, not just those in therapy. Many people find these activities relaxing and creative, which helps lower stress, boosts emotional well-being and promotes a healthier lifestyle. Regular gardening also encourages physical movement, improving fitness and helping to prevent lifestyle-related illnesses. Additionally, seeing the results of your work outdoors brings a rewarding sense of accomplishment and satisfaction.

Individuals with Limited Mobility: For those experiencing restricted mobility, both garden settings and tools can be modified to enhance accessibility and safety. Raised beds, vertical gardening systems, barrier-free pathways, and ergonomic equipment are frequently implemented. Such therapeutic approaches encourage active engagement, greater independence and improved self-sufficiency, while also mitigating social isolation and promoting psychological well-being through exposure to nature and interaction within communities.

Individuals Experiencing Homelessness: Horticultural therapy offers notable psychosocial advantages for persons lacking stable housing. Participation in horticultural activities provides purposeful engagement, fostering a sense of usefulness, accountability and daily structure. Ongoing involvement facilitates the cultivation of social connections, development of work-related competencies, and enhancement of self-worth, potentially supporting social reintegration and progress toward greater stability.

Individuals in Correctional Facilities: Horticultural therapy is increasingly incorporated into rehabilitation and resocialization initiatives within correctional institutions. Engagement in gardening tasks promotes the acquisition of vocational and life skills, encourages responsibility, patience and collaboration, and supports stress reduction and decreased aggression. Evidence indicates that participation in prison-based horticultural programs may contribute to lower recidivism rates following release.

Veterans: Horticultural therapy offers war veterans and former armed forces members an effective way to support their mental health and help them rejoin civilian life. By working with plants, veterans can better cope with PTSD, anxiety and depression, while also rebuilding a sense of purpose and belonging. Community gardening further enhances social connections and gives veterans safe, supportive spaces.

1.5. Basic Requirements for Creating a Therapeutic Garden

Establishing a therapeutic garden is an intricate undertaking that must be tailored to meet the distinct needs of the intended population, considering factors such as age, type of disability or injury and the specific objectives of therapy - whether they are rehabilitative, supportive or preventive. The garden's design should adhere to the principles of interdisciplinary planning, integrating aspects of horticulture, therapeutic practices, safety considerations and environmental design.

Figure 1.7. Alej na Prameni – Violet carpenter bee (*Xylocopa violacea*) on blooming phacelia as an example of supporting biodiversity
Photo: archive Alej na Prameni, 2025

The process of designing a therapeutic garden can be summarised in the following steps:

1) Analysis of the Target Group's Needs

At the start of the design process, gathering detailed information about what future users expect and need is crucial. This can be achieved by using surveys, holding personal consultations or organizing informational meetings, all of which allow for valuable feedback directly from the target group.

Simultaneously, it's necessary to understand users' preferences concerning activity types, comfort levels and aesthetic desires for the space. Doing so helps ensure that the garden is tailored to their needs, enhancing satisfaction and creating a positive experience for everyone involved.

2) Site and Environmental Analysis

A key step in the design process involves assessing both the climate and unique microclimate conditions of the site. This means considering factors like sunlight, shade and the main directions and strengths of the wind. Understanding these elements helps with placing garden features correctly and choosing plants that will thrive.

Additionally, it's important to review available water sources and options for adding features such as fountains, ponds or irrigation systems, since these enhance both how the space works and how it looks.

3) Accessibility and Boundary Definition of the Space

It is essential to conduct a thorough assessment of safe access points from the surrounding environment when designing the garden, while also ensuring sufficient privacy and protection using suitable fencing solutions.

Careful consideration should be given to establishing clear visual and physical boundaries, as this not only enhances user safety but also effectively delineates the extent of the therapeutic garden.

4) Specification of Materials and Infrastructure

When selecting materials, it is imperative to prioritise those with high resistance to abiotic factors – such as climatic conditions, temperature fluctuations and humidity – as well as biotic threats including pests and fungal diseases. This approach ensures the longevity

and integrity of structures, thereby reducing the frequency of repairs or replacements.

The infrastructure should encompass suitable gardening tools that facilitate safe and efficient garden maintenance. Consideration should also be given to small architectural features, such as gazebos for leisure, raised beds to improve accessibility and greenhouses to support the cultivation of weather-sensitive plants.

To promote the effective operation of the space, provision must be made for access to electricity, potable water, and appropriate irrigation systems. Furthermore, all garden elements should be designed for ease of maintenance, ensuring the environment remains functional, secure and comfortable for all users over the long term.

Figure 1.8. Alej na Prameni – Structured and diverse perennial planting has therapeutic potential. Photo: Klára Vernarcová, 2025

5) Accessibility and Safety of Surfaces

In designing gardens for individuals with limited mobility, it is essential to address the specific requirements associated with surface

treatments. Paths should be constructed to a minimum width of 1.8 meters and maintained in straight lines to facilitate comfortable and secure movement, particularly for wheelchair users and those utilizing other mobility aids. Surface materials must be selected to minimize the risk of slipping - compacted gravel or stable bound surfaces are recommended options. The inclusion of slippery or overly steep sections should be strictly avoided to ensure user safety.

6) Comfort and Rest Elements

The design of surface areas should also incorporate features such as benches and designated resting spaces. These elements enhance comfort for garden users, providing necessary opportunities for rest during transit and thereby promoting overall safety and well-being within the environment.

7) Selection of Plant Material

Selecting appropriate plant species is a critical component in the design of therapeutic gardens. Considerations must include local climate conditions, water availability and each species' resistance to pests. Aesthetic factors - such as colour, flowering periods and seasonal changes - are integral to creating a visually appealing environment.

he planting strategy should promote species diversity, enabling stimulation of multiple senses. Chosen plant species are expected to provide visual, olfactory and tactile experiences, thus supporting a holistic sensory atmosphere and enhancing the overall well-being of garden users.

Implementation of the Project and Commissioning of the Therapeutic Garden

8) Gradual Construction and Evaluation

A therapeutic garden is built in phases, prioritizing frequent checks on each element's safety and functionality along the way. This method allows for the ongoing assessment of infrastructure quality and swift resolution of any issues, helping to maintain both long-term sustainability and high safety standards for every garden visitor.

Figure 1.9. Alej na Prameni – Rest and relaxation in the shade and fragrance of a perennial planting bed. Photo: Klára Vernarcová, 2025

9) Commissioning and Adaptation of Activities

Once construction is finished, the garden can be officially opened and used. At this point, activities within the garden are monitored and therapeutic programs are continuously adjusted based on user needs and feedback. This system supports a proactive approach to improving comfort, safety and therapeutic effectiveness, making the best use of the available space.

1.6. Alej na Prameni – A Private Garden Used by the General Public

In Slovakia, therapeutic gardens, in the strictest sense, are not yet established. However, certain sections of gardens adjacent to hospitals, psychiatric clinics and care homes for the elderly may occasionally supplement medical and rehabilitation interventions. This trend indicates a growing interest in incorporating nature-based activities into both community and informal settings.

Alej na Prameni exemplifies the extension of garden- and environmentally focused concepts into public spaces. Located in the Prameň area of Nitra, this community garden was established in spring 2022 as a green, freely accessible area intended for Nitra's public.

The project is advancing through participatory methods, with active engagement from the community and volunteers spanning various age groups and is supported by grant programs and collaboration with municipal institutions. Its primary objective is to establish a long-term, sustainable "green oasis" within an urban context, aimed at enhancing psychological well-being, fostering community bonds and facilitating contact with nature (Alej na Prameni, 2024). The garden hosts informal educational initiatives for schools, floristry and environmental workshops, creative sessions for children and youth, community planting events, concerts and family-oriented activities. These programs contribute to intergenerational connectivity, social cohesion and the cultivation of an appreciation for nature.

The space has been developed as a small park / extensive garden characterised by rich biodiversity, incorporating a linden avenue, numerous edible shrubs, nectar-producing perennials, wildflower meadows, fruit trees and complementary plantings. The grounds also

feature a compact educational apiary and purpose-designed zones for relaxation and sensory engagement with natural elements.

Beginning in spring 2025, Alej is implementing a horticultural therapy programme focused on promoting the mental and physical wellbeing of children and young people with specific needs through therapeutic activities in a natural setting. This initiative builds upon prior projects, including floristry and art workshops, informal environmental education, community planting events and artistic programmes.

Figure 1.10. Alej na Prameni – The garden is also a space for guided relaxation and body awareness – group yoga session
Photo: Klára Vernarcová, 2025

Alej offers sensory stimulation through scents, textures, colours and natural forms, thereby fostering an environment conducive to relaxation, stress reduction and the cultivation of mindfulness - all elements identified as significant contributors to mental and physical health in horticultural therapy (e.g., Ulrich et al., 1991). Furthermore, informal educational initiatives for schools, creative workshops, concerts and community picnics held within the space facilitate social

interaction, strengthen community bonds and enhance visitors' sense of belonging.

Alej na Prameni stands as an innovative model of a community garden with pronounced environmental, social and therapeutic potential. While it does not function strictly as a therapeutic garden, its participatory development, focus on environmental education and incorporation of horticultural therapy activities align with contemporary practices in both horticultural therapy and community engagement with natural spaces. The garden's setting supports the enhancement of sensory stimulation, social connectedness, well-being and positive experiences - factors that are widely associated in the professional literature with beneficial outcomes for health and psychosocial well-being.

1.7 Apitherapy in the Context of Alej na Prameni

Apitherapy involves using bee products – such as honey, propolis, pollen, wax and royal jelly – as well as spending time near beehives to promote health, psychological well-being and physical rejuvenation. At Alej na Prameni, apitherapy is viewed not as a form of medical treatment but as a supportive, experiential and therapeutic practice that boosts sensory stimulation, strengthens connections with nature and aids in the healing process.

The apiary offers a therapeutic and educational space where clients can relax through activities like listening to bees or engaging in creative projects such as making candles, tasting honey or learning about pollinators. These experiences help enhance focus, curiosity, competence and a sense of purpose.

When it comes to apitherapy, prioritizing safety and ethical behaviour is vital. Those who have bee sting allergies or are at high risk of anaphylactic reactions should not take part in these practices, careful oversight, well-defined safety guidelines and consideration for everyone's comfort are necessary. Bee products are always selected based on a person's health needs and are never a substitute for professional medical treatment.

Figure 1.11. Alej na Prameni – Observation of beehives in a small educational apiary. Photo: Klára Vernarcová, 2025

Professional literature indicates that apitherapy may offer significant advantages, particularly in areas such as supportive rehabilitation, enhancement of well-being, stress management and fostering a deeper connection with nature. At Alej na Prameni, apitherapy is implemented as a carefully supervised and voluntary component of the program, complementing garden therapy and expanding the available options for holistic care for children, adolescents and adults.

1.8 Results of Ongoing Evaluation of Therapeutic and Support Activities

Activities at Alej na Prameni between 2022 and 2025 were evaluated using both informal and semi-standardized methods. Information was gathered through systematic observation, feedback from teachers, parents, and facilitators, brief reflective interviews with participants and monitoring individuals who participated in activities multiple times. This methodology allowed for ongoing assessment of how beneficial and effective each activity was for different age groups and social backgrounds.

Participants experienced improved psychological well-being and better stress management, evidenced by decreased tension and increased calmness. Children demonstrated less restlessness and were able to focus more during activities. These findings align with previous research that highlights the positive impact of natural settings on attention restoration and stress reduction (Ulrich et al., 1991; Sempik et al., 2010).

Notable social and community outcomes included enhanced intergenerational interactions between children and older adults, a heightened sense of belonging and safety within the community and the establishment of informal support networks among participants.

Advancements in sensory perception and connection to nature were demonstrated by increased engagement with plants, insects, and natural cycles, improved concentration during structured activities and greater environmental awareness and responsibility.

Figure 1.12. Alej na Prameni – Group workshop on weaving flower wreaths. Photo: Klára Vernarcová, 2025

Participants, particularly children and young people, became more motivated and confident with each activity they took part in. As the children succeeded in growing and taking care of plants, they displayed increased initiative, responsibility and enthusiasm to join in again. Being able to see the results of their own efforts was an especially effective motivator.

These findings are consistent with established scholarly literature, which emphasizes the beneficial effects of natural environments on reducing stress, restoring attention and enhancing psychosocial well-being (Ulrich et al., 1991; Sempik et al., 2010).

Alej na Prameni exemplifies a community garden model with notable preventive and pre-therapeutic potential. While it does not function as a therapeutic garden in the strictest sense, its spatial arrangement, participatory approach and evolving therapeutic features establish a robust foundation for integrating garden therapy within a community setting. Additionally, the project provides an appropriate platform for future systematic research and assessment of

therapeutic outcomes. The case study of Alej na Prameni demonstrates that community-created spaces can significantly contribute to supporting mental health, fostering social cohesion and enhancing connections with nature across diverse target groups. This model effectively bridges the gap between conventional community gardens and therapeutic environments, offering valuable perspectives for advancing garden therapy initiatives in Slovakia.

Civic Association

The Civic Association Alej na Prameni is an association of citizens who, through its activities, create a stimulating environment for the residents of the Prameň residential district and its surrounding areas (such as the Klokočina and Diely housing estates), with the aim of supporting mutual coexistence within the community. We organize events that enable meaningful leisure time, foster mutual acquaintance, connect generations, and help preserve traditions.

Experienced and enthusiastic team

The members of the project team have many years of experience in developing and implementing projects in educational settings, as well as in the social and cultural sectors. They have worked extensively with children and youth, and have expertise in community and environmental issues, as well as in project management.

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CHAPTER 2

THE GARDEN AS A PLACE FOR RELAXATION, ACTIVITY, AND COMMUNITY

Anna Makovičková

An exemplary model of a garden designed to facilitate social interaction, education, healing and relaxation is **Kraffer's Garden in Jindřichův Hradec.**

Figure 2.1. Elements of an emotionally healing garden
Photo: Petr Komárek, 2024

2.1. Historical Background

The garden is situated in the historic center of Jindřichův Hradec. Its distinguished history commenced in 1759, following a design by Jan Anton Zinner for Marquise Maria Isabella Johanna Merode de Westerloo, widow of František Josef Černín.

Figure 2.2 Map od Jindrichuv Hradec half of 19th century
Source: City Archives

The garden was linked to the palace building (Kláštěříček) and could be reached through an elaborately decorated salla terrena. A main pathway led to the original Baroque gate, which remains intact today. The terraces featured a range of elements typical for the era, such as shady arbours, pavilions and even a bowling alley. Along with ornamental flower beds, water features and fountains contributed significantly to the garden's charm.

A prominent sculptural fountain, featuring representations of a dolphin and an eagle, was situated on the highest terrace, ensuring visibility from all areas of the garden. This fountain led to a shell-shaped water cascade and an artificial rock formation, both culminating in a spacious circular basin.

