



FRC Implementation Plan

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FRC Implementation Plans

Preface

The following document gathers the Living Lab Implementation Plan (IP) of proGInreg project realized by the Frontrunner Cities: Dortmund (D), Ningbo (CHN), Turin (ITA) and Zagreb (HRV).

This Deliverable was designed as a report following the working methodology proposed by the D. 3.1 (Common methodology for implementation).

This is a first version of the IP that will be checked and updated until the end of the Implementation Phase, on June 2021.

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Executive Summary

The implementation plan (IP) is the document containing all relevant information about the co-realization of all NBS in each Front Runner City (FRC) of the proGReg project: Dortmund (D), Ningbo (China), Turin (IT) and Zagreb (HR). Moreover, it integrates the implementation activities within the context of realization of the Living Lab area by producing a framework analysis, and highlighting challenges and goals.

The IP has been elaborated following the methodological approach and schemes proposed in the first monitoring deliverable D3.1, “Common methodology for implementation” and supplemented by a Living Lab Map, which visually illustrates the basic information of each NBS in its spatial context.

Implementation progress monitoring is at the core of co-implementation within the proGReg project and the IP is conceived as a working document, which regularly documents the progress of work. At the end of the implementation phase, currently foreseen to last more than the expected 18 months, it will be a valuable source of information and knowledge, useful to achieve proGReg goals, facilitate the work of other WPs and also providing evidence of the importance of NBS in urban regeneration plans.

The IP has been compiled with the fundamental contribution of each City representatives and by focusing on the integration with the other proGReg activities carried out by other WPs.

The main analysis and outcomes already produced in each Living Lab area are summarized as follows.

Dortmund Living Lab

Dortmund Living Lab area (“LL” 215 ha) comprises the project area in which five NBSs will be realized. The LL area is situated along the Emscher River and about 2 km west of downtown Dortmund. At its longest north-south-extension it is 4.8 km long, at its broadest extension in the northern part it is 1.25 km wide, at its narrowest part it is only 40 m wide.

Dortmund Analysis Area (“Analysis Area”, 2,275 ha) is the adjacent areas in a 500 to 2000 m wide buffer around the LL. As it is not possible to realize all NBSs within the LL, there are also places in the Analysis Area in which NBS may be realized. The effects of realized NBS may have a direct impact on the Analysis Area as numerous inhabitants are living in several settlement areas directly adjacent to the Living Lab: Huckarde in the North-West, Deusen in the North-East, Dorstfeld in the South-West, the Rheinische Straße quarter respectively the Union quarter in the South. The total number of residents in the analysis area is 56,812.

Following are the 7 NBS that will be realized in Dortmund LL:

- NBS1: Integrating solar energy in Deusenberg landfill and Huckarde district
- NBS1: Sports infrastructure in an existing park in Huckarde
- NBS3: Food forest and permaculture orchard in Huckarde
- NBS3: Community gardening in Huckarde
- NBS4: Aquaponics

- NBS6: Connection of Huckarde borough with the renatured Emscher river and Deussenberg sites
- NBS8: Improving and monitoring pollinator biodiversity in Huckarde

The implemented NBS offer an opportunity to tackle the social, spatial, economic, and environmental problems. The inter-and trans-disciplinary approach, collaboration between the different stakeholders, and empowerment of the local community to participate in the co-design and co-creation of the NBSs ensure sustainable development, improve living conditions, protect the environment in many ways, and provide economic benefits to both citizens and entrepreneurs. While NBSs will be realized in a specific district, it is believed that the NBSs will have an impact beyond the LL and the neighboring districts will also benefit from that.

Lastly, proG!reg with its innovative approaches and integrated implementation process can present a comprehensive framework in which its NBS and co-creation and implementation process can be transferred and applied in new contexts.

In Dortmund, except for the NBS 6 completed in 2017, most of the works are still at the planning stage (5 out of 7). The NBS 3.1 “Food forest and permaculture orchard in Huckarde”, started its executive phase in 2018, but since the activities of community involvement (Scouts’ groups, Pastor of the Church of St. Urbanus) are very important, these two activities are closely linked and will need a long-term commitment, more than two years.

Ningbo Living Lab

The Living Lab (2.07 km²) comprises the entire Moon Lake Street around the Moon lake. Moon Lake Street is located in the downtown area of Ningbo City, with an area of only 2.07 km². It has jurisdiction over 7 communities, with a population of 25,750 people and a density of 12,440 inh. / km². In 2017, the green area of Ningbo City was 11.89 m² / inh., and the green area of Moon Lake Street was about 11.5 m² / inh., which was lower than China ’s per capita park green area of 14.01 m² / inh. Therefore, Ningbo's green infrastructure construction needs to be continuously strengthened.

There have been perennial outbreaks of algae in the moon lake, and some polluted water bodies with seasonal stench have appeared, which has affected the life and leisure quality of residents, and also seriously affected the image of Ningbo city and the beauty of Tianyi pavilion - the moon lake scenic area. Therefore, it is urgent to improve the water quality of the moon lake.

Within this context and needs, the goals of the NBS implemented in Ningbo are conceived to improve the lake and surrounding areas of the lake: to realize an ecological comprehensive control of the lake; Water quality purification and ecological restoration projects will remove pollutants in water bodies through moderate human intervention; improve self-purification ability of water bodies through ecological technology.

The underwater forest and water garden of the moon lake will reflect the cultural landscape on the shore, which will beautify the environment of the Tianyi pavilion and the moon lake, and strive to become a model of the park landscape and lake management, so that citizens and tourists can enjoy the scenery.

The NBS to be co-implemented in Ningbo LL are three:

- NBS1: Transforming lake sediment into soil fertilizer (*abandoned*)
- NBS3: Planting aquatic plants along the shore of the lake
- NBS7: Procedures for environmental compensation

Due to high levels of heavy metals in lake sediments, the NBS1 was cancelled. The works on the lakeshore (NBS 3 and 7) were halted by the COVID -19 related lockdown and now the situation is coming back to normality allowing the restart of the activities.

Turin Living Lab

The NBS implementation area is located in Mirafiori Sud District. This neighborhood of 1.149 inhabitants is placed in the southern edge of the City's borders, traced by the Sangone river. Mirafiori Sud is a post-industrial district has experienced remarkable growth during the 1950s-60s thanks to the car industry (especially FCA). As Mirafiori Sud is a peripheral urban area (a suburb), it is characterized by poor quality of the urban environment (green and grey infrastructures) and social issues such as social segregation, poverty and security problems. The District/LL area has a population of 34.659 inhabitants and a surface of 11.491 km², with a density of 3.016 inh./km². However, Mirafiori can rely on direct accesses to green area, which are more extensive and widespread than the City average.

The purpose of proGReg implementation in Turin LL is to address social, economic and urban problems by testing specific NBS and adopting the LL methodology. Through specific measures, activities and tools, this district will be regenerated, and abandoned or underused areas will be accessible again. Furthermore, the safety of these places will be improved and green economy will be supported and boosted. More specifically, the activities carried out in the LL are supposed to have a positive outcome in terms of education (in local schools), inclusion of disadvantaged social groups (social housing inhabitants; people with disabilities), reinforcement of social links, support of new entrepreneurship and new green jobs, and establishment of a common good regulations to apply on NBS. Likewise, residents' mental and physical health are supposed to improve as well.

The 17 proGReg interventions in Turin LL are the outcome of a widespread approach designed to co- implement small and medium size NBS covering and connecting the whole district and engaging different kind of stakeholders:

- NBS2: New soil production in Sangone Park
- NBS3: Mirafiori Castle's ruins recovery and new planting
- NBS3: Gardens in Cascina Piemonte (Orti Generali)
- NBS3: Pollinator friendly gardens (WOW)
- NBS3: Didactic gardens in schools
- NBS3: Micro vegetable gardens (OrtoMobile)
- NBS3: Community school gardens
- NBS3: Gardens around the houses
- NBS4: Aquaponics test system

- NBS5: Green roof at Casa nel Parco
- NBS5: Green wall indoor at school
- NBS5: Green wall outdoor on a homeless dormitory
- NBS5: New green roof at WOW
- NBS6: Green corridor
- NBS6: Local natural heritage enhancement in green corridor
- NBS7: Tools for environmental compensation processes
- NBS8: Butterfly gardens for disadvantaged people

By the date of this report in Turin there are 3 NBS (out of a total of 17) whose construction phase has already been completed, while 7 have already started work and the other 11 are in the planning phase. In Turin the COVID-19 related restrictions hit heavily proGReg NBS activities resulting in 6 month - 1 year late because of lockdown.

Despite of this, the team is working to build a strong connection between partners, residents and institutions that might last in time in order to guarantee the continuity of the project and give birth to good practices that can be repeated in other parts of Turin and in other cities as well.

Zagreb Living Lab

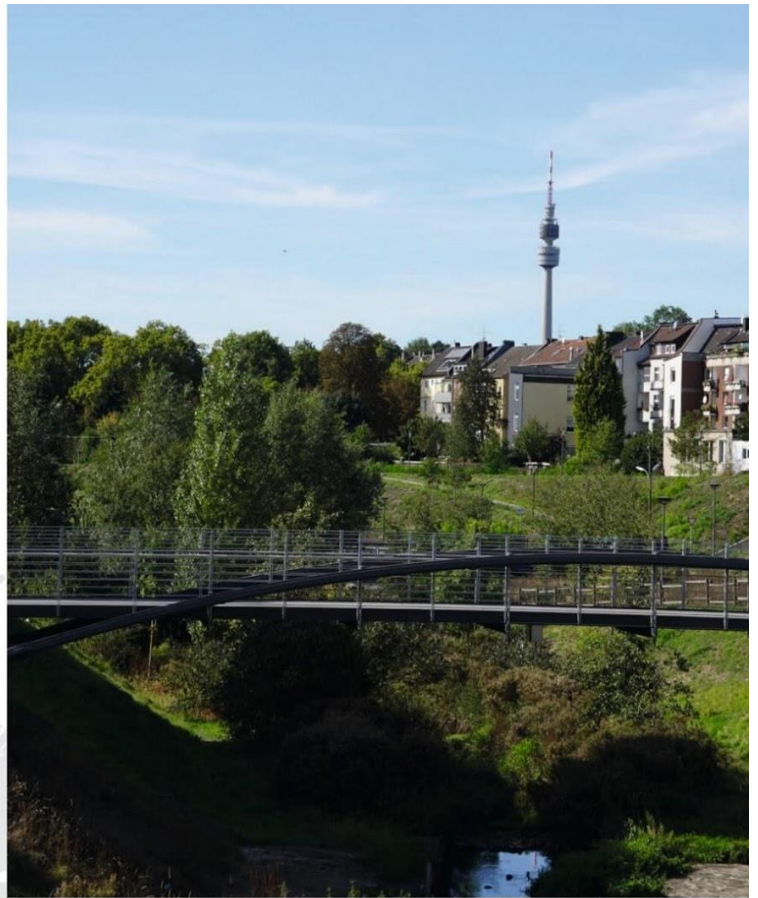
The Living Lab in City of Zagreb is located in Sesvete district, part of the Zagreb urban agglomeration. It is the easternmost neighbourhood of the Zagreb administrative area, covering 20% of the overall surface area of Zagreb. The population development is dynamic counting 70,009 inhabitants (Census 2011), with a low average age of 38.

The main objective of the brownfield regeneration program in the Zagreb LL is the creation of new public spaces and public facilities and introduce principles of sustainable urban planning. The GI approach must strengthen initiatives regarding urban resilience (low water table, storm water), wellbeing programs (jogging and cycling paths, recreation areas), community activities (urban gardens, green market) and bioclimatic building principles (mitigating city heat islands, natural cooling, green roofs and facades).

Having lacked a sense of identity, Sesvete is now developing an increased sense of confidence thanks to the activities of a local NGO with people demanding better-connected public spaces and parks, bike lanes, more public facilities and a hub for start-up businesses and culture, to create a new urban identity. The proGReg NBS interventions in the LL are supporting these demands with the implementation of:

- NBS 3: Community-based urban farming and gardening on post-industrial sites
- NBS 4: Aquaponics as soil-less agriculture for polluted sites
- NBS 5: Capillary GI on walls and roofs
- NBS 6: Making post-industrial sites and renatured river corridors accessible for local residents
- NBS 7: Establishing protocols and procedures for environmental compensation at local level

The main challenges in the development of the Zagreb Living lab stem from outdated planning documents and the lack of inclusive and sustainable principles in the planning. Also, the factory area is positioned in the central area, making it unattractive and unusable to the local residents. In June 2020, the only finished activity is the Info point, operating since December 2018 and finished/equipped in the summer of 2019. Currently the other NBS are in various phases of planning.



Dortmund Living Lab Implementation Plan

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Partner organizations

No.	Name	Short name	Country
2	STADT DORTMUND	DORTMUND	Germany
10	DIE URBANISTEN EV	URBA	Germany
13	HEI-TRO GMBH	HEITRO	Germany
16	LOHRBERG STADLANDSCHAFTSARCHITEKTU R PARTNERSCHAFT FREIER LANDSCHAFTSARCHITEKTEN MBH	LOHRBERG	Germany
32	AQUAPONIK MANUFAKTUR GMBH	APM	Germany
25	FACHHOCHSCHULE SUDWESTFALEN	SWUAS	Germany

Abbreviations

EC: European Commission

ERDF: European Regional Development Fund

D. No: Deliverable Number

FC: Follower Cities

FRC: Front Runner Cities

GA: Grant Agreement

GI: Green Infrastructure

GIS: Geographic Information System

IP: Implementation Plan

LL: Living Lab

NBS: Nature-Based Solutions

NGO: Non-governmental organization

proGInreg: Productive Green Infrastructure for post-industrial urban regeneration

SOPARC System for observing play and recreation in communities

TRL: Technology Readiness Level

WP: Work Package

DE: Germany

IT: Italy

HR: Croatia (Hrvatska)

CN: China

BA: Bosnia and Herzegovina

PT: Portugal

GR: Greece

RO: Romania

1. Introduction

1.1 Project Framework

This document is a living and working document that will produce, at the end of the implementation phase, a comprehensive description about the Living Lab and NBS implemented in the City of Dortmund. The first release of the IP is June 2020. Attached to this document a Living Lab Map will display graphically a summary of the information of each NBS.

Productive Green Infrastructure for post-industrial urban regeneration, proGReg, is a 5-year project funded by the European Commission under the Horizon 2020, a framework program for research and innovation. There are four proGReg cities called Front Runner Cities (FRC): Dortmund (DE), Turin (IT), Zagreb (HR), and Ningbo (CN). These cities are implementing Living Labs with local citizens, research institutes, and NGOs in urban areas which are undergoing postindustrial transformation and face the challenges of social segregation, pollution, abandoned former industrial buildings, social tension, poor economy, inequality, and related crime and security problems. To counteract these problems, proGReg Living Labs (LL) developed eight different Nature Based Solutions (NBS) which are co-designed, co-implemented, and co-developed by the residents of the living labs. Four follower cities in Eastern and Southern Europe which are Cascais (PT), Cluj-Napocac (RO), Piraeus (GR), and Zenica (BA) will continuously exchange knowledge and information with the front-runner cities to develop strategies for innovation and replicate the Nature Based Solutions in the local contexts. In the living labs, eight NBS will be implemented including leisure activities and clean energy on former landfills (NBS1), new regenerated soil thanks to biotic compounds for urban forestry and urban farming (NBS2), community-based urban farms and gardens (NBS3), aquaponics (NBS4), capillary Green Infrastructure (GI) on walls and roofs (NBS5), accessible green corridors for local citizens (NBS6), establishing protocols and procedures for environmental compensation at the local level (NBS7), and pollinator biodiversity (NBS8).

Through the implementation of green infrastructures (GI), proGReg aims at promoting economically self-sustaining business models and benefits that can catalyze regeneration and sustainable development in these areas. The quadruple helix approach of involving representatives of all members of the local community in each living lab including public authorities, local citizens, private investors, academics, and industry/SMEs from the co-design, to the implementation and evaluation is conceived as a fundamental part of the project's early stages. It is particularly important to build shared practices and ensure the participatory and democratic process. Inter-and trans-disciplinarily is therefore necessary because it can help resolve major challenges and conflicts of interest, practical because it empowers the citizens and can help produce more welcomed innovations, and ethical because the citizens are simply the taxpayer and the primary funder¹. Innovation will take place at different levels: at the technical level through the inter- and trans-disciplinary collaboration between the different stakeholders and the deployment and improvement of the

¹ Florian Schuetz, Marie Lena Heidingsfelder, Martina Schraudner. Co-shaping the Future in Quadruple Helix Innovation Systems: Uncovering Public Preferences toward Participatory Research and Innovation, 5(2) (2019), pp. 128-146

NBS; at the social level through co-designing, co-implementing, and co-maintaining the GI and involvement of informal and non-public actors in course of the project; at the environmental level through focusing on climate protection green infrastructure und urban agriculture; on the economic level through NBS which are cost-effective and easy to apply by the local residents and can highlight new market opportunities for the green economy development.

1.2 ProGlgreg in Dortmund

Dortmund (counting more than 600 000 inhab.) is located in Germany's most populous federal state North Rhine Westphalia and is the eighth largest city in Germany. It is also the largest city (by area and population) of Ruhr metropolis, the former center of coal mining and the steel industry in Germany. Just like the other cities of the Ruhr region, deindustrialization has forced Dortmund to transform in many ways: economically, socially and environmentally. The large-scale contaminated brownfields, former industrial and transport sites, need to be redeveloped. While the city is growing, urban areas increasingly lack good quality green and open spaces. The northern part of the city especially is confronted with important regeneration challenges and social segregation with resident populations largely dependent upon public subsidy benefits. The low cost of housing makes it attractive for new immigrants from inside and outside Europe, but the poor quality of life leads to a constant change of population and the northern boroughs have difficulties in building a positive identity. In addition, the northern part of Dortmund has the youngest population and the highest unemployment rates including the highest youth-unemployment within the city and keeps losing jobs.

To improve the life quality of the population through the implementation of NBS in the LL area, the city of Dortmund has created several integrated formal and informal planning instruments at the regional, city, and district scales. At the formal level, the city of Dortmund zoning plan and development plans (Bebauungspläne) and their binding documents identify the planning areas and further land use development as well as their qualitative requirements. While the area of the former Hansa coking plant was planned as an economic site, Deussenberg landfill was conceived to be developed as an open space with emphasis on nature-based measures. The Emscher River and the area along were planned to serve as a water management site along with sport and leisure activities. The HSP-site (Hoesch Spundwand und Profil GmbH) was presented as an industrial site. Hence, the zoning plan has to be changed to housing, green spaces, and economic sites.

Informal plans are not identified by planning regulations or by following formal procedures for their preparations. They are rather mostly thematic and voluntarily worked out as concepts to realize specific projects. If they are politically adopted, they can be binding within the administrative institutions on their respective level. In Dortmund LL there is a number of informal tools of different origins, but their overall goals supplement each other in promoting the development of green infrastructure in the northern part of the city and in Huckarde district in particular.

Developing GI in Huckarde is the focus of many informal initiatives. On top of that, the

local initiative “Nordwärts” (2015-2025) brings the strengths of Dortmund's northern districts to the public's attention and develops numerous projects and activities to foster social and economic development and improve the identity of the LL area. Important efforts are being made and continue to improve the quality of life, health, and wellbeing of the population within the same boundaries of proGlgreg LL through implementing nature based solutions (NBS). Development of the Hansa coking plant, connecting Hurckade with the Hansa coking plant and improving the green infrastructure in Huckarde are on the top of the list of the projects of Nordwärts.

Similarly, the International Garden Exhibition Ruhr 2027 ² (IGA 2027) which will focus on the question of how we want to live tomorrow is covering the area of “Emscher Nordwärts Dortmund” respective of the proGlgreg Living Lab thus giving the realized NBS by proGlgreg the privilege of being continued after the end of proGlgreg in 2023 and presented during IGA in 2027.

The urban renewal project for the area Huckarde-Nord “Integrated Action Plan” (Integriertes Handlungskonzept IHK), initiated in 2016, aims at increasing the quality of life in Huckarde and enhancing the living conditions of its residents. Multiple measures will be implemented to increase the connectivity through green infrastructures and redevelopment of “Hansa Revier Huckarde” (Hansa coking plant, Deuserberg, and light train museum Mooskamp).

ProGlgreg shares many of the development goals of the above mentioned projects through the implementation of different NBS in the Deuserberg, Hansa sites, and Huckarde district that will form a systemic intervention which can simultaneously improve the social, economic, and environmental qualities of this regeneration area.

To blend the shared NBS project measures and avoid a mismatched agenda, exchange of information about the content of these projects is taking place on a regular basis. Accordingly, the content of the proGlgreg NBS and these projects are subject to adjustment.

Following are the NBSs that will be realized in Dortmund LL:

- NBS 1: Renaturing landfill sites for leisure use and energy production
- NBS 3: Community-based urban farming and gardening on post-industrial sites
- NBS 4: Aquaponics as soil-less agriculture for polluted sites
- NBS 6: Connecting the isolated Huckarde borough with the renatured Emscher River and Deuserberg
- NBS 8: Pollinator biodiversity improvement activities and citizen science project

As Dortmund LL is situated in the northern part of the city which is characterized by high density built up areas dominated by post-industrial sites and poorly connected spatially to the city center and the rest of the city, the five implemented NBS offer an opportunity to tackle the social, spatial, economic, and environmental problems. The inter-and trans-

² International Garden Exhibition 2027 (IGA 2027), [Homepage](#)

disciplinary approach, collaboration between the different stakeholders, and empowerment of the local community to participate in the co-design and co-creation of the NBSs ensure sustainable development, improve living conditions, protect the environment in many ways, and provide economic benefits to both citizens and entrepreneurs. While NBSs will be realized in a specific district, it is believed that the NBSs will have an impact beyond the LL and the neighboring districts will also benefit from that.

Lastly, proG!reg with its innovative approaches and integrated implementation process can present a comprehensive framework in which its NBS and co-creation and implementation process can be transferred and applied in new contexts.

Huckarde Living Lab Map Dortmund

The boundaries of the LL area and the exact locations of the five NBSs in Huckarde district are presented in the “LL vision map.” The stage of development of these NBSs (implemented, in progress, in planning, ideas for future, implementation, etc.) is also included. Furthermore, this map illustrates the network of the NBSs through marking the physical connection between these projects. A short description of each NBS, partners, and stakeholders involved in the project are also provided. This map will be regularly updated throughout the project therefore providing a living document to track progress. In addition to being a primary tool to convey key information about the project, the LL vision map will also serve as a communication and dissemination tool for a wide range of stakeholders from the civil society citizen and organization to business and industry especially entrepreneurship stakeholders.

1.3 Management Activities

The involvement and management of a wide range of stakeholders throughout the project is a crucial component of the innovation process of proG!reg. Different stakeholders have different interests, capacities, networks, and degree influence and are therefore involved in different phases of the project. Moreover, they can provide insights that can help in the efficient implementation of the project and thus lead to a shorter implementation time. Section 1.3 concerns itself with stakeholder engagement and management, the relationships between these stakeholders and are their stakes in the implementation process.

In order to maximize the co-benefits of the NBS, co-design principles have been applied at the project partners' level and the local community of Huckarde level. To develop a mutual understanding of the co-design process at the project partners' level and to enable knowledge exchange, three co-design workshops were organized and moderated by ICLEI, namely: (1) “Mutual Understanding” in December 2018 focusing on bringing the core group of the project together and developing a common understanding of the co-creation principles and long-term expectations of the project as well as identifying relevant stakeholder from the LL and their roles and responsibilities; (2) “Innovation and Transformation” in April 2019 although planned to clarify the links between innovation and transformation and how sustainable long-term societal, economic, and environmental transformation can be achieved within the LL, the discussion revolved around site-search and challenges of identifying sites for some of the NBSs due to spatial limitations and landownership issues; and (3) “Implementation Plan, IP” in November 2019 introducing the methodology of the IP to the

project partners and how to achieve a smooth transition from the co-design to the implementation phase. This was done through addressing the stakeholders' engagement, especially marginalized groups, by empowering them and cultivating a sense of ownership which would serve the transition and management of the NBS by the local community after the end of the project in May 2023.

In addition to the co-design workshops, a regular jour fixe meeting is organized by the city of Dortmund in which the status quo of each NBS is presented by its respective partner and planning for upcoming activities are discussed amongst the project partners.

Expertise exchange and planning for the implementation activities are also enabled through other meetings and events organized amongst the partners. These meetings include: site visits of potential areas of implementations mainly carried out by the Die Urbanisten and The University of Applied Sciences South-Westphalia, meetings with landowners, and workshops with school students and scouts. This has in return expanded the circle of stakeholders and interactively presented proGReg to the public.

Partners and responsibilities

The extended meetings since the beginning of the project in late 2018, coupled with the clear description of the role and contribution of each project partner, provide a clear understanding of the responsibilities and activities planned and implemented by each partner (collaboration of partners) has emerged as shown in table 1.

Table 1: Partners NBS and their assigned responsibilities and cross-sectional activities

Partner	Specific activities	Cross-sectional activities
City of Dortmund, Department of Urban Renewal (DORTMUND)	<p>NBS1.1: Integrating solar energy production on Deussenberg landfill.</p> <p>NBS1.2: Sports infrastructure in an existing park in Huckarde</p> <p>NBS6: Connection of Huckarde borough with the renatured Emscher river and Deussenberg.</p>	<p>Overall project coordination</p> <p>Organization/ participation, WP 2.1 Spatial analysis in FRCs</p> <p>Organization/ participation WP 2.2 Co-design processes in FRCs</p> <p>WP 3.2 coordination activities</p> <p>Implementation LL Dortmund (NBS 1.1, NBS 6), WP 3.3</p> <p>NBS assessment and monitoring activities, WP 4 (D 4.1 – D 4.4)</p> <p>Organization/ participation, WP 6.4 Public proGReg conference</p> <p>Communication with ICLEI (WP6)</p> <p>Coordination with projects of shared development plans of Huckarde district, the International Garden Exhibition 2027 and Integrated Urban Renewal Concept Huckarde</p> <p>Supporting the project partners in the site search of NBS 1,3, and 4</p> <p>Coordination between the project partners and the involved Departments in the City of</p>

		Dortmund (e.g. with the Contract of Use (NBS3), Building Permit (NBS4) and NBS8) supporting activities with co-design communication with the WP leaders Synergies between proGReg and other local initiatives at the City of Dortmund
Die Urbanisten (DIE URBANISTEN EV)	Systemic design External communication with ICLEI (WP6) Co-design supporting activities with UNITO (WP2)	<ul style="list-style-type: none"> - Site search of NBS 3 and 4 - WP 3.3 Implementation LL Dortmund (NBS 3, NBS 4) - Design, construction and operation of the aquaponics plant - Design and implementation concepts for the community participation - Creating an internet homepage for proGReg in Huckarde - Conducting workshops about aquaponics systems in local schools - Communication activities addressed to local stakeholders
Citybotanicals (HEI-TRO GMBH)	Development of a filter for the aquaponics system	
LOHRBERG STADLANDSCHAFTSARCHITEKTUR PARTNERSCHAFT FREIER LANDSCHAFTSARCHITEKTEN MBH	Organization/ participation WP 2.1 Spatial analysis in FRC	<ul style="list-style-type: none"> - Organization/ participation WP 2.2 Co-design processes in FRCs - Creation of maps and graphic concepts
AQUAPONIK MANUFAKTUR GMBH	Development of a filter for the aquaponics system	Optimization of the technology readiness level (TRL) of the aquaponics in collaboration with South Westphalia University of Applied Science (SWUAS)
The University of Applied Sciences South-Westphalia (SWUAS) (FACHHOCHSCHULE SUDWESTFALEN)	NBS3.1: Food forests and permaculture orchard in Huckarde NBS3.2: Community gardening in Huckarde NBS8: Improving and monitoring pollinator biodiversity in conjunction with NBS 3	<ul style="list-style-type: none"> - WP 3.3 Implementation LL Dortmund (NBS 3, NBS 8) - Planning, implementation and operation of aquaponics - WP 5 - WP 5.1 Improving the Technology Readiness Level of Aquaponics

In addition to the project partners, a wide range of local stakeholders and beneficiaries are involved in the co-design and co-implementation and this number is increasing the more co-design activities are taking place. Each stakeholder is contributing in the different project activities according to their interest and area of expertise.

It is, however, important to mention that the degree of involvement of the stakeholders in Dortmund differs largely between the different NBSs. In NBS3.1 for example, co-design and co-implementation processes have accompanied the project from its conceptual phase and further until the handover and maintenance of the project. The St. Urbanus executive board of the parish as well as the Scouts participated in a kickoff workshop (72 Hours - Action) to practice the planting activities in the St. Urbanus site in spring 2019 as a preparation step towards the actual implementation of the urban gardening there. On the other hand, for NBS4 and NBS3.2, residents were not informed about the project nor included in the co-design activities as the lease contract (NBS4) and contract of use (NBS3.2) for these sites were not signed yet between the owner and the respective NBS partners. The City of Dortmund explicitly demanded not to disclose the locations of the intended sites of these NBS to the residents and involve them the co-design activities before these sites are officially granted for these NBSs. Although the city of Dortmund has a long history of citizen involvement in planning and development processes, it was concerned that a potential mistrust between the City and the residents would occur if the projects were not implemented on the tentatively announced sites and therefore the expectations of the residents would not be met and a sense of disappointment would be generated

Table 2: Stakeholders and beneficiaries' involvement in the co-production of NBS

NBS	Stakeholder	Capacity
NBS1.2	City of Dortmund	Site owner
	City of Dortmund: Department of Green Spaces	Park designer Organizer of co-design workshop with the local community
	Gustav-Heinemann school	Beneficiary of NBS1.2
	Huckarde citizens	Beneficiary of NBS1.2
	Local politics of Huckarde	Approving the project before implementation
NBS3.1	St. Urbanus, the executive board of the parish	Site owner NBS3.1
	Local scouts	Beneficiary of NBS3.1 Target group for co-design and co-implementation

NBS3.2	Gustav-Heinemann school	Beneficiary of NBS3.2
	Emschergenossenschaft	Provider, examination of the availability of sites for NBS3 and 8 Exchange of concept ideas for on NBS 3 and 8
	City of Dortmund, Department of Green Spaces	Owner of the site of NBS3.2 (contract partner)
NBS4	The Foundation for the Preservation of Industrial Monuments and Historical Culture	Owner of the site of NBS4: (1) Examination of the availability of sites at the Hansa Coking Plant for NBS 4, (2) contract partner
	Citizens of Huckarde	Beneficiaries of the aquaponics
NBS6	City of Dortmund	Site owner
	City of Dortmund, Civil Engineering Department (planning)	Path rehabilitation and construction
	Entsorgung Dortmund GmbH (EDG, Waste management company and maintainer of the former landfill)	Maintainer of the landfill and the planned path
	Huckarde citizens IGA visitors	Beneficiaries of NBS 6
NBS8	City of Dortmund, Department of Green Spaces	Site owner NBS 8
	Allotment association of (Glückauf Hansa)	Provider, potential site owner NBS 8
	N.A.B.U. (Nature conservation associations/ organizations)	NGO experts- site selection, co-design
	Entsorgung Dortmund GmbH (EDG, Waste management company and maintainer of the former landfill)	

As shown in Table 1, partners' responsibilities and assigned activities have been defined according to their field of expertise. The City of Dortmund is responsible for the overall coordination and monitoring of the progress throughout the course of the project. In that regard, jour fixe is a central meeting in which all project activities and details are presented and discussed. The City of Dortmund also facilitates the administrative procedures that requires coordination between the project partners and the different departments in the City.

The University of Applied Sciences South-Westphalia (SWUAS) provides the scientific and practiced know-how in the area of urban gardening and innovative systems of aquaponics.

Urbanbotanicals and Aquaponik Manufaktur offer the technical support for building the aquaponics. On the other hand, the NGO die Urbanisten has extensive expertise in involving local citizens in the local development projects and conduct info-events and co-design workshops. It has a well-established reputation in that regard. Table 2 presents the stakeholders that are involved at different stages of the project as needed. The interaction between a wide range of partners and stakeholders from the four major actors in the quadruple helix approach (science, policy, industry, and society) has been achieved in the co-design and co-implementation phase. Nevertheless, the involvement of the local community was a contentious issue between the different partners in terms of as at which stage the public (beneficiaries and stakeholders) should be involved in project activities (at the conceptual, planning or implementation stage). However, we believe that while diversity of opinion on this issue is a challenge, it is not wrong. Depending on the situation and the type of NBS implemented, the project members need to decide what form of participation it wants to take and in what type of activities to carry it out.

In addition to the diversity of partners and stakeholders involved in the project, table 1 and 2 demonstrate the collaboration between the partners on different WP, e.g. City of Dortmund and Lohrberg (WP2.1), die Urbanisten and the University of Applied Sciences South-Westphalia (NBS3 + NBS4), City of Dortmund and The University of Applied Sciences South-Westphalia (NBS8). A network of relationships, where governmental, NGO, SMSE and private organizations interact in the LL to transform various inputs into valuable outputs for the public interest.

Communication and co-design activities are performed through different tools including:

- Partners' website, in which information about the ProGReg and the LL area are provided. The Department of Urban Renewal in Dortmund presents the project on its homepage (www.proGReg.dortmund.de). The different co-design activities are also covered on the webpage of die Urbanisten (www.dieurbanisten.de). Recently, die Urbanisten initiated creating a website for proGReg in Huckarde presenting the Dortmund NBS addressing Huckard citizens and involving them in local projects activities. Currently, the webpage is in a draft form (<https://huckardening.dieurbanisten.de/>) and the official version will be published and advertised under (www.hansagruen.de).
- In addition to the several available communication platforms, published and printed materials (press release, leaflet, roll-up, etc.) are produced for proGReg Dortmund.
- Workshops with key actors and local communities (NBS3 and NBS4)
- Site visits with local experts to select and evaluate potential sites for NBS8
- Face-to-face meetings with site owners and potential partners
- Networking with projects that share similar goals to exchange information of best practices, such as nordwärts (Kooplab).

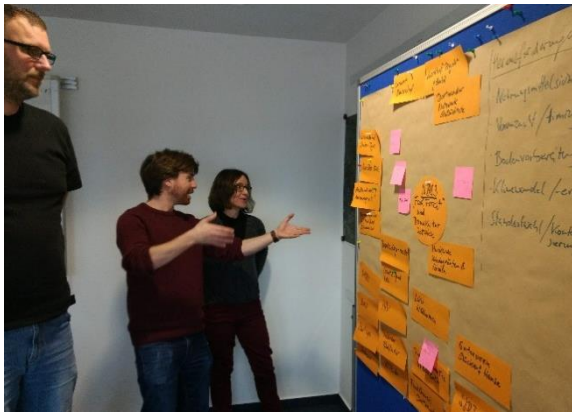


Figure 1 Development of project ideas, 1st Co-design workshop, Dortmund,
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Figure 2: Expert site visit to identify potential sites for NBS8 (Biodiversity),
© Mais Jafari



Figure 3 Scouts participating in the co-implementation in St. Urbanus church,
© Mais Jafari



Figure 4 3rd Co-design workshop, Dortmund,
© Mais Jafari

Involvement of marginalized groups

Involvement of vulnerable and marginalized groups is a core component of proG!reg in Dortmund. Yet this varies according to the type and location of the NBS. In some NBS, such as NBS 3, the expansion of the St. Urbanus Church network and contacting welfare organizations for the co-implementation phase after the initial phases of the project is considered. It is also conceived to consider the needs of the elderly and disabled people in the design of the urban garden. In that concern, die Urbanisten have initiated a contact with Caritas (catholic charity services organization) to involve elderly people in the St. Urbanus food forest. Similarly, unemployed people can be engaged in the aquaponics' planting activities (NBS 4), by training them about the aquaponics system and integrate them in the business model.

Approaching marginalized groups and speaking with multipliers has been undertaken by the project partners via personal contacts, network, and workshops and through public citizens' consultation events of IGA. In addition, the language used by the partners to communicate the project concepts and activities is rather simple so easy to understand.

Furthermore, all project partners agreed that stakeholders and beneficiaries, especially the district organizations working with marginalized groups, should be mapped in the planning

phase of the NBS to ensure their integration in the co-design and implementation phases. Nevertheless, approaching these groups and communication was not encouraged by the City of Dortmund until the sites of the different NBS were officially confirmed for the use of proGfreg (see chapter 1.3).

2. Our Living Lab

2.1 Our Living Lab

Dortmund Living Lab area ("LL" 215 ha) comprises the project area in which five NBSs will be realized (table 3). The LL area (figure 5) is situated along the Emscher River and about 2 km west of downtown Dortmund. At its longest north-south-extension it is 4.8 km long, at its broadest extension in the northern part it is 1.25 km wide, at its narrowest part it is only 40 m wide.

Dortmund Analysis Area ("Analysis Area", 2,275 ha) is the adjacent areas in a 500 to 2000 m wide buffer around the LL. As it is not possible to realize all NBSs within the LL, there are also places in the Analysis Area in which NBS may be realized. The effects of realized NBS may have a direct impact on the Analysis Area as numerous inhabitants are living in several settlement areas directly adjacent to the Living Lab: Huckarde in the North-West, Deusen in the North-East, Dorstfeld in the South-West, the Rheinische Straße quarter respectively the Union quarter in the South. The total number of residents in the analysis area is 56,812. The borders of the analysis area are highlighted in Figure 5, and this is the area in which district level analysis and assessment of WP4 is performed.

The Emscher River is a strong natural feature in the LL Area. It is about 83 km long in the heart of the Ruhr Area. It has its wellspring in Holzwickede, east of Dortmund and it flows into the Rhine. It was used as an open waste-water canal from the end of the 19th century and during industrialization. Originally the slow 109 km long river was characterized by a manifold flora and fauna. In the middle of the 19th century with increasing industrialization and population growth the Emscher was used as a wastewater sewage canal for cities, mining companies and industry. In only few years the flora and fauna disappeared more or less completely. Land subsidence up to 20 m caused by mining activities led to changes in drainage of the Emscher. Especially during flooding the polluted water remained longer in its floodplains thus yielding to more epidemics. As a corrective, the technical development of the Emscher started in the beginning of the 20th century in order to bring the wastewater as quickly as possible out of the densely populated region in an open concrete canal. Due to land subsidence, the Emscher was redirected twice to a new course. Since the early 1990s, large-scale restoration, called the Emscher re-conversion has been made and the newly restored Emscher valley is becoming an increasingly attractive location for people to live in. Within a short period of time. The adjacent footpath and cycle path of the Emscher, which runs along Huckarde is well integrated into the regional path network, but in some sections local connections to the district of Hurckade are missing.

In the northern part of the Living Lab postindustrial monuments and sites are to be found. The Hansa coking plant is situated in that part. It was one of the major coal mining sites in Dortmund which went into operation in 1927 and was closed in 1992. Nowadays it is a listed

monument of industrial heritage, a popular museum of regional interest, and a location for summer events. The coking plant is also a place used by schools to illustrate the industrial history of the Ruhr valley, structural change, or “industry nature”.

North of the freight train tracks the light rail traffic museum “Mooskamp” is located on the former train depot of the Hansa coking plant. The popular museum keeps 25 old locomotives which still use the tracks north and east of the coking plant. Moreover, the museum is a location where long-term unemployed persons are given a chance for reintegration into labor market by participating in special training programs for restoring and repairing the machines.

East of the Hansa coking plant the former landfill Deusenberg is situated with extensions of 500m x 1,000m. For about 70 years 11 billion m³ of household garbage was dumped there until 1992. Today the recultivated 50 m high hill is accessible and allows a spectacular sight. On the slopes 150,000 trees and shrubs have been planted. On top of the slopes, a 3.56 MW photovoltaic power plant has been in use since 2017. Some constructed paths are part of a mountain bike area, others are designed for pedestrians (overall length: 6 km). So far, the Deusenberg is only accessible from the eastern side from the Emscher pathway.

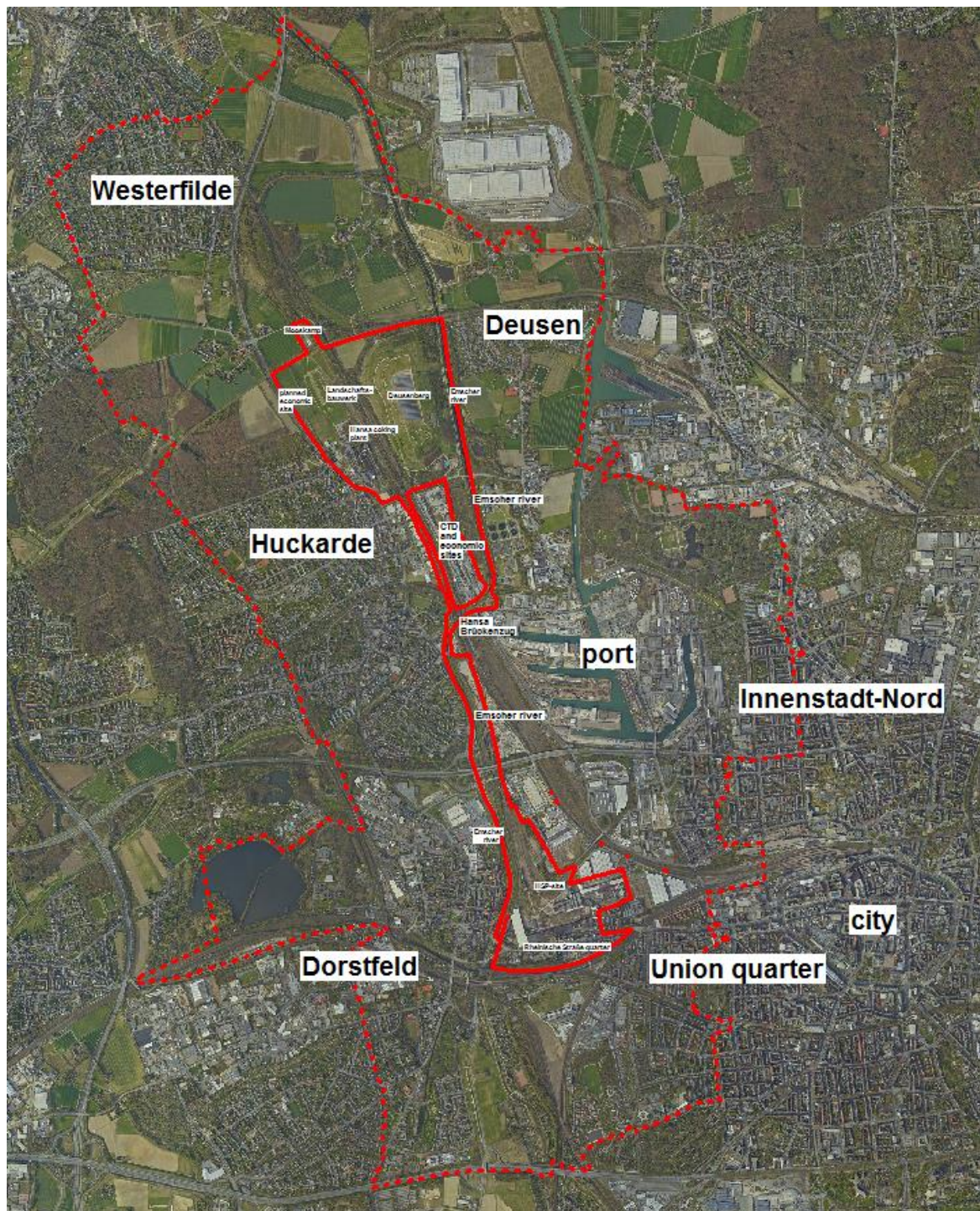


Figure 5 Dortmund Living Lab (continuous line) and Analysis Area (LL district; dashed line) and its main spatial features.
Source: City of Dortmund

The Analysis Area encompasses several settlement areas which are either directly adjacent to the Living Lab (Huckarde, Dorstfeld, Union quarter, and Deusen) or are separated by green corridors (Westerfilde) or industrial sites adjacent to the canal port (Innenstadt-Nord). Huckarde-Nord is the former settlement for workers of the Hansa coking plant. The closing of the coal mine in 1980 and the coking plant in 1992 led to a severe social decline which still affects the settlement. Today, Huckarde is one of the poorer and more deprived

neighborhoods of Dortmund. Therefore, it will be a focus area of the project and will be directly benefiting from the implemented NBS within its boundaries.

