Living Lab Zagreb

GRAD ZAGREB

Deliverable 3.5
Implemented Living Lab in Zagreb, Croatia

Living Lab Sesvete with Info Point and former Sljeme meat factory

Vision, goals and management of the Living Lab

Mirafiori Sud district with Sangone river

Vision for the Living Lab Zagreb-Sesvete

Living Lab Sesvete in Zagreb utilizes nature-based solutions (NBS) to gently reclaim the area of the Sljeme former meat factory, using it as a platform for social inclusion

Living Lab Zagreb-Sesvete overview

The Sesvete city district is located on Zagreb's east administrative border, being the largest district covering approximately 165 square kilometers. Sesvete has witnessed the highest population development due to immigration and natural growth, being on average the youngest community in Zagreb. The community is rather traditional, very tightly connected with an entrepreneurial mind-set. The north part of Sesvete is situated on the foothill of the Medvednica mountain, the river Sava plain forms the southern border. The central district center area is crossed by roads and rail connecting Zagreb to the east of Croatia.

Due to Sesvete's rapid growth and urban sprawl over the past decades, it never developed a clear urban form and identity. In recent years, activities of the local NGO ZIPS supported by experts from the Zagreb University Faculty of Architecture have fostered an urban consciousness among the local community, demanding a new urban identity and dignity including:

- quality public and green urban spaces,
- a main square,
- better public facilities,
- an efficient road network, bike lanes, a secure crossing of the railway,
- new space for the music school,
- a hub with spaces for small spin-off firms, fablabs and maker culture.

The study "The Green and Blue Sesvete" (2016) articulated these aspirations. A group of local citizens of varied backgrounds conducted an analysis of the strengths, weaknesses, opportunities and threats (SWOT) for the Sesvete district. This helped to focus the dialogue and planning propositions for NBS.

Challenges and Goals

Due to the young population, Sesvete is a growing community offering development opportunities. However, the district's growth potential is hindered by two key spatial factors:

- the railway dividing Sesvete into two parts,
- Sesvete's geometric centre is dominated by former industry and a business zone with insufficient public facilities and space.

Thorough urban transformation with high level of public involvement requires lengthy procedures. The EU funded proGIreg research project aims at resilience to increasing climate change effects through urban regeneration addressing the environment, economy, and society. This represents an over-arching and cross-cutting challenge to develop integrated nature-based solutions (NBS) in Sesvete. The proGIreg Living Lab provides first steps in the process of reclaiming and regenerating the formerly inaccessible industrial land: Using small-scale green infrastructure interventions that support community cohesion and inclusion of most vulnerable members.

The goal of NBS interventions for inclusive urban regeneration on the former industry site of "Sljeme" was to develop nature-based proposals for:

- principles and architectural solutions for regenerating the deprived and abandoned post-industrial area.
- public spaces promoting urban activity, social cohesion and increase safety.
- Recreation areas to promote healthy and sustainable lifestyles.
- Define useful inter-generational spaces
- Develop area programming and planning to promote public and private investment with the aim of creating urban character and identity
- Develop FabLab and entrepreneurial programs for teenagers (HUB) to promote innovation and a new business culture.

Living Lab management

The City of Zagreb - Office for Economy, Environmental Sustainability and Strategic Planning of Zagreb is the coordinator (fig. 1). Other local partners include Green and Blue Sesvete (local NGO with wide outreach in the community), City of Zagreb Bureau for Physical Planning and Zagreb Faculty of Architecture. The private venture "Komfor Klima Grupa" (KKG) meant to implement green walls, roof and aquaponic system in the HUB_S building in the Living Lab's Northwest but plans had to be abandoned. The sub-contracted company Vesela motika (Happy Shovel) replaced KKG to create a modular urban container farm combining green walls and roof technologies with aquaponics.

The city-owned day-care center for children with multiple disabilities "Mali dom" enables users to regularly work and stay in the calming environment of the therapeutic garden (fig.1). The Living Lab co-design and implementation focused on four NBS (fig. 2): community-based urban gardens (NBS 3), aquaponics (NBS 4) and green roofs and walls (NBS 5), reusing derelict land for the new green corridors (NBS 6), and introducing low-carbon guidelines into new strategic documents (NBS 7).