The garden stayed unchanged until the late 18th century, but everything was destroyed by a fire in 1801 and was never reconstructed. Over time, the stone ornaments were removed piece by piece and the manor's officials eventually divided up the garden.

At the end of the 19th century, the garden was acquired by the Kraffer family through a property exchange, initiating its longest and most distinguished period. During this era, the family's horticultural activities were extensive, encompassing outdoor and indoor flowers, citrus trees, camellias, vegetables and fruit trees. A sophisticated water distribution system constructed in this time has endured to the present day. The greenhouses and buildings from this period remain intact, reflecting the genuine character of early 20th-century Czech horticulture.

Figure 2.3. Mr. Kraffer's family
Source: Mrs.Kapiasová family archives

Figure. 2.4. Garden in the 20th century
Source: Mrs.Kapiasová family archives

In 1953, the Kraffer family's nursery was expropriated and incorporated into state ownership. The original owners, who had

established and operated the enterprise over several decades, were subsequently retained as employees. Despite this transition, members of the Kraffer family continued to maintain their association with the garden by working within the newly formed state-operated "Municipal Services."

During the socialist era, two substantial 50-meter-long heated greenhouses and a new boiler house were constructed on the site of the original greenhouse. These developments resulted in the permanent alteration of the Baroque layout, which had been preserved for over two centuries. The original Baroque gate was sealed, and, over time, the garden experienced a decline in maintenance and use.

During the 1980s, the nursery was formally closed and relocated outside the town to upgraded facilities. The gates of Kraffer's Garden remained inaccessible for the subsequent two decades.

Figure 2.5. Florianus nursery
Source: Martin Charvát

After 1989, the Kraffer family regained possession of the ruined garden through restitution and later sold it to the City of Jindřichův Hradec. In 2003, the perennial nursery Florianus began renting the property. By that time, the garden had become so overgrown that it resembled a forest rather than its original form. The site was heavily deteriorated - greenhouses were damaged, terraces were buried and overall, everything was in a dire state.

In just a few years, the area was transformed into a successful year-round nursery, showcasing a wide variety of perennials, grasses and herbs. The restoration of several Baroque terraces helped establish the garden as an impressive natural exhibit with themed beds, making it a popular spot for garden tourism.

Figure 2.6. Garden in 2021. Photo: Jan Makovička

The garden in Jindřichův Hradec tells a story of resilience, transformation, and enduring ties between people and their surroundings. Once established as a Baroque retreat for nobility, it later blossomed into a horticultural hub under the Kraffer family, experiencing both flourishing periods and times of neglect and renewal. Despite challenges like fire, nationalization, and abandonment, the spirit of the

garden remained strong - sustained by memories, skilled caretakers and the steadfast presence of nature.

Thanks to the dedication of committed caretakers, the garden has been transformed into a flourishing perennial nursery that highlights Czech horticultural traditions. The carefully restored terraces and specialized plantings honor historical legacy while inspiring future generations to appreciate the value, aesthetic significance and restorative potential of cultivated green spaces. The garden serves as an enduring link to cultural heritage, exemplifying how thoughtful stewardship, vision and sustained effort can preserve and enhance it.

2.2. Modern Times

Currently, the garden is managed by the Krafferova zahrada Association, which is systematically rehabilitating the previously neglected facilities and converting the site into a public garden. The preserved Baroque design serves as the conceptual foundation for the entire area, with new functionalities thoughtfully incorporated.

A large part of the garden is dedicated to a public demonstration garden. Where the original greenhouse once stood, there is now a new building containing both a florist shop and a landscape architecture studio. This building features an extensive green roof that helps it fit seamlessly into the overall garden landscape.

Right next to these rebuilt structures are areas meant for growing cut flowers and perennials. Here, plants are cultivated and sold on site with the primary aim of supporting local and seasonal flower production.

Kraffer's Garden serves not only as a site of historical significance and a demonstration nursery but is also progressively transforming into a restorative space. Here, nature, peacefulness and contact with living plants offer opportunities for emotional well-being. The garden features specific areas dedicated to horticultural therapy, sensory experiences, tranquil strolls and outdoor group activities. The renovated terraces, fragrant flower beds and seasonal plantings foster an atmosphere that helps reduce stress, enhances heart rate variability (HRV) and stimulates the limbic system.

Figure 2.7. Modern-Day Garden
Photo: Anna Makovičková, 2025

Figure 2.8. Garden in Present Day. Photo: Petr Komárek, 2024

The garden welcomes partnerships with experts in psychology, rehabilitation, education and social work, acting as a hub for running ecotherapy, art therapy and nature-focused educational programs.

Kraffer's Garden shows how a historic site can be transformed into a vibrant place that weaves together cultural heritage, rich biodiversity and support for the community's mental and emotional health.

2.3. Garden Activities

The association's primary goal is to make the garden accessible to everyone and to develop a comprehensive program available throughout the year for people of all ages. Serving as both a well-known tourist destination and a tranquil haven for residents, the garden features a versatile design intended to cater to the diverse needs of its visitors.

Seasonal café. This café was created to meet the needs of visitors and functions as an outdoor venue, where guests are served through a caravan window in an open-air setting. The project has achieved great success, drawn a diverse crowd and enriched the experience for both tourists and residents.

Figure 2.9. Cafe location and recreation area details
Photo: Anna Makovičková, 2025

Yoga Classes. Yoga sessions are conducted throughout the summer season, commencing in May or June based on prevailing weather conditions. The classes take place on the main grassy terrace of the garden. Registration is not necessary, as sufficient space is available for attendees. Sessions are scheduled for weekday evenings and Saturday mornings, subject to suitable weather.

"Sense Play" for Children. Under the guidance of a qualified instructor, weekly 1.5-hour sessions entitled "Playing with All Our Senses" address specific themes through diverse sensory stations. These outdoor activities enable children to develop concentration and relaxation skills in collaboration with their parents.

Figure 2.9. "Sense Play" for Children
Photo: Karolina Cermanová, 2022

Theatre Mini-Festival: This annual event showcases theatrical performances catering to both children and adults, with participation from local artists as well as recipients of prestigious awards.

Figure 2.10. Theatre play Edudant a Francimor

Photo: Petr Miloš, 2023

The festival utilises an established format that pairs children's activities – such as Sense Play - with performances tailored for adult audiences.

"August in the Garden": Dedicated to reflecting on the historical significance of the August 1968 events, this programme features an open-air cinema screening films pertinent to that period. In 2024, the event included the podcast Rewrite History, which provided discussions on property confiscations and daily life during the communist regime.

Children's Adventure Game: In partnership with an illustrator, a bespoke outdoor game has been developed, engaging children through garden gnomes who lead participants across the garden and present various challenges. The activity is accessible to all age groups, without time restrictions and remains available for play throughout the entire season.

Clothing Swap: Organised as a charitable initiative by individuals from sheltered workshops, this clothing swap supports the host organisation through its proceeds. By providing the venue, the garden facilitates meaningful connections between the public and the community of people with disabilities.

Exhibitions. The garden works in partnership with the Vítězslav Novák Art School and the local Grammar School and serves as a regional partner of the European Capital of Culture 2028. Collaborative projects focus on the garden's history and related topics, including the initiative "The Garden Beneath the Surface." Additionally, an international collaboration with Saki Matsumoto resulted in a children's workshop, the outcomes of which were subsequently exhibited in the garden.

Workshops. The garden offers a range of workshops throughout the year, including floral design, wreath making, herbal cosmetics, calligraphy, mosaic art, painting, stonework and Easter whip weaving.

Figure 2.11. Workshop of art – Watercolour
Photo: Petr Miloš, 2023

Reading Club. Starting in autumn 2025, the garden's inspiring setting will become home to a reading club, bringing together members of different generations to discuss selected literary works.

Lectures. The garden also functions as a venue for expert talks, such as "Know Your Enemy", which focuses on identifying edible and poisonous mushrooms.

Teambuilding Events. The garden welcomes corporate teams for meetings and teambuilding activities, blending work sessions with opportunities to relax and enjoy refreshments. Participants also contribute by assisting with maintenance and seasonal gardening tasks.

Guided Tours. Association members conduct comprehensive 60-minute guided tours, presenting the garden's historical development and current design. Visitors are encouraged to inquire about the garden's evolution, plant varieties and landscaping practices.

Figure 2.12. Guided tours are conducted by members of the Association. Photo: Anna Makovičková, 2025

Community Garden Beds. From 2021 to 2023, dedicated garden beds were allocated to an organization supporting individuals with disabilities. Clients participated in weekly visits to cultivate vegetables and appreciate the outcomes of their efforts. The garden intends to maintain and expand opportunities for community gardening in the future.

"Angel Garden". This annual event, designed for young children, replaces the more traditional "St. Nicholas and devils" festivities. During the celebration, the garden is transformed with "angels" who help guide the children along an illuminated path filled with small tasks, culminating in a happy reward.

Educational Program for Preschools. A teacher leads this seasonal program, which features activities like planting spring bulbs, picking early summer strawberries, or enjoying autumn leaves. Each session begins with an interactive introduction to the garden's history, followed by music, movement and exploration of local plants and animals. Children finish their visit by drawing what they imagine as their dream garden.

Figure. 2.13. Agel Garden event. Photo: Petr Miloš, 2024

Open Gardens Weekend: In conjunction with a Europe-wide initiative, Kraffer's Garden hosts its most significant annual event, featuring a comprehensive program suitable for attendees of all ages. This occasion incorporates nearly all previously mentioned activities, offering an inclusive experience for participants.

In Conclusion

Kraffer's Garden in Jindřichův Hradec has developed into a distinguished setting where cultural heritage, natural aesthetics, and social inclusion intersect. The garden offers an array of activities – including horticultural therapy, sensory play, yoga, educational programs, creative workshops and community initiatives – that collectively serve a therapeutic purpose by promoting emotional well-being, alleviating stress and facilitating interpersonal engagement. Its environment is designed to enhance sensory integration, encourage physical activity, stimulate creative expression and support mindfulness in nature. Targeted programs for children, individuals with disabilities, older adults and corporate groups foster inclusive participation, collaborative learning and constructive community dialogue.

Figure 2.14. The begginig of Krafferova zahrada Association
Photo: Petr Miloš, 2021

Kraffer's Garden acts as a hub for bringing together locals, visitors, teachers, artists and therapeutic experts. The garden's programs help build a welcoming, supportive and healthy community, transforming this historic location into a place of inspiration, resilience and care. These transformations were enabled by dedicated individuals, primarily members of our own family, as noted by the author. The comparison below demonstrates the significant accomplishments that can result from individuals who possess a clear and purposeful social vision.

Kraffer's Garden serves as a venue for meeting, education, relaxation, and therapeutic activities. Its mission is to enhance the skills, capabilities and knowledge of individuals across all generations, with a particular focus on its therapeutic role. Frequently described as an "oasis of calm in the city center," Kraffer's Garden features a distinctive **genius loci** and exemplifies effective urban public space design that contributes to quality of life for both residents and visitors. Positioned to become a model for multifunctional urban green infrastructure, its unique character, therapeutic approach and inclusive programming establish it as a leading example of nature-based well-being, cultural continuity and community resilience.

Figure 2.15. Kraffer‘s Garden before reconstruction
Photo: Anna Makovičková, 2021

Figure 2.16. Nowadays in Kraffer’s garden
Photo: Petr Komárek, 2024

Expansion of therapeutic programs: Through the Apigarden Therapy initiative, Kraffer's Garden will enhance its emphasis on nature-based interventions by systematically incorporating beekeeping, sensory garden experiences and seasonal horticultural activities. These structured programs are designed to support mental health, rehabilitation and social reintegration objectives.

Inclusive education and intergenerational learning: The garden will keep offering workshops, preschool activities and reading clubs, encouraging lifelong learning and meaningful conversations between generations in a peaceful environment.

Ecological and Ethical Horticulture: The focus will be on implementing local, seasonal and pollinator-friendly cultivation methods. Expanded demonstration beds and enhanced opportunities for public involvement will support sustainable flower production initiatives.

Community Integration and Social Innovation: By providing facilities for sheltered workshops, charitable events and participatory gardening, the garden will enhance its function as a social connector - facilitating engagement among diverse groups through collective experiences and stewardship of the environment.

Cultural programming and international collaboration: As a regional partner of the European Capital of Culture 2028, Kraffer's Garden will host exhibitions, performances and cross-border initiatives that examine the relationship between nature, history and identity.

Research and evaluation: Partnerships with universities and therapeutic experts will promote the evidence-based advancement of garden therapy models, thereby supporting greater recognition of green spaces as valuable public health resources.

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CHAPTER 3

THERAPEUTIC APIARIES AS A NEW FORM IN BEEKEEPING

Leonora Adamchuk

In the context of war, loss, and forced displacement, Ukrainian women seek safe spaces, as well as meaning, rhythm, and renewal. Within this search emerges a new direction – **therapeutic apiaries** as a form of ecological healing, social entrepreneurship, and women's leadership in beekeeping.

The apiary becomes an apispace where honey, wax, aromas, the sounds of the hive, melliferous herbs and trees, birdsong, and silence provide resources for healing, communication, creativity, and a new economy. Here, elements of recreation, apitherapy, garden therapy, agritourism, and psychosocial support are intertwined.

The **NGO "Foundation of Women Beekeepers"** in partnership with international organizations, adapts this model to the Ukrainian context – mentorship, educational programs, innovations, inclusive workshops, residencies, and community integration. Therapeutic apiaries become spaces where beekeeping is not only production, but also restoration, interaction, inspiration, and care.

This direction in beekeeping was born as a response to challenges related to the deterioration of mental health among the Ukrainian population, which remains under constant psychological and economic pressure from the war. Adults and children, servicemen and veterans, women and men – all experience a state of profound exhaustion caused by aggression and uncertainty.

Chronic stress negatively affects not only physical health but also the social fabric of the country: young people are leaving abroad en masse, intensifying the demographic crisis and contributing to the decline of rural areas.

Under such conditions, therapeutic apiaries emerge as a **moral and professional duty** for everyone who keeps bees within the

homestead space. They represent a new form of social responsibility that integrates tradition, craftsmanship, apitherapy, ecological tourism, and psychosocial support.

Therapeutic apiaries contribute to the restoration of vital energy, strengthen the resilience of Ukrainians in russia's hybrid war against Ukraine, and uplift the spirit of the people through interaction with nature, culture, and community.

3.1. Key Concepts, Forms, and Methods

A **therapeutic apiary** is a space where traditional beekeeping is combined with elements of health improvement, psychosocial support, ecological education, and cultural interaction.

A **therapeutic apiary** is a site equipped in full compliance with safety regulations for keeping bees, serving as an integrative platform where the involvement of various therapeutic practices and activities creates conditions for the restoration of mental health, personal development, entrepreneurial growth, preservation of traditions, and strengthening of communities.