Deusen as a former worker settlement is located east of the Deusenberg and the Emscher River. It is a small, popular and socially stable settlement. Dorstfeld is separated from the Living Lab by the Emscherallee, a major road in Dortmund, and adjacent noise protection walls. Therefore, only two streets allow access from the Living Lab to the settlement.

Even though the Living Lab and Dorstfeld are neighboring areas, there are only few links existent. Southeast of Deusenberg, the wastewater treatment plant Deusen is located. It was put into operation in 1994 as the first of four central plants along the renatured Emscher. It clarifies predominantly industrial wastewater and wastewater of 140,000 inhabitants. As part of the Industrial Heritage Trail the two digestion towers are illuminated by green light at night. Further details on the Dortmund LL and on the implemented NBS can be found in D2.2.

ProGReg in Dortmund:

Out of eight NBS developed by proGReg, 5 NBS will be realized in Dortmund. They are inspired and supported by nature and compatible with the formal and informal plans of the Living Lab and adjacent areas as mentioned in chapter 1.2.

The NBS which will be implemented in Dortmund are listed in Table 3. The different activities in NBS 1 and NBS3 are split as they have different implementation timing and development process.

Table 3: NBS projects in the LL area in Dortmund

NBS type	NBS Title
NBS 1: Leisure activities and clean energy on former landfills	Integrating solar energy in Deusenberg landfill and Huckarde district Sports infrastructure in an existing park in Huckarde
NBS 3: Community-based urban farms and gardens	Food forest and permaculture orchard in Huckarde NBS3.2: Community gardening in Huckarde
NBS 4: quaponics as soil-less agriculture for polluted sites	Aquaponics
NBS 6: Accessible green corridors	Connection of Huckarde borough with the renatured Emscher river and Deusenberg sites
NBS 8: Pollinator biodiversity	Improving and monitoring pollinator biodiversity in Huckarde

While Dortmund LL has several weaknesses such as a high rate of social welfare recipients and above-average unemployment rate as well as lack of urban green infrastructure, there are great opportunities as this area is undergoing regeneration at the regional and district levels and is made attractive to a wide range of groups from mixed socio-economic backgrounds. According to the SWOT Analysis made in D.2.2, the main domains of Dortmund LL have been divided into:

- socio-cultural inclusion
- human health and wellbeing
- ecological and environmental situation
- economy and labor market

The spatial structure of the LL area is strongly influenced by its industrial history. Many housing projects were built in the early 1900s around the coal mines and steel factorization for the workers. With the decline of these industries and little investment to modernize the workers' housing area, some settlements were in poor condition until the 1950s. In the period after the WWII there was a construction boom, as the city was heavily bombed during the War.

2.2 Our Living Lab challenges and goals

This section deals with the challenges that the LL area of Dortmund has faced since the conceptual phase through the co-design and implementation of the NBS. In addition to the citizen participation in co-designing the NBSs, land ownership is another key problem that has hindered the involvement of citizens in the co-design, as it is difficult for the partners to communicate the planned activities of the NBS to the local people without providing information on the planned locations for this NBS.

Challenges at all NBS level

- Projects starting from scratch are difficult to be realized within the given time frame of WP 3. Since all Dortmund projects started from scratch, site search, building networks, project planning and realization took/ take time and are very difficult to be realized within the given proGReg-timeframe. This is especially the case for NBS dealing with construction projects (NBS 1,4 and 6). Design and administrative procedures cannot be accelerated and are time-consuming. It is foreseeable that the Dortmund construction of some of NBS will not be finished by June 2021
- Finding sites for the implementation of some of the NBSs and the landownership issues have been one of the main challenges in Dortmund LL. This consequently caused unforeseen delays in the implementation time. The sport infrastructure of NBS1.1 was conceived to be realized on the Deuseenberg landfill, yet this was not possible within proGReg because the area of Deuseenberg should be reserved for future projects of IGA 2027. This wasn't clear until early 2020 when the coordination team (Dortmund) started considering other site alternatives in the Huckarde district. As a result, NBS1.2 will alternatively be realized in a neighborhood park in the Huckarde district (Gustav Heinemann Park). Urban gardening and biodiversity projects are also planned to be realized within the same park (NBS3 and 8), and this makes it a good alternative for integrating different NBSs with close proximity to each

other, thus making it attractive for the users of the park. The design of the park and the involvement of the local residents in the co-design and co-implementation are on top of the planning

- The effort of planning NBS is disproportionately greater than the realized projects. This has clearly manifested in the case of NBS3 where a number of different potential locations were identified for urban farming. Ongoing meetings and negotiations with the landowner were in many cases not successful and therefore more alternative locations had to be identified. Many landowners are interested in a clear plan of what will be implemented on their land. The process-oriented approach of co-design is difficult to communicate in such a context and makes negotiations more difficult. The only project, which is currently implemented is located in a backyard of St. Urbanus Catholic Church. This project presents a good practice of proGReg principles of involving the locals in the co-design and implementation of the urban gardening activities such as food forest and raised-bed gardens. Another site that has been identified for NBS3 is the Gustav-Heine-Mann Park which is owned by the City of Dortmund. Currently, the Urbanisten are preparing the content of the Contract of Use to be signed by them and the Department of Green Spaces in Dortmund
- The lack of knowledge and experience of the formal procedures for obtaining authorisations and permissions for implementation was another challenge. Several formal requirements were not known to the project partners and were therefore not included in the implementation time plan. This in turn led to delays in co-design and implementation. For example, for NBS involving agricultural activities on post-industrial sites, soil investigations should be made unless no edible plants were to be planted. The acquisition of building permits or search permits for an explosive materials has also led to delays. The intensive and time-consuming work of these Formalities (obtaining permits, explosive tests, political approval, negotiations with landowners, contracts of use, etc.) wouldn't be materialized in the end product.
- The lack of incentives for citizens, landowners and stakeholders to participate in the project is an obstacle to involving them in the design and implementation activities. Their convictions about the expected positive or negative results of their participation as well as the uncertainty beyond the project duration made some landowners hesitant to enter into a partnership with proGReg. The appreciation of intangible results ranges from the personal to the collective and social level of the various actors (citizens, landowners, stakeholders, etc.). In view of this, it is crucial to present the expected results of the NBS at the different levels to the stakeholders, such as: gaining new experiences and expanding one's own skills by participating in NBS 3 and 8 (personal level); movement, socialization and time in natural environments (NBS 1 and 6) bring positive results at a collective level. And finally, to improve the quality of the green spaces and eco-system in Huckarde and to gain a sense of belonging and a sense of achievement by doing something useful and for a greater purpose and by helping less privileged and marginalized groups at a social level (all NBSs).

- Local NBS descriptions for FRC were prepared towards the end of 2017/ beginning of 2018. Since then, some NBS settings have changed due to reframing or ongoing planning procedures, which created a new setting for the NBS and thus made it necessary to adapt the descriptions although not fitting anymore. Alternatives can hardly be worked out and approved.
- NBS 1+6: Time loss due to reframing NBS as both NBS 1 (relocation from Deussenberg to Gustav-Heine-Mann-Park in winter 2019/2020 due to IGA planning) and NBS 6 (change from the north-south route to the west-east route in autumn 2019 due to lack of accessibility) had to be redesigned, the planning procedures are taking longer than originally expected. It will not be possible to implement the project within the specified time frame (by June 2021).

In addition to the challenges of implementing the various NBS, the Dortmund project team identified various ecological, economical, procedural, societal as well as other risks as follows:

1. Ecological risks:
 - The contamination of the soil from its former use as a cooking plant is still too strong to be used for urban agriculture. This cannot be determined without technical tests. This happened in the case of NBS 3.2, where no edible plants are allowed to be planted in Gustav-Heinemann-Park.
2. Economic risks:
 - Money for NBS implementation may not be sufficiently due for unforeseeable reasons (more expensive technical Equipment than expected, damage, extreme weather conditions like hail or storm...) or poor economic Decision making in the management team, additional money is needed for insurance for equipment.
 - Undetected soil contamination on the NBS sites can lead to additional costs.
 - Risk of incorrectly calculated long-term costs (maintenance - especially for fruit trees), or lack of long-term budget
 - While some NBS such as NBS1, 6 and 8 can be easily maintained beyond the term of proGReg, especially that the City of Dortmund is the main partner of these projects and implements them on city-owned land and in cooperation with other city departments and other long-term projects like IGA, it might be a challenge to ensure the sustainability of other NBS such as NBS 3 and 4, especially with regard to the financing aspect.
3. Procedural risks
 - Other projects or politics, which have their own planning purposes and currently focus on the Living Lab, could force changes to the NBS concept. This is a challenge in the case of NBS 1.2 and is foreseen as a potential risk for other NBS. Possible resistance from user groups and stakeholders could also impose changes on the NBS.
 - Especially for the aquaponics system (NBS4), the correct application is crucial. Due to cost-intensive investments, incorrect use can lead to damage with decisive financial or time risks.

- It may not be possible to implement all the ideas resulting from the citizens' empowerment with regard to the design, construction and operation of aquaponics installations, as they may not correspond to the specific description in the building permit, which must be detailed in advance in order to obtain the building permit.

4. Societal risks:

- Either the projects are not interesting enough for public participation, or the participation strategy has not been developed and/or communicated well enough. This is also a major challenge for NBS 1, 3, 4 and 8 and the project partners must agree on co-design and participation strategies and develop a common understanding of these concepts.
- Loss of public interest in urban gardening/ food forest due to a long development period or due to contaminated crops. Dissatisfaction / disappointment with the first implementation can also lead to a loss of public commitment.
- In addition to the financial risks, vandalism can lead to project delays

5. Other risks:

- The implementation of all NBS is seen as a joint effort of all internal and external project partners from different disciplines. Open, constructive and trusting work is the basis for a good result. Nevertheless, the heterogeneity of the field of specialization of the various partners could possibly lead to differences of opinion and interpersonal confrontations
- Lack of agreement on the responsibility for maintenance / liability for the safety of users in urban gardening / food forest, resulting in insufficient quality of facilities (e.g. waste collection, control of tree stability, condition of paths / accessibility, etc.)
- Every city uses uncalibrated measuring instruments and customized methods for data collection. The data will hardly be comparable within FRC and FC. In addition, the time periods for measurements, e.g. of air quality and temperature, are too short to derive reliable results. It will be difficult to obtain NBS-derived impacts from the data.
- In addition to the predictable risks, there are low probable events that might affect the implementation of the NBS, one example of these event is the potential risk of shortening the two-year implementation period of NBS4 as IDS may have to terminate the contract by the end of 2022 instead of 31 May 2023 as agreed in the contract. The NBS4 site may have to be used as a parking lot for a new event hall at the Hansa Coking Plant in early 2023. The site originally planned as a car park is currently being used as a conversion road (detour) due to road repair work in the area. This kind of risk was never anticipated by the project partners and occurred shortly after signing the contract with IDS. This issue has already been covered in the monitoring deliverable (D.3.3.), please refer to that document for further details.

Prevention is better than cure

In order to enhance the NBS opportunities and reduce implementation threats, the project team developed the following risk mitigation measures, which subsequently correspond to the risk categories mentioned above:

- In the NBS, where edible plants are to be grown, soil contamination tests must be carried out. In case of slight contamination, the soil can be cleaned at a reasonable cost or covered with a layer of uncontaminated soil. In the case of high contamination level, other alternative activities can be carried out on site, such as biodiversity fields (NBS 8) with flowers etc., or production must be converted to a soilless system (mobile units, raised bed gardens etc.).
- Local and vernacular plant species which are able to survive and prosper under local conditions have to be selected and planted
- Regular update of project calculations. In case of larger implementations proGrieg money can be seen as leverage money and added with other financial sources (third party or companies/ funding programs/ crowd funding, etc.). Additional revenue streams or new business models have to be detected to allow higher budgets. Include economic expertise into the project.
- Inclusion of budget for adjustments (buffer) in the financial plan of each NBS.
- Taking into account the interests of the other projects proGrieg collaborates with and find a win-win solution or at least a compromise that meets the interests of all projects. A regular exchange of information within the projects and within the LL are important during the entire course of the project.
- Valid laws and regulations must be taken into account when planning NBS implementations and integrated from the beginning in order to strive for feasible ideas as early as possible in the process. Involve other city departments in the planning process.
- Careful documentation of work progress. Store data decentrally, assure clear documentation of contacts and activities. New key person should be appointed and start the job as quickly as possible.
- The users of the NBS have either to prove their expertise or have to be trained by the partners (e. g. for Aquaponics a group of experts from die Urbanisten, APM, hei-tro and/ or SWUAS).
- The co-design process and involvement of local people and citizens has to be taken serious to attract as many people as possible. Events (workshops on aquaponics, fruit trees, permaculture, etc.), information via local press, school visits or active identification and addressing of specific interest groups. Similarly, courses and informal meetings can be offered for people closely and/or loosely attached to the NBS implementations to have their interest over the project lifetime.

- Carefully select the locations of the NBS. Locations within/near public spaces where many people are present can help against possible vandalism. Light protection measures (e.g. fences, gates, video surveillance) can also be helpful. Empowerment of the citizen and promotion of public ownership of the NBS.
- Start working on follow-up concepts early, convince partners of integration into future projects as soon as possible. Planning of the technical parts and buildings shall be done with regard to easy disassembly and movability.

COVID-19 and its impact on the planning and implementation activities of NBS Dortmund

The spread of the COVID 19 pandemic has caused various negative impacts on the implementation of some NBS and has led to the postponement or cancellation of many physical and co-design activities. The following is a summary of the impact of COVID-19 on the various NBS in Dortmund:

NBS 1: Leisure activities and clean energy on former landfills

NBS 1.1: Integrating solar energy production on Deussenberg landfill

Completed since 2017. No delays due to COVID-19

NBS 1.2: Sports infrastructure in an existing park in Huckarde

Delay in obtaining the political approval to realize NBS 1.2 as the meeting for presenting ProGrieg to the representatives of the local politics in Hurckade was postponed until further notice. No delays on the implementation/execution as it hasn't started yet

NBS 3: Community-based urban farms and gardens

NBS 3.1: Food forest and permaculture orchard in Huckarde

Two months delay in the execution of NBS 3.1 since the COVID-19 outbreak: (1) workshops with the local citizens have been canceled; (2) delays in delivering planting materials to the site of St. Urbanus; (3) delays in planting the intervention area together with the scouts

NBS 3.2: Community gardening in Huckarde

No delays due to COVID-19. The implementation starts after signing the Use Contract

NBS 4: Aquaponics

No delays due to COVID-19. Construction work hasn't started yet.

NBS 6: Accessible green corridors

No delays due to COVID-19. Construction work hasn't started yet

NBS 8: Pollinator biodiversity

Around 5 months delay due to COVID-19. Start of implementation had to be shifted from spring 2020 to fall 2020. Seeding is going to start in September 2020. No citizen participation in the co-design is possible at this point due to corona social distancing measures.

Although COVID-19 lockdown has not caused major delays at the NBS implementation level per se, it is worth mentioning that the project partners and stakeholders, have had to change their daily life in unprecedented ways. Working from home, shifting to online education and teaching, challenges for working parents due to the closure of daycare and schools, etc. all these changes caused rapid slowdown of the pace of everyday life.

Following are the events that has been either canceled or postponed because of COVID-19 outbreak:

- March 20, 2020 Zukunft.Stadt.Garten, proGlgreg Infostand, Urbanisten
- March 29,2020 Seed Festival Dortmund, proGlgreg information booth and lecture by Die Urbanisten
- April 04, 2020 St Urbanus 1. Workshop, plant fruit trees (NBS 3.1)
- April 26, 2020 proGlgreg stand and greenhouse tours, Union Gewerbehof Spring Festival
- May 14, 2020 Greenhouse tour with the Dortmund and Bochum Slow-Food-Group
- May 12, 2020 Aquaponics tour VHS Dortmund
- May 18, 2020 proGlgreg presentation to the Interest Group of Huckard Associations (IHV) (for obtaining the political approval)
- June19, 2020 Aquaponik Workshop + greenhouse tours VHS-Herne
- June 20.-21, 2020 proGlgreg information booth at the NordSommer at Hansa Coking Plant (all NBSs)
- May 23, 2020 St. Urbanus 2. Workshop, climbing plants and climbing aids (NBS3)
- May, 2020 Biomonitoring (NBS 1)
- June 2020 SOPARC training (NBS1+6)



3. The NBS in Dortmund

In this chapter, the NBS, which is being implemented in Dortmund, is discussed in detail. The completion of the planned and then carried out activities for the implementation of the individual NBS took place in cooperation with the project partners. The information contained in the NBS tables is also included in the Living Lab Vision Map. The information contained in the individual tables will be regularly updated by the project partners.

Table 4: NBS to be implemented in Dortmund

NBS type	NBS Title (CTRL+ click to jump to each action)
NBS 1: Leisure activities and clean energy on former landfills	NBS 1.1: Integrating Solar Energy Production on Deussenberg Landfill
	NBS 1.2: Exercise Park in an Existing Park in Huckarde
NBS 3: Community-based urban farms and gardens	NBS 3.1: Food Forests and Permaculture Orchard in Huckarde
	NBS 3.2: Community gardening in Huckarde
NBS 4: Aquaponics	NBS 4: Community managed aquaponics system
NBS 6: Accessible green corridors	NBS 6: Connection of Huckarde Borough with the Renatured Emscher River and Deussenberg Sites
NBS 8: Pollinator biodiversity	NBS 8: Improving and Monitoring Pollinator Biodiversity in Conjunction with NBS 3

NBS 1.1: Integrating Solar Energy Production on Deussenberg Landfill

	
1. General information	
Compilation date and update	May 2020 – Initial and Final Version
NBS type	Renaturing landfill sites for energy production
NBS title	Integrating solar energy production and sports activities on Deussenberg landfill and Huckarde district.
Brief project synthesis	<p>The deposit of garbage started in the beginning of the 20th century. Mainly household and industrial garbage was dumped. After WW II, there was also debris of destroyed buildings. The landfill finally reached an extent of about 50 m x 1000 m and a height of about 50 m.</p> <p>The use of the Deussenberg landfill site stopped in 1992. Since then, the area gradually has been re-cultivated by the last operator, the local garbage company (Entsorgung Dortmund GmbH, EDG). The landfill was secured, and the surface was planted with about 150,000 trees and shrubs or is used as open grassland.</p> <p>In 2004, the Deussenberg was opened to the public. Since then, it has served as a popular destination for various outdoor activities.</p> <p>By the end of 2016, a private company started to install a photovoltaic system on top of the hill after several years of planning. Since June 2017, the 3.56 MW system with 13,000 solar modules is operating. The produced power is supplied to the network of the local energy company DEW21.</p> <p>It equalizes the electric energy of about 1,000 households. According to the operator, about 780,000 liters of heating oil can be saved annually.</p>
Area of implementation	The photovoltaic power plant is located on a 4 ha fenced area on top of the Deussenberg. The owner is responsible for this system.
Target groups (beneficiaries)	Households having a contract with the local energy company DSW21.
Timing (start and end date)	Start of operation: June 2017

Main responsible partner	Entegro Photovoltaik-Systeme GmbH (operator)
ProGReg partners involved	None
Other stakeholders involved	Entsorgung Dortmund GmbH (EDG) as a trustee for the owner (Dortmund) Local energy company DEW21
Total Budget	No proGReg budget available/used
2. Pre-implementation activities	
Planning and preparatory activities	None
Administrative procedures	None
Technical and social analysis	None
Other activities	None
3. Management structure and responsibilities	
Main partner (coordinator) and role/function	None
2nd Partner and role/function	None
3rd Partner and role/function	None
4. Co-design activities and stakeholder engagement	
Stakeholders, engagement processes, in co-design and co-implementation (link with WP2)	None

Notes on major achievements/success factors/critical issues/barriers (to be updated) (link to WP5)	None
Current situation and next steps (to be updated)	None
5. Other activities	
Synergies with other proGInreg activities	In connection with the photovoltaic power plant, measurements of CO2 reduction will be done at Deussenberg (WP 4: D Carbon Impact).
Links with other external project or activity	In addition, Biomonitoring sampling will be done at Deussenberg (WP 4: G Biomonitoring).
Business model (link to WP5)	None
Technology Readiness Level (TRL) (link to WP5)	None
Communication activity (link to WP6)	None
6. State of Play and Monitoring	
Current situation (to be updated)	-
Next steps (to be updated)	None
Notes/critical issues/barriers (to be updated)	None
7. NBS maintenance and outlook	
Maintenance	None
Sustainability after project conclusion	None
Additional resources	None

NBS 1.2: Exercise Park in an Existing Park in Huckarde



Remark:

Many landfills (artificial hills) in the Ruhr Area have something special and attractive on their top, e.g., art sculptures, lookout towers, green classrooms, or a large ski center. In Dortmund, a mountain bike area opened in 2008 on Deusenberg. Many bikers either use the beginner's trail, the Singeltrail or the Biker-X for advanced sportspersons.

The Deusenberg area is well connected within the local and regional pathway system. The top can be reached via several paths and a long staircase but almost exclusively from the east side. Joggers, bird-watchers, or walkers who want to fly kites or just enjoy the wonderful view on clear days are visiting the top of the hill.

During the preparation phase of proGReg, the idea of supplementing the existing sports activities on Deusenberg was put in the Grant Agreement as part of NBS1. In spring 2019, after the project start of proGReg, it was announced that the International Garden Exhibition Ruhr 2027 will take place in Dortmund. The Deusenberg will be part of the exhibition area. In order to be able to work out a comprehensive and concise concept, proGReg activities had to be harmonized with the IGA plans. As proGReg needs to implement its activities several years earlier than the IGA, it turned out by the end of 2019 that proGReg sport activities cannot be realized on the Deusenberg.

The project coordinator agreed to realize this subproject within the existing parks of Huckarde. Its work title was changed to "Exercise Park."

	
1. General information	
Compilation date and update	May 2020 –First draft version
NBS type	Renaturing landfill sites for leisure use
NBS title	(Integrating sports activities on Deusenberg landfill) replaced by " Exercise park " (internal work title in Dortmund)
Brief project synthesis	<u>Project planning phase:</u> Installation of sport devices in a public park useable for Huckarde and Dortmund citizens and pupils from an adjacent school. The park belongs



	<p>to the City of Dortmund, and the Eastern part of it was offered to realize NBS 1 by the Grünflächenamt (department in charge: Department of Green Spaces) by the end of January 2020.</p> <p>The overall idea is to offer devices to stimulate physical exercises as prophylaxis and as an adjustment to mainly sitting activities during daily routine. Being located in a public park, the devices are supposed to invite every person who would like to use them.</p> <p>This approach supplements project ideas of the Integrated Action Concept for Huckarde respectively the Concept of Green Spaces for Huckarde which currently is in a project defining phase.</p>
Area of implementation	<p>In the western part of the park a brick manufacture was operating between 1900 and 1925. Until the end of the 1960's, all buildings were deconstructed, and the park area was designed and realized in the 1980's.</p> <p>The sport devices are supposed to be located within the Gustav-Heinemann-Park, a 4 ha public park located within the Huckarde district. The park has a West-East extension. On the one hand, it serves as a transition space between the residential settlement of Huckarde and the regional suburban train station in the West. On the other hand, the park offers some devices for stopovers: a playground for small kids, play devices for children, table tennis, a boule facility, and many benches and stones as sitting devices.</p>
Target groups (beneficiaries)	Dortmund and Huckarde citizens, joggers, members of sports clubs, pupils from the adjacent school (Gustav-Heinemann School)
Timing (start and end date)	Start: January 2020 (conceptual phase)
Main responsible partner	Targeted end: Fall 2022 (construction)
ProGInreg partners involved	None
Other stakeholders involved	<p>Department of Green Spaces, Dortmund</p> <p>Prospectively:</p> <ul style="list-style-type: none"> - Gustav Heinemann School - Sports clubs using the gym of the Gustav Heinemann School - local politics
Total Budget	<p>120,000 Euro (proGInreg money for NBS 1)</p> <p>Additional money possible, but not secured yet (e.g., remainders from NBS 6 -budget, external supporters – depending on the project layout)</p>
2. Pre-implementation activities	

Planning and preparatory activities	<p>In spring 2020 preparing working steps are still ongoing due to the reframing process of NBS 1. By investigating the external parameters in order to identify the scope within the project ideas may be realized, several restrictions have been identified:</p> <ul style="list-style-type: none"> - the necessary political support is only possible, if a convincing concept is worked out which overlaps with other development plans (e.g. Freiraumkonzept Huckarde/ concept of green spaces for Huckarde) - The deposited soil in the park does not meet the necessary quality for areas next to sports devices and needs to be exchanged – which is very costly thus not allowing a wide-stretched but rather a punctual location of the devices. <p>Conceptual options which need to be harmonized with responsible departments respective planning processes are:</p> <ul style="list-style-type: none"> - NBS 1 may be realized in combination with a new exercise loop which also takes course through the park (planning idea of Freiraumkonzept Huckarde). - A school next to the park (Gustav-Heinemann School) would like to have more exercise tools on its schoolyard – this is the result of a questionnaire from 2019 for the Masterplan Sport. <p>The next step will be to more precisely work out the settings and a first concept for the NBS1. The planning process will start in fall 2020 by the Department of Green Spaces (Grünflächenamt).</p>
Administrative procedures	<p>Working steps after first concept has been worked out:</p> <ol style="list-style-type: none"> (1) political approval of concept (2) project plan (draft) (3) public participation (4) project plan (final) (5) political approval of plan: board decision for construction (6) call for bids (7) construction (8) Handover <p>All necessary steps of the planning process will be worked out in close collaboration with other city departments which are in charge of specific details.</p> <p>Exceptions may be public participation and construction – they might be done by external companies</p>
Technical and social analysis	<p>Next to the social analysis of WP 2, a warfare material analysis has been done. Soil analyses will follow after political approval to realize the NBS.</p>
Other activities	<p>Depending on the final concept; not clear yet.</p>
3. Management structure and responsibilities	

Main partner (coordinator) and role/function	Department of Urban Renewal, Dortmund: lead for NBS 1
2nd Partner and role/function	Department of Green Spaces, Dortmund: planning and maintenance of NBS 1
3rd Partner and role/function	Construction company (not identified yet; options will be checked to involve a job creation company at least for parts of the construction work)
4. Co-design activities and stakeholder engagement	
Stakeholders, engagement processes, in co-design and co-implementation (link with WP2)	Planned workshop during conceptual phase (fall 2020): <ul style="list-style-type: none"> - involvement of pupils and teachers of the Gustav Heinemann School - involvement of sports clubs using the sports hall at the Gustav-Heinemann School Possible activities based on the draft of the plan: <ul style="list-style-type: none"> - involvement of Huckarde citizens (presentation, discussion)
Notes on major achievements/success factors/critical issues/barriers (to be updated) (link to WP5)	Conceptual framework: Looking closer at the local conditions, it turns out that the range of possibilities is quite small. Some ideas had to be given up due to various reasons, e.g. <ul style="list-style-type: none"> - high financial need for soil exchange - refusal of adjacent dwellers regarding play devices close to their houses in the past The concept of the park will describe the overall character of NBS 1 without going into detail (they will be worked out during the planning phase): <ul style="list-style-type: none"> - target group(s) - possible locations for devices - external needs (soil exchange, robust material due to vandalism, ...) - overlap with other development plans for Huckarde The major details of the project will be disseminated to local politicians to persuade them to support NBS1 and then later used for the planning phase. Political approval is crucial to proceed with NBS 1.
Current situation and next steps (to be updated)	See “Stakeholder engagement” and “Notes on major achievements”
5. Other activities	
Synergies with other proGReg activities	Possible options: NBS 3 + 8 in Gustav Heinemann Park WP 4: NBS-visitor questionnaire, SOPARC, economic and labor impact questionnaire (SOPARC is postponed until September because of COVID-19 lockdown)

Links with other external project or activity	The contents of the project will be harmonized with: - Concept of Green Spaces for Huckarde (Freiraumkonzept Huckarde) - Masterplan Sport
Business model (link to WP5)	Still unclear; business model will be worked out based on final plan.
Technology Readiness Level (TRL) (link to WP5)	On the Deusenberg, TRL 8 was given and TRL 9 was aspired for. For the Gustav-Heinemann Park, the Grant Agreement does not give any hints. Nevertheless, TRLs can be transferred to the new location.
Communication activity (link to WP6)	Intense internal communication within various city departments: - Department of Urban Renewal (IGA 2027, concept of green spaces for Huckarde, etc.) - Department of Green Spaces (location, planning process) - Department of Environmental Affairs (soil) - Department of Sports and Leisure (Masterplan Sport, sports clubs) - Department of Youth Welfare (playground planning) - Department of City Planning (strategic playground planning) - Citizens Services (local and political affairs) External communication: - Bezirksregierung Arnsberg (warfare material survey)
6. State of Play and Monitoring	
Current situation (to be updated)	Too early for input
Next steps (to be updated)	Too early for input
Notes/critical issues/barriers (to be updated) (link to WP5)	Loss of time due to local fixation on Deusenberg according to specifications of Grant Agreement and related dependence on IGA planning process New NBS-concept starts "from scratch": time-consuming conceptual harmonization to identify the range of possibilities for the project
7. NBS maintenance and outlook	
Maintenance	City of Dortmund, Department of Green Spaces
Sustainability after project conclusion	Too early for input
Additional resources	Too early for input

NBS 3.1: Food Forests and Permaculture Orchard in Huckarde

	
1. General information	
Compilation date and update	May 2020, first draft version
NBS type	Community-based urban farming and gardening on post-industrial sites
NBS title	Waldgarten St. Urbanus (Forest Garden St. Urbanus)
Brief project synthesis	<p>A 3000 m² food forest – a self-sustaining woodland ecosystem designed for food production – will be created together with the scouts and the members of the St. Urbanus community. The food forest of St. Urbanus will be built through workshops with the community and the boy and girl scouts from Deutsche Pfadfinderschaft Sankt Georg (DPSG). The workshops also should empower people to take care of the garden in the long term. It is intended that people will take over sponsorships for parts of the food forest. The food forest should also be a place of education for the local population to learn about sustainable cultivation methods for their own garden areas.</p>
Area of implementation	<p>The food forest will be built on an unused area of the community center. At the rear end, the area is bordered by a tributary of the Emscher, which was known as the dirtiest river in Germany due to industrialization until its renaturation (see chapter 2.1).</p> <p>Address: <i>St. Urbanus Haus</i>, Am Dieckhof 6, 44369 <i>Dortmund Huckarde</i> GPS coordinates: 51.530686, 7.418268</p>
Target groups (beneficiaries)	Boy and girl scouts, St. Urbanus community, citizens of Huckarde,

Timing (start and end date)	November 2019 – November/2021
Main responsible partner	South Westphalia University of Applied Science
ProG!reg partners involved	Die Urbanisten e.V., Rheinische Str. 137, 44147 Dortmund
Other stakeholders involved	Kath. Kirchengemeinde St.Urbanus (land owner)
Total Budget	7000 €
2. Pre-implementation activities	
Planning and preparatory activities	In 2018, the parish of St. Urbanus had cleared a part of the land of its community center from dense wild growth - their idea was to plant some fruit trees in 2019. After we were able to establish contact with the community through a contact at the EmscherGenossenschaft, it became clear that a cooperation would be fruitful. After discussions with Pastor Michael Ortwald there was an agreement that the priority users should have a say in the design of the area.
Administrative procedures	The church community had to pass a formal resolution in the executive committee on cooperation within the framework of the project. This required several meetings in which the process of the co-design and the implementation of the food forest had to be explained. An enquiry was made to the lower soil protection authority as to whether soil samples were required. As no industrial uses in the past were known, this was not necessary.
Technical and social analysis	Permaculture experts were consulted to determine whether the area was suitable for the establishment of a food forest.
Other activities	A local company that prunes trees has brought its green waste to the area from November 2020. These wood chips are needed in large quantities for the construction of a food forest and would have been very expensive to buy.
3. Management structure and responsibilities	
Main partner (coordinator) and role/function	South Westphalia University of Applied Science Budget management, advising, technical and organizational barriers
2nd Partner and role/function	Die Urbanisten e.V. Planning, Co-design, participation, workshops

3rd Partner and role/function	...
4. Co-design activities and stakeholder engagement	
Stakeholders, engagement processes, in co-design and co-implementation (link with WP2)	The area has been used for activities by the local scouts. Their wish was to make the area more bee-friendly even before the forest garden was built and to use raised beds as design elements. In a workshop in May 2019, four raised beds were created over a weekend, which were set up together with many helpers and planted with bee-friendly flowering plants and vegetables. This event marked the beginning of the co-design process with the scouts and the executive board of the parish. In several talks the ideas of the participants were taken up and it was discussed how these can be implemented in a food forest. Together with an expert in permaculture, a plan was drawn up, adapted to the conditions of the site with different focal zones. In March 2020, a presentation of the concept took place in the community center.
Notes on major achievements/success factors/critical issues/barriers (to be updated) (link to WP5)	<p>Achievements: In May 2019 the topic of the project was raised and discussed at the bed workshop with over 50 participants. The plan created in co-design was accepted.</p> <p>Success factors: The work with the church is uncomplicated and not bureaucratic. There are active people in the community.</p> <p>Critical issues: The workshops planned for spring 2020 were canceled and postponed due to the corona virus.</p> <p>Barriers: None</p>
Current situation and next steps (to be updated)	The active development of the garden was planned for spring 2020. Due to measures taken about the corona virus, these had to be postponed. However, from May 2020 onwards, the garden will be set up in small groups of two people in the community. Die Urbanisten have written instructions and recorded videos to explain the work steps. Wood chips are first applied to the area before the first trees, shrubs, herbs, and vegetables are planted. The planting of trees had to be postponed until autumn.
5. Other activities	
Synergies with other proGfreg activities	<p>WP4: monitoring and assessment activities (air quality and air temperature)</p> <p>Other NBS 3 activities</p> <p>NBS 4 activities</p> <p>NBS 8 activities</p>

Links with other external project or activity	Other urban gardening projects in Dortmund from die Urbanisten
Business model (link to WP5)	The community can imagine to sell homemade products from fruits of the food forest at their festivals.
Technology Readiness Level (TRL) (link to WP5)	-
Communication activity (link to WP6)	Die Urbanisten reported on its blog about the activities. The local newspaper Ruhrnachrichten reported on the project. Die Urbanisten gave a presentation about the project at a climate protection event of the Dortmund church communities. In June 2020, the new website about the urban gardening activities of the living lab in Huckarde will be launched.
6. State of Play and Monitoring	
Current situation (to be updated)	Because of the coronavirus, the first planned workshops had to be canceled. From May onwards, however, the garden will be set up in small groups of two people in the community. Die Urbanisten have written instructions and recorded videos to explain the work steps to the participants.
Next steps (to be updated)	As soon as the measures to counteract the coronavirus allow, the workshops will be resumed in their planned form. Since some workshops are seasonally dependent, the planned sequence must be adapted.
Notes/critical issues/barriers (to be updated) (link to WP5)	
7. NBS maintenance and outlook	
Maintenance	The scouts will play an active role in the garden maintenance. Community members will have the possibility of taking sponsorship for parts of the food forest.
Sustainability after project conclusion	The community is very committed to advancing and sustaining the project. Once a food forest has been established, it requires little maintenance.
Additional resources	

NBS 3.2: Community gardening in Huckarde



1. General information

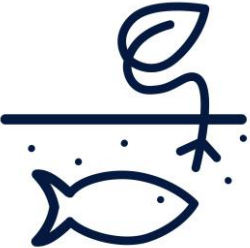

Compilation date and update	May 2020, first draft version
NBS type	Community-based urban farming and gardening on post-industrial sites
NBS title	Schulgarten am Gustav-Heinemann-Park
Brief project synthesis	Self-irrigating raised beds are being constructed on a section of the Gustav-Heinemann park. The park is built on an old brickwork factory, so it is not possible to grow edible plants in the ground. The nearby school would like to establish a school garden.
Area of implementation	Adress of the school: Parsevalstraße 170, 44369 Dortmund GPS coordinates : 51.532810, 7.405729
Target groups (beneficiaries)	Students of the Gustav-Heinemann-Gesamtschule, nearby residents of the park
Timing (start and end date)	November 2022 – July/2021
Main responsible partner	South Westphalia University of Applied Science
ProGlg partners involved	Die Urbanisten e.V., Rheinische Str. 137, 44147 Dortmund

Other stakeholders involved	Stadtgrün, Department of Green Spaces, City of Dortmund (land owner) Gustav-Heinemann-School
Total Budget	5000 €
2. Pre-implementation activities	
Planning and preparatory activities	A meeting with the Department of Green Spaces in the City of Dortmund Dortmund was held to explore other site options for implementing NBS3. Die Urbanisten met with the Head of the School (Gustav Heinemann) to discuss a potential cooperation.
Administrative procedures	A contract of use must be signed between die Urbanisten and Dortmund (Department of Green Spaces).
Technical and social analysis	Initially, the question had to be clarified whether soil samples had to be taken in the area for urban gardening activities. A soil sample was deemed not necessary as the planting of edible plants in the soil of that site had already been excluded by Dortmund.
Other activities	
3. Management structure and responsibilities	
Main partner (coordinator) and role/function	South Westphalia University of Applied Science Budget management, advising, technical and organizational barriers
2nd Partner and role/function	Die Urbanisten e.V. Planning, Co-design, participation, workshops
3rd Partner and role/function	
4. Co-design activities and stakeholder engagement	
Stakeholders, engagement processes, in co-design and co-implementation (link with WP2)	Workshops were held in the Gustav Heinemann School by die Urbanisten, in which the students could build their own aquaponics system for their school, which is now operated by them. This was also done to attract schools to the topic of aquaponics and establish cooperation for the planned school garden.
Notes on major achievements/success factors/critical issues/barriers (to be updated)	Barriers: The Department of Green spaces in Dortmund (the owner of the park) requires a Contract of Use with the die Urbanisten, in which the project has to be described in detail, e.g., the locations of the raised beds. Within the living lab in Dortmund, however, it was agreed not to communicate to the public until the necessary contracts are signed. This

(link to WP5)	leads to difficulties in the co-design process as the planning should be done with the citizens involved.
Current situation and next steps (to be updated)	
5. Other activities	
Synergies with other proG!reg activities	Other NBS 3 activities NBS 4 activities NBS 8 activities
Links with other external project or activity	Other urban gardening projects in Dortmund from die Urbanisten Aquaponics workshops in Dortmund schools
Business model (link to WP5)	
Technology Readiness Level (TRL) (link to WP5)	-
Communication activity (link to WP6)	It is planned to announce the project in autumn 2020, after signing the contract with Dortmund, to involve more participants and citizens in the co-design and implementation.
6. State of Play and Monitoring	
Current situation (to be updated)	Due to the implementation of the other projects in NBS 3 and 4, activities on the site cannot begin until 2021.
Next steps (to be updated)	The contract of use must be signed and the concept must be specified.
Notes/critical issues/barriers (to be updated) (link to WP5)	
7. NBS maintenance and outlook	
Maintenance	Self-watering raised beds do not need much care.

Sustainability after project conclusion	The school would take care of the plants. Citizens can takeover sponsorships for the beds.
Additional resources	

NBS 4: Community managed aquaponics system

	
1. General information	
Compilation date and update	May 2020 - first draft version
NBS type	Aquaponics as soil-less agriculture for polluted sites
NBS title	Community managed aquaponics system on the site of the coking plant Kokerei Hansa - Hansaponik
Brief project synthesis	Considering the focal point of proG!reg for Dortmund, two aquaponics greenhouses will be built on part of the site of the old coking plant Kokerei Hansa in Dortmund Huckarde. The greenhouses are intended to produce sustainable food for Huckarde, to advance the concept of aquaponics technically and serve as a learning venue for workshops with the population.
Area of implementation	The NBS is going to be implemented on the site of the Kokerei Hansa (former coking plant) Address (entrance): Emscherallee 11, 44369 Dortmund GPS coordinates: 51.541558, 7.410900
Target groups (beneficiaries)	The main beneficiaries of this activity are: Citizens of the neighborhoods Huckarde. Students and pupils.
Timing (start and end date)	Implementation Phase Start: Fall 2020 (depends on building permit. Possibility of delay) End: End of 2021
Main responsible partner	Die Urbanisten e.V.



ProGlgreg partners involved	South Westphalia University of Applied Science Aquaponik Manufaktur GmbH Heitro GmbH Department of City Development (Amt für Stadtentwicklung), City of Dortmund
Other stakeholders involved	The Foundation for the Preservation of Industrial Monuments and Historical Culture (Stiftung Industriedenkmalpflege und Geschichtskultur) (land owner)
Total Budget	123.000 € for the construction and equipment of the greenhouses (die Urbanisten e.V.) 50,000 € for research into TRL optimisation (FH SWF) 12.500 € for events and creation of a filter system (heitro)
2. Pre-implementation activities	
Planning and preparatory activities	<p>The search for an area for the aquaponics system proved to be very difficult.</p> <p>The location at the Hansa Coking Plant was considered at a very early stage and was unrivalled in terms of its location in the Living Lab as well as its prospects as a future hot spot for the International Garden Exhibition IGA 2027. Due to its historical importance and the high number of visitors, the industrial monument offers maximum public visibility and follows exactly the priorities of the project to implement nature based solutions on post-industrial wastelands. These characteristics were the reason to exhaust all possibilities to use this area. This was then made binding in February 2020 after some delay.</p>
Administrative procedures	<p>The owner of the site (IDS) demanded a deposit of 10.000€, which the designated tenant of the aquaponics site, Die Urbanisten, could not cover this amount from the project budget. This had to be clarified with the PO with the help of the RWTH. The urbanists did not have the funding to cover this amount. The project partner Dortmund supports in a coordinating capacity (especially in clarifying the procedures for obtaining the building permit by the building authorities) and is not the tenant or main project partner to cover the deposit. After extended negotiations and a time-consuming process of developing alternative solutions, the University of Applied Sciences South Westphalia became an official tenant, thus solving the stalemate.</p> <p>Parallel to the negotiations for the area, the technical plans for the preliminary building application are being worked on. It is expected to be submitted at the end of May 2020. The final building application will follow as soon as all administrative and legal details have been clarified.</p>

Technical and social analysis	Aquaponics is soil-independent; however, further backfill may be necessary due to the contaminated site situation. Aquaponik Manufaktur GmbH and SWUAS are working on the elevation of the technology readiness level (TRL). As a first milestone, a comprehensive list of optimization methods has been compiled. This list is going to be detailed in a document by these partners. In the following steps, technical calculations are going to be carried out in order to be able to quantify the effectiveness of these methods.
Other activities	Workshops were held in Dortmund schools, in which the students could build their own aquaponics system for their school and then operate by themselves. This was also done to attract schools to the topic of aquaponics, and establish cooperation for the further project. Guided tours of the existing small greenhouse were used to promote the aquaponics project.
3. Management structure and responsibilities	
Main partner (coordinator) and role/function	Die Urbanisten e.V. Implementation, citizen participation
2nd Partner and role/function	South Westphalia University of Applied Science Economic viability, technical and organizational hurdles, operational optimization
3rd Partner and role/function	Aquaponik Manufaktur, heitro GmbH
4. Co-design activities and stakeholder engagement	
Stakeholders, engagement processes, in co-design and co-implementation (link with WP2)	The landowner of the coking plant (Foundation for the Preservation of Industrial Monuments and Historical Culture) was engaged in the process since the first co-design workshop in December 2018. Only when the plant is realized can the population be involved on a broader scale.
Notes on major achievements/success factors/critical issues/barriers (to be updated) (link to WP5)	The project lead partner, Dortmund, prohibited any public communication about this NBS before the contract for the site was signed. Therefore, the already slim possibility for a co-design process on this NBS has been further narrowed.