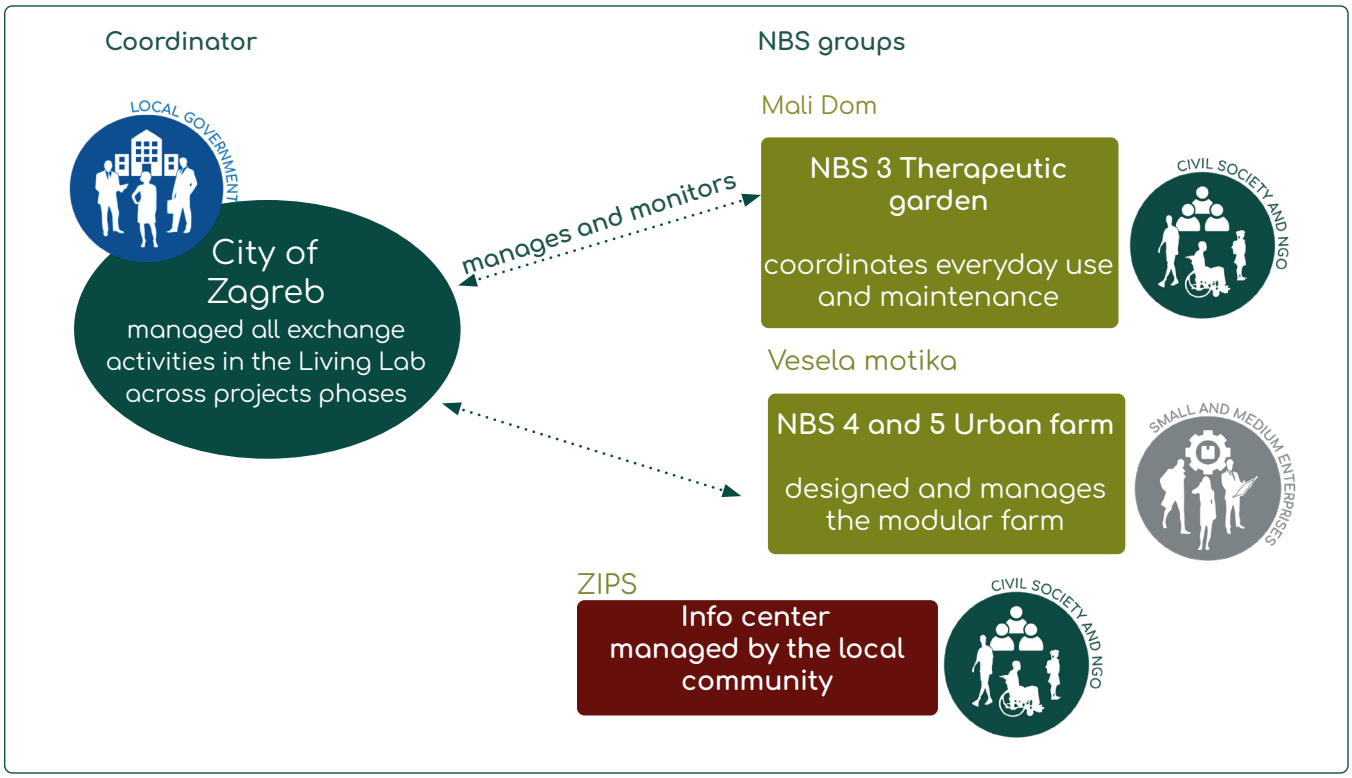

Figure 1: Living Lab management structure

Co-design activities

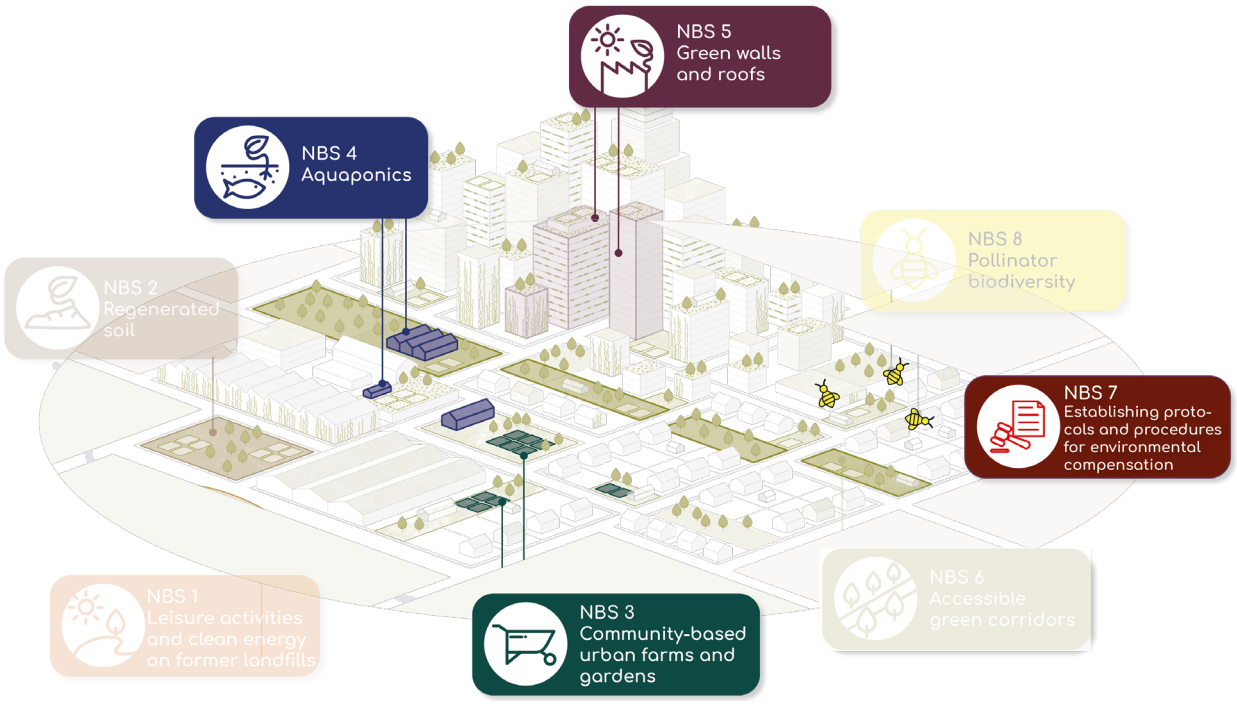

Figure 2: Four implemented proGIreg NBS in Zagreb Living Lab (RWTH)

The co-design process included a number of workshops organized at the Info centre at the heart of the Sesvete Living Lab. The building was refurbished very early on in the project and is increasingly becoming a central meeting place for the district. Additionally, it is developing into an attractive hotspot for Sesvete's young population and entrepreneurial community. The local proGIreg partners are keen to engage these groups in future activities. The Info center also serves as a meeting point for proGIreg partner co-design and replication workshops.

Outcomes, challenges and lessons learnt

From the start, consistently involving local stakeholders was important to ensure users and local residents accept and embrace the new NBS. Co-design processes proved useful for successful implementation while acting as a catalyst to detect underlying problems and risks.

- Local NGO Green and Blue Sesvete (ZIPS) played a crucial role in this process based on its strong and active ties to the local community, engaging the local population in the decision-making process.
- On project management level, partner ICLEI encouraged co-design and co-creation providing a structured framework for involving citizens.
- Local partners extended this by inviting all relevant institutions to discuss the programme for the therapeutic garden and other NBS demonstration projects.

As part of proGIreg, the local NGO ZIPS initiated and implemented several local activities from 2019 to 2021:

- Planting 550 different tree and shrub saplings in cooperation with c. 250 citizens (mostly parents with children and members of various sports organisations to increase biodiversity (fig. 4+5).
- ZIPS attracted financial donations from companies and organizations contributing material or work. The Croatian forestry department and a local radio station donated the trees.
- Changing locals' perception of the neglected South of the district. ProGIreg contributes to moving the centre of Sesvete closer to the south while connecting different areas via NBS.
- Cloning two centuries-old linden trees from the north of Sesvete. Around hundred saplings will be grown and distributed to citizens and various institutions to preserve the gene pool of trees and to point to the importance of genetic diversity.

NBS 3
Community-based urban farms and gardens

Therapeutic garden

The codesign approach proved critical for designing the therapeutic garden. The City of Zagreb invited stakeholders identified during the stakeholder mapping process to discuss user requirements. The therapists proved crucial in planning the garden and responding to the special needs of its users.

Modular Urban Farm

Combines green walls and roofs technologies and aquaponics in a modular container. It meets its energy needs by solar panels or classic electricity. The green wall and roof significantly reduce the sensitivity of the assembly to atmospheric conditions by isolating the inside from temperature extremes while containing excess rainwater through green roof technology. In the process, several roof and wall plant species were tested for Zagreb climate to be recommended for wider use.