Therapeutic apiaries should be **positioned as:**

- a space of safety and trust, where individuals can experience calm, the rhythm of nature, and the power of interaction with the living;
- a place of learning and craftsmanship, where knowledge about bees, honey and other beekeeping products, melliferous and medicinal plants, and candle-making is transmitted;
- a form of social entrepreneurship that combines production, tourism, and therapy;
- an instrument of rehabilitation, especially for women, children, veterans, internally displaced persons (IDPs), and other vulnerable groups.

Therapeutic apiaries may take different formats depending on the target audience, available resources, and community context. Yet their core principle must remain the safety of presence and the fulfillment of their primary mission – mental and physical restoration for visitors.

Stationary spaces – well-equipped apiaries with zones for health improvement (apitherapy inhalations, apisleep, meditation, and more),

occupational therapy and practical training (workshops on hive, frame, candle, sachet, and honey dessert production, among others), recreation and psycho-emotional recovery (art therapy, aromatherapy, secluded locations), as well as education and culture (summer classroom for tastings, open-air cinema, winter pavilion, winter garden, and others).

A similar space is already being implemented by the NGO "Foundation of Women Beekeepers" within the framework of the BeeVital project (Balta, Odesa region), in cooperation with local self-government bodies and sole proprietor Olha Tkach.

Mobile apitherapy stations – adapted for outreach to communities where permanent infrastructure is not available.

Residential apiaries – spaces for long-term stay (accommodation), learning, and recovery. These may include specially equipped hotel-type facilities designed to host individuals in need of extended retreat in nature.

Integrated apiaries at schools, communities, and rehabilitation centers – as part of educational or social programs.

Family or household apiaries that open to guests in the format of apitourism, but not during the peak beekeeping season, according to a defined schedule and with a specific program.

The terms "beegarden therapy" / "apigarden therapy" are new, innovative concepts that combine elements of apitherapy, garden therapy, and ecological tourism. Since they do not yet have established academic definitions, they can be formulated as authorial concepts reflecting the unique approach of the Foundation of Women Beekeepers and its partners.

Beegarden therapy is a form of ecotherapy based on the integration of gardening activities and beekeeping as instruments of psychosocial rehabilitation, carried out under the supervision or in cooperation with engaged specialists.

The interregional study (Kalle et al., 2025) examines the role of beekeepers as carriers of apitherapeutic knowledge in Estonia, southwestern Ukraine, and northeastern Italy. The authors emphasize that apitherapy within the apiary is both a healing practice and a form of cultural heritage, combining knowledge of honey, propolis, wax, and

rituals of beekeeping care. This study confirms the importance of local knowledge in shaping the therapeutic apispace.

Ecotherapy (nature therapy) is the use of the natural environment and nature-related activities to improve mental and physical health, reduce stress, and alleviate anxiety. This therapy may include walks in the park, meditation in nature, gardening, "green" therapeutic physical exercise, or even more extreme activities such as rock climbing, and can be practiced both in the wilderness and in urban settings. In addition, ecotherapy is understood (Koltok and Chaplia, 2015) as a body of traditional knowledge, techniques, and methods of using the healing factors of nature for the prevention and treatment of diseases, as well as for the maintenance and strengthening of health.

Beegarden therapy is also used to support mental health, particularly among veterans, women, and children who have experienced traumatic events. This concept encompasses not only the place and methods, the garden and the bees, but also inclusive landscape design, aromatherapy, healthy nutrition, art practices, physical activity (yoga, walks), and other elements that together create a holistic therapeutic experience.

In 2024, ecotherapy began to be introduced in extracurricular education institutions in Ukraine (Puhachova, 2024). In a narrative review (Klioumis et al., 2025), ecotherapy is considered as an integrative model of psycho-emotional well-being, combining contact with nature, gardening activities, forest walks, and meditative practices. The authors emphasize that ecotherapy has transformative potential in the field of healthcare, particularly in working with traumatized communities. This confirms the relevance of including ecotherapeutic components in the "Health Tourism" model as part of rehabilitation infrastructure.

Pet therapy (animal-assisted therapy) is a method of psycho-emotional support that involves human interaction with animals. It helps reduce anxiety, improve mood, develop social skills, and stabilize emotional states. It has been proven that communication with animals activates the production of endorphins and oxytocin.

Subtypes of pet therapy include:

Canistherapy – therapy involving dogs;

Felinotherapy – therapy involving cats;

Hippotherapy – treatment with the help of horses;

Dolphin therapy – therapy involving dolphins;

Others: rabbits, reptiles, ornamental birds, hedgehogs.

Limitations to its application may include allergies, phobias, or the absence of emotional contact with the animal.

Garden therapy (hortitherapy) is a rehabilitative practice based on plant care. It promotes the development of fine motor skills, logical thinking, aesthetic appreciation, and psycho-emotional relaxation. Activities may be active (planting, pruning, maintenance) or passive (observing, listening, meditation).

Its advantages include a high level of environmental sustainability, accessibility for people with disabilities, and the possibility of implementation in greenhouses, parks, and botanical gardens. It is recommended for children with special educational needs (SEN), veterans, internally displaced persons (IDPs), and individuals with post-traumatic stress disorder (PTSD).

Based on a review of the impact of gardening practices on mental, physical, and overall health, Wang, F., & Boros, S. (2025) demonstrated the effectiveness of garden therapy as a rehabilitation tool. Their systematic study covers more than 40 empirical works, confirming the positive effects of gardening activities on reducing anxiety levels, improving cognitive functions, and fostering social integration. This provides a scientific foundation for the inclusion of garden therapy in the "Health Tourism" model as part of psychosocial support in rural communities.

Landscape therapy is a method of psycho-emotional recovery through the aesthetic contemplation of natural landscapes. It creates a favorable background for psychotherapeutic work, activating emotions of joy, calm, and inspiration.

Key factors of influence include color, form, line, and rhythm of the natural environment. Applications involve walks, visual practices, architectural settings, and bionics.

Researchers have shown interest in the creation of therapeutic landscapes in the post-pandemic era (Ren et al., 2025). The authors analyze spatial solutions that contribute to emotional recovery – such as bionic forms, natural materials, panoramic zones, and color harmony. This study confirms that landscape therapy can be a key element in the design of the apispace, fostering deep psycho-emotional balance.

Forest therapy (Shinrin-yoku) is a Japanese practice of "forest bathing," which involves slow walks, meditation, and mindful perception of nature. It contributes to stress reduction, immune enhancement, and the restoration of inner resources.

Formats may be individual or group-based: walks, mindfulness exercises, and sharing of impressions. It has been proven that even brief contact with a tree has a positive impact on health.

Researchers (Isham et al., 2025) consider forest therapy as part of a broader paradigm of "green healing," which combines ecotherapy with social support. The authors analyze Shinrin-yoku practices, meditative walks, and landscape interventions as effective methods of reducing stress, improving immunity, and restoring inner resources. This study confirms that forest therapy can be integrated into the "Health Tourism" model as part of nature-centered rehabilitation programs.

Aromatherapy is a method of therapeutic influence on the psycho-emotional state of a person through natural aromas of essential oils, honey, wax, propolis, flowers, and more. It contributes to reducing anxiety, improving sleep, enhancing concentration, and overall well-being.

Researchers (Hiremath et al., 2025) consider aromatherapy as a scientifically grounded practice that combines phytotherapy, naturopathy, and the influence of the natural environment. The authors emphasize that essential oils derived from plants not only have a pleasant fragrance but also a proven therapeutic effect – particularly in reducing anxiety, improving sleep, and stabilizing emotional states.

Aromatherapy is especially effective in natural settings – parks, gardens, forests, apiaries – where scents are combined with visual and auditory stimuli, creating a holistic sensory experience. This study confirms the relevance of integrating aromatherapy into the "Health Tourism" model, particularly within apispaces, where natural aromas of honey, wax, propolis, and essential oils enhance the therapeutic effect.

Further details on aromatherapy will be presented in the next section of this book.

Heliotherapy is a health practice based on the effects of sunlight. It is used to normalize metabolic processes, strengthen immunity, improve mood, and stimulate the synthesis of vitamin D. It is applied in open natural spaces, with consideration of safe dosage.

Figure 3.1. Apiary space where forest therapy, ergotherapy, heliotherapy, aromatherapy, apitherapy, and landscape therapy can be combined. Image by Albrecht Fietz, Pixabay

In the article (Ponnurangam et al., 2025), heliotherapy is regarded as an effective, non-invasive method of health support based on the therapeutic influence of sunlight. The authors analyze its role in the treatment of conditions such as psoriasis, vitiligo, depression, vitamin D deficiency, and autoimmune diseases. Particular attention is given to the impact of heliotherapy on women's health—specifically on bone density, reproductive function, hormonal balance, and psycho-emotional well-being.

Mechanisms of action include vitamin D synthesis under ultraviolet B (UVB) exposure, modulation of the immune system, regulation of circadian rhythms, and mood enhancement. This study confirms the relevance of integrating heliotherapy into the "Health Tourism" model as part of nature-centered rehabilitation practices, especially for women in rural communities.

Lithotherapy is a method of energetic influence on the human body through contact with natural minerals and stones. It is used to stabilize emotional states, relieve tension, and activate inner resources. Practices may include wearing stones, meditating with them, or creating stone compositions.

In contemporary research, lithotherapy is considered part of holistic approaches to psychosocial recovery. It is based on the notion of the vibrational properties of minerals and their ability to harmonize emotional states, reduce anxiety, and activate inner resources.

Researchers (Hartwell & Kim, 2025) emphasize that lithotherapy can be effective when combined with meditation, aromatherapy, and art practices in therapeutic work with PTSD, anxiety, and depression. Other authors (Moretti et al., 2025) identified positive dynamics in reducing anxiety and improving concentration in a pilot study on the impact of stone compositions in therapeutic spaces on participants' emotional states.

In the "Health Tourism" model, lithotherapy can be integrated through: the creation of meditation zones with stones; the use of minerals in art therapy (amulets, compositions); apirituals with wax and stones; and landscape design incorporating elements of bionics and mineral aesthetics.

In the annual review, Reynolds (2025) highlights key trends in **occupational therapy**, particularly its role in psychosocial rehabilitation,

inclusive design, and work with traumatized communities. The author emphasizes that occupational therapy is not only physical activity but also an instrument for restoring autonomy, self-esteem, and social integration. This confirms the relevance of including occupational therapy practices in the "Health Tourism" model as part of comprehensive support.

Figure 3.2. Working with honey dough as a form of occupational therapy. Image from Pixabay

Thus, the therapeutic apiary emerges not only as an innovative form of beekeeping, but also as a **multifunctional space for health improvement, learning, creativity, and social interaction**. Its potential is revealed through the integration of ecotherapy methods – from pet therapy and garden therapy to forest walks, api-inhalations, and art practices.

Depending on community resources and available specialists, the therapeutic apiary can become a center of psychosocial support, ecological education, and women's entrepreneurship. It combines traditions with modern approaches, creating conditions for the holistic development of the individual in harmony with nature.

3.2. Activities and Instruments of Therapeutic Apiaries

Within therapeutic apiaries, elements of therapy may be applied and various activities conducted, depending on available resources, specialists, and community needs. An existing apiary can be adapted to different formats: educational, rehabilitative, touristic, family-oriented, and others. Depending on the format and capacities, appropriate instruments of implementation – activities – can be selected (Table 3.1).

Table 3.1. Activities of the Therapeutic Apiary

№	Activity Name	Short Definition	Main Resources
1	Safe space for communication	a trust zone where people can talk, listen, and recover	pavilion, benches, warm tea, facilitator
2	Gardening and beekeeping (occupational therapy)	practical participation in plant and bee care	gardening tools, beehives, protective clothing
3	Educational activities on beekeeping	lessons on the life of bees, bee products, and care	presentations, samples, specialist
4	Study of biodiversity	introduction to melliferous plants and ecosystems	signs, excursions, botanical materials, specialist
5	Apitourism and agritourism	walks and acquaintance with the apiary as a tourist site	routes, guide, informational materials, tastings
6	Api-inhalations, api-massage, api-son	body practices using bee products	equipped api-house, honey, wax, equipment
7	Bee venom therapy	therapy with bee venom under specialist supervision	medical support, prepared bees, instruments

№	Activity Name	Short Definition	Main Resources
8	Aromatherapy	use of honey, wax, and propolis scents for relaxation	aroma diffusers, beekeeping products, other natural aromatic means
9	Meditations with products	mindfulness practices with honey, wax, and sounds	quiet zone, instructor, products, tools
10	Art therapy	creativity as a means of self-expression and healing	drawing materials, bee products, wax
11	Psychotherapy	professional support for processing trauma	psychologist, separate room, quiet zone
12	Yoga	gentle physical activity for body and mind	instructor, mats, quiet zone
13	Digital detox	refraining from gadgets to restore attention	timer, signs, facilitator support
14	Api-observation	watching bees as a meditative practice	transparent hives, benches, silence
15	Api-education for children	play-based lessons, stories, and api-games for ecological education	board games, api-stories, specialist, educator, manuals
16	Api-art and crafts	making candles, souvenirs, napkins, sachets, postcards	wax, cappings, creative materials, specialist
17	Api-music	sounds of the hive, buzzing, natural audio	audio recordings, speaker, quiet zone, apiary area during active period

№	Activity Name	Short Definition	Main Resources
18	Api-philosophy	reflections on life, rhythm, and community through the image of the bee	moderator, circle, metaphorical questions, projector
19	Api-community	women's bee collectives, a space of support and inspiration	group, facilitator, regular meetings
20	Api-rituals	symbolic actions with honey, wax, fire, and stones	candles, honey, leader, safe space
21	Garden therapy	active or passive plant care as a form of rehabilitation	garden beds, greenhouses, gardening tools, instructor
22	Forest therapy	walks in forest areas with elements of mindfulness	forest trail, guide, quiet zone, bird feeders, insect hotels
23	Landscape therapy	aesthetic contemplation of natural landscapes for emotional recovery	panoramic zones, natural locations, benches, signs
24	Video-ecology	creating a comfortable visual environment for psycho-emotional balance	aesthetic space design, bionic forms, natural elements, outdoor cinema
25	Heliotherapy	use of sunlight for health improvement	open areas, sun zones, loungers
26	Lithotherapy	therapy through contact with natural stones and minerals	stones, minerals, meditation zones

In spaces with a focus on **psycho-emotional support** and **rehabilitation**, the following may be applied: api-inhalations, api-massage, api-son, honey wraps; bee venom therapy under professional supervision; aromatherapy using beekeeping products; meditation, yoga, light physical activity; psychotherapy with the involvement of a qualified specialist (individual or group); api-observation—watching bees as a form of meditative practice; digital detox—days or hours without gadgets.