Current situation and next steps (to be updated)	Participation in the technical implementation is difficult due to the high complexity. After all the trouble with establishing a contract, the plan was to inform the public widely about the Hansaponik project from the summer of 2020. In July there was supposed to be a large citizens' festival at the coking plant in which the aquaponics project should be introduced to the people of Huckarde, but this was cancelled because of the corona virus. The event is postponed to next year.
5. Other activities	
Synergies with other proGInreg activities	WP4: monitoring and assessment activities (air quality and air temperature) Link with the activity "Spatial analysis and analysis WP2.1 framework" Link with the activity "Community-based urban farming and gardening on post-industrial sites"
Links with other external project or activity	Workshops were held by die Urbanisten in Dortmund schools, in which the students could build their own aquaponics system for their school, and then operate by themselves. This was also done to attract schools to the topic of aquaponics and establish cooperation for the further project.
Business model (link to WP5)	Two parallel operating concepts: production for the planned gastronomy at the Hansa coking plant and testing of a rental bed concept for the population of Huckard
Technology Readiness Level (TRL) (link to WP5)	Research is being conducted into increasing the technical readiness level by improving energy and resource optimization. The goal of this line of work is the development of a passive solar zero discharge aquaponics system.
Communication activity (link to WP6)	As soon as the planning of the aquaponics is completed, the population of Huckarde will be informed about the project and the possibilities for participation. A website has been made under the lead of die Urbanisten to show all the activities of the Living Lab Dortmund, which will be released in June 2020.
6. State of Play and Monitoring	
Current situation (to be updated)	A Pessl iMETOS 3.3 Pro weather station has been implemented at the site which is monitoring the following environmental parameters: air temp, air pressure, rel. humidity, global radiation, wind speed, soil temperature and leaf humidity.
Next steps (to be updated)	After the erection of the greenhouses, a wide range of sensors is going to be deployed in the greenhouses by SWUAS, with the goal

	of quantifying the effects of those energy optimization methods that were promising enough to be implemented in experiments.
Notes/critical issues/barriers (to be updated) (link to WP5)	<p>Issues and barriers:</p> <p>Long duration of the search for an area and negotiations</p> <p>Long timeline and high costs of the German bureaucracy to obtain authorizations and permissions.</p> <p>Business models:</p> <p>Two business models will be attempted to be implemented:</p> <p>The first is a farm-to-table model of producing products for a restaurant that is located on the same site nearby the greenhouses.</p> <p>The other is a model that is adopted from the proven to work rent-a-field concept. The goal is to rent rafts to citizens rather than producing and marketing products.</p>
7. NBS maintenance and outlook	
Maintenance	During the proGReg project timeline the system is going to be operated and maintained cooperatively by Die Urbanisten and SWUAS.
Sustainability after project conclusion	<p>SWUAS has submitted a research project proposal for the continuation of research at this site and system with a focus on operational optimization with artificial intelligence.</p> <p>Regardless of the outcome, SWUAS might maintain the system for research purposes after the proGReg project timeline.</p> <p>Since the system is supposed to become part of the international gardening exhibition IGA in 2027, the project team is optimistic that a solution is going to be found for maintaining and further developing the system in the intermediate time.</p>
Additional resources	

NBS 6: Connection of Huckarde Borough with the Renatured Emscher River and Deussenberg Sites

	
1. General information	
Compilation date and update	June 2020, first draft version
NBS type	Making post-industrial sites and renatured river corridors accessible for local residents
NBS title	Connection of the Huckarde borough with the renatured Emscher River and Deussenberg sites
Brief project synthesis	<p>The former Deussenberg landfill has been recultivated since 1992 and was opened to the public in 2004. Since then, it has been a popular destination for various leisure activities like walking, jogging, cycling, mountain biking, birdwatching, etc.</p> <p>Access to the top of the Deussenberg is mainly possible from the northeastern side via several paths and stairs. The other three expositions are “gated” as there are train tracks (west, north), a fenced maintenance and work facility, and a fenced lot with a degassing installation for the landfill. In the northwestern area an unofficial trail connects the path system with the Deussenberg trails along with a second one in the southeast, connecting the Emscherpath with an existing paved road which is only accessible to workers to maintain the landfill via a gated property.</p> <p>The Deussenberg will be part of the exhibition area of the International Garden Exhibition in 2027. It will be necessary to offer a barrier-free connection from an existing parking lot to the exhibition area. Therefore, the hidden, unofficial path in the southwest will be reconstructed. Another connection is planned (an IGA-project with a budget of ~ 5 million Euro) via a bridge, linking the area north of the Hansa coking plant and the Deussenberg by crossing the train tracks.</p> <p>In the past years, the Huckarde citizens have been asking local politicians for a better connection between the settlement and the Deussenberg leisure area. The NBS therefore meets their desires. The first step was to identify a realizable connection.</p>



	The path will be about 100 m long and 3 m wide and will be designed as a combined path for walkers and bikers. Independent of the adjacent path system, there will be no lighting.
Area of implementation	<p>The reconstruction of the path is planned on a lot belonging to the City of Dortmund. In former times, when the landfill was actively filled, a road existed there but was deconstructed after 1992.</p> <p>Today, the path is hard to be seen from the Emscher path, as dense vegetation (trees, shrubs) hides the small “entrance.” It is still located at the slope toe with a comparably low gradient in comparison to the adjacent landfill.</p>
Target groups (beneficiaries)	<p>The path will be constructed for walkers/ joggers and bikers (without motor).</p> <p>Perspectively, IGA visitors will use it.</p>
Timing (start and end date)	<p>Start: January 2019</p> <p>End: December 2021</p>
Main responsible partner	Department of Urban Renewal, City of Dortmund (lead)
ProGleg partners involved	Civil Engineering Department, Dortmund (planning)
Other stakeholders involved	Construction Company (not identified yet)
Total Budget	<p>180.000 € (proGleg budget)</p> <p>6.000 € (feasibility study; federal money from Huckarde integrated action plan)</p>
2. Pre-implementation activities	
Planning and preparatory activities	<p>Internal assessment check: A north-south running path on a fenced property would have been the shorter connection between the Huckarde settlement and the Deusenberg. Nevertheless, there would have been the laborious process for Dortmund to buy the lot with the path. In order to build a barrier-free path, intense interventions in vegetation and topography would have been necessary.</p> <p>Therefore, in September 2019 the decision was taken to realize the east-west connection from the Emscherpath. The north-south path may be realized in the future as an additional connection which doesn't have to be barrier-free. Opening the fence and using the informal path for the public is not possible mainly due to liability questions, necessary investments for fences, and a construction site within the next years.</p> <p>Feasibility Study: An external office was authorized to work out the best layout of the east-west path regarding interventions and aspects like</p>

	vegetation, landscape, soil, and costs. The draft was worked out and is currently being checked by several departments of the City Dortmund. Planning Process: The path will be planned by an external landscape company.
Administrative procedures	See “planning and preparatory activities”
Technical and social analysis	NBS 6 is mainly a technical project which needs to meet all given technical and administrative requirements. The whole area is covered with deposits, but not with landfill material. Therefore, in the first step a warfare material survey was done and in a second step soil samples were taken and analysed. As the path will be open to the public, no specific social analysis was needed next to the one worked out in the Spatial Analysis. As the path will be barrier-free, extensive soil removals will be necessary.
Other activities	Close internal harmonization of NBS 6 with IGA planning group.
3. Management structure and responsibilities	
Main partner (coordinator) and role/function	Department of Urban Renewal, Dortmund.
2nd Partner and role/function	Local garbage company (Entsorgung Dortmund GmbH, EDG)
4. Co-design activities and stakeholder engagement	
Stakeholders, engagement processes, in co-design and co-implementation (link with WP2)	At the current stage, NBS 6 is mainly a technical project which needs to meet all given technical, legal, and administrative requirements. Thus, co-design has been taken place on these levels with specialists. As expert knowledge is necessary at this point, the public could not be involved. Nevertheless, the Huckarde citizens have expressed their desire in the past to receive better access to the Deusenbergr site from the settlement. This desire will be met via NBS 6.
Notes on major achievements/success factors/critical issues/barriers (to be updated) (link to WP5)	The feasibility study will be a good basis for the planning process as some aspects have already been worked out by identifying and jointly agreeing upon them by the involved departments of the City of Dortmund. Thus, the planning process might be shortened as the sketch path should fit into the administrative and legal framework.
Current situation and next steps (to be updated)	The draft of the feasibility study can be finished after receiving all the feedback from involved departments.

	The next step will be the design plan for the path as well as the list of specifications for tenders.
5. Other activities	
Synergies with other proGReg activities	Link with NBS 1: outdoor sport activities
Links with other external project or activity	Links with International Garden Exhibition 2027 Concept of green spaces for Huckarde
Business model (link to WP5)	The public path will be built with proGReg-money. The local garbage company which takes care of the maintenance of the Deutenberg, will also maintain the new path after realization.
Technology Readiness Level (TRL) (link to WP5)	Current TRL: 8 The site for the path is already attractive as the Deutenberg has a diverse path system and the Emscher has been renatured with an adjacent regional bike route (Emscher Radweg). Future TRL: 9 The accessibility to the Deutenberg will be improved by a multi-useable barrier-free path; it might stimulate physical exercise for walkers, joggers, and cyclists. Moreover, for handicapped persons, the Deutenberg path system will be better accessible.
Communication activity (link to WP6)	Communication activities were mainly focused on the internal harmonization processes in combination with the feasibility study. Once final plans for construction are worked out, local politicians will approve the project within a public meeting. The Dortmund public will be informed about the path at that point of time.
6. State of Play and Monitoring	
Current situation (to be updated)	Spring/ summer 2019: examination and finally rejection of north-south connection Fall 2019-spring 2020: examination of west-east connection and mandating a feasibility study via an external planning company
Next steps (to be updated)	Technical planning of the path (Civil Engineering Department, City of Dortmund) Call for bids Construction

Notes/critical issues/barriers (to be updated) (link to WP5)	So far it is unknown when the technical planning can be done.
7. NBS maintenance and outlook	
Maintenance	Local garbage company (Entsorgung Dortmund GmbH), which maintains the complete path system at the Deusenberg.
Sustainability after project conclusion	The path will be open for the public. During the IGA 2027 it will be the only barrier-free access to the Deusenberg.
Additional resources	www.hansagruen.de www.progireg.dortmund.de

NBS 8: Improving and Monitoring Pollinator Biodiversity in Conjunction with NBS 3

	
1. General information	
Compilation date and update	June 2020, first draft version
NBS type	Pollinator biodiversity improvement activities and citizen science project
NBS title	Improving and monitoring pollinator biodiversity in conjunction with NBS 3
Brief project synthesis	Pollinator-friendly plants will be introduced to the open slopes of the former-landfill site Deussenberg and the neighbouring permaculture orchard (NBS 3). Local citizens will help monitoring numbers and species variety.
Area of implementation	<p>During the planning phase a lawn of approximately one hectare size on the eastern side near the top of the Deussenberg, the former landfill, had been selected for the implementation of this NBS. An on-site survey, conducted with experts in the field of biodiversity, revealed that regarding biodiversity the selected site is already valuable. Several protected plants and birds were identified. Subsequently, the survey group inspected other potentially suitable places in Huckarde and was able to identify several sites that are very promising regarding the implementation. The selected sites are lawns in public parks that are currently not very rich in biodiversity and which are under management of the City of Dortmund.</p> <p>The selected sites are linked to one another so that in the end they will form a biodiversity pathway. Apart from the obvious benefit for</p>

	humans, this is also beneficial for the biodiversity since it allows for the insects in question to migrate easily between the patches.
Target groups (beneficiaries)	Citizens using the public park pathways are going to be able to follow the path of wild flowers. The park is not only a single spot for recreation, but it is also used as a pathway connecting different parts of the neighborhoods. Therefore, it is going to be visible to a large range of citizens who are using the pathways for their daily task and not only to those visiting the park for relaxation.
Timing (start and end date)	Due to the Corona virus pandemic the start of the implementation had to be shifted from spring 2020 to fall 2020. The seeds are currently in the process of being ordered, but seeding is going to start in September 2020.
Main responsible partner	City of Dortmund. The department that is maintaining the public green space is also going to take care of seeding and maintaining the biodiversity spaces of our project.
ProGReg partners involved	City of Dortmund, Die Urbanisten e.V., SWUAS.
Other stakeholders involved	N.A.B.U. (environmental association), Entsorgung Dortmund GmbH (EDG, waste management company and maintainer of the former landfill)
Total Budget	
2. Pre-implementation activities	
Planning and preparatory activities	The sites that have been selected in the co-design process are under management of the same entity that is also going to perform the actual implementation. Thus, most of the preparatory activities are going to be performed internally at this city department. The seeds have been collectively chosen with input of the biodiversity experts. The seeds are going to be purchased by SWUAS and are going to be used by the city of Dortmund department.
Administrative procedures	Since the implementation is going to take place on sites that are property of the City of Dortmund and the implementation is going to be performed by that department in particular which is maintaining these spaces anyway, no additional administrative procedures are necessary. The mentioned department is an active part of a city wide project called "Stadtgrün naturnah", which can be translated into "green city spaces close to nature." This fits very well with the goals of the proGReg project.

Technical and social analysis	The technical analysis was performed on a site survey supported by biodiversity experts. It led to a different selection of the spaces than had initially been selected by the project team. No additional societal analysis has been performed.
Other activities	The implementation partners are going to communicate this activity within other public events of our project with the goal of raising awareness for this important topic.
3. Management structure and responsibilities	
Main partner (coordinator) and role/function	City of Dortmund, Civil Engineering Department, for the implementation City of Dortmund proG!reg, for the administrative coordination
2nd Partner and role/function	Die Urbanisten e.V.: public communication within other living lab events. SWUAS : procurement of seeds
4. Co-design activities and stakeholder engagement	
Stakeholders, engagement processes, in co-design and co-implementation (link with WP2)	Experts in the field of insect diversity and general biodiversity have been invited to a collective site survey of the initially selected site with the goal of detailing the implementation. During this event, the experts came to the conclusion that the selected site is already rich in biodiversity and that the intended implementation would do more harm than good. Subsequently, this group could identify several other spaces that are more suitable for the implementation. The selection of seed and flower species has been discussed within the expert group, yielding a selection of regionally produced seeds that are deemed most beneficial for the task.
Notes on major achievements/success factors/critical issues/barriers (to be updated) (link to WP5)	One major obstacle of the LL Dortmund is the lack of available implementation spaces. Therefore, the main effort has been put into the procurement of project area spaces. Within the living lab partner group, there has been a lingering controversy about how to proceed conceptually to tackle this challenge. One partner has been pushing forward an initial selection of implementation spaces by the project team, space-concept people. This led to the situation that other LL partners had to negotiate with land owners for the procurement of the spaces. This in turn led to the land owners asking for concepts before these concepts could have been developed in a co-design process, moving the project partners away from a moderation role into an undesired actor role. It is almost impossible to procure spaces from land owners without a technological concept, just on the notion that concepts are going to be developed with stakeholders from the general public. It has also been difficult to convince land owners that

	<p>they are meant to be part of the stakeholder group which is going to develop the actual concepts.</p> <p>The stakeholder site survey on the site initially selected by the project team showed not only that the co-design yields conceptually preferable solutions, but also that the perceived lack of implementation spaces could be solved in dialogue with other stakeholders, in this particular case simply another department of the City of Dortmund that had authority over spaces which had been deemed not available for the proGReg project. Thus, the reversal of the approach to the people-concept-space led to a satisfactory outcome on all sides.</p>
Current situation and next steps (to be updated)	<p>Current: The implementation stakeholder has been identified and has been active in developing the implementation details.</p> <p>Resources, in this case seeds, are in the procurement process. No other resources are required.</p> <p>Next step: The biodiversity spaces are going to be implemented starting Sept. 2020.</p>
5. Other activities	
Synergies with other proGReg activities	<p>A surplus of seeds is going to be ordered. Smaller spaces on the implementation sites of NBS 3 and NBS 4 are going to be converted into pollinator diversity sites by the respective stakeholders. These spaces are intended to raise awareness for NBS 8 and to drive attention to the main NBS 8 implementation spaces.</p>
Links with other external project or activity	<p>The “green city spaces close to nature” project group in the Department of Civil Engineering (Tiefbauamt) is going to integrate the proGReg NBS 8 activities conceptually into their main activities, probably adapting communication strategies.</p>
Business model (link to WP5)	<p>Only theoretical business models have been developed so far, entailing a flower shop partially harvesting the biodiversity spaces for the sale of wild flower bouquets. This business model has to be further developed. An implementation on the selected spaces would be conceptually difficult since the public spaces are there for the benefit of the general public. Thus, a monetization of these spaces is not allowed.</p> <p>Hopefully, the benefit of the biodiversity sites can be communicated to the citizens of Huckarde, possibly leading to the availability of privately owned spaces which could allow for the pursuit of this business model.</p>
Technology Readiness Level (TRL) (link to WP5)	<p>The TRL of the implementation in the NBS is already rather high due to the fact that it is technologically not very challenging to prepare the space and sow the seeds. The main issue with the resources was that all stakeholders agreed that regional quality</p>

	seeds shall be used in order to prevent non-local species from spreading. Only one supplier of seeds can guarantee the required quality of seeds. A wider range of suppliers would be desirable. This goal cannot be achieved by the Living Lab Dortmund.
Communication activity (link to WP6)	Die Urbanisten e.V. are in the process of setting up a website for the communication of public LL Dortmund activities with a blog and with forums. The NBS activities are going to be integrated into this communication approach. Additional spaces at the implementation sites of NBS 3 and NBS 4 are going to be prepared as pollinator biodiversity sites, drawing attention to this topic during public events of those NBS implementations.
6. State of Play and Monitoring	
Current situation (to be updated)	Since the procedural focus of the LL coordinator has been “space-concept-people,” there has been no activity in the direction of activating citizen science up until now. Project partners have not been allowed to communicate with the general public before the spaces had been secured with contracts. Currently, the Corona virus pandemic is standing in the way of citizen science activation.
Next steps (to be updated)	Depending on whether kindergartens and elementary schools are going to open up in the coming weeks it would theoretically be possible to attempt to activate young citizens for monitoring the biodiversity in this pre-implementation summer. Due to the lack of implementation spaces and the resulting struggle to find spaces due to the above mentioned space-concept-people approach, project partners had to spend significant parts of the implementation time budget for the procurement of spaces, leaving only a rather scarce time budget for these kind of activities. Previous experience shows that this kind of public activation is very time demanding. Most likely the partners are not going to have the required time budget for this task. Thus, citizen science activities are not going to be done pre-implementation.
Notes/critical issues/barriers (to be updated) (link to WP5)	Biodiversity monitoring is a time consuming task that has no immediate monetary benefit. Thus, this is a task that is usually delegated to volunteers, young children, and school children supervised by their biology teachers, possibly supported by local environmental activism groups. The lack of monetary incentive is the main barrier for biodiversity monitoring.
7. NBS maintenance and outlook	

Maintenance	The Department of Civil Engineering (Tiefbauamt) is going to take care of the maintenance of the implementation sites.
Sustainability after project conclusion	Most likely the same department is also going to maintain the implemented sites beyond the proGfreg project time frame.
Additional resources	

4. Living Lab results and perspectives

4.1 Conclusions of the Implementation phases

This report is the official first draft of the Dortmund Living Lab Implementation Plan. It provides a detailed overview of the monitoring activities of Dortmund NBS implementation progress in its early phase (WP3, D 3.2). This report is submitted in June 2020 and will be followed by the second updated version in December 2020. The final LL IP report will be submitted at the end of the implementation phase of proGlgreg in June 2021. The NBS timeline sheet and LL Vision Map are attachments of this report.

The IP report begins by outlining the framework of proGlgreg and underlines the need and necessity of developing nature-oriented solutions and green infrastructure in Dortmund and especially in the post-industrial northern part along the Emscher river. This has been at the center of the formal and informal planning agenda in Dortmund since the early 1990s and will remain so in the coming decades. The Nature Based Solutions of ProGlgreg are part of this overall concept.

Since the start of prGlgreg in August 2018, five NBS in Dortmund have been selected for implementation (NBS 1, 3, 4, 6 and 8). With the exception of **NBS 1.1 (Integrating solar energy production on Deusenbergl landfill)**, which was completed in 2017, seven projects within these NBS are now in the planning and implementation phase.

The City of Dortmund, Department of Urban Renewal is the main partner of **NBS 1.2 "Sports infrastructure in an existing park in Huckarde"**. This NBS was originally planned on the Deusenbergl and all planning efforts were invested in this direction until the end of 2019, when this NBS had to be completely reframed as the Deusenbergl area has to be reserved for the IGA (International Garden Exhibition 2027). This meant that the project had to be relocated and this NBS is currently planned in Gustav-Heinemann-Park in Huckarde. Since January 2020, The Department of Urban Renewal has been involved in the ongoing planning and coordination with the Department of Green Spaces regarding implementing this NBS. Construction work is scheduled to start at the end of 2020 and is expected to be completed in autumn 2022. The City of Dortmund will be responsible for the management and maintenance of this NBS after realization and the end of proGlgreg.

The City of Dortmund, Department of Urban Renewal is also the main partner of **NBS 6 "Connection of Huckarde borough with the renatured Emscher River and Deusenbergl sites"**. Similar to NBS 1.2, a new path will create a barrier-free connection to Deusenbergl which will be part of the IGA. The path will be planned by the City of Dortmund, Civil Engineering Department. The technical planning has already started and the realization of the project is foreseen to be realized by the end of 2021.

South Westphalia University of Applied Science is the main partner of **NBS 3.1 (Food forest and permaculture orchard in Huckarde)** and is collaborating closely with die Urbanisten in the realisation of this NBS. The preparation and co-design activities started in May 2019, scouts, pastor of the church St. Urbanus and perspective the residents of Huckarde are actively involved in the planning and implementation activities. Their involvement is of crucial importance for this NBS, as they will continue to use and maintain this NBS beyond the term of proGlgreg. Another project related urban gardening is NBS3.2 (**Community gardening in Huckarde**) which is will be executed on part of Gustav-Heinemann park and is currently at the planning and co-design level. The implementation will begin after signing the contract of

use between the City of Dortmund (land owner) and the die Urbanisten. The actual construction work will begin early 2021 and expected to be completed by May 2021. Die Urbanisten is the main partner of **NBS 4 (Aquaponics)** and work closely with the South Westphalia University of Applied Science in realizing the aquaponics. This NBS will be realized on the former cookery Hansa Coking Plant. A binding contract was signed in March 2020. A building permit is required for the construction of the two greenhouses. The actual start of construction is scheduled for autumn 2020 until the end of 2021. In this NBS there is a potential risk that the two-year implementation period of NBS4 could possibly be shortened, as IDS may have to terminate the contract by the end of 2022 instead of by 31 May 2023 as agreed in the contract. It is possible that the NBS4 site may have to be used as a parking lot for a new event hall at the Hansa Coking Plant in early 2023. The area originally planned as a car park is currently being used as a conversion road (detour) due to road repair work in the area.

The South Westphalia University of Applied Science is the main partner of **NBS 8 (Improving and monitoring pollinator biodiversity in Huckarde)** and works closely with the City of Dortmund (Department of Green Spaces) on implementing this NBS on five sites in Huckarde. This NBS is linked to NBS3 activities. Whenever establishing an urban garden/farm, it will be integrated with pollinator improvement measures. Due to the pandemic COVID-19 there was a delay of about 5 months. The start of implementation had to be postponed from May 2020 to September 2020. At this point in time, public participation in co-design is not possible due to corona social distancing measures. As the implementation phase has only just begun (M 22, May 2020), further projects in connection with NBS 3 and NBS8 are still in the concept and site search phase and are therefore not discussed in detail in the report.

The first chapter also deals with the involvement of multi-stakeholders throughout the project, the dynamics between these stakeholders, their roles and the management activities in order to maximize the benefits and achieve an efficient implementation of the project.

A description of the spatial, natural and socio-economic fabric of the LL area is also presented in this report, as it is essential to understand the need for nature-oriented projects in the LL area in Dortmund. Furthermore, it is relevant to the challenges and obstacles that arise during the implementation phase (site search, soil contamination, landownership, co-design, involvement of marginalize people). This would not have been easily achieved without referring to WP2 "Spatial Analysis", which provides comprehensive information about the Dortmund Living Lab, adjacent areas and an overview of the historical development and spatial transformation of the LL area.

An online questionnaire on the risk and mitigation measures identified in the first project year was completed in February 2020 in cooperation with our project partners as part of WP3, D3.3. The preparation of the first draft of this report started in February 2020 and was continuously updated. An unforeseen event that has significantly influenced the implementation of the Dortmund NBS is the occurrence of COVID-19. In the period from 15 March to early June, many social distance and mobility restriction measures were imposed by the German government to combat the spread of the coronavirus. Although some of the restrictive measures have been lifted since mid-May, public events are still banned until at least the end of October and this could be extended. As a result, many of the events planned

by proGReg have either been postponed or cancelled, but new tools have been developed by the project partners as alternatives to physical meetings, such as online meetings, dissemination of NBS activities and upcoming events via the proGReg Huckarde website and blog, and the recording of tutorial videos on the implementation process (NBS3.1). The return to normality after COVID-19 is still unknown, and people are still obliged to limit contacts, to meet outdoors if possible, to wear face masks inside building and to keep a minimum distance of 1.5 meters to people. Apart from the fact that this is a precautionary measure against COVID-19, a second wave of COVID-19 is expected this autumn and the containment of this pandemic is not yet completed.

4.2 Results obtained and points of criticism

All NBS in Dortmund aim to improve the quality of life of citizens in the LL area by attracting them to open urban spaces and gardens, thus promoting social, health, environmental and economic benefits. With the exception of NBS 1.1 of energy production at the Deusenberg landfill, all NBS promote social inclusion and cohesion in this socially polarized part of Dortmund. This is to be achieved both through the implementation of the NBS and GI and by involving citizens and marginalized groups in the co-production of the various NBS projects (people with special needs, the elderly, children, refugees, etc.). In order to assess the impact of these NBS, several "NBS monitoring tools" demonstrated by WP4 in cooperation with the project partners were carried out in the LL area. For this purpose the General Questionnaire (GQ) was conducted in October-December 2019 to collect data on social, health and economic indicators at LL and district level. Further monitoring activities are carried out at the NBS level. The analysis of the results of the monitoring activities before, during and after implementation will provide comprehensive information about the LL area and allow for a tangible and validated assessment of the benefits achieved through the implementation of these NBS and allow for a comparison of the results of proGReg Dortmund with the other three front runner cities.

The timeline The monitoring activity described in Chapter 3 and the timetable attached to this report indicate some important activities which have been delayed, namely in NBS1.2, as this NBS was conceived for implementation at Deusenberg and the decision to realize IGA 2027 was taken after signing proGReg grant agreement. The landfill at Deusenberg will be part of the IGA 2027 area and as IGA has a higher priority and is expanding over a longer period than proGReg, the NBS 1.2 was moved to Gustav-Heinemann-Park. The adaptation of the project ideas to the IGA framework and the examination of the project ideas with other City departments for implementation possibilities began in January 2020. In addition, the formal administrative process of implementation in coordination with the city departments involved, as mentioned in Chapter 3.2, indicates that the completion of this NBS will take place in autumn 2022, almost one year after the planned implementation period of the NBS.

Despite the technical challenges involved in implementing NBS 1.2, such as reframing this project and relocating it from Deusenberg to Gustav-Heinemann-Park, harmonizing it with the Huckarde Open Space Concept and the bureaucratically ridged execution process, the materialized result serves the citizens of Huckarde and provides them with a natural environment with sports infrastructure to improve their physical and mental health. Low-income groups will particularly benefit from this NBS as they will have free access to the

sports equipment. The school adjacent to the park (Gustav-Heinemann-School) is also interested in this project and would like to run sports equipment in their schoolyard. The impact of this NBS will be measured by the SOPARC monitoring activities of WP4, D4.2 before and after implementation. After implementation, a monitoring tool "visitor questionnaire" will also be used to assess the social and health benefits of this NBS.

NBS 4 (Aquaponics) is a powerful technology to provide the citizens of Huckarde with local food without chemical intervention or fertilizers. The soilless plant cultivation is sustainable and enables resource-saving, where nutrient and water consumption as well as CO₂ emissions can be significantly reduced. This technology is particularly valued in Dortmund LL, as the soil in many areas is heavily contaminated and does not allow plant growth. On a social level, the greenhouses are intended to be a place of learning for workshops with the citizens of Huckarde. In addition to the mentioned advantages, the two greenhouses will serve as a scientific experiment and further advance the technical optimization of aquaponics. The Department of Agricultural Economics at South Westphalia University of Applied Science has been operating an aquaponics plant in Soest since 2015 for teaching and research purposes, and teaches the subject "Urban Agriculture". The main areas of research in Soest are phytopathology, technical optimization of aquaponics and the development of economically viable business models. From 2016 to 2019, the University of Applied Sciences was an active member of the completed European research network COST Action Aquaponics FA135, for whose final report the University of Applied Sciences was in charge of chapter 16, which illuminates the economic aspects of aquaponics. Within the project proGReg the focus of the research shall be on the technical optimization of resource consumption and on the development of new business models.

NBS 6 fulfils the wish of the citizens of Huckarde expressed to the local politicians to connect their settlement with the recreation area Deusenberg and the banks of the Emscher. Access to open spaces and leisure activities would promote positive social inclusiveness and strengthen social cohesion in Huckarde. The social and health impact of this NBS will be investigated within the framework of monitoring activities of WP4, the SOPARC. The pre-implementation of SOPARC was scheduled to take place in June 2020, but was postponed to September due to the COVID-19 pandemic.

Parts of NBS 1, 3 and 4 will be planted with flowers to attract pollinators. The implementation of NBS8 in parts of the other NBS aims to improve pollinator biodiversity, raise awareness of biodiversity and draw attention to the main areas of implementation of NBS 8.

The degree of citizen participation varies in the different NBS in Dortmund and is generally low at this stage of implementation due to the reasons mentioned in the previous chapters and currently to the social distancing measures because of coronavirus (see chapter 2). Although citizen participation is fundamental in WP2 (co-design) and WP3 (implementation) and is perceived by the project partners as an essential part of the NBS, the needs, capacities and perspectives of local citizens of Huckarde are not systematically and empirically collected in the co-design phase. The project partners are aware of this challenge and are collaborating, with support of the City of Dortmund, to create innovative forms of interaction with the different citizen groups (e.g. potential stakeholders, NGO representatives, experts in the site selection and design of the NBS).

Against this background, the implementation of the NBS requires reaching out to citizens and actors on the ground to gain their support, in particular in providing sites for implementation and perspectively managing and maintaining the NBS after implementation. In order to induce public support the following issues should be considered in the development of the co-design framework

- Presentation of the project objectives (short and long term) to the public and different actors and sharing the problems and opportunities in the LL area.
- Highlighting the co-benefits of the project and that the implemented NBS will benefit all sides and that is therefore a win-win situation, e.g. addressing the environmental, social and economic co-benefits
- Involvement of representative stakeholders who are influential, have built trust with their community and aware of their needs and can reach out to social groups in the LL area
- maintain regular contact with all parties involved during the various phases of implementation and inform them if changes occur in the overall project

Furthermore, proGReg is a trans- and interdisciplinary project involving multi stakeholders and actors. Although the diversity of the actors involved encourages innovation, confrontations and matters of controversy have emerged and led to potential conflicts between the unsatisfied partners and stakeholders. Team meetings, constructive criticism and defining a clear team culture that all partners agree to apply help to resolve disagreements and build trust between the project partners³. In this respect, the co-design workshops prepared and organized by ICLEI have been a successful tool to defining a common language between the project partners and achieving positive results in terms of disagreeing agreeably.

As highlighted in chapter 2.2 and also in the monitoring deliverables (D.3.3 first implementation monitoring report), administrative procedures and bureaucracy, especially in the NBS, which require cooperation and signing contracts with the city departments, have lengthened the preparation and planning phases and often led to delays in implementation. Nevertheless, one of the findings of this project is that although decision-making in such a hierarchical and consensual working culture can take a long time, once the decision has been taken after consultation with all stakeholders and involved city departments, implementation takes place quite quickly because all partners and stakeholders have been involved and the decision is final.

Furthermore, comparison of proGReg FRCs and knowledge transfer of approaches to co-design, gaining political support for innovation projects, challenges and solutions, innovative ways of dealing with long public administration and bureaucratic procedures must be strengthened. The same applies to encouraging more knowledge exchange with the follower cities.

³ Meyer, E. (2014). The culture map: breaking through the invisible boundaries of global business. First edition. New York: PublicAffairs

4.3 Further integrations

As mentioned in chapter one, proGlgreg is part of an overall development concept for the LL area in Dortmund. Several formal and informal planning initiatives such as Nordwärts, IGA and the Integrated Action Plan for Huckarde work together in this respect and have a common goal. The existing plans complement each other, but in other positions they have different concepts and timelines, and for the realization of these projects it is crucial that the project partners involved regularly exchange information and coordinate their actions and cooperate with each other. In light of this, the broad planning context of proGlgreg poses a challenge, as it needs to be constantly updated and supplemented in order to harmonize with the other projects, especially IGA 2027. On the other hand, this offers a possible perspective to continue proGlgreg projects also after 2023 and to integrate them into IGA and to present them to a broad international public during IGA.

A further possible cooperation is possible with a project from Nordwärts. Within the framework of the ten-year "nordwärts" project, various externally funded projects are being initiated and the KoopLab project (integration through cooperative open space development) is one of these projects that promotes open space development in a cooperative manner and improves it through the participation of people with and without a history of migration. The spatial focus of the project is on the so-called "arrival quarters". These are those districts that are particularly affected by social disadvantage, migration and population density. These characteristics apply to the LL area in Dortmund and the project partners will take the opportunity to exchange ideas with KoopLab on how the socio-ecological integration of immigrants can be promoted through modern participation processes. The aim is also to gain insights into how neighborhood residents' access to the resource of "space" can be strengthened through demand-oriented planning and the development of (semi-)public spaces, thereby increasing the quality of life and living in the district as a living space for all. The project is funded by the Federal Ministry of Education and Research (BMBF) and runs parallel in the cities of Hanover and Leipzig⁴. A meeting to exchange ideas with the Coordinator of Kooplab is planned in July, 2020, in which all proGlgreg project partners will participate via a video conference. Such a cooperation is particularly valuable for the co-design and co-creation components of the NBS implementation, which are not well defined in proGlgreg and are controversial among the project partners.

Future integration with other projects cannot be anticipated at the point. By the end of the implementation phase in June 2021 there will be more information available on that aspect.

⁴ More information about KoopLab can be found in this [link](#)

Annex 1: Dortmund Living Lab Map

Lage und Umsetzungsstand Huckarde Living Lab, Dortmund

Huckarde Living Lab Dortmund

Living Lab Plan | Living Lab Vision map

Update: 06.2020

Ziel 1

Goal1

Zur Stärkung des sozialen Zusammenhalts und der Identifizierung mit dem Stadtteil sollen in Huckarde neue Grüne Infrastrukturen entstehen und die Angebote an die Bevölkerung sich gärtnerisch zu betätigen, verbessert werden.

Implementing Green infrastructure and gardening activities to improve the social situation of Huckarde settlement and to foster the identity of the area.

Ziel 2

Goal2

Beteiligung der Bürgerinnen und Bürger bei der Planung und Unterhaltung von „grünen Projekten“.

Involving citizens in the design and management of NBS-Projects.

Ziel 3

Goal3

Beförderung von neuen Geschäftsmodellen, die auf der Idee von natürlichen Kreislaufwirtschaft beruhen.

To promote new professionalism and business models based on natural solutions.



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NBS 1 –Sportangebote im Gustav-Heinemann-Park

Ort: Gustav-Heinemann-Park, Dortmund Huckarde

Beschreibung: Öffentlich zugängliche Bewegungselemente, die Bürger verschiedener Altersgruppen zum Ausprobieren und Trainieren einladen und die einen gesundheitsförderlichen Ausgleich zu überwiegend sitzenden Tätigkeiten im Alltag darstellen.

Partner: Stadt Dortmund, Amt für Stadt Erneuerung

Weitere Akteure: Gustav-Heinemann-Schule, Huckarde Vereine



© die Urbanisten e.V.

NBS 3 – Waldgarten in St.Urbanus

Ort: Gemeinde St.Urbanus, Dortmund Huckarde

Beschreibung: Auf dem Gelände der St. Urbanus Gemeinde in Huckarde entsteht auf einer Fläche von 3000 m² ein Waldgarten, in dem vorwiegend essbare Pflanzen in mehreren Vegetationsschichten angepflanzt werden. Der Waldgarten ist ein Beispiel, wie Gärten in der Stadt produktiv und umweltgerecht gestaltet werden können. Er wird in mehreren Workshops von der Gemeinde aufgebaut.

Partner: Fachhochschule Südwestfalen, die Urbanisten e.V.

Weitere Akteure: Kath. Kirchengemeinde St.Urbanus

Weitere NBS 3 Projekte im Living Lab: Schulgarten am Gustav-Heinemann-Park, Kleingartenverein „Glückauf Hansa“, Urban-Gardening Projekte im Zusammenhang mit NBS 4



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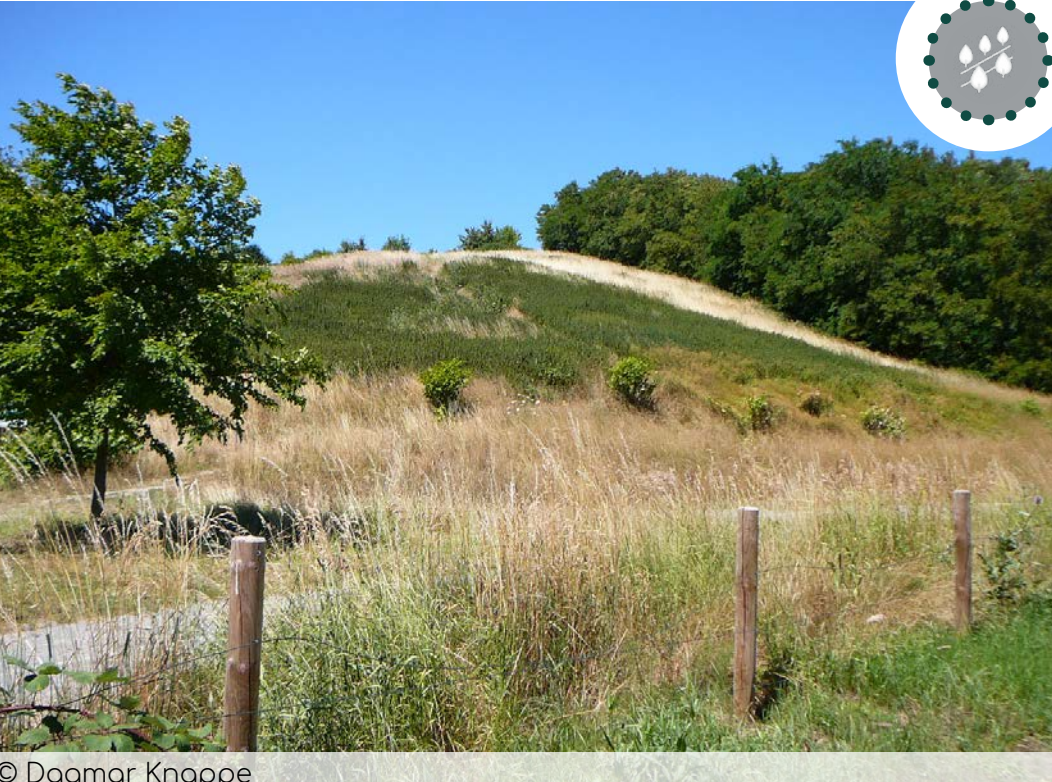
NBS 4 – Aquaponik

Ort: Kokerei Hansa, Dortmund Huckarde

Beschreibung: Auf einer Fläche des Industriedenkmals Kokerei Hansa entsteht eine Stadtform, die Fisch- und Pflanzenzucht unter einem Dach vereint. Aquaponik heißt dieses Kreislaufsystem, welches dazu beitragen kann, die Menschen in der Stadt mit gesunder und umweltschonend produzierter Nahrung umweltschonender Nahrung zu versorgen. Die Anlage dient gleichermaßen als Forschungsobjekt zur Optimierung technischer Aspekte und als Lernort für Workshops für die Bevölkerung.

Partner: Die Urbanisten e.V., Fachhochschule Südwestfalen, Aquaponik Manufaktur GmbH, Heitro GmbH

Weitere Akteure: Stiftung Industriedenkmalspflege und Geschichtskultur



© Dagmar Knappe

NBS 6 - Verbesserte Zugänglichkeit von Freiflächen

Ort: Halde Deussenberg, Dortmund Huckarde

Beschreibung: Seit der Einstellung des Betriebs 1992 und der anschließenden Rekultivierung hat sich die ehemalige Mülldeponie Deussenberg zu einem beliebten Naherholungsziel entwickelt. Die Zugänglichkeit auf die Halde besteht fast ausschließlich von Osten; an den Huckarder Siedlungskörper ist die Halde daher nicht gut angebunden. Seit Jahren besteht der Wunsch der Huckarder Bürger, die Zugänglichkeit auf die Halde zu verbessern. Daher soll eine barrierefreie Wegeverbindung am südwestlichen Hangfuß gebaut werden.