NBS 4
Aquaponics

NBS 5
Green walls and roofs

NBS 6
Accessible green corridors

ZIPS has organized a number of waste removal activities in public spaces from 2018 to 2022: Transforming a construction material dump into a 12,000 m² landscaped urban area. Citizens and local companies removed c. 500 m³ of discarded concrete, municipal and bulky waste, and invasive vegetation. The remaining vegetation was kept according to the model of assisted natural regeneration. Different flower species were seeded for pollinators. In autumn 2022, flowering trees and shrubs are planted on the western border of Sesvete to benefit citizens and to create green infrastructure stepping stones for future interventions.

Figure 3 and 4: Tree planting activity

Proposing guidelines for decarbonisation on city level

The guidelines developed for this NBS propose new procedures for development and adoption of spatial plans through early participatory processes involving citizens, and foster energy transition to decarbonisation, use of sustainable materials and circular economy, renewable energy sources, green infrastructure, sustainable water management, nature-based solutions, and re-naturalisation of urban centres.

NBS 7
Establishing protocols and procedures for environmental compensation

Living Lab results and outlook

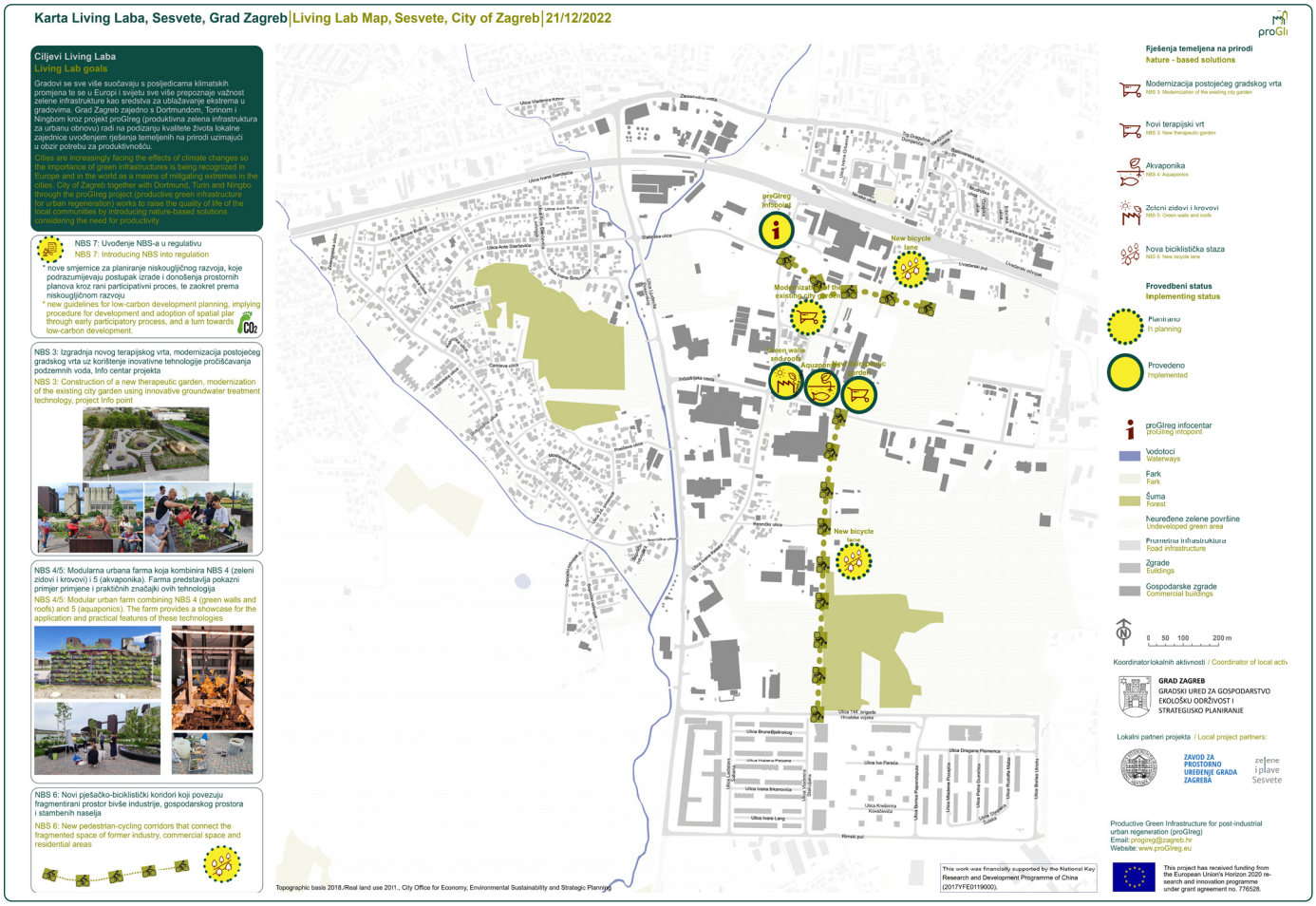

Figure 5: Living Lab map outlining NBS locations, implementation status and NBS descriptions