In apiaries that are part of educational institutions or rehabilitation centers, **educational** and **outreach activities** can be implemented. Among them: workshops on beekeeping, bee care, and hive construction with eco-materials; "bee school" for children and school youth; study of biodiversity and ecological education; api-education—integrating knowledge about the properties and applications of honey, propolis, cappings, and other products; workshops, webinars, and courses for women in communities, veterans, and other vulnerable groups; development of training programs in apitherapy and apitourism.

A **location** can be arranged **for creativity**, crafts, and self-expression. For example: art therapy using beekeeping products (pysanky – Fig. 3.3); candle making (Fig. 3.4), honey souvenirs, bee-shaped amulets made of cappings (Fig. 3.5), sachets, traditional wedding wax wreaths; api-art – painting, postcards, collages; rituals – symbolic actions with honey, wax, and fire; music – the sounds of the hive and natural audio for relaxation or processing.

These activities should be combined with local traditions of the region. For instance, the art of pysanka painting varies in techniques, motifs, and ornamental patterns.

In spaces oriented toward **tourism, ecotherapy**, and **gardening activities**, it is possible to provide: therapeutic walks, apitourism, and elements of agritourism; practical participation in gardening and beekeeping with the receipt of products or payment; creation of landscape zones for recreation and api-pavilions; greening, care for melliferous plants, and collection of herbal teas; seasonal api-camps, residencies, and excursions.

Figure 3.3. Traditional Ukrainian craft using wax – Easter pysanka.
Image by Jan Jakubowski from Pixabay

The therapeutic apiary can become a space of **social interaction** and **community support** through the creation of a safe environment for communication and recovery. For example: api-community, interest-based collectives, support groups, youth clubs; shared gatherings, cooking with honey, cultural events, festivals; integration of internally displaced persons, veterans, and families into communities through activities in the api-space; online platforms for experience exchange, mentorship, and inspiration.

Such spaces strengthen trust, foster cohesion, and ensure the emotional and practical well-being of community members.

In the post-COVID period, which has coincided with large-scale war, economic instability, and an energy crisis, Ukrainian society is experiencing multi-level traumatization, loss of social connections, and increased psycho-emotional strain. Under such conditions, spaces of social interaction and support play a critically important role in restoring trust, forming horizontal connections, and strengthening the psychological resilience of communities.

Figure 3.4. Group api-art – making a decorative candle.
Photo by Leonora Adamchuk, 2025

They create a safe environment for informal communication, experience sharing, emotional release, and collective problem-solving, which is particularly significant for internally displaced persons, veterans, educators, healthcare workers, and other vulnerable groups.

Such spaces contribute to the development of local leadership, volunteer initiatives, and cross-sectoral cooperation, which form the foundation for sustainable community recovery in times of crisis. They can function as platforms for non-formal education, psychosocial support, cultural integration, and inclusive dialogue adapted to the needs of a specific community.

Figure 3.5. Combination of art therapy and aromatherapy during the making of bee amulets from cappings wax

Photo by Leonora Adamchuk, 2025

In the context of decentralization and the reform of social policy, the creation of such spaces is both a humanitarian necessity and a strategic instrument for strengthening social capital and civic cohesion in Ukraine.

The activities of therapeutic apiaries encompass a wide range of health-promoting, educational, creative, and social practices grounded in the principles of ecotherapy. They can be adapted to the needs of specific communities, age groups, levels of traumatization, and available resources. From api-inhalations and gardening to art therapy, forest walks, and philosophical or psychotherapeutic conversations—each activity contributes to recovery, self-expression, and the reinforcement of the human connection with nature.

3.3. The Role of the Foundation of Women Beekeepers in the Formation and Transformation of Apiaries into Therapeutic Spaces

A new direction is emerging in modern beekeeping – therapeutic apiaries, which combine apitherapy, ecological education, psychosocial support, and women's entrepreneurship. At the forefront of this process stands the public organization "Foundation of Women Beekeepers," which not only supports women in beekeeping but also initiates a profound transformation of the very role of the apiary in community life.

The Foundation became the first structure in Ukraine to systematically integrate apitherapy, ecotherapy, women's entrepreneurship, and social rehabilitation into a **unified concept of the therapeutic apiary**. Through its activities, apiaries are transformed into places where not only health is restored, but also trust, connection with nature, inner resources, and dignity.

Key Initiatives of the Foundation of Women Beekeepers. The public organization "Foundation of Women Beekeepers" implements a comprehensive program for the development of therapeutic beekeeping, combining apitherapy, ecological education, women's entrepreneurship, and psychosocial support. Below are the main areas of activity that form the methodological and practical basis for transforming apiaries into spaces of healing.

Mentorship and expert participation include providing knowledge about apitherapy and the impact of bee products on mental health; conducting educational sessions on the benefits of honey, propolis, wax, and other beekeeping products for beekeepers who wish to develop in the field of api-garden therapy; engaging female scientists and lecturers in trainings, workshops, and webinars; expert assessment of potential and support for the development of therapeutic apiaries.

Figure 3.6. Photo from the Forum of the NGO "Foundation of Women Beekeepers," 2025. Image from the organization's archive, 2025

Integration of the Ukrainian community abroad includes support for women and refugee children through gardening and bee therapy; the creation of an online inclusive space for communication, recovery, and cultural exchange; and the organization of residential therapeutic events in partnership with Alej na Prameni (Slovakia).

Non-formal education and exchange of experience include the development of training materials on apitherapy, apitourism, beekeeping care, and related topics; conducting workshops for children and women in the format of a "bee school"; sharing practices with partners from V4 countries; and the creation of joint educational programs.

Brand expansion and international representation include presenting the Foundation's products, services, and initiatives at

international events; establishing new partnerships to enter the markets of V4 countries; and promoting the model of women's beekeeping as a form of social entrepreneurship.

Social and psychological support includes the use of apitherapy as a healing tool for women who have experienced trauma (online consultations) provided by both internal and invited specialists; the organization of joint activities such as art therapy, cooking with honey, and traditional gatherings in partnership with api-spaces; and the creation of success stories to inspire women in communities across other cities and countries.

The Foundation identifies the concepts of **"api-space"** and "therapeutic apiary" as synonymous. An api-space is a multidimensional environment formed around the apiary, combining elements of beekeeping, nature, therapy, education, culture, and social interaction. It is a physical place where bees are kept and a holistic landscape is created, providing conditions for mental recovery, self-realization, learning, and entrepreneurial development.

The api-space is based on an ecosystem approach, where each component – the hive, melliferous plant, aroma, sound, silence, and person – is part of the therapeutic experience. Here, beekeeping functions not only as a craft but also as a form of care, rhythm, observation, and restoration. The space is organized to be inclusive, safe, and resourceful – for women, children, veterans, internally displaced persons, people with PTSD, and persons with disabilities.

An api-space can be stationary, mobile, residential, or integrated into schools, rehabilitation centers, and communities. Its design incorporates landscape therapy, garden therapy, aesthetics, sound environment, accessibility, and the possibility for solitude or group work.

3.4. Expert Council for the Support of Therapeutic Apiaries

To ensure the effectiveness and sustainability of therapeutic apiaries, the public organization "Foundation of Women Beekeepers" is introducing a program for assessing the potential of newly established api-spaces. This initiative combines resource diagnostics, training, expert consultations, mentorship, and evaluation of the capacity to meet the status of a therapeutic apiary.

The aim of the initiative is to identify the strengths and growth areas of an existing or newly established apiary, and to provide conceptual and practical tools for the development, adaptation, and integration of therapeutic spaces into community life.

The main components of the program for assessing the potential of newly created api-spaces include evaluation, training, mentorship, and networking.

Space assessment. At the first stage, an analysis of the physical space of the apiary is conducted: its geographical location, accessibility for different population groups, ecological characteristics of the territory, and the level of safety for conducting therapeutic practices. Particular attention is paid to the presence of zones of silence, natural shade, and the possibility of arranging places for meditation, api-inhalations/api-sleep, and group meetings. The space must be not only functional but also emotionally comfortable.

Resource assessment. The next step is the inventory of available material and natural resources. This includes beekeeping products (honey, wax, propolis, and other products), garden plots, melliferous plants, care tools, educational materials, product samples, as well as access to water, electricity, and shelter. The potential for conducting workshops, api-art, api-education, and ecotherapeutic activities is determined.

Team assessment. The composition of the team is evaluated, including its motivation, level of training, experience in beekeeping, facilitation, and trauma work. The need for additional training, mentorship, or involvement of external experts is identified. Particular attention is paid to women's leadership, emotional readiness to work with vulnerable groups, and the ability to create a safe space.

Training modules. The Foundation offers a series of educational sessions covering apitherapy, ecotherapy, facilitation skills, community building, product branding, and other topics. The modules are adapted to the participants' level of preparation and can be conducted online or offline. The training combines theoretical foundations with practical case studies, community examples, and interactive exercises.

Mentorship. Each apiary receives individualized mentoring support – regular consultations, advice on program development, activity adaptation, and community engagement. The mentor helps the team

move from idea to implementation, provides support in challenging moments, shares experience, and inspires. Mentorship is a key element of the sustainable development of the api-space.

Networking. The apiary is included in a broader community of therapeutic api-spaces operating in Ukraine and abroad. This provides access to experience exchange, joint projects, educational resources, and partnership opportunities. Participants can take part in forums, residencies, and online meetings, which strengthen the sense of belonging and support.

Recommendations and Certificate of Compliance. At the final stage, the Foundation's team develops individual recommendations for each apiary – regarding space adaptation, brand development, program design, community engagement, and partnership building. These proposals are based on a comprehensive assessment of the api-space's potential, the needs of participants, and the community context. They are aimed at strengthening the therapeutic effect, ensuring emotional safety, and promoting sustainable development.

Based on the results of the program, the Foundation's Expert Council makes a decision on confirming the status of **"Therapeutic Apiary."** An apiary that meets the defined criteria receives a **Certificate of Compliance**, certifying its readiness to conduct ecotherapeutic practices, participate in the network of api-spaces, and implement psychosocial support programs.

3.5. Adaptation of the "Health Tourism" Model in the Context of Sustainable Entrepreneurship Development in Rural Areas of Ukraine

The "Health Tourism: Garden and Bee Therapy" (HT-GBT) model was developed by partners from the V4 countries and Ukraine within the framework of project ID 22510239 "Health Tourism: Garden and Bee Therapy for the Mental Health of Ukrainian Women and Children," supported by a grant from the International Visegrad Fund of the V4 countries of the European Union, implemented during the period June 20, 2025 – April 30, 2026.

The adaptation of the HT-GBT model to the Ukrainian context represents an opportunity to transform beekeeping into a new form of

social entrepreneurship, rehabilitation, and sustainable development of rural areas. At a time when communities are seeking innovative approaches to recovery, the integration of therapeutic beekeeping and gardening practices opens the way to combining economic activity with mental well-being.

This model is based on the synergy of three components:

Health – through apitherapy, garden therapy, and ecological interaction;

Entrepreneurship – through the creation of local businesses that combine production, tourism, and care;

Community – through the involvement of women, veterans, internally displaced persons, and other vulnerable groups in active participation in village life.

The adaptation of the model requires consideration of Ukrainian realities: the consequences of war, demographic changes, the need for rehabilitation, as well as the potential of rural areas as spaces for recovery, learning, and sustainable development.

At the core of this model lies the idea of care as an economic value. Therapeutic beekeeping, garden therapy, mobile apitherapy stations, and integration spaces for internally displaced persons – all of these can serve as the foundation for a new form of social entrepreneurship that not only generates income but also restores human resources, strengthens communities, and shapes a new culture of interaction with nature.

How can this be achieved?

Systemic impact on communities and policy. The implementation of the HT-GBT model in Ukraine has the potential to transform approaches to social policy at the local level. Communities that integrate therapeutic practices into their development strategies gain not only tools for rehabilitation but also new economic opportunities. This is particularly important for rural areas, which often remain outside the attention of investors and state programs. The model also contributes to the formation of policies oriented toward mental health, women's leadership, and ecological sustainability. It can be integrated into employment programs, veteran rehabilitation, support for internally displaced persons, the development of green tourism, and adult education.

International context and examples from V4 countries. The Visegrad Four countries already have experience in implementing therapeutic tourism as part of social infrastructure. Ukraine can adapt these practices, taking into account its own cultural specificities, the needs of post-war recovery, and the potential of women's initiatives. The participation of the Foundation in international forums, exhibitions, and projects enables not only the exchange of experience but also the development of its own standards, which can be exported to other countries.

Barriers to adaptation: cultural, economic, logistical. Despite its high potential, the adaptation of the HT-GBT model in Ukraine faces several barriers. Cultural barriers include distrust of non-traditional forms of therapy, low awareness of apitherapy, and stereotypes regarding the role of women in the economy. Economic barriers involve limited access to financing, market instability, and the absence of mechanisms to support social entrepreneurship. Logistical barriers include a lack of infrastructure, difficulties in product certification, and the absence of a regulatory framework for therapeutic tourism. Overcoming these obstacles requires cross-sectoral cooperation – between communities, the state, international partners, educational institutions, and civil society organizations.

Strategic significance for Ukraine. In the post-war context, the HT-GBT model can become part of the national recovery strategy. It combines economic activity with care, rehabilitation, and ecological responsibility. This is particularly important for people who have lost their jobs, homes, or loved ones and are seeking new forms of self-realization. The adaptation of the model also contributes to the formation of a new culture of entrepreneurship, where profit is combined with social impact. This corresponds to global trends – the care economy, the green transition, and inclusive development. Ukraine has the opportunity not merely to adopt the model but to become its leader in Eastern Europe.

Regulatory framework. The adaptation of the HT-GBT model requires a clear understanding of current Ukrainian legislation regulating the fields of social entrepreneurship, rehabilitation services, apitherapy, and green tourism. At present, these areas often remain outside systemic regulation, creating legal uncertainty for local initiatives. The absence of apitherapy standards, inconsistencies between medical

and social services, and the complexity of registering a social enterprise all complicate the implementation of the model. Therefore, it is important not only to adapt practices but also to initiate advocacy for change: the inclusion of therapeutic tourism in state programs, the development of certification mechanisms, and the creation of a regulatory framework for mobile therapeutic stations and stationary api-spaces.

Financial model and sources of sustainable financing. In order for the HT-GBT model to be viable in Ukrainian conditions, it is necessary to develop a financial model that combines social mission with economic efficiency. Therapeutic apiaries, educational programs, apitherapy services, and honey production can serve as sources of income for civil society organizations, cooperatives, or women's enterprises. At the same time, it is important to ensure access to start-up capital—through grants, social investments, crowdfunding, or state support programs. Successful examples from V4 countries demonstrate that the combination of local production, tourism, and therapy can be financially sustainable if adequate marketing support, community partnerships, and a transparent reporting system are provided.