Partner: Stadt Dortmund, Amt für Stadt Erneuerung



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NBS 8 - Biodiversität für Bestäuberinsekten

Ort: an verschiedenen Orten in Dortmund Huckarde

Beschreibung: An den Standorten der NBS 3 und NBS 4 sowie an mehreren Orten in Huckarde werden bestäuberfreundliche Pflanzen ausgesät. Die einzelnen Standorte sind miteinander verbunden, so dass sich die Insekten einfach zwischen den verschiedenen Grundstücken hin- und her bewegen können. Darüber hinaus profitieren auch die Menschen von der visuellen und ökologischen Aufwertung.

Partner: Fachhochschule Südwestfalen, die Urbanisten e.V.

Weitere Akteure: Stadt Dortmund, Grünflächenamt, N.A.B.U., Entsorgung Dortmund GmbH

NBS 1 – Sports infrastructure within the existing park of Huckarde

Location: Gustav-Heinemann-Park, Dortmund Huckarde

Description: Publicly accessible movement elements which invite citizens of different age groups to try out and exercise and which represent a health-promoting balance to predominantly sedentary activities in everyday life.

Partners: City of Dortmund, Department of Urban Renewal

Other stakeholders: Gustav-Heinemann-School, Huckarde Associations

NBS 3 – Food Forest in St.Urbanus

Location: Parish of St. Urban, Dortmund Huckarde

Description: A 3000 m² food forest – a self-sustaining woodland ecosystem designed for food production – will be created on an of the St. Urbanus parish. The food forest of St. Urbanus will be built on workshops with the community and is to serve as an example of how gardens in the city can be designed in a productive and environmentally friendly way.

Partners: South Westphalia University of Applied Science, die Urbanisten e.V.

Other stakeholders: the parish of St. Urbanus (landowner)

Further NBS 3 Projects within the Living Lab: School Garden along the Gustav-Heinemann-Park, Allotment Garden Associations „Glückauf Hansa“, urban garden activities in context to NBS 4

NBS 4 – Aquaponics

Location: Hansa coking plant, Dortmund Huckarde

Description: Two aquaponics greenhouses will be built on a part of the site of the old coking plant Kokerei Hansa in Dortmund Huckarde. The greenhouses are intended to produce sustainable food for Huckarde, to advance the concept of aquaponics technically, and to serve as a learning venue for workshops with the population.

Partners: Die Urbanisten e.V., South Westphalia University of Applied Science, Aquaponik Manufaktur GmbH, Heitro GmbH

Other stakeholders: The Foundation for the Preservation of Industrial Monuments and Historical Culture (land owner)

NBS 6 - Accessible green corridors

Location: landfill Deussenberg, Dortmund Huckarde

Description: Since the closure of the site in 1992 and its subsequent recultivation, the former Deussenberg landfill site has developed into a popular local recreation destination. The slag heap is almost exclusively accessible from the east, which means that it is not well connected to the Huckard settlement. For many years, the citizens of Huckard have wanted to improve access to the slag heap. Therefore, a barrier-free path connection is to be built at the south-western foot of the slope.

Partners: City of Dortmund, Department of Urban Renewal

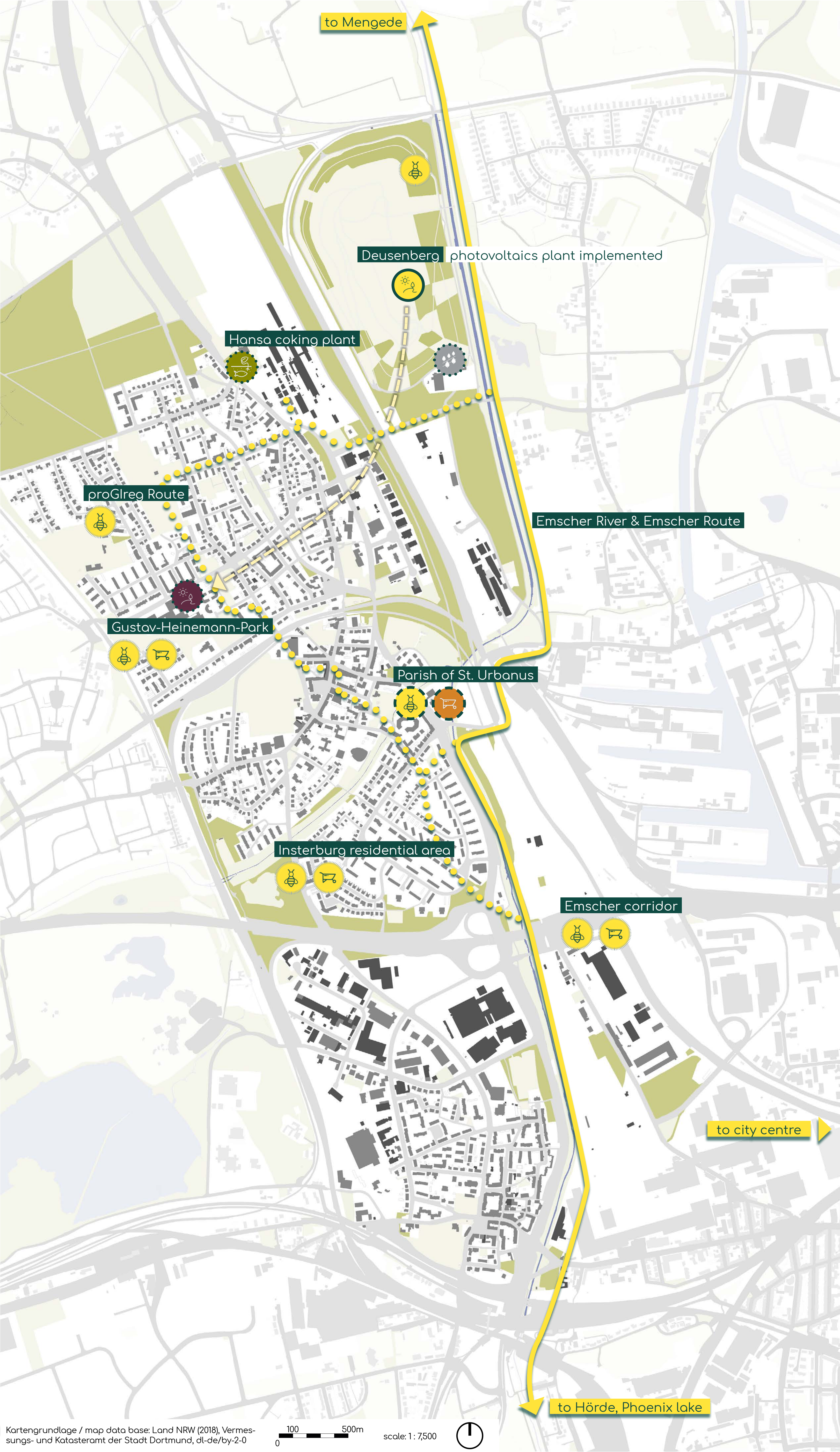
NBS 8 - Pollinator biodiversity

Location: at several locations in Dortmund Huckarde

Description: At the sites of the NBS 3 and NBS 4 implementations and at several locations in Huckarde, pollinator-friendly plants are planted. The selected sites connected to eventually form a biodiversity pathway. This benefits both humans (color, scent, contemplation) but also enhances the biodiversity within the area by allowing insects to migrate easily between the different patches.

Partners: South Westphalia University of Applied Science, die Urbanisten e.V.

Other stakeholders: City of Dortmund, Department of Green Spaces, N.A.B.U. (environmental association), Entsorgung Dortmund GmbH, (EDG, Waste management company and maintainer of the former landfill)



Naturbasierte Lösungen
Nature-based solutions

- NBS 1**
Freizeitaktivitäten und Produktion regenerativer Energien auf ehemaligen Halden
Leisure activities and clean energy on former landfills
- NBS 3**
Gemeinschaftsgärten und urbane Landwirtschaft
Community-based urban farms and gardens
- NBS 4**
Aquaponik
Aquaponics
- NBS 6**
Verbesserte Zugänglichkeit von Freiflächen
Accessible green corridors
- NBS 8**
Biodiversität für Bestäuberinsekten
Pollinator biodiversity

Umsetzungsstand
Implementation status

- umgesetzt / in Nutzung implemented
- in Umsetzung in progress
- in Planung in planning
- Idee für die Zukunft idea for the future
- Emscherweg Emscher Route
- proGReg Rundweg proGReg Route

Legende
legend

- Gebäude Wohngebiet Residential buildings
- Industrie-/ Gewerbenutzung industrial or commercial use
- Grünflächen green spaces
- Wald forests
- Emscher Emscher River

Productive Green Infrastructure for post-industrial urban regeneration (proGReg)

Email: proGReg@stadtdo.de
Website: www.proGReg.eu

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Planerstellung
map design

lohrberg
stadtlandschaftsarchitektur
Partnerschaft Freie Landschaftsarchitekten mbB

Projektpartner
project partners

Stadt Dortmund
Amt für Stadterneuerung



Fachhochschule
Südwestfalen
University of Applied Sciences



die urbanisten
local, creative, innovative





Ningbo Living Lab Implementation Plan

Deliverable 3.2

Work package: 3

Dissemination level: PU

Lead partner: COTO

Author: Tian Ruan - FBNC

Due date: 30/06/2020

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Partner organizations

No.	Name	Short name	Country
33	Ningbo Municipal Center for Forestry Science & Technology Services	FBNC	China (People's Republic of)

Abbreviations

EC: European Commission

ERDF: European Regional Development Fund

D. No: Deliverable Number

FC: Follower Cities

FRC: Front Runner Cities

GA: Grant Agreement

GI: Green Infrastructure

GIS: Geographic Information System

IP: Implementation Plan

LL: Living Lab

NBS: Nature-Based Solutions

NGO: non-governmental organization

proGIreg: productive Green Infrastructure for post-industrial urban regeneration

TRL: Technology Readiness Level

WP: Work Package

1. Introduction

1.1 Project framework

Productive Green Infrastructure for post-industrial urban regeneration (proGIreg) is developing and testing nature-based solutions (NBS) co-creatively with public authorities, civil society, researchers and businesses. Eight nature-based solutions, which will support the regeneration of urban areas affected by deindustrialization, will be deployed in Dortmund (Germany), Turin (Italy), Zagreb (Croatia) and Ningbo (China). The cities of Cascais (Portugal), Cluj-Napoca (Romania), Piraeus (Greece) and Zenica (Bosnia and Herzegovina) will receive support in developing their strategies for embedding nature-based solutions at local level through co-design processes.

1.2 ProGIreg in Ningbo

Ningbo is a sub-provincial division in northeast Zhejiang Province in the People's Republic of China which is of similar status to a prefecture-level city. In 2019, the city has a registered population of 6.085 million, and the regional gross domestic product (GDP) is 118.5 billion yuan, an increase of 6.8% over the previous year. Ningbo has an elevation of about 5 meters and belongs to the north subtropical monsoon climate.

As the city can be considered to be a typical case of rapid urbanisation in the eastern coastal region of China, it is facing many challenges concerning green and blue areas which are contaminated in quality and reduced in quantity due to the construction and spread of grey infrastructure (i.e. for transportation and buildings). As such, Ningbo has been listed as one of the pilot cities which are participating in a series of action plans launched by national and provincial governments to address soil and water challenges.

Although Zhejiang's water resources per unit area can rank fourth in China, 80% of water resources are distributed in mountainous areas, so eastern Zhejiang (including Ningbo), where the population is concentrated and the economy is developed, is a key area of water scarcity. In addition, there are four outstanding problems in Zhejiang water resources, including the large gap between supply and demand, prominent structural contradictions, serious pollution, and low effective utilization. Therefore, in 2013, the Zhejiang Provincial Party Committee proposed the introduction of the "Five Water Treatment" to transform and upgrade water management by controlling sewage, preventing flood, draining flooded fields, guaranteeing water supply and emphasizing water conservation.

Ningbo has been at the forefront of urban river management in China. It has taken the lead in adopting the PPP (public-private-partnership) management model to comprehensively harness and conserve the city's rivers. The black water bodies in urban rivers have been completely eliminated, and the river management in Ningbo has reached the stage of ecological restoration.

Due to rapid economic development, rapid population growth, and rapid industrialization and urbanization, the overall soil quality of Ningbo has shown a downward trend. In particular,

the risk of heavy metal pollution still exists, organic pollution is prominent, and the pollutants are gradually migrating to agricultural products and water bodies. Problems such as insufficient development and utilization of contaminated sites have caused serious threats to agricultural products and human health, and will affect social harmony and stability. In 2013, the Ningbo government issued a clean soil action plan to strengthen the comprehensive remediation of soil pollution sources, soil pollution monitoring and control, and pollution site remediation.

When considering that these action plans are dominated by diverse governmental agencies, however, the key question concerning local government and multiple stakeholders is how top-down plans for regeneration of the existing green and blue infrastructure associated with intensive investments can be implemented effectively at local level. There is an urgent need for the transfer of transdisciplinary research to the top-down co-actions and the city-level co-practices when implementing NBS in partnership with local communities in Ningbo.

1.3 Management activities

Compared with other FRC, Ningbo has fewer activities and only involves 3 NBS. And we only have two official partners, namely The Institute of Urban Environment, Chinese Academy of Sciences (IUE-CAS) and Forestry Bureau of Ningbo City (FBNC), but this does not affect our co-design and cooperation process.

IUE-CAS also plays a key role in Spatial analysis Co-design processes as well as to implement the LL in Ningbo. Furthermore, they are actively involved in Socio-cultural inclusiveness, Human health and wellbeing, Ecological and environmental restoration and Economic and labor market benefits, as one of the Non-European partners in China.

FBNC is actively involved in a number of other tasks relevant for the development of the LL in WP2, WP4 and WP5. Furthermore, they will also promote the results within the framework of trainings in Task 6.2 (training events) and in Task 6.3 (EdX MOOCS training module with global outreach).

The working group in Ningbo can be divided into three:

Engineering Construction, activities related to engineering construction, such as the extraction of lake bottom sediments and the cultivation of aquatic vegetation, etc., are all the responsibility of FBNC (the person in charge is Yiping Xu)

Quality monitoring, activities related to monitoring, such as soil quality monitoring, lake water quality and plankton monitoring in Living Lab, etc., are the responsibility of IUE-CAS (the person in charge is Yaoyang Xu)

Cross-sectional activity, activities related to the organization of various event meetings, the submission of materials, etc. are the responsibility of IUE-CAS (the person in charge is Tian Ruan)

Of course, some technical work is done in cooperation with some unofficial enterprises, such as Tianhe Aquatic Ecosystem Engineering Co., Ltd. to help us take soil and water samples for water quality monitoring. Ningbo Chenyu Construction Engineering Technology Co., Ltd.

and Ningbo Huanhu Construction Co., Ltd. are responsible for the construction and maintenance of LL Green Lakeshore. The Ningbo government has also given us great support in the process of environmental compensation. Therefore, our work is based on a model led by two major institutions, involving multiple enterprises and strongly supported by the government.

The responsibilities of the two main partners are clear and listed in Table 1.

Table 1- Partner and activity

Partner	Specific activities	Cross-sectional activities
The Institute of Urban Environment, Chinese Academy of Sciences (IUE-CAS)	Water quality, soil and plankton monitoring activities (WP4) Procedures for environmental compensation Co-design supporting activities with UNITO (WP2)	Spatial analysis Co-design activities
Forestry Bureau of Ningbo City (FBNC)	New soil Green lake shore	Co-design activities

We divide responsibilities according to the type of NBS, which can fully cater to the professional fields that various institutions are good at.

New soil, jointly responsible for IUE-CAS and FBNC, IUE-CAS is in charge of soil quality inspection in the early stage, FBNC is in charge of planting vegetation in the later stage
Green lake shore, mainly responsible for FBNC, design and plant aquatic plants in the lake of LL;

Environmental compensation procedures, IUE-CAS is mainly responsible for monitoring the water quality in LL to help obtain government compensation.

Table 2- Cluster/NBS/Activity table

Name of the cluster	NBS	Activities
New Soil	2.1 New regenerated soil thanks to biotic compounds for urban forestry and urban farming	Use improved sediment fertilizer for urban greening
Green lake shore	3.1 Community-based urban farms and gardening on post-industrial sites	Planting aquatic plants along the shore of Moon lake
environmental compensation	7.1 Local environmental compensation processes	Environmental monitoring in Moon lake

2. Our Living Lab

2.1 Our Living Lab

The Living Lab (2.07 km²) is the entire Moon Lake Street where the Moon lake is located. Moon Lake Street is located in the downtown area of Ningbo City, with an area of only 2.07 km². It has jurisdiction over 7 communities, with a population of 25,750 people and a density of 12,440 inh. / km². In 2017, the green area of Ningbo City was 11.89 m² / inh., and the green area of Moon Lake Street was about 11.5 m² / inh., which was lower than China 's per capita park green area of 14.01 m² / inh. Therefore, Ningbo's green infrastructure construction needs to be continuously strengthened.

Table 3 – Basic data

	Municipality of Ningbo	Moon Lake Street (LL)
Inhabitants (2017)	5,969,300	25,750
Surface area	9816 km ²	2.07 km ²
Density	608 inh./ km ²	12,440 inh./ km ²
Average green area density	11.89 m ² /inh.	11.5 m ² /inh.

Based on the previously drafted SWOT analysis (see D.2.2), we found that there are weaknesses and challenges in this area as well as strengths and opportunities.

In terms of social and cultural inclusion, although the population of Moon Lake Street and its 7 communities has witnessed a decreasing trend, it is still very dense – considering that the Street also accommodates the 28-hectare park, its density of over 12,400 inhabitants / km² (2017) represents an important defining characteristic, and providing environmental services and NBS to ensure quality of life is a challenge which proGInreg will have to address. However, there are also many primary and secondary schools, theatres, large leisure sports venues and museums, with the Analysis Area being an attractor at district level. The area is very accessible via subway, and it is convenient to meet people's needs for education and culture.

In terms of human health and well-being, Moon Lake Park is located in the center of Moon Lake Street. It covers an area of 28 hectares, and it is a municipal conservation zone for history and culture in Ningbo. There are a large number of attractions and leisure facilities around, while the residents of 7 communities can easily enter the green space for walking and entertainment.

In terms of ecological and environmental restoration, the “Shi qing hu xi” reconstruction project on Moon Lake Street is located on the west side of the lake, north to Zhongshan Road, west along Changchun Road, east to Haoyue Street, Gongqing Road, and south to Guijing Street. The construction scale of the “Shi qing hu xi” project is about 0.2 km², and the buildable area represents around 0.163km². The Chinese-protected area is about 0.027km², and the historic building is 0.039km². However, Moon Lake Park is located in the urban area, surrounded by many old neighbourhoods, with high land prices and large transformation costs.

In terms of the economy and the labor market, Moon Lake Street is a mature tourist area with many hotels and restaurants, providing a large number of jobs for the labor force. Since the western part is mostly an attraction, the company's corporate land is mostly distributed on the east and south sides. Moon Lake Street is dominated by the service industry, and its industrial structure is relatively simple, which is vulnerable to market shocks. But nowadays, Chinese people are paying more attention to the quality of life. Tourism and leisure are very popular, which provides support for the economic growth of Moon Lake Street.

Given that Ningbo has already implemented the NBS measures for improving the water quality of the man-made Moon Lake, they are currently only being monitored. Further LL implementation will need to be contextualized within the already-performed implementation (aquatic filtering plants, fry fish, pumps for oxygenizing the water, water filter, new bamboo plantings) and to support the past and ongoing initiatives with complementary NBS 2, 3 and 7 of proGReg.

2.2 Our Living Lab challenges and goals

Although Moon Lake Street is prosperous and full of tall buildings, there are many old residential quarters, old buildings, old streets, and old markets behind the high-rise buildings, with aging equipment and facilities and many remaining problems. Ten of the 11 residential quarters in the streets are old ones that have been built for more than 15 years. There are many problems such as aging infrastructure, insufficient modern facilities, and difficulties in coordinating group interests. In 2013, the Zhejiang Provincial Party Committee proposed the introduction of the “Five Water Treatment” to transform and upgrade water management by controlling sewage, preventing flood, draining flooded fields, guaranteeing water supply and emphasizing water conservation.

In recent years, there have been perennial outbreaks of algae in the moon lake, and some polluted water bodies with seasonal stench have appeared, which has affected the life and leisure quality of residents, and also seriously affected the image of Ningbo city and the beauty of Tianyi pavilion - the moon lake scenic area. Therefore, it is urgent to improve the water quality of the moon lake.

The goal of Living Lab:

On the lake ecological comprehensive control project within one year after the completion of the main water quality indicators will reach IV class, will reach III class¹ for two years.

Water quality purification and ecological restoration projects will continue to remove pollutants in water bodies through moderate human intervention; improve self-purification ability of water bodies through ecological technology.

Through renovation, the underwater forest and water garden of the moon lake will reflect the cultural landscape on the shore, which will beautify the environment of the Tianyi pavilion and the moon lake, and strive to become a model of the park landscape and lake management, so that citizens and tourists can enjoy the scenery.

3. The NBS in Ningbo

Table 4– NBS summary template table

NBS type	NBS Title (<i>CTRL+ click to jump to each NBS</i>)
NBS 2: New regenerated soil thanks to biotic compounds for urban forestry and urban farming	NBS 2: Transforming lake sediment into soil fertilizer (cancelled)
NBS 3: Community-based urban farms and gardens	NBS 3: Planting aquatic plants along the shore of the lake
NBS 7: Establishing protocols and procedures for environmental compensation at local level	NBS 7: Procedures for environmental compensation

¹ In China, water quality is divided into five levels from good to bad: I, II, III, IV and V. If the water quality is worse than the V class, it is called inferior V class water.

NBS 2: Transforming lake sediment into soil fertilizer



1. General information

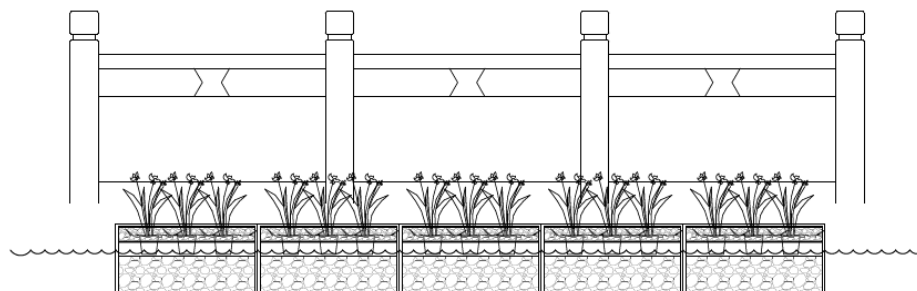
Compilation date and update	May 2020 - first release draft
NBS type	New regenerated soil thanks to biotic compounds for urban forestry and urban farming
NBS title	Transforming lake sediment into soil fertilizer
Brief project synthesis	<p>This NBS is for reusing lake bottom sediments and turning waste into treasure.</p> <p>At the bottom of Moon Lake in the LL area, there are many sediments such as sludge. They will release harmful substances to the water body, so the lake must be dredged. However, the lake area is huge, and more than 50,000 m³ of sediment have been removed. Modifying these sediments into soil fertilizers for planting vegetation will greatly protect the environment and save resources.</p>
Area of implementation	<p>This NBS is going to be implemented in an area of 20 ha green space surrounding Moon Lake park.</p> <p>Address: No. 183, Xianxue Street, Haishu District, Ningbo</p> <p>Coordinates: 29° 52' 09" N, 121° 32' 21" E.</p>

Target groups (beneficiaries)	The main beneficiaries of this activity are residents living around Moon Lake Park and people who come to the park for tourism.
Timing (start and end date)	Implementation phase. Start: 01/2019 End: 12/2020
Main responsible partner	The Institute of Urban Environment, Chinese Academy of Sciences (IUE-CAS)
ProGInreg partners involved	Forestry Bureau of Ningbo City (FBNC)
Other stakeholders involved	Tianhe Aquatic Ecosystem Engineering Co., Ltd. It is responsible for lake dredging. Ningbo Tianyige museum & Moon Lake Scenic Area Management Committee.
Total Budget	Total budget of the implementation: 500,000€
2. Pre-implementation activities	
Planning and preparatory activities	This project comes from the Moon Lake Water Ecological Comprehensive Improvement Project. Moon Lake is mother lake of Ningbo, and it is also a landmark and business card of Ningbo City. Moreover, in order to cooperate with Tianyi Pavilion and Moon Lake to create a national tourism 5A-level scenic spot, there is an urgent need to improve the water quality of Moon Lake and beautify Moon Lake Park to adapt it to the requirements of 5A-level scenic spots.
Administrative procedures	The funding for this project comes from 2 parts: the Ministry of Science and Technology of China and the Ningbo government.
Technical and social analysis	Before the sediment is converted into soil fertilizer, the physical and chemical properties of the soil will be analyzed first to ensure that the sediment will not cause secondary pollution to the soil.
Other activities	Laying a layer of "ecological phosphorus removal agent" on the bottom of the lake can inactivate the phosphorus activity in the water. In this way, not only does the phosphorus content of the water decrease in a cliff-like manner, but also cuts off the nutritional line of cyanobacteria.
3. Management structure and responsibilities	

Main partner (coordinator) and role/function	The Institute of Urban Environment, Chinese Academy of Sciences (IUE-CAS) Organize the transformation of Moon lake sediment into soil fertilizer.
2nd Partner and role/function	Forestry Bureau of Ningbo City (FBNC) Select plant species and use regenerated soil fertilizers for plant cultivation
3rd Partner and role/function	Tianhe Aquatic Ecosystem Engineering Co., Ltd. Mainly carry out drainage, dredging and water storage of lakes
4. Co-design activities and stakeholder engagement	
Stakeholders, engagement processes, in co-design and co-implementation (link with WP2)	
Notes on major achievements/success factors/critical issues/barriers (to be updated) (link to WP5)	
Current situation and next steps (to be updated)	
5. Other activities	
Synergies with other proGInreg activities	
Links with other external project or activity	
Business model (link to WP5)	

Technology Readiness Level (TRL) (link to WP5)	
Communication activity (link to WP6)	
6. State of Play and Monitoring	
Current situation (to be updated)	Due to high levels of heavy metals in lake sediments, the activity was cancelled.
Next steps (to be updated)	
Notes/critical issues/barriers (to be updated) (link to WP5)	
7. NBS maintenance and outlook	
Maintenance	
Sustainability after project conclusion	
Additional resources	

NBS 3: Planting aquatic plants along the shore of the lake



1. General information

Compilation date and update	May 2020 - first release draft
NBS type	Community-based urban farming and gardening on post-industrial sites
NBS title	Planting aquatic plants along the shore of the lake
Brief project synthesis	Moon Lake is an urban lake located in the urban area, and as a tourist area, there are many hotels and restaurants nearby, and the lake water body is often polluted. The water quality of lakes needs to be purified urgently. Planting aquatic plants along the lake can beautify the environment while purifying the water quality. Aquatic plants are being used to re-nature a 5 km corridor surrounding the urban Moon lake Park.

Area of implementation	<p>This NBS is going to be implemented in an area of 5km(about 21,641m², Including 1,918 m² of emergent plants and floating plants, and 19,723 m² of submerged plants) surrounding Moon lake Park.</p> <p>Address: No. 183, Xianxue Street, Haishu District, Ningbo</p> <p>Coordinates: 29° 52' 09" N, 121° 32' 21" E.</p>
Target groups (beneficiaries)	Schools and residents near Moon lake Park, as well as citizens of Ningbo City and tourists.
Timing (start and end date)	<p>Implementation phase.</p> <p>Start: 06/2019</p> <p>End: 12/2020</p>
Main responsible partner	Forestry Bureau of Ningbo City (FBNC)
ProGleg partners involved	The Institute of Urban Environment, Chinese Academy of Sciences (IUE-CAS)
Other stakeholders involved	<p>Ningbo Tianyige museum & Moon Lake Scenic Area Management Committee</p> <p>Work Committee of Moon Lake Street</p>
Total Budget	Construction costs: 200,000 €
2. Pre-implementation activities	
Planning and preparatory activities	The purpose of planting aquatic plants is to purify water quality. First, you need to choose the type of aquatic plant to ensure that it does not bring the risk of biological invasion. Then it needs to go through rigorous calculations to choose the planting location and design the ecological media box.
Administrative procedures	The funding for this project comes from 2 parts: the Ministry of Science and Technology of China and the Ningbo government.
Technical and social analysis	Planted aquatic plants need to have a strong purification ability, but also need to be ornamental. The design and layout of the ecological media tank need to be carefully calculated. After being beautified, the environment of Moon Lake provides people with high-quality green space.
Other activities	Install an internal circulation system in the lake to realize the self-purification of the whole lake water every 16 days.

3. Management structure and responsibilities	
Main partner (coordinator) and role/function	Forestry Bureau of Ningbo City (FBNC) Mainly responsible for the selection and cultivation of aquatic plants.
2nd Partner and role/function	Ningbo Yilianhuimo Information Technology Co., Ltd. Responsible for the production of ecological media box mold.
3rd Partner and role/function	Ningbo Chenyu Construction Engineering Technology Co., Ltd. Responsible for embankment repair.
4. Co-design activities and stakeholder engagement	
Stakeholders, engagement processes, in co-design and co-implementation (link with WP2)	<p>Co-design in planning and preparatory activities</p> <p>The design of the green lake shore requires the joint participation of experts and scholars, local residents, government departments and enterprises.</p> <p>Co-implementation and maintenance:</p> <p>Experts from FBNC and other research institutions choose species, considering ornamental and purification capabilities and avoiding biological invasion and plant withering. It is also necessary to plan the planting of submerged plants and emergent plants.</p> <p>Ningbo Yilianhuimo Information Technology Co., Ltd. needs to design ecological media tanks to cultivate aquatic plants.</p> <p>Tianhe Aquatic Ecosystem Engineering Co., Ltd needs to calculate the size, location and spacing of ecological media boxes , and is also responsible for plant maintenance and management.</p>
Notes on major achievements/success factors/critical issues/barriers (to be updated) (link to WP5)	<p>Major achievements: Large aquatic plants will be planted along the shore of Moon Lake to purify water quality and beautify the environment. Enhance the image of Tianyi Pavilion- Moon lake Scenic Spot and the charm of Ningbo City. Provide high-quality green space for surrounding residents.</p> <p>Success factors: Local policies require water treatment, the project has sufficient funds and professional staff to implement the project, and residents are eager to improve the quality of green spaces.</p>

Current situation and next steps (to be updated)	
5. Other activities	
Synergies with other proGReg activities	Planting aquatic plants can play a role in purifying the water body and bring benefits to the success of Ningbo NBS7- Procedures for environmental compensation activity.
Links with other external project or activity	<p>The cultivation of aquatic plants was successfully experimented in Qinglin Bay Park in Haishu District.</p> <p>Drawing on the successful experience of purification and replenishment of water treatment in Hangzhou West Lake, and on this basis, it has made innovations, and proposed to improve through internal circulation purification. The main technologies include bidirectional living water and purification technology, stepped underwater forest technology and so on.</p>
Business model (link to WP5)	
Technology Readiness Level (TRL) (link to WP5)	
Communication activity (link to WP6)	
6. State of Play and Monitoring	
Current situation (to be updated)	At present, The layout of the ecological media box location has been completed and the cultivation of aquatic plants has been half completed.
Next steps (to be updated)	The cultivation of aquatic plants continues and is expected to be completed by the end of 2020. Conservation and management of already planted vegetation
Notes/critical issues/barriers (to be updated) (link to WP5)	critical issues: Due to the impact of COVID-19, aquatic plant cultivation was delayed and management and maintenance were neglected.

7. NBS maintenance and outlook	
Maintenance	There are specialized technical personnel responsible for the management and maintenance of aquatic plants.
Sustainability after project conclusion	Haishu District Government and Moon Lake Street Administrative Committee will continue to support the management and maintenance of aquatic plants.
Additional resources	

NBS 7: Procedures for environmental compensation

	
<h3>1. General information</h3>	
Compilation date and update	May 2020 - first release draft
NBS type	Establishing protocols and procedures for environmental compensation at local level
NBS title	Procedures for environmental compensation
Brief project synthesis	<p>This activity is based on the PPP (Public-Private Partnership) project of Moon Lake Water Ecological Comprehensive Improvement Project. PPP means that in the field of public services, the government adopts a competitive approach to select social capital with investment, operation and management capabilities. The two parties conclude a contract based on the principle of equal negotiation, and the social capital provides public services. The government pays compensation to the social capital based on the results of public services.</p> <p>The main content of this activity is to evaluate the comprehensive management results of Mook Lake, that is, collecting meteorological, hydrological, chemical and ecological data to monitor the environment of Mook Lake (mainly water environment). If the water quality meets the III level standard, then the government will pay all the costs of the project implementation.</p>

	Note: In China, water quality is divided into five levels from good to bad: I, II, III, IV and V.
Area of implementation	3 observation sites in Moon Lake Coordinates: 29° 52' 20" N, 121° 32' 06" E. 29° 52' 14" N, 121° 32' 22" E. 29° 51'52" N, 121° 32' 15" E.
Target groups (beneficiaries)	Residents living around Moon Lake Park and people who come to the park for tourism.
Timing (start and end date)	Water environment data collection started in June 2019, but the comprehensive evaluation is at the end of 2021.
Main responsible partner	The Institute of Urban Environment, Chinese Academy of Sciences (IUE-CAS)
ProGReg partners involved	Forestry Bureau of Ningbo City (FBNC)
Other stakeholders involved	Tianhe Aquatic Ecosystem Engineering Co., Ltd. Haishu District Government Ningbo University
Total Budget	Total cost is 50,000 €
2. Pre-implementation activities	
Planning and preparatory activities	In order to enhance the city's image and promote the development of tourism, Haishu District has gone through long-term investigations and brewing work to do a good job of water quality, sludge, pollutant and other surveys and surveys, and formulate preliminary technical treatment plans. After listening to the opinions of experts in water control, representatives of the National People's Congress and citizens, and optimizing the technical plan for many times, it was decided to start the Moon Lake Water Ecological Comprehensive Improvement Project.
Administrative procedures	The Ministry of Science and Technology of China will support the funds for water quality monitoring, and the Ningbo government will compensate for the cost of the engineering measures.

Technical and social analysis	The selection of water environment monitoring samples, as well as the collection and testing of water samples, require professional operation.
Other activities	Many well-known scientific research institutions and universities such as Wuhan Institute of Aquatic Biology and Ningbo University will carry out scientific research on the management of Moon Lake's ecological environment and provide scientific theory and technical support for other similar types of lake management in China.
3. Management structure and responsibilities	
Main partner (coordinator) and role/function	The Institute of Urban Environment, Chinese Academy of Sciences (IUE-CAS). Organization and coordination of activities, as well as testing of collected water samples.
2nd Partner and role/function	Tianhe Aquatic Ecosystem Engineering Co., Ltd. Water samples collection.
3rd Partner and role/function	Haishu District Government Provide advice and financial support.
4. Co-design activities and stakeholder engagement	
Stakeholders, engagement processes, in co-design and co-implementation (link with WP2)	<p>Co-design in planning and preparatory activities</p> <p>The environmental compensation procedure requires advance payment by social capital. After the results are accepted, the government will compensate the social capital. This process requires the joint participation of enterprises, governments, and third-party supervision agencies.</p> <p>Co-implementation and maintenance:</p> <p>IUE-CAS will monitor the water environment of Moon Lake.</p> <p>Nearby residents will be affected by the project during the water environment treatment, but will then enjoy the high-quality green space after the water environment treatment.</p>
Notes on major achievements/success factors/critical issues/barriers	Major achievements: Introduced a new type of business model-PPP (Public-Private Partnership), which can make full use of social resources for effective project actions.

(to be updated) (link to WP5)	Success factors: Before the implementation of the project, experts, officials and scholars from various parties conducted detailed discussions. This activity includes the professionalism of experts, the political considerations of officials and the wishes of residents.
Current situation and next steps (to be updated)	
5. Other activities	
Synergies with other proGInreg activities	The environmental compensation of Mook Lake is closely related to NBS2 and NBS3 of Ningbo, because dredging and green lake shore can better affect the water environment of Mook Lake.
Links with other external project or activity	
Business model (link to WP5)	
Technology Readiness Level (TRL) (link to WP5)	
Communication activity (link to WP6)	
6. State of Play and Monitoring	
Current situation (to be updated)	Water samples have been collected since June 2019, but due to delays in the epidemic, water quality monitoring has been suspended since January 2020.
Next steps (to be updated)	Water sampling is expected to continue in July 2020.
Notes/critical issues/barriers (to be updated)	Barriers: Moon Lake has a huge area, and it is difficult to control the water environment.

(link to WP5)	
7. NBS maintenance and outlook	
Maintenance	
Sustainability after project conclusion	
Additional resources	

4. Living Lab results and perspectives

4.1 Conclusions of the Implementation phase

We introduce Ningbo from the aspects of its geographical location, population, GDP (including growth rate) and climate characteristics, and introduce the GI project of Ningbo as well as some problems that need to be paid attention to at this phase.

As a relatively developed city in eastern China, Ningbo takes the lead in urban construction and greening, especially in certain policies, such as "Five Water Treatment" in Zhejiang province and the construction of urban green infrastructure.

Because of the rapid urban development, many years ago, it was at the expense of the environment. Now the government, society, urban residents and stakeholders will pay more attention to the construction of urban green infrastructure, which requires us to use scientific methods to carry out a series of urban monitoring and management. Compared with other FRCS, Ningbo has fewer NBS and only two official partners. Briefly introduce the main roles played by the two organizations in LL and the tasks.

The working group is divided into three modules, **Engineering Construction**, **Quality Monitoring** and **Cross-sectional activity**. The first module is about the extraction of lake bottom sediments and the aquatic vegetation; The second module is about soil quality monitoring, lake water Quality and Plankton monitoring in Living Lab. The third module is mainly submission of materials. Unofficial Enterprises was also introduced to the project cooperation.

- **NBS 2: Transforming lake sediment into soil fertilizer;**
- **NBS 3: Planting aquatic plants along the shore of the lake;**
- **NBS 7: Procedures for environmental compensation.**

4.2 Results obtained and criticism

As a city promoting proGireg project, it is necessary to monitor and manage the urban greening with the joint government, residents and stakeholders. The purpose of the project is to obtain certain environmental effects through long-term supervision of the pilot area. In this implementation plan, we monitor the Ningbo pilot area – Moon Lake, and draw the following conclusions:

- Basic information about the pilot area

The location of the Living Lab and the introduction of communities, green area, population and density.

- Weaknesses and challenges in this area

Crowded streets around the Moon Lake. Many old residential quarters, old buildings, old streets, and old markets behind the high-rise buildings, with aging equipment and facilities and many remaining problems. With aging infrastructure, insufficient modern facilities, and difficulties in coordinating group interests. Some polluted water bodies with seasonal stench have appeared (see D.2.2)

- Main obstacle in this area

In terms of ecological and Environmental Restoration, since Moon Lake is located In the city center, it is difficult and costly to construct some green foundations around it. It is the main reason that restricts the further development of moon Lake green infrastructure.

Given that Ningbo has already implemented the NBS measures for improving the water quality of the man-made Moon Lake, they are currently only being monitored. Further LL implementation will need to be contextualized within the already-performed implementation (aquatic filtering plants, fry fish, pumps for oxygenizing the water, water filter, new bamboo plantings) and to support the past and ongoing initiatives with complementary NBS 2, 3 and 7 of proGInreg.

4.3 Further developments

The Zhejiang Provincial Party Committee Proposed the Introduction of the "Five Water Treatment" to transform and upgrade the Water Management by friendly interest, preventing flood, draining flooded fields, guaranteeing water supply and emphasizing water conservation. The move will have important effect to moon lake water quality in the future, to improve the moon lake water quality, improve the comfortable degree of residents and life experience.

Water quality: On the lake ecological comprehensive control project within one year after the completion of the main water quality indicators will reach IV class, will reach III class for two years. Water quality purification and ecological restoration projects will continue to remove pollutants in water bodies through moderate human intervention; improve self-purification ability of water bodies through ecological technology.

Overall environment: Through renovation, the underwater forest and water garden of the moon lake will reflect the cultural landscape on the shore, which will beautify the environment of the Tianyi pavilion and the moon lake, and strive to become a model of the park landscape and lake management, so that citizens and tourists can enjoy the scenery.

4. Annex 1: Ningbo Living Lab Map

Ningbo Living Lab Map

Living Lab Plan
Living Lab Vision map

Update: 06.2020



NBS type: New regenerated soil thanks to biotic compounds for urban forestry and urban farming.

Brief project synthesis: This NBS is for reusing lake bottom sediments and turning waste into treasure.



NBS type: Community-based urban farming and gardening on post-industrial sites.

Brief project synthesis: Planting aquatic plants along the lake can beautify the environment while purifying the water quality. Aquatic plants are being used to re-nature a 5 km corridor.

Living Lab goals and overall vision

On the lake ecological comprehensive control project within one year after the completion of the main water quality indicators will reach IV class, will reach III class for two years.

Water quality purification and ecological restoration projects will continue to remove pollutants in water bodies through moderate human intervention; improve self-purification ability of water bodies through ecological technology.






NBS type: Establishing protocols and procedures for environmental compensation at local level.

Brief project synthesis: The main content of this activity is to evaluate the comprehensive management results of Mook Lake, that is, collecting meteorological, hydrological, chemical and ecological data to monitor the environment of Mook Lake.






Nature-based solutions

-  **NBS 2**
Transforming lake sediment into soil fertilizer
-  **NBS 3**
Planting aquatic plants along the shore of the lake
-  **NBS 7**
Procedures for environmental compensation

Implementation status

-  implemented
-  in progress
-  in planning

legend

-  Living lab
-  Water surface
-  Existing green spaces

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Partner organizations

No.	Name	Short name	Country
3	City of Turin	COTO	Italy
23	Politecnico di Torino	POLITO	Italy
31	Orti Alti	OA	Italy
11	Fondazione della comunità di Mirafiori Onlus	MIRAFIORI	Italy
15	Dual SRL	DUAL	Italy
18	Parco scientifico e tecnologico per l'ambiente - Environment Park SpA	ENVIPARK	Italy
22	Università degli Studi di Torino	UNITO	Italy

Abbreviations

EC: European Commission

ERDF: European Regional Development Fund

D. No: Deliverable Number

FC: Follower Cities

FRC: Front Runner Cities

GA: Grant Agreement

GI: Green Infrastructure

GIS: Geographic Information System

IP: Implementation Plan

LL: Living Lab

NBS: Nature-Based Solutions

NGO: Non-Governmental Organization

ProGIreg: Productive Green Infrastructure for post-industrial urban Regeneration

TRL: Technology Readiness Level

WP: Work Package

1. NBS implementation in Turin

This document is a living and working document that will produce, at the end of the implementation phase, a comprehensive description about the Living Lab and NBS implemented in our City. The first release of the IP is June 2020. Attached to this document a Living Lab Map will graphically display a summary of the information of each NBS.

1.1 Project Framework

ProGlgreg is funded by the European Commission under the Horizon 2020 programme and its name stands for “Productive Green Infrastructure for post-industrial urban Regeneration”. It aims to demonstrate the benefits of nature based solutions (NBS) applied into business models in post-industrial cities. In fact, post-industrial sites present several weaknesses and deficiencies from the social, economic and environmental point of view that must be addressed in order to guarantee better and more sustainable life conditions for the inhabitants. Lack of social bounds, poverty, forms of social exclusion and social deprivation, polluted and/or abandoned buildings and lands, uncertainty, unemployment and economic stagnation are some of the main features. These patterns can be observed in many cities that have undergone serious changes over the past years due to the de-industrialization process, and that have found themselves with huge gaps and inequalities among their own districts.