Achievements and lessons learnt

The co-design approach has been crucial in the successful implementation of the Living Lab NBS interventions. The NBS implementation of **NBS 3 - Community urban gardens** provide plenty of benefits in Sesvete district, in particular social shifts:

- Greater inclusion of vulnerable groups into society
- Responding to demands for offering people with disabilities the opportunity to engage in gardening activities
- The therapeutic garden can be seen as the most successful NBS. It improves the well-being of users with physcial and mental abilties by providing accessible and serene spaces for social interaction and contemplation. It has connected several care institutions to bring people with disabilities to the garden.

NBS 4 and 5 achieve greater resource efficiency and create economic value:

- The existing urban garden is in the process of modernisation by installing an improved water distribution network and a solar purification device rendering the slightly contaminated groundwater with spores into potable water.
- Detailed analysis prior to the installation of the aquaponic system resulted in a realistic business model that could be

Figure 6: Green wall as part of the modular urban farm

appealing to local people. The installed container modular urban farm provides a showcase for the application and practical features of these technologies.

NBS 7 - Establishing protocols and procedure for environmental compensation represents a key project outcome:

- Proposal of guidelines for low-carbon development planning, created in accordance with European green policies. The proposed guidelines and new direction considers risk assessment and management, and solutions for mitigating climatic extreme effects and natural disasters (floods, extreme precipitation and droughts etc.). Starting point is the transition from grey to green infrastructure in spatial planning and the protection of natural resources in early trans-disciplinary processes.

A number of external reasons (i.e. damages by the earthquake in 2020, land ownership issues) and procedural reasons led to delays and cancellations of original plans for planned NBS implementations (NBS 4 and 5, NBS 6). This required several modifications, however, flexibility to change the NBS design was an important driver for the success of local activities. NBS 6, bike and walking path connecting the district with the former meat factory and other parts of Sesvete changed. An alternative path is undergoing final procedural steps (NBS 6 - Green corridor):

- The first section of the cycling route connecting the centre of Sesvete to the north was built along the Vuger stream prior to the proGIreg project. The next phase of the route continues south along the newly planned street No. 6, connecting the Living Lab with the housing development south of Sesvete built on the site of the former pig farm (part of the meat industry complex). Implementation was not feasible during the project timeline. The alternative cycling track runs in east-west direction along the road crossing the Living Lab.

- The original modular urban farm (NBS 4 and 5) planned at the HUB building had to be cancelled due to procedural and financial difficulties. It aimed to provide a venue for young innovators and enterpreneurs from Sesvete while showcasing green wall and roof technology and aquaponics on the roof. However, the lead partner and local food tech company Vesela motika conceived an alternative modular urban farm solution that combines technologies in a small-scale intervention.

Outlook

The conversion of the abandoned industrial facilities in Sesvete (Sljeme and Badel) has started a wider urban regeneration process of Sesvete to provide productive green spaces and creating a contemporary identity. Empty silos and interesting industrial buildings are planned to be reconstructed and reused, turning industrial plants into mixed use areas (housing, commercial activity, hospitality, work, recreation etc.).

The guideslines (NBS 7) promoting early participatory processes and green infrastructure transition is included in the proposal for the Decision on amendments to the Sesvete Master plan, which is currently in process of public consultation, expected to be adopted by early 2023.

Hence, Sesvete can serve as a living laboratory for advanced technology solutions in tackling numerous challenges based on urban plans for environmental protection and sustainable development. This includes traffic solutions, housing, economic zones, agriculture, energy production, waste management centres, water purifiers, recreation zones tailored to the community. This approach should generate educational, cultural and development interest of the wider community, to be a model for Zagreb and Croatia.

Living Lab Zagreb, Croatia

Urban gardens next to the former meat processing factory Sljeme (c) City of Zagreb

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