Impact indicators and monitoring. For the HT-GBT model to be scalable and attract donor support, it is necessary to implement a system of monitoring and evaluation of effectiveness. Indicators should cover social, economic, and psychological impact: the number of program participants, level of satisfaction, improvement of psycho-emotional state, volume of products sold, and creation of new jobs. It is also important to consider qualitative indicators – changes in community dynamics, growth of trust, and the emergence of new leadership initiatives. Such a system will not only allow for the assessment of project success but also enable adaptation to the needs of different regions, ensure transparency for partners, and build an evidence base for policy advocacy.

Gender dimension and the role of women. The HT-GBT model has strong gender potential, as it creates conditions for the economic activity of women in rural communities, who often remain outside the formal labor market. Apitherapy, apiary care, and garden therapy can become sources of income, forms of self-realization, social recognition, and leadership. In the wartime context, when many women have lost

loved ones or are forced to adapt to new circumstances, such a model can serve as a tool for recovery. It is also important to ensure access to training, mentorship, and resources – and to create a support network that enables women not only to work but also to influence the development of their communities.

Figure 3.7. Photo from the women's apiary.
Image from the archive of Natalka Poturai, 2025

Digitalization opportunities and online component. Digital tools can significantly expand access to therapeutic practices, education, and communities. Online courses on apitherapy, virtual tours of apiaries, and platforms for booking group therapeutic services all allow the model to be scaled without major investments in infrastructure. In addition, digitalization opens opportunities for creating online communities of women entrepreneurs, apitherapists, and project coordinators, who can exchange experiences, support one another, and shape a new culture of interaction. In the context of war and displacement, the online component also enables maintaining

connections with communities, supporting psycho-emotional health, and ensuring continuity of learning.

Risks and ethical aspects. Despite its positive potential, the implementation of the HT-GBT model must take into account risks and ethical challenges. The commercialization of therapy may lead to the exploitation of vulnerable groups, especially if the principles of voluntariness, informed consent, and safety are not observed. It is important to avoid situations where therapeutic practices are used merely as a marketing tool without real impact on health or well-being. Therefore, ethical standards must be developed, staff training ensured, and mechanisms for feedback and control established. The ethics of care must be not only a declaration but a practice – in every project, every interaction, and every decision.

The relevance of integrating therapeutic gardening into the HT-GBT model is confirmed by contemporary research. In particular, in the article by Zhurba & Kosovska (2025), the authors analyze therapeutic gardening as an innovative method of rehabilitation and a promising direction for the development of rural green tourism in Ukraine.

The study emphasizes that such practices not only contribute to psychological recovery but also stimulate the local economy, create new jobs, and build an infrastructure of care based on the natural environment.

It is important to note that any form of therapy must be conducted by a qualified specialist, while the beekeeper can provide the space, conditions, and tools for collaboration and for creating synergy between economically and socially significant activities.

CHAPTER 4

AROMATHERAPY: A JOURNEY TO THE SELF THROUGH SCENTS AND SENSATIONS

Svitlana Volynets

4.1. Aromatherapy as a Response to the Challenges of War

During the war, Ukrainian society experiences chronic tension, loss of security, high emotional fatigue, and the accumulation of stress. Women and children are particularly vulnerable – they simultaneously hold the emotional frontline while themselves needing support. In response to these challenges, interest in natural methods of recovery is growing – therapeutic practices connected with the body, breathing, nature, and scents. One such direction is aromatherapy – a method that combines the physiological mechanisms of the influence of aromas with the possibility of gentle psycho-emotional correction.

Aromatherapy (from Greek aroma "fragrant herb," therapeia "care") is a branch of phytotherapy that uses essential oils to support physical and psycho-emotional health. According to Ukrainian professional sources, aromatherapy is defined as "a method of prevention and correction of functional states of the body through essential oils that enter the organism via the respiratory tract or skin and exert a regulatory influence on the nervous, endocrine, and immune systems" (Hrynko & Melnyk, 2017).

In the textbook *Pharmacognosy with Fundamentals of Plant Biochemistry* it is noted that essential oils of aromatic plants are used for therapeutic and preventive purposes due to their ability to affect the psycho-emotional state, as well as the functioning of the cardiovascular and respiratory systems (Lytvynenko et al., 2014).

The scientific definition of aromatherapy in peer-reviewed articles from different countries has evolved over the years, reflecting the transformation of societies that required new natural practices.

We encounter the following definitions.

Buckle (2003), in her book Clinical Aromatherapy: Essential Oils in Practice, writes that aromatherapy is the controlled use of essential oils to support and strengthen physical, psychological, and spiritual health.

Cooke et al. (2007), in the Australasian Emergency Nursing Journal, indicate that aromatherapy involves the use of essential oils extracted from plants for therapeutic purposes, which are often administered through inhalation or topical application.

Lee et al. (2012), in the Journal of Korean Academy of Nursing, define aromatherapy as the therapeutic use of essential oils from aromatic plants to improve physical, emotional, and spiritual well-being.

A B C D

Figure 4.1. Various natural materials that can be used in aromatherapy due to their content of volatile aromatic compounds.
Images A–C by Silvia, D by Melanie from Pixabay

Agatonovic-Kustrin et al. (2020), in their work on age-related disorders, define aromatherapy as the therapeutic use of essential oils rich in terpenoids for mood modulation, reduction of anxiety, and

support of mental health, often as a complement to pharmacological treatment.

Ni & Zhou (2021), in their study of ergonomics methods in healthcare, describe aromatherapy as the application of volatile plant extracts in public or clinical settings to improve psychological well-being and reduce stress, particularly during health emergencies such as the COVID-19 pandemic.

Tatavarti et al. (2025), in the article Supportive Therapy during Cancer, define aromatherapy as a complementary intervention involving the use of essential oils to alleviate symptoms such as pain, anxiety, and sleep disturbances, especially in oncology settings.

We can thus formulate a generalized academic definition: **aromatherapy** is a branch of complementary therapy based on the use of volatile aromatic compounds aimed at influencing the psycho-emotional state, physiological functions, and quality of human life through meditative, inhalation, transdermal, or other routes of administration.

Accordingly, aromatherapy lies at the intersection of physiology, psychology, botanical pharmacology, and somatic regulation, which makes it particularly relevant in programs of recovery after traumatic experiences and the consequences of war, as well as in group psychological support for women.

4.2. Scientific Basis: The Limbic System, Stress, and Body Memory

To explain why aromatic stimuli can evoke an emotional response more quickly than verbal information or cognitive interpretations, it is appropriate to refer to the popular psychophysiological concept known as the "triune brain" model (MacLean, 1990). According to this conditional model, the human brain consists of three evolutionarily developed levels – the reptilian brain, the limbic system, and the neocortex – each responsible for specific types of behavioral and psycho-emotional reactions (Table 4.1).

The limbic system – the emotional center of the brain – plays a key role in shaping the sense of safety or danger. It includes several important structures that respond to aroma even before we consciously realize that we have perceived something.

Table 4.1. Simplified model of human behavioral and psycho-emotional reactions, according to MacLean (1990)

Brain Structure	Function	Behavioral Manifestation
Cerebral Cortex (Neocortex)	logical thinking, planning, analysis	"i think," "i understand what is happening to me"
Limbic System	emotions, memories, attachment reactions	"i feel scared / warm / safe"
Brainstem (Reptilian Brain)	automatic survival reactions	heartbeat, breathing, "fight / flight / freeze"

The amygdala is the "emotional alarm," instantly evaluating sensory signals as safe or threatening. A pleasant aroma reduces its activity, sending the body a signal of relaxation.

The hippocampus is the "library of memories," forming associative images and emotional reactions based on past experience. This explains, for example, why the scent of lavender can evoke feelings of home and comfort.

The hypothalamus is the center of hormonal regulation, controlling vital rhythms, breathing, pulse, and body temperature. Pleasant scents, for instance, contribute to lowering cortisol levels – the stress hormone – thus stabilizing physiological processes.

In a state of chronic stress accompanying life during war, these mechanisms become disrupted. Under the influence of constant danger, loss, and uncertainty, the body shifts into survival mode, which leads to a range of physiological and psychological consequences: cortisol and adrenaline levels increase; sleep, breathing, and thermoregulation rhythms are disturbed; the ability to concentrate and maintain bodily awareness decreases; emotions become unstable; and phenomena of dissociation appear – "I do not feel myself," "I seem disconnected," "my body feels like stone."

According to neuropsychological studies of post-traumatic experience (McEwen, 2017), **prolonged stress causes structural and functional changes in the brain:** the hippocampus decreases in volume, which complicates learning, memory, and the integration of

experience; the amygdala becomes hyperactive, intensifying anxiety and danger responses; the prefrontal cortex loses its ability for rational analysis of emotions and behavior.

Figure 4.2. Group aromatherapy session
Photo from the archive of Svitlana Volynets, 2025

In such conditions, the limbic system and brainstem begin to dominate, while the cortex effectively "switches off." Therefore, rational advice such as "calm down," "think positively," or "control yourself" does not work – the body lacks access to the mechanism of self-soothing.

To restore the nervous system's capacity for self-regulation, it is necessary to reestablish bodily sensation. When we once again feel our own body, the system receives a signal of safety. Creating such an "anchor" – a simple, familiar sensory stimulus – reminds us: "I am here, everything is all right with me."

Aroma is precisely such a signal. It requires no words, demands no analysis, and acts directly through the body. Olfactory information follows a unique pathway: it bypasses the cerebral cortex and enters

directly into the limbic system. This makes aroma a powerful tool for working with deep emotional states.

The principle is based on the following: aroma enters the nasal cavity, odor molecules bind to the receptors of the olfactory epithelium, the signal is transmitted to the olfactory bulb, and from there – without the involvement of the cortex – it reaches the limbic system: the amygdala (emotional reaction), the hippocampus (memories and images), and the hypothalamus (hormonal regulation).

For example: we inhale the scent of lavender → the amygdala receives the signal "safe" → the heart slows down → the body relaxes → and only then do we think: "Mmm, pleasant smell".

In the context of recovery, aromatherapy is widely used to overcome the symptoms of chronic stress (Table 4.2).

Table 4.2. Ways of Positive Influence on Chronic Stress through Aromatherapy

Symptom of Chronic Stress	Aromatherapy Support
Persistent anxiety, hypervigilance	reduction of amygdala hyperactivation
Emotional numbness, "I feel nothing"	restoration of bodily sensitivity through aroma + touch
Fatigue, "no energy"	gentle stimulation of the nervous system via olfaction
Sleep disturbances	regulation of breathing and rhythms through calming oils
Sense of self-loss	formation of an "aroma-anchor" as a feeling of inner home

What does this mean for recovery from stress? Aromas require no words; they are suitable for people in states of exhaustion or emotional numbness; they act gently and naturally; they restore the contact of "I feel my body" and return the capacity to be present.

Aromatherapy does not "heal trauma," but it supports the restoration of a basic sense of safety in the body, which is fundamental for psychological stability, the recovery of sleep, energy, and the feeling of "I am alive again."

4.3. Properties and Quality Criteria of Raw Materials for Aromatherapy

Essential oils are concentrated volatile compounds found in aromatic plants that determine their fragrance, biological activity, and pharmacological properties. They consist primarily of terpenes, aldehydes, alcohols, ketones, and esters, which have the ability to penetrate through the skin and mucous membranes and influence the nervous, endocrine, and immune systems.

The main therapeutic properties of essential oils are presented in Table 4.3.

Table 4.3. Properties of Essential Oils

Property	Mechanism of Action	Examples of Oils
Antibacterial and Antiseptic	destroy cell walls of bacteria and fungi, inhibit the growth of microorganisms	tea tree, eucalyptus, lavender, lemon
Anti-inflammatory	reduce local inflammation, decrease redness and pain	chamomile, calendula, frankincense, sage
Restorative and Regenerative	stimulate cellular renewal, support healing processes	rose, neroli, sandalwood, lavender
Regulation of the Nervous System	affect the limbic system, reduce stress response, stabilize emotions	lavender, bergamot, mint, jasmine
Respiratory Support	dilate airways, facilitate breathing	pine, eucalyptus, thyme, cedar

Quality is a key factor. The therapeutic effect of an essential oil depends on its chemical composition, purity, and method of extraction. A natural, high-quality essential oil meets the following criteria:

- it has a clear, homogeneous consistency without sediment;
- it contains no synthetic additives or stabilizers;
- it has a vivid, unfixed aroma that changes during inhalation;

- it contains active molecules (e.g., linalool, cineole, geraniol) that interact with cell receptors and neurotransmitter systems.

Synthetic or diluted oils do not have therapeutic effects. They only create a scent but lack bioactive components (terpenes, aldehydes, ketones) capable of penetrating the skin and mucous membranes, activating the limbic system, and influencing hormonal balance. This is why perfumes, scented candles made from synthetic or chemically produced materials (paraffin, vegetable waxes, aroma lamps with cheap substitutes for essential oils) do not work therapeutically – they create an atmosphere but do not trigger self-regulation processes. Moreover, they may even be harmful.

For example, soy and coconut waxes, which are widely used today in aromatherapy – particularly in candles, creams, and products for aroma massage – are considered natural bases. Synthetic waxes also include gel wax, produced from a mixture of polymers and mineral oil, which is transparent.

Soy wax is obtained from soybean oil through hydrogenation; that is, it is a natural vegetable fat transformed into solid wax by chemical-physical means. The production technology includes: **pre-pressing** and **extraction** (soybeans are cleaned, dried, and ground, mechanically pressed, and extracted with solvents); **chemical hydrogenation** (with the addition of hydrogen under pressure in the presence of a catalyst, usually nickel); **purification** (by mechanical methods); and **chemical stabilization** (filtered, deodorized, and stabilized), as described below.

Coconut wax is obtained from coconut oil, with a production technology similar to the previous one – through hydrogenation.

Hydrogenation is a chemical reaction in which hydrogen is added to unsaturated fatty acids in vegetable oil, occurring under high pressure and temperature in the presence of a catalyst, usually nickel.

Nickel can negatively affect the body through inhalation or skin contact, especially in the form of its compounds such as nickel carbonyl, sulfate, chloride, or oxide, which may be produced during chemical reactions. These compounds can cause allergic reactions and irritation, and at industrial concentrations – chronic poisoning. The most dangerous form is nickel carbonyl ($Ni(CO)_4$), classified as hazard class 1, which can lead to pneumonia, pulmonary edema, and neurotoxic

effects. Symptoms include chest pain, shortness of breath, cough, nausea, headache, and weakness.

Other compounds (nickel sulfate, nickel chloride, nickel oxide) may cause chronic poisoning under prolonged exposure to the respiratory tract, potentially leading to bronchitis and allergies. Nickel is also one of the most common contact allergens. It can cause contact dermatitis (itching, redness, rash) and chronic irritation. In cosmetics and personal care products, permissible levels of nickel are strictly regulated, but sensitive individuals may react even to trace amounts. Nickel used as a catalyst in the hydrogenation of vegetable oils (including soybean and coconut oils) is removed after the reaction through filtration and purification. In the finished wax, **its residues should be minimal or absent**.