Through the implementation of green infrastructures (GI), proGlgreg intends to promote self-sustaining business models that can boost and regenerate these areas. The cooperation of public actors, civil societies, academies and industry/SMEs (the so-called “quadruple helix approach”) is fundamental to build shared practices and ensure continuity over time. Innovation will take place of three levels: on a technical level through the deployment and improvement of the NBS; on the social level through co-designing, co-creating and co-implementing GI in partnership with local communities; on the economic level, as NBS can highlight new market opportunities for the green economy development that can be used in the private sector, social entrepreneurship and public actions.

1.2 ProGlgreg in Turin

Located in the North-West Italy, Turin is Piedmont's capital and one of the biggest and economically most attractive Italian cities. It has an average elevation of 250 m upon the sea level and benefits from a mild temperate climate (Köppen and Geiger classification). It has a GDP of 55 billion euros (which is 4,5% of the national GDP), 130 km² extension and about 884.733 inhabitants (2018).

Turin is characterized by the typical features of a post-industrial city, having turned from an (almost) exclusively industrial centre to an innovative city based on culture and services. Because of this shift some core areas of the local industrial manufacturing have been emptied and are now disused or abandoned.

The City began working specifically on these areas from the 1990s through regeneration plans and programmes. These efforts, financed also by European programmes and funds, have mitigated the negative impacts of severe deindustrialization processes but the aftermath of the industrial heritage seems to have left a gap which has not yet been filled by the growth of other sectors (Belligni and Ravazzi 2012) and the attempt to focus on tourism and research has cut out of development plans many of Turin's suburbs.

Moreover, Turin is not immune to structural weaknesses. For instance, both the progressive ageing of the population (the percentage of people over 65 years old is constantly rising since 2007: from 23,7 % in 2007 to 25,6% in 2017)¹ and the downward population trend are accompanied by an increased urban poverty rate and a weak economic development perspective (which is, as already mentioned, particularly severe in neighborhood with socio-economic difficulties).

In addition, due to its own orographic features, the high level of private mobility and the spread of old heating systems, Turin is one of the most air polluted cities in Italy. This led the City to exceed the limit of 50 µg/m³ more of the legal constraint established in 40 times a year (Forni et al. 2019)².

This dynamic is accompanied by the dysfunctions of public transport as well as the unequal distribution of urban green spaces, which generally penalizes the suburbs compared to central areas.

This lack of connection between the LL and the city centre is a main topic that has to be addressed in order to reduce the isolation perceived by residents living in post-industrial areas.

ProGireg represents an opportunity for tackling these problems in a way that ensures environmental sustainability, improves living conditions and provides economic benefits both to citizens and entrepreneurs. Although its focus is on a specific district, the entire city will benefit from it. Thus, proGireg may be able to represent a worthy model to be replicated by professionals and administrators interested in applying NBS in regeneration projects. This aspect requires **a recognized and agile management structure to ensure effective communication, optimal collaboration among actors and a common and shared narrative of the process and of the results to be effectively disseminated.**

1.3 Living lab management activities

One of the main proGireg's pillars is cooperation between all of the involved partners throughout the project. In Turin, this principle has been applied from the beginning of the planning activities. This subchapter retraces the process of management that has led to the co-design and co-implementation of the NBS will be displayed. This collaborative process has evolved to adapt to the necessities emerged during the ongoing works and all the partners have been involved into the definition of a common strategy. All the stakeholders have had a central role in the definition of each activity, its placement and the definition of its

¹ Data is taken from the Annual Observatory of the Municipality of Turin (2017). [link](#)

²<https://rsa.tandfonline.com/doi/abs/10.1080/23748834.2019.1596045?scroll=top&needAccess=true&journalCode=rcah20&#.XyAo6J4zaUm>

beneficiaries and, most importantly, for highlighting the real possibilities given by the Living Lab, acting as real co-creators. The result is an interconnected system that defines each partner's role and responsibilities and provides guidance for each NBS implementation.

Working groups and clusters

The most distinctive feature of our Living Lab (also comparing with the other FRC) is the high number of projects (or actions) to be implemented under the frame of the 7 proGReg NBS in which Turin is committed (see chapter 3). This variety of interventions has led to the involvement of a large number of local stakeholders, beyond the official partners of proGReg. Some of them, such as the Municipality, University and Politecnico have been based on huge and articulated. For example, in the only Municipality of Turin have been directly involved in the activities almost 30 colleagues of 12 departments (mostly technical) as well as 100 of public and private partners enrolled in the local mailing list. Thus, there was a strong need of coordination and operative management of this big group of people. After a plenary meeting which involved all the stakeholders, **three main groups** (also called "tables") have been created with the purpose of managing all the planning activities within proGReg properly. For each group, a specific partner had been put in charge of the table activities:

- the first table was named "**new soil**", as NBS2 (*New regenerated soil thanks to biotic compounds for urban forestry and urban farming*) is the core project in Turin (Envipark was responsible for it);
- the second is the "**widespread green**" table (tavolo "verde diffuso"), in which all the activities related to all the other NBS have been included (Orti Alti was the supervisor);
- the last one is the "**cross-sectional activities**" table (tavolo "attività trasversali"), in which various activities related to different fields of work and research have been included (Fondazione Mirafiori is the supervisor).

The participants of these three tables have met separately, according to the division mentioned, to carry on the co-design phases and to define each own's area of competence.

Consequently, a "**core team**" ("cabina di regia") had been created to guarantee a shared planning process among local partners. City of Turin (European Funds and Innovation Services) acted as coordinator and leading subject. The core team was used as coordination and exchange board to manage Turin Living Lab along all the implementation phases: according to a "variable geometry" principle local partners are invited to each meeting on the basis of the needs and of the issues to be discussed.

In addition to this, other meetings and events have been organized to boost cooperation among parts and manage all the different activities carried out: for example, inspections of the places in which NBS were meant to be implemented (on summer, 2018); workshops that lead to the SWOT analysis drafting (autumn, 2018); ICLEI workshops about co-design processes.

Partners and functions

After this first period and considering what has been done within the core team, a clear division of roles and tasks emerged, as shown in the following table:

Table 1 - Partners and activities

Partner	Specific activities	Cross-sectional activities
Comune di Torino (COTO)	Green walls/ Aquaponics ICT tools Green Corridors	WP3 coordination activities
Politecnico di Torino (POLITO)	Systemic design External communication with ICLEI (WP6) Co-design supporting activities with UNITO (WP2)	Synergies between NBS (fil rouge) Engagement of marginalized groups Green walls co-design activities Analysis of urban and suburban features of productive NBS Spatial analysis
Università degli Studi di Torino (UNITO)	Monitoring activities with CRN (WP4) Socio-economic analysis ricerca azione (WP2) Scientific contributions on specific NBS (new soil)	Codesign activities (with POLITO) Policy, project executive board
Fondazione Mirafiori (MIRAFIORI)	Gardens in boxes implemented in schools and social housing buildings Educational activities concerning sustainable agriculture	Communication activities addressed to local citizens Synergies between proGInreg and other local actions
Orti Alti (OA)	Pollinator garden Green roofs	Spatial analysis Co-design activities
Parco scientifico e tecnologico per l'ambiente - Environment Park SPA (ENVIPARK)	New soil Training courses on: -new soil -innovative agriculture systems	Role in WP5 drafting for reducing market barriers
Dual s.r.l. (DUAL)	New soil	

Partners have been involved according to their field of expertise. For instance, both University of Turin and the Politecnico carried on research activities such as monitoring, sampling, testing solutions and/or other important stages of the process. On the other side, NGOs' presence was necessary in order to involve citizens and foster proGInreg's issues thanks to the trust given to them by residents. As shown in the table, all the four main parts described by the quadruple helix approach theory have been included: local institutions (COTO), academies (UNITO and POLITO), industries (DUAL and ENVIPARK), and the civil society (OrtiAlti, Fondazione Mirafiori).

As it emerges from table 1, cooperation principles have been applied to integrate and create synergies among Work Packages (WP) and NBS, as proGReg requires. Links among different activities are extremely tight and a lack of coordination and collaboration could possibly damage different actions at the same time. Hence, the goal is to work on the Living Lab in an harmonious way taking into the account all the needs of each activity without losing sight of the greater picture

From the first ICLEI workshop emerged the necessity of splitting NBS in a different way. In Turin, 7 out of 8 nature based solutions have been planned to be tested, and different activities have been planned within almost each NBS. In order to manage appropriately all these activities, and given that some solutions are tightly linked together because of their nature or because of same actors are involved, six clusters have been created [table 2]. This further division is expected to facilitate problem solving and the implementation process.

Table 2 - Cluster/NBS Activity

Name of the cluster	NBS Activities
New Soil	2.1 New Soil production by Sangone Park
Social Gardening	3.1 Mirafiori Castle's ruins recovery and new planting
	3.2 Gardens in Cascina Piemonte (Orti Generali)
	3.3 Pollinator friendly garden at WOW
	3.7 Gardens around the houses
	8.1 Butterfly gardens in school and for disadvantaged people
Green in building	4.1 Aquaponic test system
	5.1 New green roof at Casa nel Parco
	5.2 Green wall in a school
	5.3 Green wall on a homeless dormitory
	5.4 New green roof at WOW
Education community	3.4 School garden in box
	3.5 Micro vegetable garden in schools
	3.6 Community school garden
Green Corridors	6.1 Green corridor
	6.2 Local natural heritage enhancement in green corridor
ICT Tools	7.1 Tools for environmental compensation processes

In order to guarantee a good management of all these activities, three figures have been identified for each cluster:

- a spokesperson (a external representative of the City of Turin responsible for monitoring the timeline and for calling table meetings),
- an internal facilitator (an employee of the City of Turin that has the task of facilitating administrative procedures)
- and a delegate of the Turin Smart City Office (responsible for the coordination of the cluster with regards to other groups and with the project in its entirety)

1.4 Communication strategy and plan

Turin planned to realize various activities, with the perspective to foster diffused benefits along the intervention area: Mirafiori Sud District. Thus, our LL will be co-designed and co-implemented by multiple actors, each of them with different skills, experiences and backgrounds. So, there was a need since the beginning to find a common narrative of the proGlg activities based in Mirafiori Sud and to build a shared image together with all local actors. Consequently, Turin decided to have a dedicated and experienced human resource that helps us in defining a communication plan and strategy and then coordinate the communication and dissemination activities for the LL.

The general objective of our communication plan is to effectively disseminate the results of the project to maximize their impact. Starting from the 7 specific objectives (Update; Communicate; Create global awareness on nature-based solutions (NBS); Promote networking; Exploit recommendations and learnings; Disseminate; Monitor and coordinate dissemination events) identified by ICLEI (WP6 activities) a set of coordinated communication objectives and modalities were structured with this scheme:

1. Make the project known > produce news
2. Show partner network, > share news
3. Promote Living Lab participation > before the event
4. Measuring participation in Living Labs > after event

Specific attention was devoted to the social media. A Digital Editorial Plan (PED) has been created and shared with partners in order to:

- create replicable documentation of the communication process
- to find out when a partner edits news and be able to share it

Moreover, a press office was established and a first screen of traditional and new media (social) channels was done. The communication plan set general rules and specific modalities to communicate proGlg activities and schedule periodic news.

A second contribution aimed at communicate proGlg activities and results extensively and by using the information technology tool is a digital map produced by Links Foundation (third party of POLITO). This map will show graphically and dynamically the progress of the intervention by summarizing and localizing each NBS implemented. The map can be found here: <http://www.urbantoolbox.it/project/progireg>.

2. Our Living Lab

2.1 Our Living Lab

The implementation area which hosts the NBS is Mirafiori Sud District. This neighborhood of 1.149 inhabitants is placed in the southern edge of the City's borders, traced by the Sangone river.

Mirafiori Sud is a post-industrial district that has had a remarkable growth during the 50s-60s thanks to the car industry (especially FCA). As Mirafiori Sud is a peripheral urban area (a suburb), it is characterized by a poor quality of the urban environment (green and grey infrastructures) and social issues such as social segregation, poverty and security problems. The District/LL area has a population of 34.659 inhabitants and a surface of 11.491 km², with a density of 3.016 inh. / km². However, Mirafiori can rely on direct accesses to green area, which are more extensive and widespread than the City average (as shown in the following table).

Table 3 - Turin and Mirafiori Sud District data

	City of Turin	Mirafiori Sud district (LL)
Inhabitants (2017)	884.733	34.659
Surface area	12.999 km ²	11.491 km ²
Density	6.805,690 inh. / km ²	3.016 inh/km ²
Average green area density	55 inh. / m ²	91 inh.m ²

This district presents several weaknesses as well as great opportunities and important assets that could play a pivotal role for the successful implementation of several NBS. According to the SWOT Analysis previously drafted (see D.2.2), the main features of our LL have been divided into:

- socio-cultural inclusion
- human health and wellbeing
- ecological and environmental situation
- economy and labour market

In regard to the first analysis dimension ("socio-cultural inclusion"), Mirafiori Sud district is characterized both by strong community bounds and worrisome dynamics that threatens this social cohesion. On the one hand, the presence of community foundations and citizens' associations have helped to avoid a further degradation of the social fabric at local level. On the other hand, the low population density and the huge amount of empty spaces left by the industrial downturn affects interactions, communications and connections among citizens, companies and associations. At the meantime, decrease of generalized participation to social, religious and otherwise community events and gatherings have been noticed, as well

as forms of relational isolation and loneliness, especially among elderly people³. The growing presence of monoparental families, which may necessitate of greater attention.

Regarding the “human health and wellness” dimension, despite the large presence of green areas, a higher incidence of different diseases has been detected (compared to the city level): in particular a higher incidence of cardio and respiratory diseases, chronic and mental stress. Additionally, there is a relevant presence of alone elderly with psychic discomfort. Also, even though this area benefits from great green spaces, these aren't homogeneously distributed: a shortage of parks has been highlighted in the Western part of this district. Lastly Sangone river itself is perceived as a no-go-area and is currently underused by Mirafiori's dwellers.

With regards to the “ecological and environmental situation”, this area presents good pathways connecting green areas and houses which has a positive impact on reducing both air pollution (walking spaces help to avoid traffic congestions) and overheating phenomena during hot seasons. However, many problems have to be tackled during the implementation phase: for instance, the chemical soil composition turns out to be polluted due to industrial waste and fuels used in the whole XX century. Air quality has proven to be still dramatically poor (see the “human health and wellbeing section”) and the presence of several abusive gardens in the district increases the sense of degradation and pollution (i.e. garbage).

From the economic point of view, this area has been affected by the crisis of 2008 which has had a deep impact in the construction and industry sectors. Today, Mirafiori Sud district is experiencing a severe youth unemployment rate (over 50%) and is also characterized by a generally low education level and a low number of local businesses. Also, labor force is mainly employed in the service sector, and both the low real estate values and the large availability of empty accommodations could become a pull factor for new citizens.

Among the strategic assets that have been considered to propose proGInreg in Mirafiori, there is the presence of meaningful research and industrial hubs such as Politecnico Design Office and FCA's headquarter. Innovative companies in the Ex-Iveco area represent a great chance to address sustainability issues. Industrial brownfields, flat roofs and residual urban spaces are pivotal elements to enhance sustainability. At the city level, some projects oriented towards green spaces recovery and economic plans have been already put into practice: for example, TNE (Torino Nuova Economia - Turin New Economy) and the “Corona Verde” program, which aims to connect the peripheral parks, and developing the shores of the Sangone river. Finally, thanks to european and local projects (Cocity / Regulation of common goods) some innovative processes of citizen involvement in the management of commons took place in recent years, producing relevant social benefits and improving the care and the quality of public green spaces (flowerbed, green traffic island).

Starting from this context, proGInreg will represent an effective opportunity to regenerate and recover the district. In order to have meaningful and long-term impact, the vast majority of

³ In 2017 the average age among residents of Mirafiori Sud district is 48 years old, it represents the higher score among all district and, consequently, is slightly higher than the average age of all citizens of Turin (46 years old). Source: Annual Observatory of the Municipality of Turin (2017). [link](#)

NBS (7 out of 8) will be tested in our Living Lab according with the features and needs of each selected site.

From this point of view those parks extended in the southern part of the district present a good ecological potential that can be a good asset for testing NBS2 (new soil regeneration) in Sangone Park. Moreover, the current network of cycle paths could represent the starting point for NBS6 (green corridors): thanks to the implementation of this specific NBS (NBS 6.1), the lack of path connecting different areas of the district can be tackled, promoting a healthier lifestyle among inhabitants at the same time. Within NBS6, an enhancement of natural heritage sites (NBS 6.2) has been planned in order to achieve a better biodiversity development, which is strongly linked to pollinator activities (NBS8) and may promote a greater use of outdoor spaces.

The presence of a strong third sector which is already oriented toward increasing socialization, social cohesion and environmental issues is pivotal for the success of this project as well. Some of the association and networks that are providing us support are OrtiAlti, Mirafiori Chlorophyll Project and Mirafiori Social Green Project. Thanks to their contribution proGReg can have a real and useful impact at the local level, since each NBS can be better integrated and adapted to the real conditions and needs of the residents. Specifically, these associations have collaborated especially for the implementation of NBS3 (Community-based urban farms and gardening on post-industrial sites) and NBS8 (pollinator biodiversity). These NBSs will be implemented by considering and directly involving the gardening community built by OrtiAlti to enhance the local knowledge.

More specifically, seven activities have been planned within NBS3: the first activity (NBS 3.1) aims to recover Mirafiori Castle's ruins, an old castle symbol of the district that has endured great degradation over time; the second one wants to test new social garden activities, especially vegetable gardens (NBS 3.2); some of them are linked with the education system, promoting social gardening in schools (NBS3.4/ NBS3.5/ NBS3.6); one activity is linked to the creation of pollinator friendly gardens (NBS 3.3) which is tied directly to NBS 8; and the last one (NBS 3.7) promotes social gardening among buildings.

If empty industrial spaces usually cause further degradation, they can also potentially become social spaces that provide services to the community, especially throughout NBS4 (Aquaponics as soil-less agriculture for polluted sites) and NBS5 (Capillary GI on walls and roofs). Aquaponic represent a great resource for the labor market (green jobs) and may provide supplies for the most vulnerable part of the population (Casa nel Parco is a "borough house" that helps those citizens who are more in needs also through a free canteen), as well as promoting more sustainable ways of fish farming and planting. More specifically, with NBS5 there is the chance to convert abandoned spaces into community gardens, as well as testing green walls solutions. This NBS has been divided into four different activities that concern a green roof in Casa nel Parco (NBS 5.1), an indoor green wall in a school (NBS 5.2), an outdoor wall in a dormitory for homeless people (NBS 5.3) and an empty public building (NBS 5.4).

Eventually, NBS7 aims to promote local environmental compensation processes. This aim will be implemented through awareness-raising activities related to environmental issues at school level, especially with regards to the realization of a planting intervention of trees in a school yard.

By adopting these activities, proGReg aims to enhance the quality of life of all residents with regard to different dimensions. The main (and direct) beneficiaries of this project are pupils that attend school in Mirafiori Sud, local urban farmers and some marginalized group (homeless, people who are living in disadvantaged situation and people with disabilities),.

2.2 Our Living Lab challenges and goals

The purpose of proGReg implementation in Turin is to address the social, economic and urban problems mentioned above by testing specific NBS by adopting the LL methodology. Through specific measures, activities and tools, this district will be regenerated, and abandoned or underused areas will be accessible again. Furthermore, the safety of these places will be improved and green economy will be supported and boosted. More specifically, the activities carried out in the LL are supposed to have a positive outcome in terms of education (in local schools), inclusion of disadvantaged social groups (social housing inhabitants; people with disabilities), reinforcement of social links, support of new entrepreneurship and new green jobs, and establishment of a common good regulations to apply on NBS. Likewise, residents' mental and physical health are supposed to improve as well.

This district has faced significant changes and presents weaknesses linked to its status of post-industrial area: air and - possibly - soil pollution that has a negative impact on residents' health, progressive displacement of services, weakening of social bonds, unemployment, the presence of abandoned buildings and a sense of insecurity largely perceived among the inhabitants are some of the major problems emerged during the analysis of Mirafiori Sud district.

Some of the weaknesses and necessities which came up in the SWOT analysis could be turned into opportunities and strategic starting points for the implementation of several NBS: already-existing cycle paths can be enlarged, empty buildings can be turned into green infrastructures, brownfields can be turned into community gardens, etc.

At the same time, many points of criticism must be addressed. Our Living Lab presents many tough challenges which might affect the effectiveness of the whole project. During the co-design process, round tables and meeting have been organized with local partners in order to have a deeper understanding of those risks that may occur at different stages of the process. Above all, the most likely risks mentioned during these meetings were: delays due to administrative procedures or construction problems, insufficient budget for the realization of the project, lack of interest by residents, weak recognition of benefits produced by the NBS by the direct beneficiaries, and lack of perspective beyond the end of the project (2023).

More specifically, delays might be because many activities are carried out on public land or in public buildings and properties (schools, the Mirafiori Castle, the public building generally called "WOW") by private groups or associations: in these cases, administrative procedures can take more time than expected. Funds provided by Horizon 2020 happened to be insufficient for the realization of all activities planned in our LL, but other sources for financing the project have been found elsewhere (see the official Proposal). Nevertheless, additional financing problems can emerge at any time due to the extent and complexity of the project itself.

Although a large number of partners involved could cause further complications, as cooperation is more demanding and complex, it can increase reliability by involving experts from different scientific fields. Each partner provides sound knowledge according to its abilities and area of competence, considering that none of them could own a comprehensive knowledge of all the aspects faced by proGlgreg. Then, building a common knowledge around NBS and their implementation is a major goal too.

Finally, the relationship between institutions and citizens needs to be strengthened and processes of ownership should be activated to make residents and direct beneficiaries more concerned about the success of proGlgreg and its possible further development after 2023. In order to achieve this goal, the construction of a common identity in the neighborhood is a fundamental step. Through the realization of a “Mirafiori Sud brand” that includes the activities and values carried out by proGlgreg, citizens will perceive themselves as part of a community and easily identify themselves with proGlgreg. Promotion and communication activities are pivotal elements for what concerns this purpose.

From the City's perspective, our team is working to build a strong connection between partners, residents and institutions that might last in time in order to guarantee the continuity of the project and give birth to good practices that can be repeated in other parts of Turin and in other cities as well: in fact, a second Living Lab in the northern part of Turin is currently under study.



3. The NBS in Turin

The following table displays all the NBS implemented or to be implemented in Turin. As mentioned, due to the nature of living and working document, some information is missing because not available yet.

Table 4 - NBS summary table

NBS type	NBS Title (CTRL+ click to jump to each action)
NBS 2: Regenerating soil	2.1: New soil production in Sangone Park
NBS 3: Community-based urban farms and gardening on	3.1: Mirafiori Castle's ruins recovery and new planting
	3.2: Gardens in Cascina Piemonte (Orti Generali)
	3.3: Pollinator friendly gardens (WOW)
	3. 4: Didactic gardens in schools
	3.5: Micro vegetable gardens (OrtoMobile)
	3.6: Community school gardens
	3.7: Gardens around the houses
NBS 4: Aquaponics	4.1: Aquaponics test system
NBS 5: Green on walls and roofs	5.1: Green roof at Casa nel Parco
	5.2: Green wall indoor at school
	5.3: Green wall outdoor on a homeless dormitory
	5.4: New green roof at WOW
NBS 6: Accessible green corridors	6.1: Green corridor
	6.2: Local natural heritage enhancement in green corridor
NBS 7: Local environmental compensation processes	7.1: Tools for environmental compensation processes
NBS 8.1: Pollinator biodiversity	8.1 Butterfly gardens for disadvantaged people

2.1: New soil production in Sangone Park

	
1. General information	
Compilation date and update	April 2020 - first release draft
NBS type	New regenerated soil thanks to biotic compounds for urban forestry and urban farming
NBS title	New soil production by Sangone Park
Brief project synthesis	<p>The experimentation consists in the creation of an area of "urban forest" along the banks of the Sangone river through the use of regenerated soil (New Soil), based on excavated material with the addition of compost from FORSU, zeolites and innovative biostimulants. The composition of the New Soil has been defined with the main scope of minimize maintenance needs. The composition is:</p> <ul style="list-style-type: none"> - soil from deep excavation from works in the city as the main ingredient - compost from OFMSW for organic matter and nutrients addition (10%) - zeolites in the surface layer for the purpose of decreasing the density of the material and with an adsorbent function to retain water - <i>Mycorrizae</i> as bio-stimulants to improve nutrient uptake and resilience of plants. <p>Plants of different species were planted in the New Soil area and in the adjacent area as a control. UNITO will perform plant growth analysis in order to monitor the effect of new soil on vegetation.</p> <p>Chemical characterizations of the soil from excavation before and after the mixing with the other ingredients have been done in order to verify the compliance with law prescriptions and to proceed with the authorization procedures.</p>
Area of implementation	2000 m ² in Sangone Park. GPS coordinates (of a central point): 45.009040 N, 7.641200 E
Target groups (beneficiaries)	Green department technicians of the City of Turin Citizens Quarry managers Compost producers Legislators

Timing (start and end date)	December 2019 - February 2020
Main responsible partner	Envipark (coordination)
ProGlgreg partners involved	Dual Srl UNITO ACEA (TLP of Envipark) CCS (subcontracting of Envipark) City of Turin Arpa Piemonte (TLP of City of Turin) Città Metropolitana di Torino (TLP of City of Turin)
Other stakeholders involved	Private gardeners of adjacent municipal gardens Representatives of groups of citizens
Total Budget	Dual Srl (major part of funds): 124.000 € Arpa: 17.000 € Città Metropolitana di Torino: 9.000 € UNITO: 2.500 € Envipark: 55.000 € Acea: 54.500 € CCS Aosta: 20.000 € Total budget: 278.000 €
2. Pre-implementation activities	
Planning and preparatory activities	The planning activity started in 2016 with the first proposal step. The City of Turin (green department) had the problem to find soil to build new parks in Turin, without taking the soil from agricultural areas. Dual srl had the problem to reuse soil from deep excavation in Turin. They had experimented, in some construction sites of the city, the mix with compost. Envipark proposed to use ACEA compost and also the biotic compound produced by CCS Aosta, to improve this solution, and to add zeolites for capacity to retain water and for lower the material weight (as superficial layer on ground application and in the whole mixing for roofs applications). Arpa and Città Metropolitana were involved to overcome some administrative limitations about the use of soil from deep excavation. UNITO was involved to monitor the soil by the chemical and botanical points of view.
Administrative procedures	<ul style="list-style-type: none"> ● Experimentation Agreement (between City and Dual to do works on public land) ● Safety documentation: <ul style="list-style-type: none"> - Single Document for the Assessment of Interference Risks (DUVRI) - Security and coordination report

Technical and social analysis	<p>Analysis of the basic components of the new soil:</p> <ul style="list-style-type: none"> - Preliminary evaluation of main physico-chemical parameters and characterization of microbial consortia of soil already present on site. - Compost: chemical and microbiological composition, contribution to organic load and to fertilization - Inert carrier sieved (provided by the Dual srl); Analysis of the characterization provided by the company and contribution to the definition of the composition to be used for the implementation of the area to be planted - Micorrizae: provided by CCS Aosta. Definition of the best consortia to be applied in the soil depending on the basic composition of soil, the selected plants and the autochthonous microbial composition of the soil. Contribution to the definition and the formulation and production of the best consortia to be applied in the test site of the project. Evaluation of the effects on plants growing, environmental strength and chemical composition in relation to the Mycorrhizae consortia application. - Implementation of a test site monitoring of the new soil effects on green site and environmental development <p>Several epidemiological studies show that fruits, vegetables and cereals can play a nutraceutical role for their content of many antioxidant phytochemicals such as carotenoids, ascorbic acid and polyphenols or phenolics derivatives. A commercial inoculant (MICOSAT F®) containing arbuscular mycorrhizal fungi (AMF) could improve the nutritional value in crops. The goal of this work was to evaluate the effect of AMF on the level of carotenoids production, phenols, anthocyanins and saponins, proteins, total antioxidant activity and nitrates content in fruits, vegetables, legumes and durum wheat var. grecale, whose consumption is largely recommended according to Mediterranean diet. The treatment increased the antioxidant activity in strawberries (37.50%), in giant lentils (29.17%) and in durum wheat (63.63%) but decreased it in kiwi (31.81%) and in grape (19.81%). Nitrate levels decreased significantly in strawberries (39.78%) and in tomato intended for transformation (37.79%). The application of MICOSAT F® enhanced the levels of several secondary metabolites. However, the number of phytochemicals and respective by-products were reduced in some cases. Environmental conditions and modality of AMF inoculation could module both primary and secondary metabolites. AMF symbiosis is an efficient strategy to improve nutritional value of crops. In this study we evaluated the potential of MICOSAT F®. The application of this new commercial product enhanced the levels of several secondary metabolites analyzed in foodstuffs. However, the number of phytochemicals and respective by-products were reduced in some cases.</p>
Other activities	
3. Management structure and responsibilities	
Main partner (coordinator) and role/function	Envipark (coordination)
2nd Partner and role/function	Dual Srl (major part of funds: realization of the construction site)
3rd Partner and role/function	UNITO (monitoring activity)


4th Partner and role/function	ACEA (TLP of Envipark, they provide compost)
5th Partner and role/function	CCS (subcontracting of Envipark, they provide micosat: the biotic compound)
6th Partner and role/function	City of Turin (coordination of administrative procedure)
7th Partner and role/function	Arpa Piemonte (TLP of City of Turin, help in administrative barriers)
8th Partner and role/function	Città Metropolitana di Torino (TLP of City of Turin, help in administrative barriers)
4. Co-design activities and stakeholder engagement	
Stakeholders, engagement processes, in co-design and co-implementation (link with WP2)	<p>A social involvement of local population has been done in order to increase awareness about the experimental site developments and aims. This involvement was done through the organization of opportunities to meet with the neighborhood committees and with the owners of the urban gardens located in the Mirafiori area. During these meetings, dialogue was created with the representatives of local citizenship and a brief training was carried out on the actions envisaged in the project and on the new soil. Local government and research center are already actively involved in the project as partners (POLITO, UNITO, City of Turin, Arpa Piemonte (TLP of City of Turin), Città Metropolitana di Torino (TLP of City of Turin)).</p> <p>The Mirafiori district of Turin involved in the implementation of the experimental area of the new soil has partially complex social characteristics.</p> <p>The active involvement of the citizen in the project activities is essential to make the installations 'alive and useful' and to avoid acts of vandalism. In the case of the NEW SOIL experimental park, citizenship was informed and involved through the involvement of the neighbourhood committees and their representatives. Moreover, proposing a dedicated meeting with explanations on the function of the new soil with insights on the theme of <i>Mycorrizae</i> was organized for the tenants of the urban gardens adjacent to the experimental planting area. In addition, a permanent information panel in Italian and English is present on the area (public park).</p> <p>Processes behind the design and implementation of NEW SOIL has provided for the organization of a technical table dedicated to the realization which met on a periodic basis to decide how to formulate the new soil recipe, analyses the regulations related to the formulation of the request to the authorization bodies and carry out all the chemical analysis to decision support. These meetings involved representatives from both companies and research centres and from authorization bodies depending on the topics covered.</p>

Notes on major achievements/success factors/critical issues/barriers related to the engagement process (to be updated)	<p>As for stakeholders' involvements please see the description above.</p> <p>The major success factor of this implementation was the overcoming of the authorization barriers linked to the use of a by-product</p>
Current situation and next steps (to be updated)	<p>Currently the new soil has been placed in the area of interest, the plants and the grass have been planted in the new soil area and in the neighboring control area. The University of Turin has started monitoring the effects of new soil on plants and will proceed in the coming months.</p>
5. Other activities	
Synergies with other ProGReg activities	<p>NBS8: the lawn has been sown with wildflowers that can attract pollinating insects</p> <p>NBS3: pollinator garden: the new soil will be used for pollinator garden</p> <p>NBS3: orti generali: a flowerbed with new soil has been created in Orti Generali and further experiments have been carried out, financed by the Axto circular economy project</p>
Links with other external project or activity	<p>AxTO circular economy project</p> <p>SATURNO project: production of bio-fertilizers from wastes</p>
Business model (link to WP5)	<p>Still to be done</p>
Technology Readiness Level (TRL) (link to WP5)	<p>Current TRL: 5</p> <p>Among natural resources, the soil is often overlooked despite its paramount ecological role and its non-renewable nature. The scarcity of the soil resource is particularly felt in urban areas where the competition of land uses endangers its environmental quality. Previous and ongoing projects have typified urban soils, their fertility and their environmental quality. Contamination, poor chemical, physical and biological fertility and high heterogeneity are common traits of soils in urban settings. However, e.g. for the construction of new green areas within a city, a soil of good agronomical and environmental quality is required. Soil is also needed for the restoration of derelict industrial areas.</p> <p>Future TRL through proGReg implementation: 8</p> <p>The new soil concept will be investigated at its very base, in consideration of the wide variability of the materials that may compose the mixtures used as cultivation substrate. A sampling strategy will be established and laboratory and field tests will lead to the preparation of a methodology for the preparation of new soil. The methodology will be centred on the chemical, physical and agronomic quality of the materials and mixtures and will be fine-tuned and validated with the project partners using the soil.</p> <p>Guidelines to be produced will indicate the best strategy in the preparation and utilisation of a new growing medium, in view of the starting mineral and organic materials that can be employed, on the quality of the site to be restored, and on the type of plants that will grow in the area. At the end of the process, different types of new soil will be placed on the market and inserted into the public works pricelist.</p>

Communication activity (link to WP6)	<p>At the opening of the construction site a specific press release was written for this action and some articles were published in the local press. Envipark is editing specific facebook posts on the new soil issue. Videos and images of the construction site have been collected in order to make an overall film that can describe the action.</p>
6. State of Play and Monitoring	
Current situation (to be updated)	<p>Before the definition of the final mixture of materials to be used as 'New Soil', a lot of chemical characterizations have been done in order to comply with legislation standards for land application.</p> <p>In addition, several meetings with the participation of the technical team and the policy makers were dedicated to overcome the authorization procedure limitations in order to define a model for the implementation of these application in urban areas. These activities are still in progress in order to create not only a first in kind application of New Soil but also a standard procedure for exploitation of results at National and international level.</p> <p>The setup of the site was finished in February 2020.</p> <p>The most important data about the experimentation are:</p> <ul style="list-style-type: none"> ● soil composition (90% deep excavated soil with grain diameter between 0-20 mm and 10% compost ACEA) ● quantity of zeolites scattered and integrated in the first 20 cm: 100g at m2 ● materials inserted at the base of the tree clumps before planting: <ul style="list-style-type: none"> ○ 500 g of a mix of coconut fibre and hydrating polymers saturated with water. ○ 30 g per hole of hydroretention compound. ○ 50 g of Micosat (mycorrhizal consortia from CCS company) ● the sown lawn is composed of: <ul style="list-style-type: none"> ○ 90% dwarf clover ○ 10% from a mix for flowering lawn with low water demand ○ before sowing the seeds were mixed with zeolite and "micosat semi" from CCS company. ● essences used for sowing the flowering lawn: <ul style="list-style-type: none"> ○ achillea millefolium wild form ○ plantago lanceolata ○ hypericum perforatum ○ anthemis sancti johannis ○ bellis perennis ○ centaurea cyanus ○ anthyllis vulneraria ○ salvia pratense ○ leucanthemum vulgare ○ hieracium pilosella ○ papaver rhoeas ○ potentilla neumanniana ○ lotus corniculatus ○ solidago virgaurea ssp minuta ○ thymus serpyllum ○ allium schoenoprasumsatureja hortensis ○ calamintha nepeta ○ cichorium intybus ○ sanguisorba minor

	<ul style="list-style-type: none"> ○ <i>satureja hortensis</i> <p>University of Turin has carried out the soil sampling for chemical analyses (February 2020). CNR, with the help of UNITO, started the monitoring of PM10 (from June 2019) and temperature (from February 2020).</p>
Next steps (to be updated)	Botanical monitoring
Notes/critical issues/barriers (to be updated) (link to WP5)	The sign of administrative and authorization documents; several meetings with the participation of the technical team and the policy makers were dedicated to overcome the authorization procedure limitations in order to define a model for the implementation of these application in urban areas. These activities are still in progress in order to create not only a first in kind application of New soil but also a standard procedure for exploitation of results at National and international level.
7. NBS maintenance and outlook	
Maintenance	During proGReg the maintenance will be done by Dual srl, after maybe the city will carry on the maintenance.
Sustainability after project conclusion	Following the successful outcome of the trials, it is planned to produce a brand for the new soil and to include it in the public specifications for the construction of the new urban areas.
Additional resources	

3.1: Mirafiori Castle's ruins recovery and new planting



	
1. General information	
Compilation date and update	April 2020 - first release draft
NBS type	Community-based urban farming and gardening on post-industrial sites
NBS title	Mirafiori Castle's ruins recovery and new planting
Brief project synthesis	<p>Landscape transformation, through new plants and signposting, to enhance the area of historical-environmental interest (green area adjacent to the ruins of the Castle of Mirafiori and the altar inside the area of the Bela Rosin Mausoleum).</p> <p>At the end of the 16th century Carlo Emanuele I of Savoy started the construction of the Castle of Mirafiori, a residence with wonderful gardens which took part in the "crown of delights" of the Savoy dynasty. Unfortunately, it was demolished in the 19th century but some ruins continue to keep track of the palace. Comitato Mirafiori Borgata, a committee from the Mirafiori Sud neighborhood born in 1978, has worked over the years to recover the historical memory of this place and with this NBS it will be possible to carry out their work by enhancing the ruins of the castle and spreading the historical and artistic heritage.</p>
Area of implementation	<p>The area of implementation is the Sangone Park next to Bela Rosin Mausoleum</p> <p>GPS coordinates: 45.009504, 7.636714</p>
Target groups (beneficiaries)	Citizens who can discover this historical part of the Sangone Park
Timing (start and end date)	End of physical transformation: November 2020 - December 2020

Main responsible partner	Associazione Coefficiente Clorofilla
ProGlgreg partners involved	City of Turin (Green Department)
Other stakeholders involved	<p>Comitato Borgata Mirafiori</p> <p>The Mirafiori Borgata District Committee, established in 1970, is not exactly an association but a group of citizens who are passionate about our district and who dedicate time, skills and creativity to the promotion of the area and the transmission of local culture. It does so by organizing meetings and conferences, publishing articles, promoting authors and literature and maintaining a self-managed library of 3000 volumes, with free access.</p>
Total Budget	16.000 €
2. Pre-implementation activities	
Planning and preparatory activities	<p>Recovery of the ruins of the Castle of Mirafiori with the improvements of the green area of the Bela Rosin Mausoleum, was a request coming from Borgata Mirafiori Committee.</p> <p>Inspections were carried out for the interventions in the green area of the Bela Rosin Mausoleum and reformulate the expenses on the Castle area based on new engineering needs. A continuous work group of cleaning and maintenance of the Castle area was started (together with the Borgata Mirafiori Committee and the Torino Spazio Pubblico) formed by volunteers.</p> <p>The works in the area of the gardens, the Castle and the Mausoleum of Bela Rosin can be realized upon arrival of the December co-financing.</p>
Administrative procedures	The final plan for tree plantation will be proposed to the green department but is not necessary a formal act.
Technical and social analysis	
Other activities	
3. Management structure and responsibilities	
Main partner (coordinator) and role/function	<p>Associazione Coefficiente Clorofilla</p> <ul style="list-style-type: none"> - Coordination

2nd Partner and role/function	City of Turin - Project Approval
3rd Partner and role/function	Comitato Borgata Mirafiori - Citizen engagement
4. Co-design activities and stakeholder engagement	
Stakeholders, engagement processes, in co-design and co-implementation (link with WP2)	The ordinary and extraordinary maintenance works preparatory for the new set-up were defined in collaboration with Comitato Borgata.
Notes on major achievements/success factors/critical issues/barriers related to engagement process	The engagement of Comitato Borgata allowed a deep historical knowledge of the area and ensured an important contribution for the cleaning of the ruins. A possible critical issue for the future is the high average age of people of Comitato di Borgata, with the possible risk of losing the cultural heritage brought by them.
Current situation and next steps (to be updated)	
5. Other activities	
Synergies with other proGREG activities	The NBS 2 with the experimental flowerbed of regenerated soil takes place in the same green area of the Bela Rosin Mausoleum. In this way, the whole area is redeveloped through two actions of the NBS 2 and the NBS 3.
Links with other external project or activity	The City has started the redevelopment of the banks of the Sangone river and at the end of this intervention a cycle path will connect the area of the Bela Rosin Mausoleum with Piemonte Park and the neighboring parks of Stupinigi and Beinasco.
Business model (link to WP5)	
Technology Readiness Level (TRL) (link to WP5)	

Communication activity (link to WP6)	The communication of this NBS will take place through the social media channels of Orti Generali, Mirafiori Social Green and Fondazione Mirafiori.
6. State of Play and Monitoring	
Current situation (to be updated)	<p>At the moment the following interventions have been carried out in the area:</p> <ul style="list-style-type: none"> - First ordinary maintenance work near the ruins of the Castle of Mirafiori - Felling of 3 Robiniae pseudoacacia - Construction of a Narrow Road - Realization of the wooden guard rail
Next steps (to be updated)	<p>Two more grass cuts will be made in spring and autumn 2020.</p> <p>In autumn the information panel will be installed and planting will be carried out.</p>
Notes/critical issues/barriers (to be updated) (link to WP5)	
7. NBS maintenance and outlook	
Maintenance	The maintenance of the area is carried out by the volunteers of Borgata Mirafiori committee together with the City of Turin.
Sustainability after project conclusion	
Additional resources	

3.2: Gardens in Cascina Piemonte (Orti Generali)

	
1. General information	
Compilation date and update	March 2020 - first release draft
NBS type	Community-based urban farming and gardening on post-industrial sites
NBS title	Gardens in Cascina Piemonte (Orti Generali)
Brief project synthesis	<p><i>Orti Generali</i> was born with the aim of building a model of enterprise model for the transformation and management of post-industrial and metropolitan residual agricultural areas based on ecological sustainability and social equity.</p> <p>The aim is to regenerate Cascina Piemonte area, which is mostly reduced to ruins because of occupations and acts of vandalism, creating new community gardens that will pursue different goals: education, social inclusion, technological innovation, job training and integration into the labor market. 160 gardens of different charges and sizes will be realized and 330 trees will be planted. Gardens will be assigned to private citizens, families or collectives, with lower charges for people under 35 and for economically disadvantaged people. The design of these gardens goes beyond the classic model of urban gardens. In fact, it includes an area (30% of the entire site) that is meant to become a shared green space in which people can meet and socialize. Gardeners have the opportunity to partially contribute to the maintenance activities of these common spaces (i.e. trimming fruit trees, the trees of the roads, cutting the hedges and the lawns, managing the recycling bins, taking care of ordinary maintenance). The goal is to create an educational center that uses the garden as a multidisciplinary tool that promotes the spread of urban, social and civic agriculture by building networks of relationships with public and private bodies, associations, cooperatives, groups, individual people. The setting up of an educational area with an urban farm, an apiary, a greenhouse-classroom and didactic gardens will guarantee a continuous educational and training offer over time and addressed to multiple types of users.</p> <p>Thanks to its innovative and technological characteristics, <i>Orti Generali</i> won a tender published by MIUR, called <i>Smart cities and Communities and Social Innovation</i>.</p>

Area of implementation	This NBS is going to be implemented in an area of 12.000 m ² surrounding Cascina Piemonte. GPS coordinates: 45.011266, 7.627034
Target groups (beneficiaries)	The main beneficiaries of this activity are: families (also one-person households), collectives, schools of the district and disadvantaged people. However, the whole neighborhood will benefit from this project thanks to the re-enhancement of the land, the courses provided by the centre and the reinforcement of social bonds.
Timing (start and end date)	Implementation phase Start: February 2019 End: November 2019
Main responsible partner	Associazione "Coefficiente Clorofilla" e-mail address: ortigenerali@gmail.com
ProGlg partners involved	<ul style="list-style-type: none"> • Fondazione Mirafiori • University of Turin (Department of Life Sciences and Systems Biology, DBios and Department of Agricultural, Forest and Food Sciences, DISAFA)
Other stakeholders involved	<ul style="list-style-type: none"> • Miur (Ministry of Education, University and Research). It supported the start-up phase • Compagnia di San Paolo. It supports physical transformations of the area. • IREN SpA. It supports the energy requalification of Cascina Piemonte • PON Metro (City of Turin). It supported the social inclusion and voluntary activities
Total Budget	ProGlg Partners funds: 61.500 € Other funds: - 45.000 € MIUR - 155.000 € Compagnia di San Paolo - 18.000 € IREN - 8.000 € PON Metro (City of Turin) Total budget of the implementation: 287.500 €
2. Pre-implementation activities	

Planning and preparatory activities	The design of Orti Generali comes from a project of research-action called MiraOrti. This project of 4 years worked in the district of Mirafiori Sud for a social survey and a local entertainment for accompanying urban-environmental transformation of the areas along the banks of the Sangone river that have an agricultural vocation. Inclusive decisional programs have been activated for planning the territory by involving institutions, gardeners, students from neighborhood schools and their parents in plenary discussions and educational activities especially focused in vegetable gardens. This research showed the interest of a significant and diversified citizenship towards urban vegetable gardens and also the desire to support them with common areas that involve leisure, cultural and educational activities.
Administrative procedures	As the funds used for the implementation of this NBS come from European projects (Horizon 2020), these funds have been transferred at first to the City of Turin and, then, to the partners involved according to their necessities. All these phases have been accounted.
Technical and social analysis	Planning and preparatory activities: in addition to the social analysis made during the project MiraOrti, some physical-chemical analysis of the soil was made to ensure the absence of high metals or other pollutants in the area.
Other activities	<ul style="list-style-type: none"> • Fundraising to get the economic resources for physical transformations • Involvement of citizens in the work of cleaning and requalification of the area
3. Management structure and responsibilities	
Main partner (coordinator) and role/function	<p>Associazione Culturale "Coefficiente Clorofilla"</p> <p>The association has designed the whole activity in its entirety, taking charge of the pre-implementation and implementation phases. They are the main partner involved, as they currently manage the social gardens area and the courses and workshops linked to them. they will guarantee the continuity of this NBS over time.</p>
2nd Partner and role/function	<p>Fondazione Mirafiori</p> <p>It supports the project sharing with the association its office and acting as facilitator in relations with institutions.</p>
3rd Partner and role/function	<p>UNITO (DBios e DISAFA). The Department DISAFA is the responsible of the environmental monitoring in the area and collaborate with the association for the experimentation and divulgation of the new soil concept; The Department DBios monitored the pollinators in the area and has supported the association in the choice and planting of trees and shrub species.</p>

4. Co-design activities and stakeholder engagement

Stakeholders, engagement processes, in co-design and co-implementation (link with WP2)

Co-design in planning and preparatory activities

Orti Generali is the result of a four-year period of participatory planning that has involved schools, associations, gardeners and citizens of Mirafiori (Mira Orti) and discussion in focus groups with Borgata Mirafiori and the Environment Department of the Municipality.

Co-implementation and maintenance:

Having the possibility to grow their own vegetables and fruits, gardeners will benefit from their own food production and, possibly, they will cooperate to maintain Orti Generali, thus strengthening their civic engagement. Interestingly, gardeners do not come exclusively from Mirafiori Sud district but from other parts of Turin as well. The differentiated charges system is meant to ensure the possibility of access to those who are economically disadvantaged. More specifically, 15 gardens are exclusively given in solidarity to people who live in severe poor conditions and can devote some of their time in volunteering in return. Other 25 gardens are reserved to citizens under the age of 35, thus promoting farming activities among younger generations. Gardeners, and also all the citizens interested in, can benefit from training courses about organic agriculture, permaculture, pruning, composting and also about collateral activities linked to the environmental theme such as apiculture, painting with dyeing plants, food preservation. Associations and cooperatives find in Orti Generali a place where they can benefit from the positive feedback from disadvantaged people to do horticultural activities and in relating with farmyard animals. University students find in Orti Generali a place where they can develop their research on urban agriculture and trainees from gardening courses can apply the notions learned during the training course.

All the stakeholders are engaged in different ways:


- volunteers and solidarity gardeners are engaged in the maintenance of the common spaces and the management and cultivation of the collective gardens, and are also involved in plenary meetings to facilitate team building and plan activities together;
- the staff of the association provides constant support to cultivation for those who need it;
- events are periodically organized to gather all the gardeners and encourage relations and community making;
- communication in social networks, the publication of videos and photos, the drafting of articles concerning Orti Generali create a sense of belonging among gardeners.

<p>Notes on major achievements/success factors/critical issues/barriers (to be updated) (link to WP5)</p>	<p>Stakeholders involved:</p> <ul style="list-style-type: none"> • Gardeners of 160 allotments. They are the major contribution to the economical sustainability of the project and the first responsible for the development of the community. • Disadvantaged people from SERD and Consorzio Abele Lavoro, immigrants from Casa del Mondo and people with physical disabilities of “Il Punto scs”. They allow the pursuit of social inclusion as one of the objectives of Orti Generali. • UNITO (DBios and DISAFA). It allows the pursuit of technological innovation and research as one of the objectives of Orti Generali. • Fondazione Mirafiori. It helps the association in establishing relationships with associations, cooperatives and institutions. • Compagnia di San Paolo. It provides economic support to the association before achieving the economic sustainability of the project. • Volunteers and social gardeners. They widely contribute to the management of the common spaces. <p>Major achievements:</p> <ul style="list-style-type: none"> • Creation of a community in a former abandoned area that has been regenerated. • Gardeners involved in the project come from different districts of Turin, thus bringing attention to an area that is usually underrated. • 160 allotments assigned in 4 months and a waiting list of 60 people. <p>Critical issues/barriers:</p> <ul style="list-style-type: none"> • Long timeline and high costs of the Italian bureaucracy to obtain authorizations and permissions. • Small theft prolonged over time (work tools, gas cylinder, coffee, dishes...)
<p>Current situation and next steps related to engagement process (to be updated)</p>	<ul style="list-style-type: none"> • In 4 months (March-June 2019) all the 160 allotments were assigned. • 330 trees of ancient local species of apple and pear, mulberry, and salix purpurea. • Construction of the water well, the irrigation system and three greenhouses (classroom-greenhouse, seedbed and tropical greenhouse).. • Installation in the area of sensors for environmental monitoring by CNR (PM10, PM2.5, Ozone, NOx, Temperature, Humidity, Pressure). • Monitoring of lepidoptera by DBios. • 800 kg of vegetables produced by volunteers and social gardeners in the collective garden and donated to the project “Mirafiori Zero waste” for people in economical difficulty. • Redevelopment of Cascina Piemonte. • 8 classrooms from schools of the district involved in educational activities. • Activation of 6 courses. <p>Next steps:</p> <ul style="list-style-type: none"> • Kiosk inauguration. • Increase in the educational offer.

	<ul style="list-style-type: none"> • New collaboration with Il Punto SCS involving people with motor disabilities in the preparation of seedlings of transplant plants. • Setting up of a pollinators garden with citizen science activities in collaboration with Farfalle in Tour.
5. Other activities	
Synergies with other proGInreg activities	<ul style="list-style-type: none"> • Links with the activities of "Citizen science and social inclusion of the mentally disabled (NBS8) with UNITO • Links with the activity "Methodologies and variables for NBS monitoring and evaluation" (WP4) with UNITO • Link with the activity "Spatial analysis and analysis WP2.1 framework"
Links with other external project or activity	<ul style="list-style-type: none"> • Collaboration with SERD and Consorzio Abele. • "Biodiversity Turin for pollinators" project for monitoring and conservation of pollinators in Piemonte Park in collaboration with DBios with CRT funding. • "Un chiosco per Orti Generali" project of energy upgrading of Cascina Piemonte with IREN funding.
Business model (link to WP5)	<p>Gardens' costs:</p> <ul style="list-style-type: none"> • 120 Standard gardens: 50m² - 25€/month; 75m² - 35€/month; 100m² - 45€/month. • 25 Gardens Under 35: 50m² - 15€/month; 75m² - 20€/month; 100m² - 30€/month. • 15 Social Gardens: 50m² - 5€/month; 100m² - 10€/month.
Technology Readiness Level (TRL) (link to WP5)	<p>The NBS 3 is supposed to reach the TRL nr. 9, starting from the level 7.</p> <p>The association contributes to achieve this goal playing the role of mediator between citizens and the Municipality. It takes care of the involvement in the project of a large public of around 400 people, it draws up documentation to ensure the legality and environmental safety of the horticultural activity and manage the business plan which is supposed to reach the economic sustainability in 3 years.</p>
Communication activity (link to WP6)	<p>From February 2019 the communication activities focused in the creation of a community into social networks and the diffusion of information through DEM and press office. Facebook channel has reached 1600 followers and Instagram channel with the hashtag #ortigenerali has reached 650 followers and 270 posts. In 2019 the press release had 40 articles and the website www.ortigenerali.it had 400 monthly visitors. At the moment there are over 500 people subscribed to the newsletter.</p>
6. State of Play and Monitoring	

Current situation (to be updated)	<ul style="list-style-type: none"> • The widening of the areas destined to the gardens has been monitored since June 2018 • Road access to the farm had been improved, working activities were concluded in March 2019 • Disadvantaged people and students have been involved in the care and implementation of gardens, from July 2019 to December 2019 • By the 23th of June 2019, all gardens have been assigned. • By the end of November/beginning of December 2019, the hedges and all the 330 trees have been planted.
Next steps (to be updated)	
Notes/critical issues/barriers (to be updated) (link to WP5)	<ul style="list-style-type: none"> • Cascina Piemonte building is severely damaged because of vandalism and occupations. There is the necessity to adopt measures for securing the site, external proGireg funds will be use if necessary. • Ministerial restrictions due to the containment of the infection from Covid-19 have forbidden the access of gardeners at Orti Generali. This obstacle has been overcome activating the “telecoltivazione”, a remote cultivation activity made by the workers of the association that let the gardeners to not lose the annual harvest.
7. NBS maintenance and outlook	
Maintenance	<p>The association Coefficiente Clorofilla will continue to maintain and manage the area even after the end of proGireg.</p> <p>The goal of the association Coefficiente Clorofilla is to reach as soon as possible the economic sustainability of the project Orti Generali offering a wide range of services to citizens by diversifying activities and thus managing to cover management and personnel costs.</p>
Sustainability after project conclusion	<p>The goal of Associazione Clorofilla is to make the reality of the gardens self-sufficient thanks to the revenues deriving from the monthly rents and all the other collateral activities (kiosk, educational activities, courses).</p> <p>The association is in continuous dialogue with the environment department of the City of Turin discussing together possible future scenarios for the implementation of Orti Generali that would be useful for its economic sustainability.</p>
Additional resources	<p>https://www.ortigenerali.it/</p> <p>https://www.instagram.com/ortigenerali/</p> <p>https://www.facebook.com/ortigenerali/</p> <p>Orti Generali (Youtube channel)</p>

3.3: Pollinator friendly gardens (WOW)

	<div> <p>ortowow</p> </div> <div> <p>Cassoni con piante da orto e mellifere, VOV102, Via Onorato Vigliani 102, Torino</p> </div> <div> </div> <div> <p>COSA POSSIAMO FARE INSIEME:</p> <ul style="list-style-type: none"> • Co-progettazione della distribuzione dei 15/18 cassoni dell'orto wow; • Laboratorio di consociazioni; • Piantumazione degli ortaggi e piante mellifere scelte; • Laboratori di cura dell'orto wow, co-progettato e co-costruito. </div> <div> </div>
<h4>1. General information</h4>	
Compilation date and update	April 2020 - First draft release
NBS type	Community-based urban farming and gardening on post-industrial sites
NBS title	ORTO WOW - A pollinator friendly garden
Brief project synthesis	<p>As NBS3 Orto WOW is designed to address to topic of ecological corridors in Mirafiori South, as being the living lab area for proGReg. The main needs are:</p> <ul style="list-style-type: none"> - to recover an abandoned and underutilized former industrial lot and to return it for public use; - to favor the transition of pollinating insects, following the directions of the ecological corridors identified by proGReg; - to activate local inhabitants in taking care of the new green installations, by stimulating them through citizens-science activities; - to favor a collaborative setting of different stakeholders, in order to guarantee the sustainability of the intervention in the future. <p>Orto wow will be made in the courtyard of the VOV102, abandoned space that periodically hosts a Coldiretti market. Orto wow is composed of a number of 15/18 of garden boxes with aromatic plants and other melliferous plants. The distribution of the boxes in the courtyard will be defined in accordance with Coldiretti, in order to do not hinder the operations of the market. Moreover, the idea is to create a sort of "green square", by displacing the boxes so as to facilitate the organization in the courtyard of public activities open to all (such as educational activities, public talks, convivial activities, etc..). The idea is to collaborate with a number of local NGOs in order to make Orto WOW a lively and vibrant green area open to the public and managed by inhabitants of the surroundings. Main partners of the project are: Fondazione di Comunità Mirafiori, as the main local actor able to involve citizens in local development projects and Coldiretti, which will also participate in organizing educational activities for the people and will support the daily management of the garden boxes.</p>

Area of implementation	<p>At the address of via Onorato Vigliani 102, there is a public building currently unused inside and waiting for a future destination. The building has been the seat of the National Agricultural Mechanical Centre since 1951. Later it was instead the seat of a social housing and for some years now it has been in a state of abandonment.</p> <p>Nowadays the courtyard is instead periodically used by Coldiretti, for markets of local producers.</p> <p>The area borders to the south with the Colonnetti Park, identifying itself as a suitable place for the placement of hives. While the garden boxes will be placed in the area in front of the entrance, closer to the public part of the courtyard.</p> <p>GPS coordinates: 45.017254, 7.644881</p>
Target groups (beneficiaries)	<p>The main beneficiaries of this intervention are local inhabitants, and in particular people who live in the surroundings, which have been historically interested in having access to the open area of VOV 102. Our beneficiaries will thus be probably families and elderly people.</p>
Timing (start and end date)	<p>The construction site was started in February 2020 but was blocked by Covid-19 lockdown. In 2020 the construction site will be finished. Probably all activities with citizens will be carried out in spring 2021.</p>
Main responsible partner	<p>Orti Alti: Elena Carmagnani - elena.carmagnani@ortialti.com and Emanuela Saporito - emanuela.saporito@ortialti.com</p>
ProGlg partners involved	<ul style="list-style-type: none"> • Heritage Management Department, City of Turin • Fondazione di Comunità Mirafiori • University of Turin (Department of Life Sciences and Systems Biology, DBios and Department of Agricultural, Forest and Food Sciences, DISAFA)
Other stakeholders involved	<ul style="list-style-type: none"> • Coldiretti (the national association of farmers) to support the management of the garden boxes and keep the area open to the public in the future • Associazione Parco del Nobile (Beekeepers - operative partner)
Total Budget	<p>Construction costs: 7.500 €</p>
2. Pre-implementation activities	

Planning and preparatory activities	<p>The identification of the area was due to the Spatial Analysis phase, which indicate the VOV 102 site as an interesting area where to test such NBS, both for its environmental and social meanings. In fact, the site is located at the entrance of Colonnetti Park, on the border with the residential area of the neighbourhood: a perfect spot where to implement solutions aimed at reconnecting ecological corridors (detected and planned after the analysis) and bring nature inside the urban area. From a social point of view, this site was also identified by the local community as an urban common, as a demonstration that there was the citizens interest in recovering the green area and reusing, at least part, of the building for community purposes.</p> <p>In the planning phase, OrtiAlti, as responsible of the realization of NBS 3, in collaboration with the City of Turin, have identified Fondazione di comunità mirafiori, as the main stakeholder and main allied in co-designing activities for community engagement. Furthermore, among other stakeholders, there were involved since the planning activity Coldiretti and Parco del Nobile, to the preparatory activity about the apiary installation (e.c.cleaning the green area where to locate the beehives).</p> <p>The planning phase was impacted by the change of design of the green roof (the budget is the same for both actions) and it changed the number of wood boxes and also the shape. At the end, the wood box project was proposed by OrtiAlti collaborators in order to spend less money and to reuse wood axes from other construction site. In that way also, the circular economy issue was insert like planning element.</p> <p>As preparatory activity, we have also implemented some infrastructural interventions (as the water access on the courtyard) in order to prepare the site for the garden boxes.</p>
Administrative procedures	<p>In order to use the open area of the VOV 102 it was necessary to involve many public sectors of the local Municipality, especially the Public Building sector, in order to obtain a pre-assessment and the final resolution of the city council.</p> <p>Afterwards, an agreement has been signed between the Municipality and OrtiAlti, to have permission for initiate the worksites, and a report for the key's delivery to the property.</p> <p>We are working on the Pact of collaboration, as the management tool, to be signed between the community actors who will take care of the NBS and the City of Turin.</p>
Technical and social analysis	<p>As technical analysis, as OrtiAlti we have verified the possibility to use the new soil for growing the plants identified for the pollinator garden. We have finally decided to use it in the boxes where melliferous plants will be planted, and not the edible ones. Moreover, in collaboration with UNITO we have selected which plants will be grown in the boxes, in order to attract pollinators.</p> <p>As preparatory activity, we have also implemented some infrastructural interventions (as the water access on the courtyard) in order to prepare the site for the garden boxes.</p> <p>In terms of social analysis, we, as OrtiAlti, has carried out a preliminary stakeholder assessment, together with Fondazione di Comunità Mirafiori, in order to understand the needs of the local communities (are there citizens interested in taking care of the garden boxes? are these citizens interested in using the green areas of VOV 102? For which purpose?)</p>
Other activities	<p>In order to keep the construction costs low, we will use some recycled materials (e.g. the wooden boards used to build the garden boxes are taken from the green roof construction site [NBS5], and part of the soil used will be new soil [NBS2])</p>

3. Management structure and responsibilities	
Main partner (coordinator) and role/function	OrtiAlti <ul style="list-style-type: none"> - coordination - design - construction - community engagement - pact of collaboration coordinator
2nd Partner and role/function	City of Turin (administrative partner) <ul style="list-style-type: none"> - owner of the building - administrative permissions - mediator
3rd Partner and role/function	Fondazione di Comunità Mirafiori (operative partner) <ul style="list-style-type: none"> - community engagement activity - site management activity
4rd Partner and role/function	Associazione Parco del Nobile (operative partner) <ul style="list-style-type: none"> - plant growing consulting - educational activity for citizens
5rd Partner and role/function	Coldiretti (operative partner) <ul style="list-style-type: none"> - collaboration in the taking care of the boxes - educational activities for citizens
6rd Partner and role/function	University of Turin (technical and communication partner) <ul style="list-style-type: none"> - citizens and science activities - selection of the plants
4. Co-design activities and stakeholder engagement	

Stakeholders, engagement processes, in co-design and co-implementation (link with WP2)	<p>The stakeholder engagement process was blocked by Covid-19. The plan is to organise an activation plan for citizens, a number of meetings for animating the space of VOV 102 and make citizens interested in the event taking place there. These public meetings will be about communication, animation and education activities on the main topics of the proGReg project and will be organized every Friday afternoons, for at least 6 weeks (each Friday will involve a different stakeholder, involved in the NBS) and will take place during the farmer market of Coldiretti. This process of community engagement will be organized together with Fondazione Mirafiori, Coldiretti, UNITO, Associazione Parco del Nobile and other informal groups (such as the “metropolitan pollinators network”) and will be anticipated by a communication plan.</p> <p>Moreover, some co-design activities were organized in order to decide the layout of the garden boxes, especially by involving Coldiretti, as the main actor using the space for the local produce market. Another co-design activity coincides with the collaboration in writing the collaboration pact for the management of the NBS.</p>
Notes on major achievements/success factors/critical issues/barriers related to engagement process	<p>The most critical aspect is due to the Covid-19 emergency situation. However, as a main result, we managed to gather a number of local stakeholders, which will be involved at different stages of the implementation and management phases of the NBS 3. Among the others, already listed in this fiche, we had also included the informal network of “metropolitan pollinators”, a group of experts in urban beekeeping and biodiversity, that will be part of the management group, concerned with the functioning of the all VOV 102 external area, comprising the NBS3, but also 8 and 5. In order to do not lose the time waiting for better conditions related to the sanitary emergency, we decided to anticipate some co-design activities, which need more time to be fully developed, such as the drafting of the Pact of Collaboration.</p>
Current situation and next steps (to be updated)	<p>Results:</p> <ul style="list-style-type: none"> - stakeholder engagement, in particular of Fondazione di Comunità Mirafiori (as main local actor able to facilitate citizens participation in future); Coldiretti, as main guardian of the space - community engagement methodological definition (from communication plan, to an animation plan of the space, organization of training activities for the management group, and the initiation of a Pact for collaboration) <p>Next Steps:</p> <ul style="list-style-type: none"> - scheduling and implementation of the community engagement plan
5. Other activities	
Synergies with other proGReg activities	<p>This NBS3 is related with many other NBS most of all NBS5 and NBS8. The species selected to be planted in the boxes are, in fact, related to the apiary, located in the same complex, which will produce the urban garden honeydew. The selection of the plants has been made in collaboration with UNITO and the Agriculture Department and the Life Sciences and Systems Biology Department. This operation allows to activate city ecological corridors, in connection with the Colonnetti Park, which is exactly bordering with the VOV 102 area.</p> <p>The new soil from NBS 2 will be used to fill wood boxes. Plants into wood boxes will be pollinator friendly in connection with NBS8 and NBS5.</p>

Links with other external project or activity	Since the VOV102 area hosts different proGReg NBS, the idea is, moreover, to create a connection in the management and valorization of all the interventions, creating a collaborative group, which will accompany the involvement of local inhabitants, and will support the re-use of the open area and, luckily, also the future re-use of the abandoned building. Together with Fondazione Mirafiori, Coldiretti and OrtiAlti (as coordinator), the group also involves Associazione Parco del Nobile (for the management of the apiary) and la Rete degli Impollinatori Metropolitani (the Network of the Metropolitan Pollinators), an informal group of experts in beekeeping, pollinating insects and urban biodiversity.
Business model (link to WP5)	
Technology Readiness Level (TRL) (link to WP5)	
Communication activity (link to WP6)	A communication and animation plan for inviting local people to take part to the use of this space, has been drafted (even if because of Covid-19 most of the activities will take place in Spring 2021). OrtiAlti posts on Facebook different phases of the construction site, the local press wrote a lot in March (before Covid-19 lockdown) about the green roof and the pollinator friendly garden.
6. State of Play and Monitoring	
Current situation (to be updated)	May 2020: realization of the garden boxes, placing of the gardens on site and planning
Next steps (to be updated)	May - December 2020: drafting of the collaboration pact and bureaucratic steps Spring 2021: community engagement process Spring 2021: training activities to the management group
Notes/critical issues/barriers (to be updated) (link to WP5)	<i>See Section 4 "Co-design activities and stakeholder engagement"</i>
7. NBS maintenance and outlook	
Maintenance	It will be important to identify the citizen group who can carry out the maintenance of the pollinator friendly garden. Another co-design activity coincides with the collaboration in writing the collaboration pact for the management of the NBS.

Sustainability after project conclusion	The sign of the collaboration pact for the management of the NBS will ensure the sustainability of the NBS after the project.
Additional resources	www.ortialti.com http://www.ortialti.com/2017/04/20/or-to-il-nuovo-orto-di-eataly-lingotto/ http://www.ortialti.com/2018/07/06/giardino-incredibile-lorto-dei-viali-2/ http://www.ortialti.com/2011/04/14/orto-fai-da-noi-2

3. 4: Didactic gardens in schools



1. General information

Compilation date and update

May 2020, first release

NBS type

Community-based urban farming and gardening on post-industrial sites

NBS title

Didactic gardens in schools

Brief project synthesis

The schools in South Mirafiori district are suffering a decrease in the number of students; the families with more opportunities tend to enroll their children in schools more near to the city centre. A consequence is that in Mirafiori school there is a higher percentage of children coming from families that struggle economically and socially. Fondazione della Comunità di Mirafiori, since its establishment, has cooperated with the schools in order to tackle this challenge.

By establishing vegetable gardens in all the primary schools of Mirafiori, plus two kindergarten and one vocational school, and providing educational activities focusing on the themes of sustainable agriculture, biodiversity and the NBS of proGReg, we aim at improving the science curriculum of the schools, increase their attractiveness and raise awareness of environmental sustainability, NBS and how they can improve life quality in the cities.

To do so, we began our planning by meeting the schools' principals and the teachers, then we organized co-design workshops involving teachers, non-teacher staff, pupils and their families. During the co-design workshop both the practical set-up of the gardens and issues related with the maintenance of the gardens and the activities to be organized in them have been addressed.

Seven school gardens have been installed and one more will be installed after the end of the Covid-19 lockdown of schools, for a total of eight. Three types of wooden boxes have been used, two on the floor (the smaller ones 60x80x40 cm, the larger 120x80x40 cm) and one raised, that allows people on wheelchair to access them.

The educational activities will cover 3 full schoolyears (originally planned: 2018/19, 2019/20, 2020/21, extended to part of the 2021/2022 year due to the Covid-19 lockdown).

The educational activities involve pupils and teachers, while the pupils' families will be involved in events and in the maintenance of the NBS.

The benefits of school gardens are many and well assessed in scientific literature: improvement in achievements scores in science, increase in focus, patience, teamwork and social skills, tendency to make healthier food choices, increase of environmental awareness. Our boxes have been placed on concrete pavements, thus increasing the green spaces in schoolyards, with benefits in terms of reduction of the heat island effect and water runoff.

Area of implementation	<p>In South Mirafiori neighborhood there are two “<i>Istituti Comprensivi</i>”, state educational institutes that include primary and intermediate schools, I.C. Cairoli and I.C. Salvemini.</p> <p>The schools of the two institutes are spread across the whole neighborhood; the proGReg container gardens are placed in the five primary schools of the two institutes, in one kindergarten of Cairoli Institute, in a municipal kindergarten and in a vocational school.</p>
Target groups (beneficiaries)	<p>Pupils, teachers and families of the pupils of the aforementioned schools.</p> <p>In ENGIM vocational school, the garden is dedicated to students with special education needs.</p>
Timing (start and end date)	<p>Educational activities: November 2018 - April 2022</p> <p>Implementation of the container gardens: April 2019 - September 2020</p>
Main responsible partner	<p>Fondazione della Comunità di Mirafiori,</p> <p>contact person: Vittorio Bianco - v.bianco@fondazionemirafiori.it</p>

ProGReg partners involved	<p>Linked Third Party Miravolante for the implementation and maintenance of the gardens</p> <p>UNITO (DBios) and “Farfalle in TOur” group for the integration in the educational program of activities regarding butterflies.</p>
Other stakeholders involved	<p>I.C. Salvemini, I.C. Cairoli, ENGIM San Luca, Polo dell’Infanzia - Municipal kindergarten</p>
Total Budget	<p>81.000 €</p>

2. Pre-implementation activities



Planning and preparatory activities	<p>The plans have been discussed with the school's managers and the teacher concerned.</p> <p>On-site inspections have been conducted in all schools, in order to identify the sites suitable for the implementation of the school gardens.</p> <p>Further planning and preparatory activities have been conducted through the co-design workshops (see below).</p>
Administrative procedures	<p>Being implemented in the schools' premises, this NBS implementation has required the approval by the school managers and by the school's board, to which the preliminary project has been proposed.</p>

Technical and social analysis	<p>The choice of the NBS and of the approach and methodology for its implementation, has been based upon the in-depth knowledge of the schools and their context, and has been discussed during the meetings of the “Osservatorio d’Area”, a monthly meeting that involves the schools of the neighborhood, the district’s administration and non-for-profit organisations cooperating with the schools, among which Fondazione Mirafiori.</p> <p>The technology (i.e. container gardening) has been chosen in order to avoid possible risks related to the soil contamination. Different kinds of boxes available on the market have been taken in consideration, and the most suitable and cost-effective have been proposed to the stakeholders during the codesign activities.</p>
Other activities	All other pre-implementation activities have been conducted through co-design workshops.
3. Management structure and responsibilities	
Main partner (coordinator) and role/function	Fondazione della Comunità di Mirafiori
2nd Partner and role/function	Associazione Miravolante (Linked Third Party): support in the implementation and maintenance of the container gardens.
3rd Partner and role/function	City of Turin: coordination of this NBS with other proGIreg NBS involving the schools.
4. Co-design activities and stakeholder engagement	
Stakeholders, engagement processes, in co-design and co-implementation (link with WP2)	<p>Main stakeholders engaged:</p> <ul style="list-style-type: none"> - teachers; - pupils and their families (parents, grand-parents); - non teaching staff. <p>For each school garden, it was held first a meeting with the teachers concerned, and then, with the help of the teachers, a co-design workshop has been organised, in which the different aspects of the NBS implementation and maintenance have been discussed: number and dimensions of the containers, positioning of the boxes in the school premises, types of vegetables to be cultivated, involvement of families in the management of the gardens.</p> <p>Accordingly, to the outcomes of the co-design workshops, the school container gardens have been installed together with the pupils, their families, or both.</p> <p>The educational activities have been planned together with the teachers at the beginning of each school year and tailored to the needs of each class.</p> <p>For ENGIM vocational school the process has been slightly different, as the garden is part of the activities aimed at the students with special needs: the garden has been designed together with the school manager and the support teachers, and has been implemented together with students with mental disabilities.</p>
Notes on major achievements/success factors/critical issues/barriers	<p>Teachers reacted positively to the proposal of school container gardens, their response in terms of engagement has been very good, and for the second school year the number of classes asking to participate in the project was too high to satisfy all requests.</p> <p>Non-teaching staff also was keen to be engaged and cooperates in the maintenance of the</p>

related to engagement process	<p>gardens.</p> <p>Parents and grand-parents participating in co-design workshops also expressed positive comments on the project and gave their availability to participate in the maintenance of the gardens. Their involvement was planned for the spring-summer of 2020 but the Covid-19 pandemics forced the interruption of the activities. The real engagement of families in the maintenance of the NBS will have to be assessed in the next school year.</p>
Current situation and next steps (to be updated)	<p>The co-design workshops have been held in all the schools. All but one of the school container gardens have been installed, the last one being the one of the Polo dell'Infanzia kindergarten whose implementation was scheduled for March 2020 but had to be postponed due to the Covid-19 pandemic.</p> <p>A crucial step will be the involvement of stakeholders in the gardens' maintenance during the summer months, which was scheduled for the summer 2020 but has been rescheduled for summer 2021 due to the Covid-19 pandemic.</p>
5. Other activities	
Synergies with other proGReg activities	<p>School gardens and the educational activities that are organized in the frame of this NBS have many potential links with other NBS, as they are designed to introduce to pupils' basic concepts of the proGReg project (biodiversity, the importance of soil, biogeochemical cycles...). At the moment, the main link is with NBS 8, with activities designed together with the University of Turin in order to help pupils learn concepts related to butterflies, their life cycle, their ecological importance.</p>
Links with other external project or activity	<p>School gardens activities are coordinated with those of <i>Batti il 5</i>, a national project of which Fondazione Mirafiori is partner, and which offers to the schools among others, a program aimed at improving their curriculum in STEM subjects.</p>
Business model (link to WP5)	<p>A proper business model has not yet been designed, also because this NBS is not very market-oriented. However, during the co-design workshops ways to raise funds for the school's gardens have been discussed, which include small fund-raising events for collecting offers in exchange of the vegetable gardens products.</p>
Technology Readiness Level (TRL) (link to WP5)	<p><i>Starting TRL 7 - TRL to be achieved at the end of the project: 9</i></p>
Communication activity (link to WP6)	<p>Part of the communication activity for this NBS involved direct contact with the teachers. The families of the pupils directly involved in the NBS have been reached through the teachers and with the co-design workshops.</p> <p>A wider public has been reached through the participation in local events hosted by the schools, namely the "PrimaVera Festa" (May 18th, 2019), an yearly event during which the schools of the neighborhood and the organisations that cooperate with them present their activities to families and citizens, and the "Feste della Partecipazione", a series of events held between the end of September and the first half of October 2019 by the primary and intermediate schools of the neighborhood to promote the participation of families to the schools' life. In each of these event Fondazione della Comunità di Mirafiori have organized gardening workshops for the kids.</p> <p>The educational activities have been promoted through the publication of a leaflet with the different activities organized by Fondazione Mirafiori and partners for the schools of the</p>

	<p>neighborhood, with dedicated pages to proGReg activities and <i>Batti il 5</i> activities respectively. All these events and the activities of the school gardens have also been communicated through the Facebook page of Fondazione Mirafiori, https://www.facebook.com/fondazionemirafiori/</p>
6. State of Play and Monitoring	
Current situation (to be updated)	<p>As stated above (section 4), all co-design workshops have been held and all but one school container gardens have been installed.</p> <p>The educational activities started in school year 2018/2019 and the second year activities were being conducted when the schools were shut down at the end of February 2020.</p> <p>At the moment all the activities are suspended, and we plan to shift them of one year, thus including the school year 2021/2022.</p>
Next steps (to be updated)	<p>The activities for school year 2020/2021, as well as the implementation of the school garden of "Polo dell'Infanzia" kindergarden, will have to be planned together with the teachers as soon as it will be made clear by the authorities how the school activities will take place to comply with the Covid-19 measures.</p>
Notes/critical issues/barriers (to be updated) (link to WP5)	<p>The most critical issue at the moment is the Covid-19 epidemic and the related shut down of schools. Given the specific nature of the educational activities related with the school gardens, it has been decided not to convert the activities into online courses, as it would seriously reduce their impact. Instead, it has been decided to postpone them, adding a new school year. In case of a new, prolonged shut down, it will be necessary to adapt the activities to distance learning.</p> <p>Another issue is the maintenance of the school gardens during the summer, when the schools are closed. During the first summer the maintenance has been conducted by Fondazione Mirafiori staff with the cooperation of non-teaching staff; the plan is to involve more the families of the pupils in the next years, but the right balance between the desire to engage more people and the necessity of clearly identify a limited number of persons authorized to access the school premises has to be achieved.</p>
7. NBS maintenance and outlook	
Maintenance	<p>During the progress of proGReg, Fondazione Mirafiori staff will gradually hand over the maintenance of the gardens to teachers, non-teaching staff and families. We plan to form a group of volunteers and accompany them towards a sustainable management of the gardens.</p>
Sustainability after project conclusion	<p>The school container gardens and the educational activities linked to them are part of Fondazione Mirafiori strategy and continuous effort to support the schools of the neighborhood.</p> <p>The goal is to give to the schools the instruments to autonomously manage the project, but Fondazione Mirafiori will support them after the conclusion of proGReg if needed.</p>
Additional resources	<p>https://www.facebook.com/fondazionemirafiori/</p> <p>Further documentation has not been published but is available upon request.</p>

3.5: Micro vegetable gardens (OrtoMobile)

	
1. General information	
Compilation date and update	April 2020 - first release draft.
NBS type	Community-based urban farming and gardening on post-industrial sites
NBS title	"OrtoMobile" - Micro vegetable gardens in box
Brief project synthesis	<p>The urban laboratory "OrtoMobile" promote by ITER - City of Turin that has as its common thread " micro garden in box" interpreted as a unit minimum of "Natural Based Solution" easy to implement for all ages, with high degrees of socialization, both in the classroom and at home, with considerable potential for composition that enables the realization of simple and effective installations of indoor and outdoor areas in the schools.</p> <p>The action provides:</p> <ul style="list-style-type: none"> • The realization of a practical course for teachers to learn how to make a "vegetable garden in a box" • The supply to the classes by the ITER LabCS of a kit composed of: suitable cassettes to the realization of the individual modules of "micro gardens", seeds (with particular attention to those suitable for pollination), potting soil, small tools, garden care manual. • The organization by ITER's LabCS of events for the composition of the set-ups inside schoolyards and/or on public space of formed "collective gardens" by assembling the different modules of "micro vegetable garden", designing formal compositions and different colors depending on the creativity expressed and the places adopted. One of the objectives is to create small ecological corridors to facilitate the processes of pollination. • At the end of the events and the setup period will be organized on space the "OrtoMobile Marketplace", which will also collect schools that have developed the experience of caisson gardens with the aim of promoting the activity realized in proGireg and to raise small funds to support the "OrtoMobile" project.

Area of implementation	<p>Scuole dell'Infanzia:</p> <ul style="list-style-type: none"> • Circolo Didattico 33, Mirafiori Nord, • Circolo Didattico 33, Elvira Pajetta, • Circolo Didattico 33, Cento fiori, • I.C. "A. Cairoli", La Giostra, • I.C. "G. Salvemini", Mariele Ventre • I.C. "G. Salvemini", Str. Castello Di Mirafiori • Privata Paritaria, Margherita Mirafiori, • Scuole Primarie: • C.D. "Carlo Collodi • Scuola Engim
Target groups (beneficiaries)	<p>The first beneficiaries are: teachers and students from primary and secondary schools. Moreover, it involves students with disabilities from a vocational school.</p> <p>Indirect beneficiaries are: households involved by students in activities both in schools and at home, dwellers who will take part in outdoor public markets set up by schools and cultural and educative stakeholders from the local community.</p>
Timing (start and end date)	<p>Start: October 2019</p> <p>Stopped by Covid-19: March 2020</p> <p>End: June 2021 (estimated after Covid-19 emergency)</p>
Main responsible partner	ITER - Institution for a Reliable Education (City of Turin)
ProGReg partners involved	Fondazione Mirafiori
Other stakeholders involved	<ul style="list-style-type: none"> • Circolo Didattico 33 • I.C. "A. Cairoli • I.C. "G. Salvemini" • Privata Paritaria, Margherita Mirafiori • C.D. "Carlo Collodi • Scuola Engim • Osservatorio d'Area di Mirafiori Sud • POLITO - Denerg
Total Budget	25.000 €
2. Pre-implementation activities	

Planning and preparatory activities	<p>The strategy identified to plan educational activities in proGReg is oriented with a "Learning Cities" approach, which foresees the active involvement of the whole local educational system: starting from the school communities and then extending to groups of citizens (organized or not) engaged in information, training and co-designing paths in a logic of lifelong learning and peer education.</p> <p>The objectives of the educational activities coordinated by ITER of the City of Turin can be summarized as follows:</p> <ul style="list-style-type: none"> • To promote the active role of the local educational system for the entire duration of the project by consolidating, through co-planning processes, the protagonism of the school communities in order to give continuity to the experience and make schools a point of reference on environmental, cultural and socio-economic issues related to the concept of Green Cities. • To contribute to the development of the co-design process and the definition of the management models of the Natural Basic Solutions (NBS) foreseen in the project, evaluating the possible activation of Collaboration Pacts as foreseen by the Regulation of Common Goods adopted by the City of Turin. • Modelling in the Mirafiori area a school acting as a Civic Centre: a public structure open to the territory, recognized as one of the territorial centralities where to develop dissemination/training activities foreseen in the project, also as one of the hubs of a possible living lab spread throughout the territory on Green City issues. • Enhance the educational projects already active in the area and support the creation of initiatives that can be born as a spontaneous expression of the territory. • Identify and establish ways of connection and forms of collaboration with local partners starting from the activation of a continuous relationship for the entire duration of the project with the Area Observatory table. <p>The "OrtoMobile" project is part of this general strategy and is born from the "Educational co-designing table" set up for proGReg and bringing together the stakeholders active in the educational sector present in the Mirafiori Sud Area Observatory.</p>
Administrative procedures	ITER is a task body of the Educative Service of the City. Its regulation relies on public administrative law.
Technical and social analysis	'Orto Mobile' activity was born from the ITER experience in community garden projects inside schools of the City of Turin. This involvement methodology of school communities on green issues has been shaped in the framework of proGReg and shared by local stakeholders in 'Co-designing educational table'.
Other activities	<ul style="list-style-type: none"> • Link with the project "Didactic box gardens" (3.06) • Participation in the 'Spring party of Mirafiori Sud'
3. Management structure and responsibilities	
Main partner (coordinator) and role/function	ITER - Institution for a Reliable Education (City of Turin)

2nd Partner and role/function	<p>Mirafiori Foundation for the management of educational and co-design activities which have been involving the educational system of the neighborhood. Fondazione Mirafiori per il coordinamento delle attività educative e di co-design che vedono coinvolto il sistema educativo locale</p>
4. Co-design activities and stakeholder engagement	
Stakeholders, engagement processes, in co-design and co-implementation (link with WP2)	<p>ITER proposes an initial training experience for teachers to train them in the creation of "micro gardens in boxes". With the guidance of a technician with great experience in the field, the groups of teachers are involved in very practical activities in order to be able to transfer the experience also to the class groups that will realize the NBS micro modules.</p> <p>The second phase of co-design provides for the accompaniment of the experience at the individual schools, from the educational point of view, involving the whole school community and composition for the realization of "mobile gardens" built with the micro modules of NBS, to obtain green installations inside school yards or in public spaces.</p> <p>The third phase of co-design offers support to the school communities to organize, communicate and set up the "OrtoMobile Marketplace" which, in addition to publicly conveying the initiative, is also an opportunity to meet other partners and stakeholders of proGReg and fund raising with the sale (free offer) of the products made.</p> <p>Monitoring phase of the experience carried out involving all parts of the community involved: teachers, students, families.</p> <p>The co-implementation phase is foreseen through the support to the replicability of the experience by publishing a "manual" that collects all the information necessary to replicate the actions in an autonomous way.</p>
Notes on major achievements/success factors/critical issues/barriers related to engagement process	<p>Major achievements:</p> <ul style="list-style-type: none"> • Creation of a network of schools working simultaneously on the same objective. or identified in proGReg • Active involvement of 30 pre-school and primary school teachers • Active involvement of 568 students, of whom 462 from nursery schools, 94 from primary school, • Involvement of a community of disabled people in the vocational training school. • Collaboration with the Mirafiori Foundation for the coordination of all educational activities proposed in proGReg • Establishment of the "Educational Table" within the Mirafiori Sud Area Observatory, to govern the actions of the proGReg project. <p>Critical issues/barriers:</p> <ul style="list-style-type: none"> • How to get involved and organizational timing to activate such a large community. • Establishing effective forms of communication • Fluidity over time of the composition of school communities • Complex public procurement procedures for the purchase of supplies • Effective experience monitoring system

Current situation and next steps (to be updated)	Current situation: <ul style="list-style-type: none"> • Awareness and information activities were carried out to identify all the stakeholders affected by the actions. • Preliminary meetings with the teacher-reference groups for each school plexus were carried out • Start public purchasing procedures for the equipment made available to school groups • Start teacher training activities • Training stopped in February 2020 due to the Covid-19 emergency Next step: <ul style="list-style-type: none"> • Resumption and conclusion of training activities • Purchase and distribution of material to all school groups involved • Realization by the school groups of the micro-gardens in boxes • Co-design meetings for the composition of mobile gardens • Organisation of the OrtoMobile Marketplace • Social monitoring activities with stakeholders involved and environmental monitoring with the POLITO - Denerg
5. Other activities	
Synergies with other proGReg activities	
Links with other external project or activity	<ul style="list-style-type: none"> • Project of School-Job with the 'Primo Levi' Institute • Research grant with the Politecnico of Turin - Denerg for the environmental monitoring • Progetto Too(I)Smart, environmental monitoring by sensors in Mirafiori Sud area
Business model	
Technology Readiness Level (TRL)	
Communication activity	
6. State of Play and Monitoring	
Current situation (to be updated)	<ul style="list-style-type: none"> • Awareness and information activities were carried out to identify all the stakeholders affected by the actions • Preliminary meetings with the teacher-reference groups for each school plexus were carried out • Start public purchasing procedures for the equipment made available to school groups • Start teacher training activities • Training stopped in February 2020 due to the Covid-19 emergency

Next steps (to be updated)	<ul style="list-style-type: none"> • Resumption and conclusion of training activities • Purchase and distribution of material to all school groups involved. • Realization by the school groups of the micro-gardens in boxes • Co-design meetings for the composition of mobile gardens • Organisation of the OrtoMobile Marketplace • Social monitoring activities with stakeholders involved and environmental monitoring with POLITO - Denerg
Notes/critical issues/barriers (to be updated) (link to WP5)	<ul style="list-style-type: none"> • How to get involved and organizational time to activate such a large community • Establishing effective forms of communication • Fluidity over time of the composition of school communities • Complex public procurement procedures for the purchase of supplies • Effective experience monitoring system
7. NBS maintenance and outlook	
Maintenance	<p>The simplicity of the cassette gardens does not pose any maintenance problems. The NBS micro modules can be reused several times by recovering containers and culture soil.</p> <p>The compositions of "mobile gardens" are easily maintainable and can be quickly disassembled and reused in other situations.</p>
Sustainability after project conclusion	<p>At the end of the project the adaptability of the system will guarantee the sustainability from economic, social and environmental viewpoints.</p>
Additional resources	

3.6: Community school gardens

	
1. General information	
Compilation date and update	April 2020 - first release draft
NBS type	Community-based urban farming and gardening on post-industrial sites
NBS title	Community school gardens
Brief project synthesis	<p>Within the framework of proGReg, a School-Work Alternance Agreement has been activated between ITER - City of Turin and the Istituto Superiore Primo Levi to realize a project dedicated to the themes and purposes of proGReg.</p> <p>The objective of "Community school gardens" project is the development of the following activities:</p> <ul style="list-style-type: none"> • knowledge of soil composition • creation of an educational garden inside the school • support for the creation of collective urban gardens with a social ethical function which need to specific forms of maintenance and management, as a form of adoption of public space • experimenting with the role-playing game "Green Surge City" provided by the proGReg project • peer to peer" experiences of tutoring students of the same age or from primary or secondary schools <p>Participants and programme:</p> <p>The course will involve 4 classes and will provide training modules and practical experience on:</p> <ul style="list-style-type: none"> • training course for the creation and care of an educational vegetable garden in a box implanted in the schoolyard for which ITER will provide all the necessary equipment (chests, soil, seeds, equipment) • initial event and laboratories dedicated to a network of sensors for monitoring environmental variables such as relative humidity, temperature and air quality that have been installed in school plexuses of Mirafiori area. The students will measure themselves with a "Sensor self-construction kit", with the data collection platform and with the implementation of the sensor network • participation in 3 thematic workshops, "Environmental monitoring" and "The new soil flowerbed" conducted by the Chlorophyll Coefficient Association, "Green Solutions" conducted by the DIATI del Polytechnic Turin • visit to OPEN 11 "Youth Mobility and Interculture House" conducted by the Environment Service of the City of Turin • public return of the experience on the occasion of the "Spring Festival" of Mirafiori • participation in the edition of "Torino Porte Aperte" with the special project "Adopt a Neighbourhood".