Purification is carried out mechanically. Nickel is usually used in the form of solid particles (such as nickel granules or powder), which do not dissolve in oil. This makes it possible to mechanically separate it after the reaction is completed. For filtration, special filter presses or centrifuges are employed, ensuring a high degree of purification.

Purification and refining of vegetable oils is a complex of chemical and physico-chemical processes. Deodorization, neutralization, and bleaching involve the use of reagents, sorbents, and temperature regimes that alter the composition of the oil.

Neutralization (removal of free fatty acids) is a chemical reaction with sodium hydroxide (NaOH).

Deodorization (removal of odors and volatile substances) is steam distillation under vacuum at temperatures of +180…+260 °C, during which chemical changes and the decomposition of volatile compounds occur.

Bleaching is the removal of pigments, residual metals, and oxidation products, for which activated clays (bentonite, kaolin), activated carbon, and acids (phosphoric, citric) are used for preliminary treatment. In other words, the oil/wax is mixed with sorbents and then filtered. **As a result**, such oils become stable, light-colored, odorless, and suitable for further hydrogenation or for use as wax, as well as for creating various chemical colors and aromas. Therefore, it is important to use truly natural oils without additional technological processing.

A generalized characterization of the examined waxes and beeswax is presented in Table 4.4.

Table 4.4. Technological Characteristics of Wax for Use in Aromatherapy

Technological Stage	Beeswax	Soy Wax	Coconut Wax
Raw material origin	Product of bee activity	Soybean oil (from soy seeds)	Coconut oil (from coconut pulp)
Neutralization	Not applied	**Yes**, with NaOH	**Yes**, less often with NaOH, sometimes not required
Bleaching	Not required	**Yes**, activated clays, phosphoric acid	**Yes**, minimal with acids, or not applied
Deodorization	Not applied	**Yes**, steam distillation at 180–260 °C	**Yes**, mild or not performed
Hydrogenation	Not applied	**Yes**, with nickel	**Yes**, mild hydrogenation with nickel
Catalyst (nickel)	Absent	**Yes**, removed after reaction	**Yes**, removed after reaction
Degree of processing	Natural, unprocessed	Natural raw material, chemically processed	Natural raw material, partially chemically processed
Final product	Natural wax with characteristic aroma	Solid wax, odorless, light-colored, stable	Soft wax, odorless, sometimes with a slight coconut aroma
Melting temperature, °C	62–65	49–54	32–39

Note. *The melting temperature (°C) can be used as an indicator to prevent falsification of beeswax.*

Thus, the safety of using waxes based on vegetable oils can be ensured only through high-quality technological processes and the availability of confirming documentation regarding the absence of chemical residues in the raw material.

In contrast, beeswax is a natural aromatic complex that does not require additional flavoring. Its aroma is the result of biological synthesis and the enzymatic activity of bees, rather than chemical aromatization. Therefore, it contains natural aromatic compounds that form its characteristic honey-floral scent. The basis of this aroma consists of complex esters, aldehydes, ketones, and terpene components.

Essential oils are highly concentrated substances. Most of them should not be applied to the skin in pure form, as this may cause irritation or allergic reactions. Exceptions include lavender and tea tree oils, which are sometimes used topically in microdoses.

It is important to take into account the contraindications for the use of essential oils (Table 4.5).

Table 4.5. Contraindications for the Use of Essential Oils

Condition	Explanation	Alternatives
Asthma / Bronchospasm	some oils may provoke spasm or irritation	lavender, chamomile (gentle, non-inhalation options)
Pregnancy (First Trimester)	many oils have embryotoxic effects or stimulate the uterus	citrus oils, lavender, neroli (after the second trimester)
Allergy / Sensitive Skin	possible reaction to oil components	patch test, use in a diffuser or on fabric

In a therapeutic context, essential oils require careful selection and dosage, particularly when working with vulnerable groups such as children, pregnant women, and individuals with chronic illnesses.

They act most safely and naturally within a living environment, as part of a holistic space that integrates aromas, touch, the rhythms of nature, and bioactive air. This approach is embodied in apigarden therapy – a comprehensive practice of restoration carried out in the apiary.

4.4. Apigarden Therapy: A Holistic Space for Restoration

Apigarden therapy is a comprehensive therapeutic practice that integrates the resources of the apiary, the garden, and living nature to support psycho-emotional, bodily, and hormonal balance. It is grounded in the principles of integrative medicine, neuropsychology, aromatherapy, and ecotherapy, creating an environment in which the organism receives a multi-channel signal of safety.

Unlike the isolated use of essential oils, apigarden therapy operates through a holistic sensory field—combining scents, sounds, temperature, vibrations, light, breathing rhythms, and silence. This approach activates not only the olfactory system but also the tactile, vestibular, auditory, and proprioceptive channels, which are often "switched off" under conditions of stress. The **key therapeutic elements** of apigarden therapy are presented below.

Aromas of melliferous plants – natural essential compounds that act gently, gradually, and safely, without overloading the nervous system.

Bioactive hive air – enriched with phytoncides, propolis, and honey vapors; it possesses anti-inflammatory, immunomodulatory, and calming properties.

Hive therapy – lying on hives, which combines vibrations, warmth, scents, and contact with the earth. This practice promotes deep relaxation, reduces anxiety, improves sleep, and enhances emotional stability.

Bee vibrations – function as natural microstimulation, harmonizing brain rhythms and stabilizing the autonomic nervous system.

Consumption of bee products – honey, bee bread, pollen, royal jelly, and propolis contain enzymes, amino acids, flavonoids, and adaptogenic substances that support energy balance, regulate immune and hormonal activity, improve microbiota and mucosal health, and contribute to recovery from exhaustion, prolonged stress, sleep disturbances, and appetite disorders. The consumption of bee products in the context of apigarden therapy is not merely nutrition, but part of a sensory experience: honey possesses aroma, texture, temperature, and the rhythm of dissolution within the body.

Silence and garden sounds reduce sensory overload and activate the parasympathetic branch of the nervous system, which is responsible for recovery.

Embodiment in nature restores contact with oneself, lowers cortisol levels, and normalizes breathing and heart rhythm.

Contemporary scientific studies (Scott, Weigand, & Thayer, 2020; Aras, Yilmaz, & Yildirim, 2024; Higuchi, Nakamura, & Yamamoto, 2025) confirm that being in a natural environment reduces stress levels and improves heart rate variability (HRV), which is a marker of nervous system adaptability. The influence of aromas, natural sounds, and micro-vibrations activates the limbic system, decreases amygdala hyperactivation, and supports the restoration of homeostasis.

4.5. Practical Experience of Group Training

The theoretical foundations of apigarden therapy were integrated into the international project "Health Tourism: Garden and Apitherapy for the Mental Health of Ukrainian Women and Children", coordinated by ALEJ NA PRAMENI, o.z./Alley in "Pramen" neighbourhood in partnership with the NGO Foundation of Women Beekeepers.

Within the framework of the project, a three-hour training session entitled "Journey to Oneself through Aromas and Sensations" was held in the city of Nitra (Slovak Republic). This practical session was dedicated to reconnecting with one's body, cultivating a sense of grounding, and creating an aromatic resource that participants could carry with them.

The training was designed and conducted by Svitlana Volynets – a practicing psychologist, Development Director of Apiprodukt LLC (www.apiprodukt.ua), expert in apitherapy and healthy living, Vice-President of the NGO Association of Apitherapists of Ukraine, Head of the "Apitherapy" program at the NGO Foundation of Women Beekeepers, member of the Global Team IFA (International Federation of Apitherapy), and holder of a Master's degree in Food Technology with specialization in Nutrition Science (NULES of Ukraine). Also the author and developer of the channel "Apiznavstvo", which you can join using the attached QR code.

Practical Experience of Group Training
"Journey to Oneself through Aromas and Sensations"

In working with women who have experienced war, loss, or separation from home or family, what matters is not only the method of aromatherapy itself but also the way it is delivered.

A **safe space** is the foundation of psycho-emotional work. Its creation allows participants not "merely to perceive a scent," but to encounter themselves without fear of overload or judgment.

Fundamental Principles of a Safe Space

1. **Voluntary participation** – no exercise is mandatory; each woman has the right to pause, leave, or remain in silence.
2. **Absence of evaluation and comparison** – within the group there are no "correct" reactions; everything that arises is part of the individual process.
3. **Embodiment** – the facilitator gently guides participants' attention back to breathing, bodily surfaces, and tactile contact with objects, helping to maintain stability in the moment.
4. **Respect for personal boundaries** – an invitation rather than a requirement: "If you feel comfortable now, you may close your eyes; if not, simply observe."
5. **Absence of interpretations** – the facilitator does not interpret experiences; there are no explanations such as "this means that you…"; each participant defines the meaning of her own experience

Different Emotional Reactions as Part of the Healing Process

During the training in Nitra, participants experienced a wide range of reactions:

- Tears as a form of tension release and the return of feelings.
- Quiet concentration as a sense of inner presence.
- Tension or resistance, which is a normal reaction of the psyche accustomed to self-protection.
- Smiles, warm memories, and a sense of lightness as indicators of the activation of resource layers of memory.
- Uncertainty or surprise, when the body and emotions move faster than the mind.

It is **important** to emphasize that no reaction requires correction. The facilitator does not "change" the participant's state; rather, they provide conditions for her natural self-regulation.

Trainer competence as a key factor. Conducting aromatherapy groups requires specialized preparation. The trainer should possess:

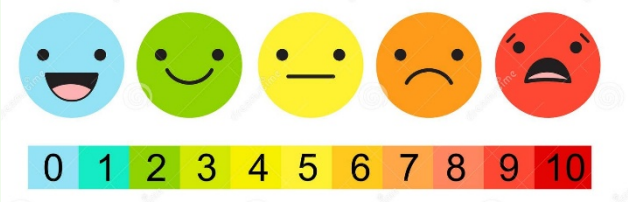
- Knowledge of the neuropsychology of stress, in order to understand bodily and emotional reactions.
- Basic skills for stabilizing the nervous system, including techniques of breathing, grounding, and bodily awareness.
- The ability to lead the group without pressure, yet with support and structure.
- Personal stability and self-regulation (a trainer cannot lead a group if emotionally unstable at the time of the session).

In trauma work, the main goal is not to "release emotions," but to enable the individual to feel her capacity to remain in contact with herself without being destroyed by that contact.

Structure of the Training: Exercises and Dynamics

Exercise 1. Internal State Barometer.

Participants assessed their level of tension on a scale from 1 to 10. This created an entry point and an opportunity to become aware of changes.



Exercise 2. Theoretical Block: How Aroma Influences the Psyche.

An explanation of the mechanisms of the limbic system enabled women to understand that their reactions were normal and not a sign of "weakness."

Exercise 3. Lavender Aroma Practice.

Each participant received a vial containing salt and lavender essential oil. The exercise was carried out through breathing, tactile contact, associative imagery, and awareness of bodily sensations. This created an aroma-anchor of calm—an individual tool for self-soothing.

Exercise 4. Metaphorical Cards The Herbal Astrology Oracle.

These were used to work with imagery and inner meanings without direct analysis or psychological pressure.

Exercise 5. Practice "Aroma-Anchor + Visualization."

Participants created an inner space of calm associated with the scent. Subsequently, the aroma of lavender became a signal for returning to this state.

Exercise 6. Final Integration.

A comparison of the "initial state" and the "post-session state" showed changes in most participants, with a reduction of tension by 1–3 points.

Conclusions

Aromatherapy is an important tool of sensory and psycho-emotional self-regulation, acting through the limbic system—the center of emotions, memory, and hormonal balance. Its influence begins even before conscious awareness, helping to reduce stress, hyperactivation, and internal tension. In the context of war and widespread traumatic experience, aromatherapy acquires particular value as a gentle, accessible, and safe method of support. It can be applied in psychosocial adaptation programs; in practices for stabilizing the nervous system; in group work with women and children; and as an individual instrument for reconnecting with the body and experiencing inner grounding. Aromatherapy is not an alternative to psychotherapy or medical treatment, but its effectiveness increases when integrated into comprehensive recovery programs. It contributes to the restoration of bodily sensitivity, the reduction of anxiety symptoms, the normalization of breathing, and the formation of an *aroma-anchor* as a marker of safety. Scent can become a memory of calm – a deep inner resource to which one may return even in difficult moments. The formation of such an inner "*aromatic dwelling*" supports the nervous system during periods of uncertainty and fosters the restoration of a sense of wholeness. Thus, aromatherapy is regarded not merely as a means of relaxation, but as an instrument for restoring the connection between body, emotions, and lived experience. It helps the individual to once again feel present, alive, and capable of breathing freely.

CHAPTER 5

BIODIVERSITY AS A SOURCE OF HUMAN HEALTH AND WELL-BEING

Dina Lisohurska

In today's world, undergoing profound ecological, social, and economic transformations, the concept of human well-being and health is inseparably linked to the state of the natural environment. Biodiversity provides fundamental ecosystem services that sustain life on the planet – from air and water purification to the formation of psycho-emotional comfort and social stability.

Within the framework of the One Health concept (2022), it is recognized that the health of humans, animals, and the environment are interdependent components of a single system.

To understand these interconnections, it is important to define the basic concepts of biodiversity and health. They are enshrined in key international documents – the Convention on Biological Diversity (UN, 1992) and the Constitution of the World Health Organization (WHO, 1946).

The definition of biological diversity was adopted at the United Nations Environment Summit in 1992, according to which it refers to the variability among living organisms from all sources (terrestrial and aquatic) and the ecological complexes of which they are part; this includes variability within species, between species, and of ecosystems.

The World Health Organization (WHO) defines health as a state of complete physical, mental, and social well-being, and not merely the absence of disease or infirmity (1946). This means that health is not reduced to the medical absence of illness, but encompasses balance, harmony, and well-being at all levels – physical, psychological, and social.

Marselle et al. (2021) refer to a wide range of studies demonstrating that biodiversity affects both physical health (Lovell et

al., 2014; Romanelli et al., 2015; Aerts et al., 2018) and mental well-being (Lovell et al., 2014; Korpela et al., 2018; Marselle et al., 2019).

The importance of deep connections between biodiversity and human health is increasingly recognized at the international level and enshrined in global policy documents. Thus, the World Health Organization (WHO), in partnership with the Convention on Biological Diversity (CBD, 2016), implements a Joint Work Programme mechanism aimed at raising awareness of how biodiversity affects human health and well-being. This initiative seeks to integrate the role of biodiversity into health policies and to strengthen cross-sectoral coordination of actions.