Area of implementation	Istituto Superiore Primo Levi GPS coordinates: 45.019397, 7.629588.
Target groups (beneficiaries)	High school teachers and students
Timing (start and end date)	Start: October 2019 Stopped by Covid-19: March 2020 End: June 2021 (estimated after Covid-19 emergency)
Main responsible partner	ITER, Institution for a Reliable Education (City of Turin)
ProGlgreg partners involved	<ul style="list-style-type: none"> - Orti Generali - Associazione Coefficiente Clorofilla - Fondazione Mirafiori - POLITO - DIATI
Other stakeholders involved	Osservatorio d'Area di Mirafiori Sud POLITO - DENERG
Total Budget	ProGlgreg funds: 15.000 €
2. Pre-implementation activities	
Planning and preparatory activities	<p>The strategy identified to plan educational activities in proGlgreg is based on a "Learning Cities" approach, which foresees the active involvement of the whole local educational system: starting from the school communities and then extending to groups of citizens (organized or not) engaged in information, training and co-designing paths in a logic of lifelong learning and peer education.</p> <p>The educational goals defined by ITER and the City of Turin are:</p> <ul style="list-style-type: none"> • Promoting the active role of the local educational system for the entire duration of the project by consolidating, through co-design processes, the protagonism of the school communities in order to give continuity to the experience and make schools a point of reference on environmental, cultural and socio-economic issues related to the concept of Green Cities • Developing co-design process to define the management models of the Natural Basic Solutions (NBS) foreseen in the project. This might be achieved by setting Collaboration Pacts as foreseen by the Regulation of Common Goods of the City of Turin

	<ul style="list-style-type: none"> • Modelling in the Mirafiori area a school that acts as a Civic Centre: a public structure open to the territory, recognized as one of the territorial hubs. It has to host dissemination/training activities foreseen in the project, to create the conditions for a possible living lab spread throughout the territory on Green City issues • Enhancing the educational projects already active in the area and supporting the creation of initiatives that can arise as a spontaneous expression of the territory • Identifying and establishing ways of connection and forms of collaboration among local partners starting from the activation of a continuous relationship for the entire duration of the project with the Area Observatory table. <p>The project 'School gardens' is part of the wider proGReg strategy and has its roots in a co-production project designed by Istituto Superiore Primo Levi.</p>
Administrative procedures	ITER is part of the Educational Service of the City of Turin, hence its rules and management are based on public administrative regulation.
Technical and social analysis	<p>The "Community school gardens" activity is the result of ITER's experience gained over the years with schools in Turin and developed for three years with the "Slow Food" association, which has allowed the consolidation of intervention methodologies and techniques.</p> <p>This methodology of involving school communities on green issues has been redesigned by proGReg and shared with the Istituto Superiore Primo Levi.</p>
Other activities	<p>Link with the "Micro vegetable gardens" project (NBS 3.05)</p> <p>Participation in the Spring Festival of Mirafiori Sud</p> <p>Participation in the edition of "Torino Porte Aperte" with the special project "Adopt a Neighbourhood"</p>
3. Management structure and responsibilities	
Main partner (coordinator) and role/function	ITER - Institution for a Reliable Education (City of Turin)
2nd Partner and role/function	Istituto Superiore Primo Levi
3rd Partner and role/function	POLITO

4. Co-design activities and stakeholder engagement

<p>Stakeholders, engagement processes, in co-design and co-implementation (link with WP2)</p>	<p>ITER proposes a training course dedicated to high school students aimed at the creation and care of a community school garden in the schoolyard.</p> <p>The co-designing phase entails the definition of the activities with the school representatives followed by a workshop with the students involved in the projects.</p> <p>The second phase of student involvement includes a series of workshops focused on some of the issues addressed in proGlgreg: environmental monitoring, the "new soil", green solutions (NBS). The workshops are conducted by experts from partners of the proGlgreg project, in addition, it has organized a visit to OPEN 11 "Youth Mobility and Interculture House" conducted by the Environment Service of the City of Turin to learn about a "green" experience dedicated to young people.</p> <p>The third phase of co-design foresees a practical training of the group of students on two different actions:</p> <ul style="list-style-type: none"> • learning laboratory aimed at realizing and monitoring a community school garden • laboratory focused on the management of sensors of environmental data collection provided by proGlgreg. These sensors will enhance the ongoing network placed on some of the schools of Mirafiori Sud by the project 'Too(l)Smart' <p>The monitoring phase is carried out by involving all parts of the community involved: teachers, students, experts, stakeholders, through direct observation, questionnaires and interviews.</p> <p>The co-implementation phase is foreseen through the signing with the school community of a "pact of collaboration" that defines the management and development of the experience, guaranteeing the protagonism of children.</p>
<p>Notes on major achievements/success factors/critical issues/barriers related to engagement process</p>	<p>Major achievements:</p> <ul style="list-style-type: none"> • Creation of environmental awareness in a community of young people active in proGlgreg • 8 high school teachers actively involved • More than 100 students from the three years of high school actively involved • Collaboration with the Mirafiori Foundation for the coordination of all educational activities proposed in proGlgreg • Collaboration with the experts of the proGlgreg partners of the Chlorophyll Association and DIATI of POLITO • Collaboration with "Casa della mobilità giovanile e della intercultura" and with the Environment Service of the City of Turin • Establishment of the "Educational Table" within the Mirafiori Sud Area Observatory, to govern the actions of the proGlgreg project <p>Critical issues/barriers:</p> <ul style="list-style-type: none"> • Effective strategies for involving a youth community (15/18 years old) and organizational timing consistent with the school organization. • Establishing effective forms of communication • Definition of the "cooperation pact" for the co-management phase • Fluidity over time of the composition of the school community, especially in the co-management phase • Complex public procurement procedures • Effective experience monitoring system

Current situation and next steps (to be updated)	<p>Current situation: The cognitive and informative activity has been carried out to identify all the stakeholders affected by the actions Preliminary meetings with the referring teacher groups were carried out Start-up workshop with groups of students carried out Start public purchasing procedures for the equipment made available to school groups Training and workshops were discontinued in February 2020 due to the Covid-19 emergency Next step:</p> <ul style="list-style-type: none"> • Resumption and conclusion of training activities and workshops • Purchase and distribution of the material to all school groups involved. • Realization by the school groups of the community school garden • Create "peer to peer" moments to disseminate the experience in other school communities • Co-design meetings to define the "pact of collaboration" and the management and opening to the territory of the plant • Organisation of public events designed by youth groups • Social monitoring activities with the stakeholders involved and environmental monitoring with POLITO - Denerg
5. Other activities	
Synergies with other proGReg activities	
Links with other external project or activity	<p>Research grant with POLITO - Denerg for environmental monitoring activities</p> <p>Too(l)Smart project, activation of an environmental monitoring network in the Mirafiori Sud area</p> <p>"House of youth mobility and interculture - OPEN 011" of the City of Turin</p>
Business model	
Technology Readiness Level (TRL)	
Communication activity	
6. State of Play and Monitoring	
Current situation (to be updated)	<p>The cognitive and informative activity has been carried out to identify all the stakeholders affected by the actions Preliminary meetings with the referring teacher groups have been carried out Start-up workshop with groups of students has been carried out Start public purchasing procedures for the equipment have been made available to school groups Training and workshops were discontinued in February 2020 due to the Covid-19</p>

Next steps (to be updated)	<p>Resumption and conclusion of training activities and workshops</p> <p>Purchase and distribution of material to all school groups involved.</p> <p>Realization by the school groups of the community school garden</p> <p>Peer to peer moments to disseminate the experience to other school communities.</p> <p>Co-design meetings to define the "pact of collaboration" and the management and opening to the territory of the plant</p> <p>Organisation of public events designed by youth groups</p> <p>Social monitoring activities with the stakeholders involved and environmental monitoring with the POLITO - Denerg</p>
Notes/critical issues/barriers (to be updated) (link to WP5)	<ul style="list-style-type: none"> • Effective strategies for involving a youth community (15/18 years old) and organizational timing consistent with the school organization. • Establishing effective forms of communication • Definition of the "cooperation pact" for the co-management phase • Fluidity over time of the composition of the school community, especially in the co-management phase • Complex public procurement procedures • Effective experience monitoring system
7. NBS maintenance and outlook	
Maintenance	Signing of a 'collaboration deal' with the school community and other stakeholders to define the conditions of use
Sustainability after project conclusion	The suitability of 'community school gardens' avoids potential threats in terms of environmental/social economic sustainability in the long period
Additional resources	

3.7: Gardens around the houses

	
1. General information	
Compilation date and update	June 2020, first release
NBS type	Community-based urban farming and gardening on post-industrial sites
NBS title	Gardens around the houses
Brief project synthesis	<p>The action consist in the installation of wooden boxes for urban horticulture on public space in the South Mirafiori district, with the aim of improving the urban quality and quality of life in the areas, stimulating the active participation of citizens in the processes of urban transformation, creating opportunities for aggregation and cooperation among citizens on the issue of environmental sustainability and urban horticulture, technological and social innovation, care and sharing of common goods. The number of the planned boxes to be installed has been increased thanks to the contribution of the Turin City District 2 administration, within the project “<i>L’orto tra le case</i>” (The garden among the houses). A total of 20 wooden boxes for vegetable gardens are planned to be positioned (three types of wooden boxes will be used, two on the floor - the smaller ones 60x80x40 cm, the larger 120x80x40 cm - and one raised, that allows people on wheelchair to access them), in two public spaces of the South Mirafiori district, plus smaller installations in the yards of public buildings managed by non-for-profit organisation (one center for refugees, one center for kids and teenagers, one center for disadvantaged families), that have been added, as preparatory, support and engagement actions, during the months of delays caused by the administrative procedures for the installation of the boxes in the two public spaces mentioned.</p>

<p>Area of implementation</p>	<ul style="list-style-type: none"> - Centro Mirafleming, a community centre for children and teenagers managed by a group of non-for-profit organisations (Cooperativa Mirafiori, Cooperativa l'Arcobaleno and Associazione Arcobaleno) that offers a wide array of activities. <p>It is located in via Fleming 19/c - Turin. GPS coordinates: 45.016525, 7.635449</p> <p>Two wooden boxes 60x80x40 cm have been installed.</p> <ul style="list-style-type: none"> - Casa del Mondo, a community centre that hosts refugees (males, adults), managed by Progetto Tenda. Two raised boxes, 120x80x20 cm, raised to an height of 70 cm, have been installed. - Crescere Insieme, a community centre managed by Associazione Crescere Insieme, hosts disadvantaged families, offers activities for families and children and also distributes food to people in need. A minimum of two wooden boxes 60x80x40 cm will be installed and a vegetable garden in open ground will be reactivated in the centre garden (the number of boxes could be increased if Covid-19 emergency issues will make more feasible to install here also part of the boxes planned for via Roveda public garden). - public space of via Morandi 6 (back of Villa Scintilla) - Turin. GPS coordinates 45.013953, 7.633208 It is a small pedestrian space on the back of a 19th century mansion surrounded by social housing buildings, in the vicinity of a centre for elderly people. Ten wooden boxes 120x80x40 cm will be installed. - public garden of via Roveda 35/1 (elevated area) - Turin. GPS coordinates 45.020615, 7.606504 This container garden will be placed on a small hill with a concrete pavement inside a public garden. The garden is next to a social housing building and it is perceived as neglected and unsafe. Ten wooden boxes 120x80x40 cm will be installed (the number of boxes could be reduced if Covid-19 emergency issues will make more feasible to install part of the boxes in Crescere Insieme garden instead).
<p>Target groups (beneficiaries)</p>	<ul style="list-style-type: none"> - Mirafleming: kids age 6-14 and their educators and families - Casa del Mondo: male adult refugees and their educators - Crescere insieme: disadvantaged families hosted in the centre and people of the neighbouring area - via Roveda and via Morandi public areas: all the citizens of the neighbourhood willing to participate.
<p>Timing (start and end date)</p>	<p>First co-design workshop has been held on the 19/2/2019.</p> <p>All the actions have then been delayed due to the procedure to obtain permits to place the boxes on public space; co preparation has been rescheduled for January 2020, for via Roveda public garden. Co-design workshops have been interrupted again due to the Covid-19 pandemics.</p> <p>Current plan, TBC accordingly to the Covid-19 pandemics evolution, has July 2020 as starting date for the via Roveda public garden, with the possibility to transfer part of the boxes inside Crescere insieme centre; as far as via Morandi is concerned, the area will first undergo a change of paving, from concrete to a permeable one, in the frame of the green corridor action, and then the container garden will be installed in april 2021 (TBC).</p> <p>The wooden boxes in Mirafleming have been installed in June 2019; the wooden boxes in Casa del Mondo have been installed in July 2019.</p>

	End date of the accompanying activities is foreseen in May 2022 (provisional date, depending on Covid-19 evolution).
Main responsible partner	Fondazione della Comunità di Mirafiori Contact person: Vittorio Bianco - v.bianco@fondazionemirafiori.it
ProGfreg partners involved	(Linked Third Party) Associazione Miravolante - involved in the co-design and co-implementation of the gardens. City of Turin - administrative procedures and authorisations
Other stakeholders involved	ATC - Agenzia Territoriale per la Casa: it is the institution responsible of public social housing - involved in the preliminary activities for identifying the areas - owner of the area of the public garden in via Roveda. Cooperativa Mirafiori, Cooperativa l'Arcobaleno and Associazione Arcobaleno - non-for-profit organizations managing Mirafleming centre Progetto Tenda - non-for-profit organization managing Casa del Mondo Associazione Crescere insieme - non-for-profit organization managing Crescere insieme centre near via Roveda public garden
Total Budget	ProGfreg funds: 32.000 € District 2 of the City of Turin - L'orto tra le case project: 2.800 €

2. Pre-implementation activities

Planning and preparatory activities	<p>The preliminary phase of identifying the areas where the container gardens could be created started in June 2018, with meetings between Fondazione Mirafiori and ATC and between Fondazione Mirafiori and City of Turin District 2.</p> <p>The meetings with District 2 led to the submission, in October 2018, of the project "L'orto tra le case" which has been funded with 2.800 € in order to increase the number of wooden boxes.</p> <p>On-site inspections have been conducted around the South Mirafiori district in the months of August, September, November and December 2018, also with officers of the District administration, in order to identify suitable areas.</p> <p>At the end of the process, the two areas of via Morandi and via Roveda have been identified.</p> <p>The first meeting with citizens was held on February 19th, 2019 at the elderly centre in via Morandi (one of the candidate areas is located in the immediate vicinity).</p> <p>The project was presented and co-planning was started through activities (cognitive mapping, collages) that allowed to detect the expectations and predispositions of the participants regarding the urban horticulture activity, to visualize the different proposals regarding the cultivations to be realized, to discuss ideas regarding the problems and possible solutions related to the management of the garden.</p> <p>During the rest of the year 2019 Fondazione Mirafiori, the City of Turin, the District 2 and ATC have been working to the administrative procedures (see below).</p> <p>In the months of June and July 2019, in order to start spreading the concept of container gardening and activate groups of citizens that could participate in the future activities, small container gardens have been installed in Mirafleming (near via Morandi) and in</p>
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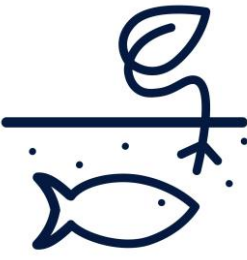
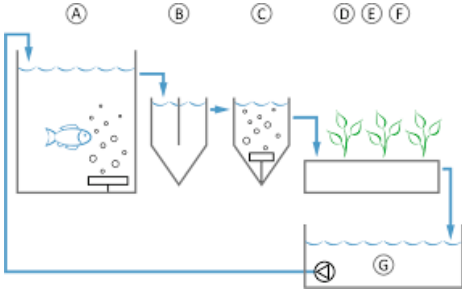
	<p>Casa del Mondo (near via Roveda). Gardening workshops have been held in Mirafleming in June, July, October and November.</p> <p>A series of biweekly workshops was scheduled to take place in Crescere Insieme and via Roveda public garden from the end of January to the end March, to be concluded with the installation and inauguration of the container garden. Unfortunately, the series of workshops has been interrupted after the third meeting by the outbreak of Covid-19.</p>
Administrative procedures	<ul style="list-style-type: none"> • First of all it was sent to the Municipality an application for authorization to install wooden boxes for urban horticulture on the two areas identified. • The answer from green department was that was needed a “pact of collaboration” in compliance with the “commons” (“<i>beni comuni</i>”) regulation of the City. • Fondazione presented the pact of collaboration, but it was blocked in “circoscrizione 2” offices (district 2 offices of Municipality) • The innovation department tried to help the installation of boxes asking another authorization from “public soil” office, but the procedure never finished. • It was discovered that the area of via Roveda public garden is not owned by the city but by ATC (social housing company): they gave authorisation after a request of Fondazione Mirafiori • Currently the pact of collaboration for is blocked by Covid-19 lockdown but it is quite ready in “Circoscrizione 2” offices
Technical and social analysis	<p>The choice of the areas has been made by considering the following criteria:</p> <ul style="list-style-type: none"> - availability of water in the vicinity; - exposure to the sun; - concrete or asphalt paving in order to increase the green availability by installing the container gardens, instead of covering an existing green area; - vicinity to social housing complexes; - presence of active group of citizens in the vicinity; - preference to neglected areas in need of maintenance and care, in order to maximize social benefits. <p>The technology (i.e. container gardening) has been chosen in order to avoid possible risks related to the soil contamination. Different kinds of boxes available on the market have been taken in consideration, and the most suitable and cost-effective have been proposed to the stakeholders during the codesign activities.</p>
Other activities	
3. Management structure and responsibilities	
Main partner (coordinator) and role/function	Fondazione Mirafiori / Linked Third Party Associazione Miravolante: co-design, co-implementation, co-maintenance and accompanying activities
2nd Partner and role/function	City of Turin (authorisations)

4. Co-design activities and stakeholder engagement	
Stakeholders, engagement processes, in co-design and co-implementation (link with WP2)	<ul style="list-style-type: none"> - meetings with ATC and Circoscrizione 2 - joint on-site inspections with Circoscrizione 2 - co-design workshop with members of via Morandi centre for elderly people (19/2/2019) - co-implementation of Casa del Mondo container garden (July 23th, 2019) together with refugees hosted in the centre - co-implementation of Mirafleming container garden and workshops (11-18-25/6, 2-9-16/7, 11/10, 8-23/11/2019) - via Roveda / Crescere Insieme co-design workshops (25/1, 8-22/2/2020)
Notes on major achievements/success factors/critical issues/barriers related to engagement process	<ul style="list-style-type: none"> - Refugees in Casa del Mondo are interested in gardening, the two boxes are well maintained several months after the installation; they are also interested in sharing their products with their neighbors - activities in Mirafleming have been successful too - the workshops in Crescere Insieme have had a good number of participants (29), although it is not certain that all of them will take part in the gardening activities - the main critical issues have been the lockdown and the uncertainties related to the Covid-19 epidemic, on one side, and the delays in the administrative procedures, on the other
Current situation and next steps (to be updated)	All activities were blocked by Covid-19 lockdown; engagement activities, co-design, co-implementation, will restart when the Covid-19 measures will allow meetings and gatherings.
5. Other activities	
Synergies with other proGReg activities	<p>Via Morandi area is on the green corridor (NBS 6.1) and the paving of the area will be made permeable in the frame of NBS 6.1 implementation.</p> <p>The activities are similar to those of school container gardens and pollinator friendly garden, and an exchange of practices and experiences among the different groups of active citizens involved will be facilitated.</p>
Links with other external project or activity	<p>The gardens implementation has been integrated with the project “L’orto tra le case”.</p> <p>Possible links are currently taken into consideration with two other projects in Mirafiori:</p> <ul style="list-style-type: none"> • “Tele-Coltura” a project carried out by OrMe, the network of urban gardens of Turin Metropolitan Area, will distribute to people in need toolkits for container gardening at home; we are planning to involve beneficiaries of proGReg in this project and increase the number of toolkits; • Fondazione Mirafiori is active in several projects for the collection and distribution of food to people in need, and we are considering using part of the “gardens among the houses” to produce food to distribute; some of the beneficiaries of the food distribution could be involved in the maintenance of the gardens as well, enabling them to produce their own food.
Business model (link to WP5)	This NBS is not very business oriented, and the costs of maintenance of the gardens are quite low; the model will rely mainly on volunteer work and small fund-raising events organised together with the groups of active citizens involved.

Technology Readiness Level (TRL) (link to WP5)	<i>Starting TRL 7 - TRL to be achieved at the end of the project: 9</i>
Communication activity (link to WP6)	<ul style="list-style-type: none"> - 19/02/2019 the workshop "L'orto sotto casa" has been organised in via Morandi centre for the elderly people; - 1/06/2019 participation at the event ValletT'incontra, open day of the public health centre near via Morandi area, to present the project; - 15/06/2019, participation at "Eataly & OrMe", stand at the entrance of Eataly mall to present the project to customers interested in urban gardening activities; - Mirafleming workshops (see above): leaflets have been printed to communicate the project and the workshops to kids and their families; - 23/07/2019: "Coltiviamo l'arte" event in Casa del Mondo, presentation of the project and co-implementation of the container garden; leaflets have been printed and distributed in the area; - Crescere insieme workshops in January and February 2020 (see above): leaflets have been printed and distributed in the area; - all the events have also been communicated on the Facebook page of Fondazione Mirafiori, https://www.facebook.com/fondazionemirafiori/ and on the pages of local organisations involved.
6. State of Play and Monitoring	
Current situation (to be updated)	<ul style="list-style-type: none"> - wooden boxes for gardening have been installed in Mirafleming and Casa del Mondo, together with the relevant groups of citizens (kids and families and refugees respectively), and are co-maintained by them; - co-design and co-implementation activities for via Roveda garden are suspended due to Covid-19
Next steps (to be updated)	<ul style="list-style-type: none"> - co-design and co-implementation activities for via Roveda garden will reprise once Covid-19 limitation are lifted; wooden boxes will be installed in Crescere Insieme in July; the exact number of boxes to be installed in via Roveda garden and in Crescere Insieme TBD accordingly to the Covid-19 pandemic outlook; - co-design and co-implementation activities for via Morandi planned for Spring 2021, in parallel with green corridor NBS.
Notes/critical issues/barriers (to be updated) (link to WP5)	The main critical issues have been the lockdown and the uncertainties related to the Covid-19 epidemic, on one side, and the delays in the administrative procedures, on the other.
7. NBS maintenance and outlook	
Maintenance	After the end of proGReg the NBS will be maintained by the group of volunteers formed during proGReg.

Sustainability after project conclusion	This NBS is connected with Fondazioni Mirafiori strategy on food and agriculture, with the Slow Food "Comunità del cibo di Mirafiori", and with OrMe, the network of urban gardens of Turin Metropolitan Area
Additional resources	https://www.facebook.com/fondazionemirafiori/ Further documentation has not been published but is available upon request

4.1: Aquaponics test system

	
1. General information	
Compilation date and update	
NBS type	Aquaponics as soil-less agriculture for polluted sites
NBS title	Aquaponics test system
Brief project synthesis	<p>The aim of this activity is to develop and test innovative systems for horticulture. A pilot project is proposed to create a collaborative system for the production and consumption of vegetable products based on "aquaponic" cultivation techniques, aimed at demonstrating the feasibility of shared systems at the service of the citizen and the sustainability of "BIO" cultivation in urban areas.</p>
Area of implementation	<p>One possible location could be via Onorato Vigliani 102, where there is a public building currently unused inside and waiting for a future destination. The building has been the seat of the National Agricultural Mechanical Centre since 1951. Later it was instead the seat of a social housing and for some years now it has been in a state of abandonment. Nowadays the courtyard is instead periodically used by Coldiretti, for markets of local producers.</p> <p>The area borders to the south with the Parco Colonnetti, identifying itself as a suitable place for the placement of hives. While the chests will be placed in the area in front of the entrance, closer to the public part of the courtyard.</p> <p>Coordinates: 45.017254, 7.644881</p>
Target groups (beneficiaries)	
Timing (start and end date)	
Main responsible partner	
ProGInreg partners involved	
Other stakeholders involved	Carlo Prelli Service (SME)
Total Budget	



5.1: Green roof at Casa nel Parco

	
1. General information	
Compilation date and update	April 2020, first draft version
NBS type	Capillary GI on walls and roofs
NBS title	Green roof on Casa nel Parco
Brief project synthesis	<p>New Access to Green Roof on top of “Casa del Parco”: realization of the physical access and the improvement of the already existing green roof at Casa del Parco, with the aim to improve its use by citizens, even disabled and aged people. The new access to the green roof at Casa del Parco will allow to use this NBS by all for recreational activities.</p>
Area of implementation	GPS coordinates: 45.013616, 7.648410
Target groups (beneficiaries)	
Timing (start and end date)	September - November 2018
Main responsible partner	City of Turin
ProGReg partners involved	Fondazione Mirafiori

Other stakeholders involved	
Total Budget	29.316,97 euro
2. Pre-implementation activities	
Planning and preparatory activities	
Administrative procedures	Project and tender conducted by the City of Turin
Technical and social analysis	
Other activities	
3. Management structure and responsibilities	
Main partner (coordinator) and role/function	City of Turin
2nd Partner and role/function	Fondazione Mirafiori
4. Co-design activities and stakeholder engagement	
Stakeholders, engagement processes, in co-design and co-implementation (link with WP2)	Intervention is the outcome of the co-design phase and stakeholder engagement carried out within WP2. These minor changes will affect positively the work in Turin Living Lab management: indeed, these new interventions respond to new needs/challenges detected within the co-design phase. This will then improve the sense of ownership/community of our NBS living lab, which is one of the objectives of the project (co-design and inclusion of local stakeholder). Also, they are perfectly in line with the overall project and living lab objectives, with a specific focus to inclusivity of vulnerable categories through NBS.
Notes on major achievements/success factors/critical issues/barriers related to engagement process	
Current situation and next steps (to be updated)	

5. Other activities	
Synergies with other proGIreg activities	
Links with other external project or activity	
Business model (link to WP5)	
Technology Readiness Level (TRL) (link to WP5)	
Communication activity (link to WP6)	
6. State of Play and Monitoring	
Current situation (to be updated)	
Next steps (to be updated)	
Notes/critical issues/barriers (to be updated) (link to WP5)	
7. NBS maintenance and outlook	
Maintenance	
Sustainability after project conclusion	
Additional resources	

5.2: Green wall indoor at school



	
1. General information	
Compilation date and update	Aprile 2020, first draft release
NBS type	Capillary GI on walls and roofs
NBS title	Green indoor wall in a school
Brief project synthesis	<p>The project foresees the preparation and construction of two green walls - intended as replicable examples in urban environments of Nature Based Solution (NBS) - to be placed in an atrium of the IC Salvemini School located in Via Negarville 30 - Turin.</p> <p>Specifically, the project foresees the setting up of a green wall with dimensions of 20 square meters (school indoor) It will be positioned at a height between 0 and 3 m above the ground floor.</p> <p>The botanical choice of the indoor wall will instead be agreed with the project group of POLITO, which is investigating in depth the issues related to the abatement of indoor contaminants due to the presence of vegetation.</p> <p>Moreover, on the occasion of specific didactic-disseminating circumstances, the presence of a technician may be required (for a maximum of 1 time per year) to illustrate the characteristics of the intervention, the structure set up and its possible applications.</p>
Area of implementation	<p>The area of implementation is an atrium of the Salvemini primary school</p> <p>GPS coordinates: 45.019222, 7.608875</p>
Target groups (beneficiaries)	Students, teachers, parents.
Timing (start and end date)	Start June 2019 then was blocked by Covid-19

Main responsible partner	City of Turin
ProGlgreg partners involved	POLITO
Other stakeholders involved	
Total Budget	40.000€ (unique budget for all green walls)
2. Pre-implementation activities	
Planning and preparatory activities	Working inside a school is so important as we will start spreading knowledge about NBS with children, they will grow knowing the importance of plants in everyday life
Administrative procedures	<p>As there are so many different technologies for green walls the City decided to do a pre-tender procedure (avviso esplorativo) to discover different way to do it as the amount was quite small (for the Italian market) the City had 4 answer with 2 different technologies.</p> <p>The City decided to do the tender for both technologies, and at the end, out of 4 only 1 applied and won.</p>
Technical and social analysis	We did the pre-tender to have the chance to choose between different technologies and discover the most suitable for our project
Other activities	
3. Management structure and responsibilities	
Main partner (coordinator) and role/function	City of Turin
2nd Partner and role/function	POLITO for co-design and co-creation
3rd Partner and role/function	UNITO (DBios and DISAFA) for plants choose
4. Co-design activities and stakeholder engagement	

Stakeholders, engagement processes, in co-design and co-implementation (link with WP2)	Searching for a technology easy to maintain, so that can be an easy to cure wall, that can last for many years and is adapting to the children in many years to come, where you can also change some plants keeping and improving the benefits of NBS
Notes on major achievements/success factors/critical issues/barriers related to engagement process	
Current situation and next steps (to be updated)	All is blocked by Covid-19
5. Other activities	
Synergies with other proGReg activities	NBS 8.1 for plants choosing, and 3.4 School garden in box
Links with other external project or activity	Taking plants into indoor space means improving knowledge about plants that can lead to some new activities and teaching action about nature, plants???
Business model (link to WP5)	
Technology Readiness Level (TRL) (link to WP5)	
Communication activity (link to WP6)	The chosen firm would use this project to communicate the achievement of the NBS as a way of improving green quality in the city and green knowledge among citizen
6. State of Play and Monitoring	
Current situation (to be updated)	Due to Covid-19 works has still to start

Next steps (to be updated)	A questionnaire will be done by teachers and students for WP4 Works should start in June 2020 ARPA analysis on air quality should start before and after planting
Notes/critical issues/barriers (to be updated) (link to WP5)	Covid-19 will change the way children could interact with experts, teachers. Social distance will change the perspective of any human action inside a school building
7. NBS maintenance and outlook	
Maintenance	For 3 years it will be maintained by the company who won the tender.
Sustainability after project conclusion	Not yet, but NBS good practice should move and open up new attitudes about plants maintenance and respect
Additional resources	

5.3: Green wall outdoor on a homeless dormitory

	
1. General information	
Compilation date and update	April 2020, first draft release
NBS type	Capillary GI on walls and roofs
NBS title	Green wall outdoor on a homeless dormitory
Brief project synthesis	<p>Green wall mq 80 (outdoor made with self-supporting structure compared to the anchor wall).</p> <p>It will be positioned at a height between 0 and 3 m above the ground floor according to the instructions given at the time of setting up. In particular, as far as the outdoor equipment is concerned, a clear space between the green wall and the building is guaranteed to allow any future maintenance work on the facade.</p> <p>The outdoor walls outside the Corso Tazzoli building must be mounted on an independent structure and not resting on the building.</p> <p>As far as the outdoor installation is concerned, the botanical characteristics of these small seedlings can be chosen by the successful bidder according to the nursery experience gained, considering the aesthetic and chromatic elements to be obtained with the green wall, on the one hand, and on the other hand identifying nursery material able to attract pollinating insects (bees, bumblebees and butterflies). For the latter purpose, the following species are proposed as examples that can be defined with the scientific coordinators of the University of Turin who will follow the project directly during the preparation of the vertical panels: marjoram, scabiosa, thyme, yarrow, lavender, sedum, oregano, wild thistle, minnow, verbena, clover, aubrezia, violacacia, etc.</p> <p>The positioning of the green wall described in this way, is understood to include the irrigation system deemed most suitable by the manufacturer, in this regard it is specified that the Administration will prepare a water intake at a distance not exceeding 10 m from the point of preparation of the vertical wall. The contracting party is responsible for the final hydraulic connection as well as the preparation of a possible collection system for leaching water from the panels.</p> <p>The installation, as described above, must be prepared, built, set up and maintained - for the entire contractual period of three years from construction - by the contractor in accordance with the rules of the art and in compliance with the defined technical specifications.</p> <p>Moreover, on the occasion of specific didactic-disseminating circumstances, the presence of a technician may be required (for a maximum of 1 time per year) to illustrate the characteristics of the intervention, the structure set up and its possible applications.</p>

Area of implementation	The dormitory for homeless people in Corso Tazzoli - Turin is a precast building, owned by the city and managed by a social cooperative GPS coordinates: 45.032972, 7.633774
Target groups (beneficiaries)	Homeless people
Timing (start and end date)	The tender is finished but Covid-19 blocked works
Main responsible partner	City of Turin
ProGlgreg partners involved	POLITO for co-design and co-creation
Other stakeholders involved	UNITO (DBios and DISAFA) for plants choose
Total Budget	40,000€ (unique budget for all green walls)
2. Pre-implementation activities	
Planning and preparatory activities	A homeless dormitory with a concrete courtyard without green or trees, was the perfect place to give the people sleeping there at least a chance for a better environment.
Administrative procedures	As there are so many different technologies for green walls the City decided to do a pre-tender (avviso esplorativo) to discover different way to do it as the amount was quite small (for the Italian market) the City had 4 answer with 2 different technologies. The city decided to do the tender for both technologies, and at the end, out of 4 only 1 applied and won.
Technical and social analysis	We did the pre-tender to have the chance to choose between different technologies and discover the most suitable for our project
Other activities	
3. Management structure and responsibilities	

Main partner (coordinator) and role/function	City of Turin
2nd Partner and role/function	POLITO for co-design and co-creation
3rd Partner and role/function	UNITO (DBios and DISAFA) for plants choose
4. Co-design activities and stakeholder engagement	
Stakeholders, engagement processes, in co-design and co-implementation (link with WP2)	Searching for a technology easy to maintain, so that can be an easy to cure wall, that can last for many years and is adapting in the years to come, where you can also change some plants keeping and improving the benefits of NBS
Notes on major achievements/success factors/critical issues/barriers related to engagement process	
Current situation and next steps (to be updated)	All is blocked by Covid-19
5. Other activities	
Synergies with other proGREG activities	NBS8.1 for the plant choose
Links with other external project or activity	This NBS could inspire to upgrade the grey courtyard, adding some trees and green area to have a better place for outdoor living
Business model (link to WP5)	
Technology Readiness Level (TRL) (link to WP5)	

Communication activity (link to WP6)	The chosen firm would use this project to communicate the achievement of the NBS as a way of improving green quality in the city and green knowledge among citizen
6. State of Play and Monitoring	
Current situation (to be updated)	Due to Covid-19 works have still to start
Next steps (to be updated)	As soon as possible works will start, as for an outside work Covid-19 new measurement should not affect too much the process
Notes/critical issues/barriers (to be updated) (link to WP5)	Covid-19 will change the way people could interact with experts and gardeners and between them. Social distance will change the perspective of any human action but plants and a more attractive place can give people some more chance of a better way of life, even in a homeless dormitory
7. NBS maintenance and outlook	
Maintenance	For 3 years it will be maintained by the company who won the tender. After, the cooperative who manage the center will maintain it (the city inserted the issue in the future tender for cooperatives)
Sustainability after project conclusion	NBS good practice should move and open up new attitudes about plants maintenance and respect
Additional resources	

5.4: New green roof at WOW

	
1. General information	
Compilation date and update	April 2020 - first release draft
NBS type	Capillary GI on walls and roofs
NBS title	New green roof on public building (WOW)
Brief project synthesis	<p>The project concerns the realization of an extensive green roof on a public building, currently abandoned.</p> <p>The green roof is realized using the green roof technology supplied by Harpo Group, composed by layered materials: antirroot waterproofing, water retention felt, drainage, storage and ventilation elements, filter sheet and 14 cm of substrate, produced by Harpo specifically for green roofs, mainly made by mineral-based material (volcanic lapillus, pumice).</p> <p>The green roof is intended to be a "natural lawn" obtained by sowing a mixture of seeds from stable meadows of northern Italy that can be calibrated to be used from the plain to the mountain areas up to 1000 - 1500 m of altitude. Many species extend their range also in the regions of central-southern Italy, allowing the use of this system to the most part of the Italian peninsula.</p> <p>The mixture, supplied by the seed company "Semenostrum", is composed of at least 20 species belonging to the association <i>Chamaecytisus hirsutus</i> - <i>Chrysopogon etum grylli</i>, typical species of natural lean meadow vegetation, with a balanced ratio of grasses, perennial dicotyledons and annual dicotyledons.</p> <p>This kind of vegetation has been conceived in order to be a pasture for the bees hosted in the hives located nearby the building.</p> <p>A sub-irrigation system has been installed on the roof, under the substrate, realized by a serpentine of pvc pipes $\varnothing 16$ mm with a pitch of 30 cm.</p> <p>The system is fed by a cistern placed in the nearby garden, with a capacity of 11.000 liters for the accumulation of rainwater, pumped to the roof and connected to the downpipes of the building.</p>

Area of implementation	<p>The area of implementation is a public building located in via Onorato Vigliani 102 – Turin. The building has been the seat of the National Agricultural Mechanical Centre since 1951. Afterwards it was managed by a social cooperative and since few years it's empty and abandoned, waiting for a future destination.</p> <p>In front of the building there is a large paved area, easily accessible by the road and partially covered by a canopy. This area is periodically used by Coldiretti for their market of local producers and it will host the NBS Pollinator friendly garden.</p> <p>In the backyard of the building, a green area bordering with the Colonnetti Park has been identified as the suitable place for the placement of hives.</p> <p>The green roof will cover an area of 140 sqm.</p> <p>GPS coordinates: 45.017254, 7.644881</p>
Target groups (beneficiaries)	<p>The green roof implementation is strictly connected with the other NBS expected in the same area: the Pollinator friendly garden and the apiary.</p> <p>The main beneficiaries of these implementations will be the inhabitants of the neighborhood (families, collectives, schools of the district and disadvantaged people), who are expected to spend their time in the new refurbished area, together with the Coldiretti farmers and their clients, who regularly go to the market.</p>
Timing (start and end date)	<p>Implementation phase:</p> <p>Start: February 2020</p> <p>Blocked by Covid-19 lockdown</p> <p>End: June 2020</p>
Main responsible partner	<p>Associazione "OrtiAlti"</p> <p>e-mail address: info@ortialti.com</p>
ProGReg partners involved	<ul style="list-style-type: none"> • Heritage Management Department, City of Turin (Owner of the building) • University of Turin (Department of Life Sciences and Systems Biology, DBios and Department of Agricultural, Forest and Food Sciences, DISAFA)
Other stakeholders involved	<p>Associazione Parco del Nobile (beekeepers)</p>
Total Budget	<p>ProGReg funds: 53.500 €</p>
2. Pre-implementation activities	