In their review study, Robinson et al. (2024) classified the impacts of biodiversity on human health through different pathways (Fig. 5.1)

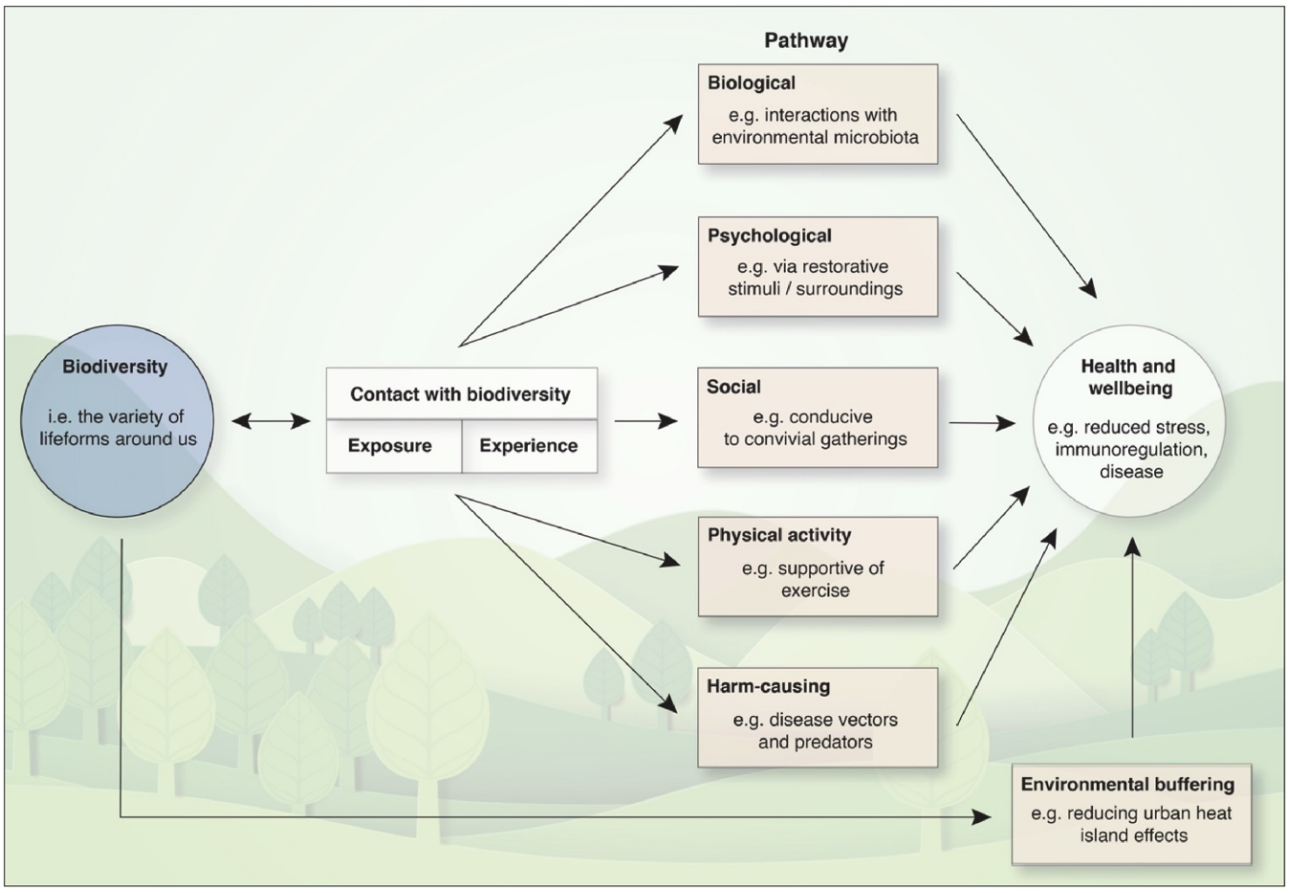


Figure 5.1. Pathways of Interconnection between Biodiversity and Human Health (after Robinson et al., 2024)

By defining these mechanisms of interaction between natural stimuli and bodily responses, researchers emphasize their interdependence and the complex impact on human well-being. In

particular, they distinguish five main pathways of "nature–health" interaction:

a. **Biological** – physical interactions between humans and other biological components of the natural world (microbiota, volatile organic compounds of plants).

b. **Psychological** – interactions between natural environmental stimuli and the affective or cognitive system of humans.

c. **Social** – characteristics, spaces, and interactions that foster social activity.

d. **Through physical activity** – elements of the natural environment that stimulate movement and the performance of physical exercise.

e. **Ecological buffering** – components and processes of nature that physically mitigate the negative effects of pollution and other environmental stressors.

Table 5.1 presents an example of the health impacts associated with each "nature–health" pathway.

Table 5.1. Example of Health Impacts of Each "Nature–Health" Pathway (after Robinson et al., 2024)

Pathway	**Example of Health Impact**
Biological	Regulation of the immune system as a result of exposure to diverse environmental microbiota.
Psychological	Reduction of anxiety levels through presence in calming and restorative natural environments.
Social	Decrease in overall mortality risk due to social cohesion and collective interaction (social isolation is a major risk factor for mortality).
Physical activity	Improvement of cardiovascular functioning through physical activity in natural environments that encourage movement.
Ecological buffering	Benefits for the respiratory system through reduced air pollution by natural elements such as trees.

This review study provides a comprehensive assessment of existing evidence confirming the interconnections between biodiversity and

human health. The authors emphasize the need for more targeted research using specific biodiversity indicators to deepen the understanding of mechanisms of interaction between environmental influences and health status.

The identification of current scientific approaches creates a reliable foundation for further studies aimed at expanding knowledge and developing practical recommendations for improving public health and well-being.

The conclusions obtained have not only theoretical but also applied significance, as they highlight the need to improve ecosystem restoration policies as an effective instrument of public health protection. Such policies should envisage broader consideration of mutual benefits for humans and nature in the implementation of nature-based solutions, promote the integration of One Health principles, and foster the development of a harmonious interaction between humans and the environment.

In this regard, particular attention should be paid to biodiversity in private and garden plots, which may become important elements of urban or regional ecological networks. Below are key strategies, confirmed by contemporary research, that can be implemented within such policies to enhance biodiversity in homesteads and household plots.

Taking these recommendations into account, it is also appropriate to focus on specific practical solutions. One promising direction is the development of biodiversity within private gardens and apiaries – as elements of health-oriented tourism. Such areas can become not only decorative but also functional spaces that strengthen the therapeutic effect of nature, deepen tourists' ecological connection with the environment, and stimulate the provision of local ecosystem services.

Biodiversity in the garden–apitherapeutic context is of key importance. First, plant diversity provides bees with a wide spectrum of pollen and nectar, which supports their health, resilience, and colony productivity (studies demonstrate a direct link between floristic diversity and the stability of bee colonies). For example, in the study by Garibaldi et al. (2022), the pathways through which pollinator health is connected to human health are examined—specifically through nutrition, psychological effects, and the provision of medicinal resources.

Secondly, there is a strong link between human perception of biodiversity and psychological well-being: studies show that individuals with high "nature connectedness" respond more positively to biodiversity – for instance, increases in the presence of birds, butterflies, or flowers have a beneficial impact on emotional state. Therefore, when embedding principles of biodiversity into the design of a health garden with apitherapy, we not only support bee health but also enhance the therapeutic effect for visitors, ensure ecosystem stability, and open opportunities for monitoring the state of nature within the framework of health-oriented infrastructure (De Vrieze et al., 2025).

Figure 5.2. Homestead Applying Principles of Biodiversity Against the Background of Neighboring Monocultures

Photo: Leonora Adamchuk, 2025

In the following section, a system of strategies is presented, grouped on the basis of an analysis of contemporary scientific publications (2020–2025), which demonstrate the effectiveness of ecological approaches to enhancing biodiversity in the context of garden therapy and apitherapy. The application of these strategies

allows the integration of aesthetic, ecological, and health functions of garden spaces, creating a favorable environment for humans, bees, and other living organisms.

Such strategies include:

1. **Use of local (endemic) plant species.**
2. **Creation of complex spatial structures and habitat mosaics.**
3. **Minimization of intensive interventions.**
4. **Maintenance of soil biodiversity.**
5. **Provision of water sources, shelters, and refuges.**
6. **Support for connectivity with surrounding green areas.**
7. **Continuous monitoring and adaptive management.**

The implementation of these principles contributes not only to the ecological resilience of garden ecosystems but also to the creation of environments with high therapeutic potential. Such environments positively influence the psycho-emotional state of humans, support the vitality of honeybees and other beneficial insects, and serve as natural indicators of environmental conditions.

The use of local (endemic) plant species – planting autochthonous crops that sustain natural trophic chains, provide a forage base for pollinators, birds, and other fauna, enhance the ecological resilience of plantings, and reduce the need for additional irrigation or fertilization. This approach contributes to the formation of balanced ecosystems in which the interaction between flora and fauna ensures natural self-regulation and the sustainable functioning of the garden biocoenosis.

In designing a health garden with apitherapy, particular attention should be paid to the selection and composition of local (endemic) plants. Research shows that the characteristics of the garden itself – particularly plant composition – may exert a significantly greater influence on pollinator diversity than the surrounding landscape. This means that planning should not only take into account the broader context but also carefully select species and their arrangement within the garden.

Applying such an approach ensures more effective attraction of pollinating insects, strengthens ecosystem linkages, increases the productivity of bee colonies, and consequently enhances the therapeutic potential of the garden. For example, typical local plants of the Kyiv region (Ukraine) include the following

Martagon Lily (*Lilium martagon*), mentioned as one of the flora species within the Holosiivskyi National Nature Park – a natural reserve in Kyiv and the surrounding region. It is a perennial bulbous plant that inhabits oakwoods and mixed forests (Fig. 5.3).

Figure 5.3. Six-spot Burnet *(Zygaena filipendulae)* on Martagon Lily *(Lilium martagon).* Image by Marc Pascual from Pixabay

It can be used in the context of ecological zones, conservation programs, or eco-labeling of local homestead areas, particularly if adjacent to forest or semi-wooded plots. Flowering period: June–July. Nectar value: weak, due to limited access to the deep floral tubes where sweet secretions accumulate. Pollinators: bumblebees (Bombus), true butterflies (Papilionoidea), skippers (Hesperioidea), hawk moths (Sphingidae). Significance: supports populations of specialized pollinators in forest ecosystems, important for biodiversity, though not directly for beekeeping production.

Bear's Garlic (*Allium ursinum*) is listed among the rare or protected flora species of the Kyiv region. It grows in moist forests and shaded areas, and may have potential as a local natural component (for example, in the context of biodiversity or forest-adjacent apiaries). Flowering period: April–May. It produces whitish nectar and light-yellow pollen (Fig. 5.4).

Figure 5.4. Bear's Garlic *(Allium ursinum)*
Image by WikimediaImages from Pixabay

Pollinators: honeybees (*Apis mellifera*), wild bees (Andrena, Halictus), hoverflies (Syrphidae). Significance: one of the key spring forage resources in forest areas.

Greater Celandine (*Chelidonium majus*) – one of the species listed among the "Top 15 useful plants of the Kyiv region." It grows at forest edges and in shaded areas, and may be of interest as a "wild" element that can be incorporated into ecological landscapes around apiaries. Flowering period: May–August (Fig. 5.5).

Figure 5.5. Greater Celandine (*Chelidonium majus*)
Image by WikimediaImages from Pixabay

A highly productive pollen source, it does not produce nectar. Pollinators: small bees (Lasioglossum, Andrena), flies (Syrphidae, Calliphoridae), thrips (Frankliniella, Thrips, Scirtothrips). Significance: important for small wild pollinators in urban and homestead areas.

Careful formation of the floristic composition and plant arrangements within a health garden is of critical importance. In particular, Delahay et al. (2023) emphasize that plant composition and vegetation cover are strongly correlated with the number of animal species visiting the garden – that is, richer flora and denser vegetation create more attractive conditions for fauna.

Thus, in designing a therapeutic garden it is advisable not only to select local species but also to strive for dense, diverse, and multi-layered vegetation. This will not only increase the likelihood of visits by various species but also strengthen the ecological potential of the site as part of a network of conservation spaces.

Garden crops can not only preserve existing biodiversity but also play an active role in its dissemination beyond the plot. According to Staude et al. (2024), garden agroecosystems are capable of functioning as "distribution stations" for species, creating conditions for the natural migration of plants into adjacent landscapes. Such spaces contribute to the expansion of local species' ranges, the reduction of interspecific competition, and the maintenance of ecological balance in urbanized areas.

Therefore, in designing a health garden it is advisable to consider not only its local ecological functions but also its potential as a source of environmental renaturalization. Combining this approach with the careful selection of local plant species and the formation of multi-layered vegetation structures (Delahay et al., 2023) makes it possible to create an environment that simultaneously supports biodiversity at the local level and promotes its restoration in a broader ecosystemic context. Such a garden not only fulfills aesthetic and therapeutic functions but also becomes an effective element of the green infrastructure of the territory.

The creation of complex spatial structures and habitat mosaics involves shaping the garden space with different layers and types of microhabitats, which provide a wide range of conditions for the existence of various groups of living organisms. Such a structure encompasses a combination of trees, shrubs, herbaceous plants, flower meadows, natural clearings, as well as moist and dry areas, thereby creating numerous ecological niches.

The multi-layered and mosaic character of the garden increases its ecological resilience, supports the conservation of pollinators, birds, and small animals, and also establishes natural microclimatic regulation – reducing soil overheating, retaining moisture, and ensuring the stability of soil processes. Studies by contemporary landscape ecologists emphasize that mosaic habitat structures are a key factor in increasing species diversity in urbanized and recreational spaces (De Vrieze et al., 2025; Delahay et al., 2023).

The multi-layered plant design – combining trees, shrubs, and herbaceous species – enhances the number of ecological niches, offering diverse conditions of lighting, moisture, and structure for the existence of fauna (Fig. 5.6).

Figure 5.6. Visualization of homestead biodiversity enhancement strategies. Photo by Leonora Adamchuk, 2025

Note. *On the left – an example of a multi-layered flower bed in the interrows of fruit shrubs and trees. On the right – an example of path mulching and its bordering with a medicinal honey plant, Common Oregano (Origanum vulgare).*

According to Delahay et al. (2023), plant composition and vegetation cover are positively correlated with the number of animal species visiting the garden: the more complex and denser the plant structure, the greater the opportunities for the formation of diverse microhabitats. Therefore, in designing a health garden it is advisable to include tree, shrub, and herbaceous layers, which provide the maximum number of ecological niches for insects, birds, small animals, and soil organisms.

The creation of different microhabitats – shaded corners, open sunny areas, moss-covered zones, or patches with sparse vegetation – also enhances biodiversity. As noted by Delahay et al. (2023),

microhabitat diversity provides more opportunities for different groups of fauna to inhabit the garden. The combination of such microzones with a multi-layered planting structure creates favorable conditions for colonization by insects, birds, small animals, and microorganisms, thereby improving ecosystem functions and strengthening the therapeutic effect of the garden.

In their work, Wang et al. (2024) emphasize the importance of functional diversity, ecological connectivity, and adaptive management – principles that can be directly applied in the planning and maintenance of therapeutic gardens. Functional diversity involves selecting plants with different ecological roles (e.g., varying root system types, flowering periods, heights), which ensures ecosystem resilience to environmental changes. Ecological connectivity refers to linking the garden with surrounding green areas to support organism migration and genetic exchange.

Adaptive management implies a flexible approach to garden care, with continuous monitoring, analysis of biodiversity dynamics, and adjustment of practices based on observed results. Practical implementation of these principles in garden therapy and apitherapy may include:

– selecting plants with diverse functional characteristics (e.g., early- and late-flowering, deep- and shallow-rooted);

– designing the garden as part of an ecological network, providing corridors or transitions to adjacent natural areas;

– systematic monitoring of fauna and flora with adaptive care based on observation results.

Applying such approaches transforms the garden from a passive "island of nature" into an active element of green infrastructure with high ecological, recreational, and therapeutic potential.

Minimization of intensive intervention is a set of ecologically oriented practices aimed at preserving the natural balance of the garden, reducing anthropogenic impacts on the biocoenosis, and maintaining ecosystem health. This approach is based on the principles of sustainable gardening, where priority is given to natural regulatory processes, biocontrol, organic methods, and the preservation of soil life.

The use of chemical pesticides and herbicides significantly reduces the abundance of invertebrates, including pollinators,

earthworms, and other soil organisms, thereby disrupting trophic chains and ecosystem functioning. In the study by Munschek et al. (2023), it is noted that excessive use of agrochemicals leads to biodiversity degradation even in small garden spaces.

Therefore, preference should be given to natural methods of pest population regulation – biocontrol, compost-based preparations, the use of companion plants, and polycultural plantings, which naturally limit the spread of pathogens and pests

Mulching with organic materials – such as sawdust, bark, leaves, hay, or wood chips (Fig. 5.7) – supports soil microbiota, improves the soil's water-retention properties, reduces erosion, and creates a habitat for earthworms and saprophytic fungi. As emphasized by Gilmer et al. (2020), the use of organic mulches and natural fertilizers significantly increases soil biodiversity indicators, ensuring ecosystem stability without the intervention of chemical growth stimulants.

Another effective method is reducing the frequency of lawn mowing and allowing areas with taller herbaceous vegetation. This fosters habitats for pollinators, butterflies, and small animals.

According to a national study in the United Kingdom, published in *The Guardian (2024),* allowing grass to grow nearly doubled the number of butterflies in gardens, enhancing their forage base and the diversity of flowering species. This approach is not only aesthetically appealing but also ecologically justified, as it contributes to the formation of natural microhabitats and the stability of local fauna.

Thus, the minimization of intensive intervention implies the creation of a self-regulating garden environment in which natural processes of regeneration, symbiosis, and trophic interaction play a leading role. For therapeutic gardens and apitherapeutic sites, this has a dual significance – on the one hand, it supports the health of bees and beneficial insects, and on the other, it preserves natural harmony, which fosters a sense of calm, balance, and positively influences the psycho-emotional state of visitors.

Maintaining soil biodiversity is the foundation of ecological stability in the garden, since the soil itself is a living environment in which key biochemical processes take place – essential for plant growth, nutrient cycling, and the maintenance of ecosystem balance.

1

2

3

Figure 5.7. Natural materials for mulching. Images from Pixabay: 1 – Olya Adamovich; 2 – Gary Chambers; 3 – Annie Spratt

Soil biodiversity includes the diversity of bacteria, fungi, protozoa, arthropods, and earthworms, which together form a complex system of interrelationships (Figs. 5.8–5.9).

Figure 5.8. Common earthworm *(Lumbricus terrestris)*
Image by Natfot from Pixabay

Figure 5.9. European mole *(Talpa europaea)*. Image by Dirk (Beeki®) Schumacher from Pixabay

According to Gilmer et al. (2020), the application of organic substances such as compost, vermicompost, or plant residues stimulates the development of microorganisms, earthworms, and mycorrhizal fungi. These organisms decompose organic matter, enrich the soil with nutrients, and enhance its structural stability. In addition, organic amendments improve water-retention capacity and reduce erosion, which is particularly important for gardens located on slopes or areas with sandy soils.

The incorporation of compost or vermicompost not only enriches the soil with nutrients but also creates a favorable microenvironment for beneficial microorganisms that suppress pathogens, thereby reducing the need for chemical plant protection agents. These natural processes create "living soil" – a self-regulating system that supports plant resilience against diseases and stress.

Proper soil management is equally important. According to the recommendations of Gilmer et al. (2020), mixing soil between plots, avoiding its compaction (especially during the movement of machinery or irrigation), and maintaining an optimal pH level contribute to the stability of soil biocoenoses. Excessive compaction or disruption of soil structure leads to reduced aeration and impaired functioning of soil organisms.

In the context of therapeutic gardens and apitherapy, maintaining soil biodiversity has dual value. First, it ensures long-term fertility and vitality of plants that form the healing environment of the garden. Second, biologically active soil serves as a source of phytoncides and natural aromatic substances, enriching the air and enhancing the therapeutic effect during garden visits.

Thus, maintaining soil biodiversity is not only an element of ecological garden management but also an integral component of the therapeutic ecosystem, which combines natural regeneration, sustainable development, and harmony between humans and nature.

Providing sources of water, shelters, and refuges is an important component of maintaining ecological balance in a therapeutic garden, as such elements create favorable conditions for the life, reproduction, and migration of various species of animals, insects, and microorganisms. Water and shelters act as microclimate stabilizers,

supplying living organisms with moisture, shade, and protection from overheating and predators.

The creation of small ponds or water features – such as ornamental ponds, depressions for rainwater collection, rain barrels, or moist "barriers" – encourages the presence of amphibians, aquatic insects, butterflies, and birds (Fig. 5.10). Even small water sources become sites for drinking and reproduction, positively influencing trophic chains within the garden. In therapeutic garden systems, such water features not only strengthen ecosystem functions but also have a psycho-emotional effect, as the sound of water, reflections, and movement promote relaxation and reduce stress levels.

In addition, natural materials should be used as shelters – fallen trees, stumps, deadwood, branches, and hollow logs. They create habitats for pollinating insects, small mammals, amphibians, fungi, and mosses, which together form a complex ecological system. Such elements not only enhance the natural character of the landscape but also contribute to biodiversity through microhabitats with varying levels of moisture and light.

Figure 5.10. Pond in the Asticou Azalea Garden, Maine, USA. Image by Mohan Nannapaneni from Pixabay.

As shown in the study by Munschek et al. (2023), artificially created shelters for insects – such as "bee hotels," "insect boxes," and other structures – can significantly increase the presence of specialized species, particularly wild bees and wasps, if they are properly designed and positioned according to species-specific needs. Correct orientation of the openings, choice of materials (bamboo, reed, dry wood), and placement in sunny areas make these structures effective elements for supporting entomofauna (Fig. 5.11).

In the context of garden therapy and apitherapy, such shelters and water features serve a dual function: on the one hand, they support the life cycles of pollinators and small animals; on the other, they enrich the sensory environment of the garden, making it more attractive to visitors.

Figure 5.11. Eco-designed insect hotel
Image by Sabine Fenner from Pixabay.

Observation of living creatures, natural sounds, and the movement of water stimulates emotional recovery, reduces anxiety, and fosters the harmonization of human–nature interaction. The creation of water

features, natural shelters, and specialized insect structures is not only an ecologically justified practice but also a therapeutic tool that combines ecological value with restorative effects on the human psychophysical state.

Maintaining connectivity with surrounding green areas is an important principle of ecological planning, aimed at ensuring the movement, exchange, and interaction of organisms between different natural or semi-natural sites. Gardens that are integrated into a broader ecological network serve as "green bridges" or "ecological stepping stones," connecting fragmented parts of the natural environment. Such connectivity increases population viability, supports the migration of pollinators, birds, and small mammals, and sustains genetic diversity of species.

As noted by Egerer et al. (2024), urban community gardens can serve as key nodes in the green infrastructure of cities. They provide ecological connectivity between larger green spaces such as parks, forests, or coastal zones, and create a continuous network of habitats accessible for the movement of organisms. Researchers emphasize that even small plots of greenery in dense urban areas are of great importance as "microhabitats of biodiversity" when designed with natural processes in mind.

In the context of therapeutic and apitherapeutic gardens, ensuring ecological connectivity has not only conservation value but also therapeutic significance. Such gardens create natural corridors through which pollinators (bees, bumblebees, butterflies), small birds, and other organisms can move freely, supporting ecosystem stability and resilience to external pressures. Moreover, they contribute to a sense of spatial harmony and connection with nature among visitors, which is an essential component of the therapeutic effect.

An important condition for maintaining connectivity is coordinated action with neighbors and local communities. Joint planning of garden boundaries, leaving natural passages for small animals, using permeable fences, greening fences with ivy or climbing plants, as well as regulating the level of artificial lighting help to create a unified natural space without barriers. This is particularly relevant in areas where gardens adjoin shelterbelts, coastal zones, or urban parks.

Maintaining connectivity with surrounding green areas transforms the garden from an isolated ecosystem into an active element of the landscape ecological network, supporting species exchange, enhancing ecological resilience of the territory, and at the same time increasing its recreational and therapeutic value.

Continuous monitoring and adaptive management are key elements of the sustainable development of therapeutic and apitherapeutic gardens, ensuring their ecological stability and long-term effectiveness. This approach involves ongoing observation of biodiversity status, analysis of collected data, and the introduction of flexible adjustments in care, structure, or plant composition depending on actual results. Unlike static systems, adaptively managed gardens are able to respond to changing climatic conditions, the emergence of new species, or ecological risks, remaining living, dynamic ecosystems.

The use of self-assessment tools such as the Garden Biodiversity Index (GBI) by Felgentreff et al. (2025) enables quantitative measurement of the garden ecosystem's condition, evaluation of changes in species composition, vegetation structure, or pollinator activity. Such approaches help to identify weak points in planning and management, determine areas where biodiversity requires reinforcement, and make decisions based on data rather than observations alone. This is particularly important for gardens that combine recreational, therapeutic, and ecological functions.

Equally significant is public engagement through citizen science programs – such as *iNaturalist, Global Pollinator Watch, eBird, and PollinatorWatch* – which allow the recording of new occurrences of plant, insect, or bird species. Citizen participation in observations not only enriches the scientific database but also fosters ecological awareness, social cohesion, and responsibility for the state of the environment. For therapeutic and apitherapeutic gardens, this also opens the possibility of transforming the process of observation into part of the therapeutic experience, involving visitors in collective care for nature.

Adaptive management implies that any decision in the garden must be based on monitoring results: which plants establish best, which areas attract the greatest number of pollinators, where excess moisture accumulates, or where soil degradation is observed. Reviewing

practices – such as mowing frequency, irrigation regime, species composition, or the placement of flowerbeds – helps to maintain ecosystem balance. This is a form of "learning through observation," in which the garden and its care continuously evolve in response to natural signals.

Thus, the combination of scientific monitoring, public participation, and adaptive management creates a system in which the garden becomes not merely a place for observing nature but a living laboratory of ecological interaction. This approach enhances ecosystem resilience, optimizes care, and simultaneously strengthens the therapeutic effect – since involvement in observation and maintenance itself has a restorative and health-promoting impact.

Summarizing the material of Chapter 5, it can be stated that biodiversity is a key factor in human physical, psychological, and social well-being. Contemporary scientific research confirms that natural ecosystems provide not only ecological stability but also therapeutic functions – from reducing stress levels to improving the immune system. Within the framework of the "One Health" concept, biodiversity serves as an integrative link between the health of humans, animals, and the environment, and its preservation is a necessary condition for sustainable societal development. The practical dimension of this interaction acquires particular significance in the context of health tourism, garden therapy, and apitherapy.

The application of ecological gardening principles – using native plant species, creating a mosaic structure of habitats, maintaining soil life, preserving water elements, and establishing shelters and ecological corridors – has been shown to enhance biodiversity and improve the psycho-emotional state of humans. Such gardens become living laboratories of natural balance, where harmony between people and the environment is restored.

Particular attention should be given to the integration of adaptive management and biodiversity monitoring – specifically through the use of self-assessment tools and public involvement via citizen science programs. These approaches not only improve the quality of ecological management but also foster ecological awareness, transforming the process of garden care into a form of therapy and civic participation.

Thus, biodiversity serves not only as the foundation of ecological resilience but also as a source of health, harmony, and inspiration.

The development of garden and apitherapeutic spaces based on nature-oriented management principles represents one of the most promising directions in the advancement of health tourism, combining ecological, social, and spiritual dimensions of human well-being.

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ABSTRACT

The **Health Tourism Guide using Garden and Bee Therapy** explores the integration of ecological gardening, therapeutic landscapes, and apitherapeutic practices into the broader framework of sustainable health tourism. Drawing on contemporary scientific research and practical case studies, the book demonstrates how biodiversity functions not only as the foundation of ecological resilience but also as a source of physical, psychological, and social well-being.

The text emphasizes the principles of ecological gardening – such as the use of native plant species, mosaic habitat structures, soil life preservation, water elements, shelters, and ecological corridors – as proven strategies for enhancing biodiversity and improving human psycho-emotional health. Therapeutic gardens are presented as "living laboratories of natural balance," where harmony between humans and the environment is restored through observation, interaction, and care.

Adaptive management and continuous monitoring are highlighted as essential components of long-term ecosystem stability. Tools such as the Garden Biodiversity Index (GBI) and citizen science platforms (iNaturalist, Global Pollinator Watch, eBird, PollinatorWatch) are introduced as innovative methods for quantitative assessment and public engagement. These approaches transform garden care into both a therapeutic practice and a form of civic participation, fostering ecological awareness and social cohesion.

Special attention is given to the role of ecological connectivity, where gardens act as "green bridges" or "ecological stepping stones" linking fragmented habitats. This connectivity supports pollinator migration, bird movement, and genetic diversity, while simultaneously enriching the sensory and therapeutic environment for visitors. The book situates these practices within the *One Health* framework, underscoring biodiversity as an integrative link between human, animal, and environmental health.

Ultimately, the guide positions garden and bee therapy as promising directions in health tourism, combining ecological, social, and spiritual dimensions of human well-being. By merging scientific monitoring, adaptive management, and public participation, therapeutic gardens evolve into dynamic ecosystems that provide ecological stability, cultural value, and restorative experiences. This synthesis offers a pathway toward sustainable development, ecological consciousness, and holistic health promotion.

Keywords: Health tourism, Garden therapy, Apitherapy, Biodiversity, Ecological gardening, One Health

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