Planning and preparatory activities	<p>The initial project concerned the creation of a roof top garden to be managed by a citizens' association.</p> <p>After evaluating and excluding the building located in via Negarville 8 and the Youth Centre in strada delle Cacce, the feasibility study led to identify the roof of a building owned by the Municipality, located in via Onorato Vigliani 102.</p> <p>Subsequently the structural verification confirmed the feasibility of the roof garden only in a specific portion of the flat roof of the building, an area of 140 sqm.</p> <p>The Heritage Management Department of the City of Turin has excluded the use by the citizens of internal stairs to reach the roof, as they will try to transfer the use of the building to a new entity and the mixed use of the stairs is not feasible.</p> <p>The cost of external stairs is considered excessive compared to the green roof cost and poses safety problems since the building is not supervised and would only be used occasionally.</p> <p>The choice therefore fell on the construction of an extensive green roof with flowering lawn, which can function as a pasture for the bees, with a very low maintenance (one annual grass mowing) that can be taken in care by the beekeepers who are involved in the installation and care of the apiary (Associazione Parco del Nobile).</p> <p>Alternatives choices of vegetation for the extensive green roof were considered: sedum (requires less maintenance but is less attractive for pollinating insects), lippia nodiflora (low maintenance, quite attractive for pollinating insects), meadow florin (higher maintenance but higher biodiversity and attraction of pollinating insects). Given the willingness of the beekeepers to mow the flowering meadow, it was decided to prefer the flowering meadow.</p> <p>The roof will be provided with a lifeline and access to the roof will therefore be allowed only to specialized personnel, through an aerial platform.</p> <p>Following the request of the City of Turin, irrigation will be carried out through the recovery of rainwater. In fact, the City with another European project (CWC interreg) is planning a green roof with rainwater reuse.</p>
Administrative procedures	<p>Resolution of the City Council, agreement between town and OrtiAlti, report of delivery of the keys of the property.</p>
Technical and social analysis	<p>Structural analysis and load test on the roof slab; analysis of the state of deterioration of the concrete and solutions; cost analysis in order to keep the budget provided by proGireg.</p>
Other activities	
3. Management structure and responsibilities	
Main partner (coordinator) and role/function	<p>OrtiAlti:</p> <ul style="list-style-type: none"> - coordination - design - construction - maintenance coordination

2nd Partner and role/function	<p>City of Turin (owner of the building):</p> <ul style="list-style-type: none"> - owner of the building - administrative permissions - co-maintenance
3rd Partner and role/function	<p>University of Turin:</p> <ul style="list-style-type: none"> - air quality monitoring
4rd Partner and role/function	<p>Associazione Parco del Nobile (beekeepers):</p> <ul style="list-style-type: none"> - maintenance of the green roof
4. Co-design activities and stakeholder engagement	
Stakeholders, engagement processes, in co-design and co-implementation (link with WP2)	<p>During the co-design process the offices of the Heritage Management Department of the City of Turin have been included to manage the construction site. The co-implementation process, strictly connected with the implementation of the Pollinator friendly Garden (see NBS 3:03), has engaged Fondazione Mirafiori, Coldiretti and an informal network of beekeepers but the process was blocked by Covid-19.</p>
Notes on major achievements/success factors/critical issues/barriers related to engagement process	<p>Major achievement in the engagement process has been the resolution of the City Council for the intervention in the site and the collaboration with Fondazione Mirafiori in the co-design of the engagement process.</p>
Current situation and next steps (to be updated)	<p>Despite the Covid-19 lockdown, the construction process is almost completed but co-design activities which are crucial for engaging communities and ensuring the long-term maintenance of the NBS, are in standby.</p> <p>In response to the impossibility by the City to bring in charge the maintenance of the NBS lawn, OrtiAlti decided to bear these costs (mowing of the lawn once a year), during the time needed to define the permanent maintenance of the NBS.</p>
5. Other activities	
Synergies with other proGReg activities	<p>Strictly connected with NBS8 Pollinator Friendly Garden: this implementation is in the same area and it's also in charge to OrtiAlti. Interconnections are related to the co-design process which is the same for the two NBS and to the future use of the area as a showcase of NBS.</p>
Links with other external project or activity	<p>European project (CWC interreg): the same reuse of rainwater for a green roof.</p>

Business model (link to WP5)	
Technology Readiness Level (TRL) (link to WP5)	
Communication activity (link to WP6)	Different phases of the construction site have been documented and diffused by OrtiAlti's social media. Local press interviewed OrtiAlti and several articles went out between February and March (before Covid-19 lockdown) about the green roof and the pollinator friendly garden.
6. State of Play and Monitoring	
Current situation (to be updated)	After Covid-19 lockdown, in May 2020 the construction site can restart and it will be completed by the end of May 2020.
Next steps (to be updated)	
Notes/critical issues/barriers (to be updated) (link to WP5)	The most critical aspects and barriers are connected to the difficulty by the City to find a new use for the building which fall back in the management of the green roof, related also to the impossibility by the City to bring in charge the maintenance of the NBS lawn that requires an annual mowing. Barriers are also emerged in the difficulty to engage the green maintenance offices of the City in taking care of the site during and after the realization.
7. NBS maintenance and outlook	
Maintenance	The maintenance will be done by Associazione Parco del Nobile (beekeepers) through OrtiAlti resources.
Sustainability after project conclusion	<p>The sustainability after project conclusion is strictly linked to the future use of the building and the area.</p> <p>The strategy designed by the City supposes a strong new actor managing the building in order to define a new science center disseminating proGireg NBS and other green solutions towards citizen and scholars. In this hypothesis new collaborations could emerge between the Science Center and other stakeholder acting in the area through a collaboration pact (Fondazione Mirafiori, Parco del Nobile, informal beekeepers, etc.).</p>
Additional resources	

6.1: Green corridor

	
1. General information	
Compilation date and update	June 2020 – First draft version
NBS type	Making post-industrial sites and renatured river corridors accessible for local residents
NBS title	Green corridor
Brief project synthesis	<p>The Sangone torrent, the waterway that surrounds the city to the south, and the area of the Piedmont Park, with agricultural, horticultural and beekeeping activities, is an opportunity to create an ecosystem path capable of redeveloping areas that today are weakly characterized and at risk of "heat island". Pollinating insects will enter urban areas, producing a vital pollination action. It will foster processes of involvement, participation and awareness in the residents. By participating in the project, and at the events, they will find a sense of identification and affection for the territory that will stimulate further actions of care and community ownership. The green traffic divider and small gardens, are today without any characterization and poorly used by the inhabitants: the accommodation with grasses and shrubs and few trees will solve these deficiencies and at the same time will provide a welcoming environment for pollinating insects with appropriate plant species. The composition of the intervention is designed to have pre-defined and repeatable modules and will allow the operation to be carried out in relation to the economic availability of the moment and to be increased as soon as there will be further funding. A "mosaic" methodology of project actions in a wider master plan.</p>
Area of implementation	<p>The "Green Corridor" area is developed by incremental lot in the areas inside the Mirafiori district along via Rodolfo Morandi in the stretch between via Castello di Mirafiori and via Palmiro Togliatti: the first lot is between via Castello di Mirafiori and via Rodolfo Morandi n.17.</p>

Target groups (beneficiaries)	The main benefits will be for citizens who live in the area: residents of social housing and smallholders, communities of people with economic and social difficulties, those who are hospitalized in facilities for physical and mental problems, those who work in the neighborhood, of different age groups and their economic differences. All the citizens are asked to become communities around the importance of actions on the environment in which they live or work, from simple information to active participation in construction and maintenance activities.
Timing (start and end date)	Start: 08/2020 End: 06/2021
Main responsible partner	City of Turin – Mobility and Infrastructure Department – Urban plan Service e-mail address: ferruccio.capitani@comune.torino.it
ProGireg partners involved	<ul style="list-style-type: none"> Fondazione Mirafiori University of Turin (Department of Life Sciences and Systems Biology, DBios and Department of Agricultural, Forest and Food Sciences, DISAFA):
Other stakeholders involved	<ul style="list-style-type: none"> ATC (Housing Agency): contacts with tenants Casa Farinelli: activity with users AIAPP – Italian Association of landscape architecture - Piemonte and Valle d'Aosta section: professional consultancy about project technical features
Total Budget	proGireg funds: 60.000,00 €
2. Pre-implementation activities	
Planning and preparatory activities	<p>The project started from the need to carry out actions to involve citizens in safeguarding, maintenance and design of the territory aimed at the redevelopment of green areas within urban areas and to promote the composition of embryonic ecosystem services with positive reverberations both on human beings and on other species, whether animal or plant.</p> <p>The area has been identified as part of a series of actions already in place by proGireg: the development of community farming (NBS 3.2) and beekeeping activities (NBS 8.1), the organization of caisson crops with the involvement of citizens living in the neighborhood (NBS 3.7). The redevelopment of the riverbanks of the Sangone torrent is also a planned COTO project financed by others funds.</p> <p>The area is characterized by a varied set of green areas with little or no identity but great potential. The main stakeholders have been identified in relation to the project needs and the skills they can offer.</p>
Administrative procedures	As the funds used for the implementation of this NBS come from European project (proGireg), these funds were initially transferred to the City of Turin and, subsequently, to the partners involved according to their needs. All these phases have been taken into consideration.



Technical and social analysis	Social and demographic analyses already carried out within WP2 activity have been used. Analyses carried out by the City of Turin about green heritage, population characteristics and dynamics, environmental conditions -such as the heat islands – and the infrastructure system of the district have been considered. Previous actions of citizens involvement by local NGOs have been considered in order to involve them in this action.
Other activities	<p>Actions planned to involve the citizens and the District in order to:</p> <ul style="list-style-type: none"> - prepare and eventually clean up the areas of intervention - to carry out information and training actions in order to know and recognize the tools and aims of the actions for the construction of the Green Corridor, also in relation to its maintenance - to organize groups of citizens, also coordinated by the District through the technical offices, for light maintenance works together with control actions and reporting any critical maintenance and management issues
3. Management structure and responsibilities	
Main partner (coordinator) and role/function	<p>City of Turin – Mobility and Infrastructure Department – Urban plan Service; Project design and coordination</p> <p>Collaboration between several Departments within the Administration has enabled the Urban Plan Service to coordinate the design of the NBS green corridor through meetings with the various stakeholders, both in terms of communication and professional and design exchanges.</p>
2nd Partner and role/function	<p>University of Turin (Department of Life Sciences and Systems Biology, DBios and Department of Agricultural, Forest and Food Sciences, DISAFA): scientific support for the identification of flora and fauna species on the territory</p> <p>UNITO contributed for some fundamental scientific characteristics for the design of the NBS, in particular for the choice of botanical and faunal species and then for the pre and post implementation monitoring actions</p>
3rd Partner and role/function	<p>Fondazione Mirafiori: stakeholders and citizen involvement and active participation</p> <p>Fondazione Mirafiori carries out actions of facilitation in the management and organization of the meetings with the various stakeholders both for organizational experience and for historical knowledge of the territory and will manage a group of vegetable gardens that will be involved in the creation of the green corridor.</p>
4. Co-design activities and stakeholder engagement	

Stakeholders, engagement processes, in co-design and co-implementation (link with WP2)	<p><i>Co-design</i></p> <p>The DBios University and the Mirafiori Foundation Association were involved in the design process, as well as, until the lockdown that imposed restrictive measures, Casa Farinelli and the ATC, especially in the phases of involvement of the resident population for the future maintenance of the NBS and in training experience on the re-introduction of pollinating insects, addressed to families with housing or economic difficult conditions. The aim is to achieve an affection for the places and consequent identification with them and the development of virtuous pathways to safeguard them, from a physical and social point of view, both in the pollinating insects' corridor and in the box gardens that will be managed through the Mirafiori Foundation.</p> <p><i>Co-implementation</i></p> <p>Having the opportunity to understand the sense of participation in the planting, construction and monitoring works, and the benefit of a small and little – symbolic - food production, the people involved will work together to maintain the areas, thus strengthening their civic commitment.</p>
Notes on major achievements/success factors/critical issues/barriers related to engagement process	<p>Stakeholders involved:</p> <ul style="list-style-type: none"> - Resident citizens already involved by Fondazione Mirafiori in the cultivation of vegetable gardens in the caissons, with the provision of cultivation experiences with all participants - Residents of Casa Farinelli: horticultural activities of small size in the spaces of their own residence with the aim of sharing and production of plant material to be "exported" in the green corridor - Residents of ATC Houses, both in the condition of assignees and those who have redeemed the property units, in the activities of planting and maintenance of the green corridor, with the aim of being able to carry out small cultivation activities "on balconies" with the goal of reintegrating or increasing the presence of species along the corridor - District technicians and occasionally other City Department to help and guide in maintenance and management activities. - Members of AIAPP - Italian Association of Landscape Architecture, for the transfer of knowledge related to the cultivation and landscape composition techniques. <p>Summary of the results achieved:</p> <ul style="list-style-type: none"> - Creation of a community feeling among residents in different residential, housing and social conditions with the aim of sharing and understanding the preciousness of social contamination and at the same time with the extraordinarily positive effects of "biodiversity" in the natural world. - Development of the sense of belonging to the Community and consequently to the places, and consequent development of virtuous actions of maintenance by the community with an economic aid directed towards the wider community that is in the City as a whole. - Collaboration in actions to mitigate the effects of climate change and heat island risks highlighted in the analysis of locations <p>Critical issues:</p> <ul style="list-style-type: none"> - Action timing indefinable with certainty as it is very dependent on the condition of awareness of the community but also of the individuals, especially in relation to the events of restriction and change in social relations as a result of the pandemic. - Theft of plant species, especially aromatic or aesthetically attractive, notwithstanding the sensitization done with small training courses on the possibility of taking plant material without having to reach total removal.
Current situation and next steps (to be updated)	<p>Current situation</p> <p>The DBios University is currently starting to monitor the presence of butterflies within the project areas in order to detect the current status at the "zero" point before any intervention on the site has already begun so that subsequent comparisons can be made as the work is carried out.</p> <p>Next steps</p> <ul style="list-style-type: none"> - Executive project approval by the end of July 2020 - Start of the procurement procedure - Start of work month February-March 2021 - Contextual information activities with the various residents

5. Other activities	
Synergies with other proGReg activities	<ul style="list-style-type: none"> • Links with "Citizens' science and social inclusion of the mentally disabled" (NBS 8) activities with UNITO • Links with the activity "Methodologies and variables for NBS monitoring and evaluation" (WP4) with UNITO • Possible interactions with the NBS 2.1 for the possible use of the new soil in the construction of the green corridor
Links with other external project or activity	"Biodiversity Turin for pollinators" project for the monitoring and conservation of pollinators in the Piedmont Park in collaboration with DBios with CRT funding.
Business model (link to WP5)	At this stage there are not yet sufficient elements to complete this request.
Technology Readiness Level (TRL) (link to WP5)	At this stage there are not yet sufficient elements to complete this request.
Communication activity (link to WP6)	<p>Communication activities are essential, as stated also in the preliminary workshops, and can be carried out on several levels:</p> <ul style="list-style-type: none"> - "Endogenous" workshops with the aim of involving the resident population in different situations to contribute to the formation of a community, although heterogeneous. - "Exogenous" workshops, with the aim of involving multimedia networks (radio, television, local but also national press...), social, political, productive world in order to valorize the existence and the role of such an NBS that can give life to trendy phenomena that increase the conscience and the possible participation. - Small training courses with the aim of making people understand the importance of the presence of vegetation, the fundamental role of pollinating insects, the crucial synergy between the different actions to enable a respectful behavior for the places and hopefully collaboration in maintenance and management activities. - Activities aimed at highlighting the value of the experience that many people have unexpectedly, if not in the agronomic field, certainly in that of cultivation, expression of a certain popular tradition.
6. State of Play and Monitoring	
Current situation (to be updated)	<p>In collaboration with the Mirafiori Foundation, the first meetings were held with a significant number of stakeholders who were interrupted due to the pandemic.</p> <p>Within this interaction with DBios University, the most suitable plant species were selected for the design of the green corridor according to the propagation of butterflies and pollinating insects.</p> <p>The DBios University has also started monitoring the presence of butterflies in the area in order to define the situation before the project.</p>

Next steps (to be updated)	<ul style="list-style-type: none"> - Executive project approval by the end of July 2020 - Start of the procurement procedure - Start of work month February-March 2021 - Contextual information activities with the various residents
Notes/critical issues/barriers (to be updated) (link to WP5)	The most critical element was the lockdown following the pandemic which led to the suspension of a series of meeting activities on the territory, monitoring and inspections with design function.
7. NBS maintenance and outlook	
Maintenance	Once ProGReg will be completed, Citizens, organized in the forms of associations or bodies already present in the territory, those that will eventually be formed over, with the collaboration of the technicians of the City and the District, to carry out maintenance and development of the project carried out. At the same time will be verified the possibility to undertake subsequent participation in raising new funds or funding that will be useful for the development of more ambitious and wider project goals.
Sustainability after project conclusion	The NBS has characteristics compatible with the indications that the Administration of the City of Turin, therefore it is integral part of the new Green Plan that has been drawn up and is being presented.
Additional resources	<ul style="list-style-type: none"> • http://www.pollinatorpassasjen.no/intro#!/food_en • https://www.greenme.it/informarsi/animali/autostrada-api-oslo/#:~:text=L'autostrada%20per%20le%20api%20di%20Oslo%20%C3%A8%20il%20primo,altrove%2C%20non%20solo%20in%20Norvegia. • https://www.rainews.it/dl/rainews/media/autostrade-di-fiori-selvatici-per-le-api-15c09457-55db-47f6-ab29-9f3e83f7ccd7.html#foto-1 • https://www.greenme.it/informarsi/natura-a-biodiversita/corridoi-api-regno-unito/#:~:text=Corridoi%20per%20le%20api%3A%20Londra%20pianta%20una%20vera%20e%20propria,di%20fiori%20lunga%2011%20chilometri&text=Un%20autentico%20%E2%80%9Ccorridoio%20delle%20api,insetti%20impollinatori%20entro%20questa%20estate. • http://www.teveretv.it/news/2016/maggio/23/nasce-in-italia-l-autostrada-delle-api-in-umbria-sbarca-un-progetto-ideato-in-norvegia/ • https://www.corriere.it/pianeta2020/20_maggio_18/giornata-mondiale-api-milano-festeggia-l-installazione-sotto-cometa-14f84a6e-9784-11ea-a89d-213e261096e7.shtml • https://www.npr.org/sections/thesalt/2015/05/20/408017267/pollinator-politics-environmentalists-criticize-obama-plan-to-save-bees?t=1592841790264 • https://www.facebook.com/aiapp.piemonte.vda

6.2: Local natural heritage enhancement in green corridor


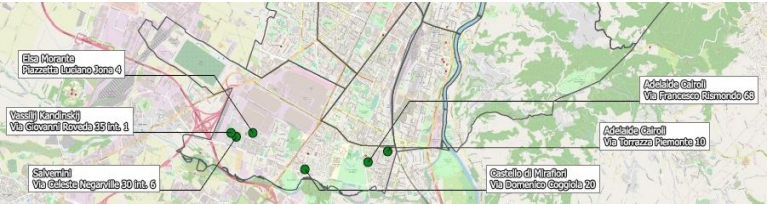
	
1. General information	
Compilation date and update	May 2020, first release
NBS type	Making post-industrial sites and renatured river corridors accessible for local residents
NBS title	Local natural heritage enhancement in green corridor
Brief project synthesis	The aim of this action is to facilitate access to the NBS implemented by proGReg, by placing landmarks/signs, providing information both on site and online, and organizing activities and visits for the residents.
Area of implementation	This action will be spread across the different NBS sites and in particular along the green corridor.
Target groups (beneficiaries)	All the inhabitants of Mirafiori and visitors alike.
Timing (start and end date)	March 2021 - July 2022
Main responsible partner	Fondazione della Comunità di Mirafiori Contact person: Vittorio Bianco - v.bianco@fondazionemirafiori.it
ProGReg partners involved	Linked Third Party Associazione Miravolante: organization of visits and activities City of Turin: link with NBS 6.1, authorisations

Other stakeholders involved	
Total Budget	22.000 €
2. Pre-implementation activities	
Planning and preparatory activities	<ul style="list-style-type: none"> - Meetings with City of Turin to plan the action and coordinate it with the green corridor action (NBS 6.1) - Request and collection of estimates for the landmarks/signs - Contact with the offices of the City of Turin in charge of urban furniture in order to identify the necessary administrative procedures to install landmarks/signs
Administrative procedures	<ul style="list-style-type: none"> - Estimates for landmarks/signs have been requested and collected from three possible suppliers - Once the co-design process will be completed, the final design will be submitted to the office responsible for the occupation of public land
Technical and social analysis	<ul style="list-style-type: none"> - Technical analysis is still ongoing, in order to identify the kind of landmarks/signs to be installed, with the necessary guarantees of durability and static conformity - The social analysis was performed in order to identify the stakeholders to engage in the co-design process
Other activities	
3. Management structure and responsibilities	
Main partner (coordinator) and role/function	Fondazione della Comunità di Mirafiori - coordination of the activities, co-design, implementation
2nd Partner and role/function	City of Turin - coordination with NBS 6.1, authorisations
3rd Partner and role/function	Linked Third Party Miravolante - organisation of activities and visits for the citizens
4. Co-design activities and stakeholder engagement	

Stakeholders, engagement processes, in co-design and co-implementation (link with WP2)	<p>A first group of stakeholders have been identified and invited to two workshops, on the 9th and 22nd of July 2019; it includes:</p> <ul style="list-style-type: none"> - ATC - Agenzia Territoriale per la Casa, institution that manages public social housing and owns many plots of land in the district; - Mirafleming, centre for kids (age 6-14); - the local parish; - Presidio Sanitario Valletta, public health centre; - Casa Farinelli, a centre that provides temporary housing to families in need; - Associazione Clorofilla, that manages Orti Generali; - Circoscrizione 2 - Turin's District 2 administration; - Comitato Borgata Mirafiori, a group of active residents of Borgata Mirafiori neighbourhood. <p>They will be involved again once the planning moves forward towards the final design and will be involved together with other group of active citizens in the co-implementation and co-management process.</p>
Notes on major achievements/success factors/critical issues/barriers related to engagement process	<p>The participation to the two first workshops has been good, all invited stakeholders were actually present.</p> <p>The level of engagement will be re-assessed when entering the co-maintenance phase.</p>
Current situation and next steps (to be updated)	<p>Currently the co-design process of landmarks/signs has just started, and will proceed until March 2021 in parallel with the green corridor implementation.</p> <p>Engagement activities and visits will be planned during the same period and are due to start when the green corridor will be completed.</p>
5. Other activities	
Synergies with other proGReg activities	<p>The activity is strongly linked to NBS 6.1; the co-design of landmark/signs that are meant to signal and connect all NBS, will involve all partners responsible of the other NBS implementation in Turin</p>
Links with other external project or activity	<p>The activity is linked with Iperurbana project that organizes visits and events to promote South Mirafiori district</p>
Business model (link to WP5)	<p>The landmark/signs will be designed to be durable and require little maintenance. A group of volunteers will be formed for the maintenance.</p> <p>For the organisation of visits and events Iperurbana project will be involved, which is being incubated by Fondazione Mirafiori as a way to promote sustainable tourism in Mirafiori.</p>

Technology Readiness Level (TRL) (link to WP5)	Current TRL: 8 TRL to be achieved by the end of the project: 9
Communication activity (link to WP6)	<ul style="list-style-type: none"> - June 1st, 2019: participation at the event ValletT'incontra, open day of the public health centre near via Morandi area, to present the project - October 6th, 2019: participation at the event "Giro di Blues" tour accompanied by music along the Sangone riverside.
6. State of Play and Monitoring	
Current situation (to be updated)	<ul style="list-style-type: none"> - Preliminary co-design workshops completed - First group of stakeholders engaged - Quotes for landmarks/signs requested and collected
Next steps (to be updated)	<p>As stated above, the co-design process will continue until March 2021.</p> <p>Co-implementation will begin in March 2021</p>
Notes/critical issues/barriers (to be updated) (link to WP5)	<p>The timeline could be changed if the Covid-19 pandemic causes further disruption making meetings and on-site visits impossible.</p> <p>Possible delays may be caused also by the authorisation process, that can be started only once final design is available</p>
7. NBS maintenance and outlook	
Maintenance	As stated before the landmark/signs will be designed to be durable and require little maintenance, and a group of volunteers will be formed for the maintenance, with the help of local stakeholders.
Sustainability after project conclusion	Iperurbana project will be involved for the organisation of events and visits and to promote sustainable tourism in the area and the access to proGireg NBS and Sangone riverbanks.
Additional resources	<p>https://www.facebook.com/fondazionemirafiori/</p> <p>Further documentation has not been published but is available upon request.</p>

7.1: Tools for environmental compensation processes (School forest)



	
1. General information	
Compilation date and update	May 2020, first draft release
NBS type	Local environmental compensation processes
NBS title	Tools for environmental compensation processes (school forest)
Brief project synthesis	<p>The acquired supporting IT instrumentation is intended to provide a common framework to develop data collection and transformation workflows and, eventually, automate them. This wants to be the prerequisite for the construction of thematic territorial databases of interest for the different targets (internal and external to the PA). It is considered functional to the strategic planning of the project and its future spin-offs on a city and metropolitan scale.</p> <p>This activity aims to provide the project team and, in the future, the City and the territory, with IT tools and technologies able to allow the collection and systematization of all spatial and non-spatial data that will be considered of interest, on common cartographic databases.</p> <p>The educational services together with the ICT department have recently started a similar path aimed at equipping themselves with territorial information tools (a GIS project, in this case) to geo-referencing administrative information on school infrastructures. The approach with which they are managing the process can be borrowed.</p>
Area of implementation	N.A.
Target groups (beneficiaries)	Urban planners, city department interested in use this tool.
Timing (start and end date)	2019- 2023
Main responsible partner	City of Turin

ProGlgreg partners involved	
Other stakeholders involved	Green department, Public and Private building and Urban planning Departments of the City
Total Budget	30.000 (software FME, a geodata integration platform)
2. Pre-implementation activities	
Planning and preparatory activities	<ul style="list-style-type: none"> • Check (geo)dataset available for the construction of the territorial database of reference for the project, in which all the elements of urban planning useful for the purpose will have to be brought together. • Verify also new urban planning database. • Needs analysis and software requirements specification. • Understand the functionality needed for the workgroup and then define the requirements for the internal expert/non-expert user interface (for visualization) + Public Interface.
Administrative procedures	
Technical and social analysis	<p>To date, the following areas of interest have been identified within the City of Turin. Environment and Green Dept One hypothesis is the purchase of an instrument able to return the possible effects of the application of an NBS widely applied in a part of the city, verifying the improvements for example in the area of heat islands.</p> <p>Urban Planning and Private Building Dept Reference is made to instruments of a different nature, implementing a good policy mix to support innovation in the NBS sector:</p> <ul style="list-style-type: none"> • regulatory/regulatory instruments (e.g. Building Regulations) • thematic action plans (e.g. Climate Adaptation Plan) • private stimulus instruments (environmental compensation and CSR Green network)
Other activities	<p>The idea is to use the tool also to establish a sponsorship model to find private resource to regenerate the public-school yards, by establishing environmental compensation processes. The procedural steps are summarized as follows:</p> <ul style="list-style-type: none"> • Make a municipal resolution applying the proGlgreg framework as already done in other activities (NBS 3) where the specificity of schoolyards is presented. • Then it would be necessary to approve a technical annex describing the actions that can be sponsored • Then prepare and edit the sponsor search notice
3. Management structure and responsibilities	

Main partner (coordinator) and role/function	City of Turin
4. Co-design activities and stakeholder engagement	
Stakeholders, engagement processes, in co-design and co-implementation (link with WP2)	
Notes on major achievements/success factors/critical issues/barriers related to engagement process	
Current situation and next steps (to be updated)	
5. Other activities	
Synergies with other proGReg activities	The action can cross all other actions.
Links with other external project or activity	
Business model (link to WP5)	
Technology Readiness Level (TRL) (link to WP5)	
Communication activity (link to WP6)	
6. State of Play and Monitoring	
Current situation (to be updated)	<p>Acquired “FME software suite” a Geo ETL (Extract, Transform, Load), to build workflows that receive input from heterogeneous data sources, perform transformations on them (e.g. mapping, restructuring, manipulation, coordinate reprojections) and generate output in as many formats as possible, both proprietary and free.</p> <p>Calculated some of the indicators provided for in Annex 1.2 of ProGiReg WP2 (Methodology on spatial analysis in front-runner and follower cities), section 3.3.2.</p>

	Developed a GIS project mapping the buildings owned by the City of Turin with flat roofs or otherwise suitable to host green installations.
Next steps (to be updated)	Perform what-if analyses that allow, on the basis of data collected on "pilot" installations of the punctual type (e.g. a roof, greenery, some caisson gardens), to make forecasts on a larger scale, both at Living Lab and City level.
Notes/critical issues/barriers (to be updated) (link to WP5)	The data collected by the sensors must be fed into a suitable database. The solution initially chosen by the City was a regional platform named YUCCA (http://www.smartdatanet.it/), but the scenario has changed and there are currently no indications.
7. NBS maintenance and outlook	
Maintenance	
Sustainability after project conclusion	<p>As stated in section 1, the acquired supporting IT instrumentation is intended to provide a common framework to develop data collection and transformation workflows, so our intention is to enlarge the pool of users in order to increase the (geo)data processing capacity of the offices of the City of Torino.</p> <p>In parallel we will try to keep the various tools updated by acquiring the necessary maintenance contracts, which we believe to be very useful for the valorisation of the data in the possession of the City of Turin (for example, for urban planning strategies or for the release of open data), in compliance with the indications of the ICT Three-Year Plan 2019-2021 by AgID, the Agency for Digital Italy).</p>
Additional resources	

8.1 Butterfly gardens for disadvantaged people

	
1. General information	
Compilation date and update	May 2020 - Time 0 / Initial version
NBS type	NBS 8 - Pollinator biodiversity improvement activities and citizen science project
NBS title	Butterfly garden for disadvantaged people
Brief project synthesis	<p>All the activities are part of "Farfalle in ToUr", a project born in Turin (Italy) in 2014 from the collaboration between Local Health Company (LHC), Mental Health Centres and University of Turin (Department of Life Sciences and Systems Biology). The objective of the project is to promote the presence of butterflies in the city of Turin through the creation of a network of green areas which, with proper management and with the presence of suitable plants (food plants and nectar sources) for the life cycle, allows butterflies to cross the urban area, otherwise seen by these insects as a wall. The scientific aim of the project is accompanied by the social purpose, the involvement of fragile people with mental or physical disabilities, against isolation and social stigma. Supported by university researchers, people affected by mental or physical diseases, after a training course, become scientific disseminators and carry out all the project activities in some realities of the Mirafiori district: they create and take care of pollinator gardens, observe and record butterfly species, manage a website, breed caterpillars, taking part in public events and educational activities in schools, refugee centres, social housing, shelter facilities for the elderly.</p>
Area of implementation	<p>Butterfly garden in centro Aquilone: GPS coordinates 45.009894, 7.636412</p> <p>Butterfly garden in scuola Torrazza: GPS coordinates 45.015945, 7.656806</p> <p>Butterfly garden in Casa Farinelli: GPS coordinates 45.015232, 7.634801</p> <p>Butterfly garden in Casa del Mondo Unito: GPS coordinates 45.018837, 7.609188</p> <p>Butterfly garden in presidio Valletta: GPS coordinates 45.015602, 7.631016</p> <p>Transects in Orti Generali: GPS coordinates 45.00916, 7.62559</p>

	They collaborate with other activities and events all around the district.
Target groups (beneficiaries)	The main beneficiaries of this project are psychically and mentally disabled people. Other categories of disadvantaged people will be involved: refugees, social housing guests, Alzheimer patients. Common citizens will benefit from this project and will ask them to take part in the project activities involving public green areas, public events, online challenges.
Timing (start and end date)	Start: April 2019 End: December 2021
Main responsible partner	UNITO (DBios) email address: zoolab.unito@gmail.com
ProGlg partners involved	<ul style="list-style-type: none"> • City of Turin • Coefficiente Clorofilla (Orti Generali) • Fondazione Mirafiori
Other stakeholders involved	<ul style="list-style-type: none"> • Cooperativa La Rondine • Cooperativa Il Margine
Total Budget	<p>Budget DBIOS (UNITO):</p> <ul style="list-style-type: none"> • 31.106,75 € Staff costs • 2.000 € Other direct costs • 4.138 € Indirect costs <p>ProGlg funds from City of Turin to Cooperativa Rondine for activities from 2020 to 2021 (total 22.000 €):</p> <ul style="list-style-type: none"> • 540 € for the supply of plants from Orto che Cura (Il Margine) • 18.000 € from self-financing activity made by Cooperative Rondine-Il Margine • 3.360 € for University researcher teaching
2. Pre-implementation activities	
Planning and preparatory activities	<p>Before proGlg the project "Farfalle in TOur" was launched in the city of Turin (2014) thanks to the collaboration between DBios and the Mental Health centre of district 3 managed by ASL TO1. The will to set up the project had at first arisen from doctors, professional educators and users of Mental Health Centers (MHC) of the city, that asked the collaboration of the University.</p> <p>It was the first Italian <i>Citizen Science</i> project where citizen scientists were users of Mental Health day centres. Accompanied by the staff of the zoology laboratory of DBIOS (UNITO), the users have:</p> <ul style="list-style-type: none"> - to set up a green area with foodplants and nectar plants; - to survey regularly butterflies that visited the green area; - to involve the citizens of District 3 by distributing seeds, foodplants and nectar plants to be placed in private gardens or balconies;

	<ul style="list-style-type: none"> - to activate a project ("Butterflies go to school") of knowledge transfer and awareness raising with a Primary School of the same district, carrying out for two years workshops and caterpillars breeding (<i>Vanessa cardui</i>) with children.
Administrative procedures	Direct contract between the City of Turin and the Cooperativa La Rondine
Technical and social analysis	
Other activities	
3. Management structure and responsibilities	
Main partner (coordinator) and role/function	UNITO: coordination of project activities
2nd Partner and role/function	City of Turin: coordination of exchange among "Farfalle in ToUr" and other proGReg activities
3rd Partner and role/function	La Rondine cooperativa: co-designing activities with the disabled
4th Partner and role/function	Il Margine cooperativa: co-realization of project activities with La Rondine cooperativa
4. Co-design activities and stakeholder engagement	
Stakeholders, engagement processes, in co-design and co-implementation (link with WP2)	The City of Turin, with the help of Fondazione Mirafiori, found out what vulnerable groups in the district could be interested in the butterfly activities. Together with the "Farfalle in ToUr" group, the City decides how many and what type of activities could be conducted by the group of psychically and mentally disabled people who became scientific disseminators.
Notes on major achievements/success factors/critical issues/barriers (to be updated) (link to WP5)	<p>Major achievements:</p> <ul style="list-style-type: none"> • (8) disabled people were trained and became "butterfly scientists" • Creation and maintenance by "Il Margine" users of a butterfly garden in centro l'Aquilone • Realization of "InGenio" exhibition (Turin, 13 - 25 September 2019), with urban butterfly photos and laboratories

	<ul style="list-style-type: none"> • Participation in educational activities within the PON (National Operational Programme on Education) project won by the I.C. Racconigi Primary School • Planning of many educational activities in schools and in other cooperatives/communities hosting fragile people (2021)
Current situation and next steps (to be updated)	<p>All activities outside are stopped because of Covid-19. Disableds are closed in their “group homes”. The group is thinking about alternative activities to carry out the dissemination about butterflies.</p> <p>Butterfly monitoring in Cascina Piemonte will probably take place, but carried out only by one person of DBios.</p> <p>Next steps:</p> <ul style="list-style-type: none"> • a contest will take place on the Facebook page. Each wednesday a video (shooting by Il Margine users and educators) about butterflies will be published, each with a specific challenge attached. Citizens taking the challenge will receive a identification card of urban butterflies of Turin (6 in total); • educational material will continue to be published in the Facebook page, possibly one post per day; • next year (2021): activities planned (school activities, workshop in other cooperatives/communities, butterfly monitoring with disableds) in collaboration with Fondazione Mirafiori and Orti Alti
5. Other activities	
Synergies with other proGReg activities	<p>UNITO has suggested suitable plants for pollinators for actions 3.2 3.3, 3.4 3.5. 5.1, 5.2, 6.1.</p> <p>They are collaborating with schools: they will do laboratories with pre-primary and middle schools. They will do the school PrimaVera Festa in 2021.</p> <p>They will do some training and dissemination events in connection with pollinator friendly garden.</p>
Links with other external project or activity	<p>“Biodiversity Turin for pollinators” project for monitoring and conservation of pollinators in Piemonte Park in collaboration with Orti Generali and CRT funding.</p>
Business model (link to WP5)	
Technology Readiness Level (TRL) (link to WP5)	
Communication activity (link to WP6)	<p>A press release was written on the occasion of the visit to the city of Piraeus (September 2019). The local press has published several articles on this action. The project group manages a website (http://www.farfalleintour.it/) and a Facebook account (https://www.facebook.com/farfalleintour/), which publishes scientific contents and updates on the activities on an ongoing basis.</p>
6. State of Play and Monitoring	

**Current situation
(to be updated)**

State of play

With proGReg the project "Farfalle in ToUr" will be strengthened, expanded and in particular concentrated in the area of Mirafiori South. The reference centre for activities with the disabled identified is the accommodation community l'Aquilone in Strada Castello di Mirafiori 142 in Turin. During 2019 it was the venue for the training course for 10 users of the city's Mental Health Centres, identified on the basis of their skills and interest in the project. The course also had a final evaluation and some of them will be offered a work grant for the years 2020 and 2021.

The activities for disabled people will concern:

- the care of a butterfly garden created in the centro Aquilone;
- the care of the website and facebook page of "Farfalle in ToUr";
- participation in dissemination events and parties in connection with other proGReg actions (e.g. green roof, pollinator friendly garden);
- participation in training interventions in schools, in a refugee centre, in social housing, in a residential centre for the elderly.

Monitoring

In Turin, biodiversity monitoring (NBS8) involves floral, bees and butterfly surveys, in agreement with the EU Pollinators Initiative (2018). Pollinator monitoring focus area is Cascina Piemonte, a large green area (19 hectares) in Mirafiori Sud, located along the Sangone river. The park has been object of unauthorized agricultural and grazing activities until 2018. Currently, thanks to the work done by the Coefficiente Clorofilla association (Orti Generali project) in the NBS3, the park hosts 170 urban gardens, and a building used for raising of chicken and for beekeeping. The monitoring of pollinators and flora were carried out in 2018 and 2019, from April to September, to cover the main flowering period and butterfly and bee activity in Turin. Surveys were conducted along two transects (T1 and T2) with different ecological characteristics. The first (T1) is characterized by a transitional environment (ecotone) between the river and open grazed meadow; the second one (T2) is conducted between urban gardens, where a "pollinators avenue" has been implemented. In the area an apiary of 7-9 beehives has been placed in June 2018. Butterfly, bee and flower surveys were carried out in order to evaluate the success of NBS implemented, by combining butterfly and bee responses at community level.

- Butterfly surveys: semi-quantitative surveys were performed by experts walking along fixed-route 300 m transects¹² along T1 and T2. Butterfly species were identified, and individuals of each species counted. The observations were conducted between 10:00 am and 3:00 pm.
- Bee surveys: 250 m long linear transects were walked in 50 min. Each transect start point and direction walked were randomly determined. All bees unambiguously identifiable were recorded and all others that could not be identified in the field were caught with a hand net and identified in the laboratory. Six observation sets were made, conducted between 9:00 am and 5:00 pm.
- Flower surveys: larval food plants of butterflies as well as flower surveys to identify plants visited by bees and/or butterflies for nectar, and pollen and honeydew for bees were carried out in parallel to the bee and butterfly surveys along the transects. Plant species were collected and identified according to Pignatti (2018)¹⁶.

Shannon Diversity Index and Shannon Evenness Index were calculated for butterflies and bees in order to quantify the biodiversity in a community and the homogeneity of individual distribution between species in the community respectively. Shannon Diversity Index and Shannon Evenness Index provide valuable information about the fauna richness and composition and they take into consideration both the number of different species observed and their relative

	<p>abundances. Both the indexes used turned out to be repeatable and standardized, easily applicable to different fauna taxonomic groups; the data collection has been cheap and quick.</p> <p>Notably, biodiversity surveys in Cascina Piemonte represent the first Italian urban transect to be part of the European Butterfly Monitoring Scheme (eBMS), and it represents the only example of coupled monitoring between butterflies and bees in an urban context.</p> <p>Pollinators monitoring will continue involving neighbouring areas, as a green corridor and a social cooperative's green area. The green corridor (NBS6), co-designed and planned for 2020, will connect Cascina Piemonte with another green area (Colonnetti park). Users of the community have been trained in butterfly recognition and transect sampling method: it will be possible to involve citizens in butterflies survey, through Citizen Science project "Farfalle in ToUr" (NBS8).</p>
Next steps (to be updated)	The pollinator monitoring will continue in next years.
Notes/critical issues/barriers (to be updated) (link to WP5)	The progress of the activities is often slowed because users need more time to carry them out. However, sometimes the great motivation leads users not to abandon the project, as it is a way to feel part of the community and then overcome loneliness; the participation of users could be low in hours' term, but constant.
7. NBS maintenance and outlook	
Maintenance	Each butterfly garden is created by an association or community that will take care of it.
Sustainability after project conclusion	<p>Il Margine and La Rondine cooperatives will continue to carry on the project and to support it with their own funds, proposing the activities to their users.</p> <p>To convince the other associations that will participate in the project to keep the commitment, a membership fee will be required of anyone who wants to be part of "Farfalle in ToUr" and receive training workshops. For school activities will be required to the school a contribution. These financial contributions will help to finance project activities and materials.</p>
Additional resources	<p>http://www.farfalleintour.it/</p> <p>https://www.facebook.com/farfalleintour/</p>

4. Living Lab results and perspectives

4.1 Conclusions of the Implementation phase

As indicated, this version of the IP represents the first version of a document that we believe gathers, as exhaustive as possible, information on the implementation of 18 different implementations linked to 7 NBS. Many of the planned activities are still in progress or will be implemented by next year, so not all the information is yet available.

Nevertheless, the information collected is already a very important wealth of knowledge, which in itself represents a result in line with what proGireg has established.

We highlight the relevance of the post-implementation phase, both for understanding barriers (technological and non-technological) and new business models (WP5) to be developed from the NBS realized, and for understanding benefits (see WP4), as well as for handover and long-term sustainability.

The first release of the IP was developed in about five months of work (February - June 2020). This phase coincided with the outbreak and spread of the Covid-19 pandemic which severely affected the implementation of several NBS. Both the physical implementation activities and all those involving the participation of the beneficiaries (citizens, associations, students) were stopped, cancelled or suspended. The finalization of this document coincides with the loosening of the restrictive measures imposed by the authorities to prevent the spread of contagion. However, the consequences of this tragic situation have yet to be fully assessed and, above all, there are fears that a new wave of the virus will occur.

4.2 Results obtained and criticism

The working methodology conceived and put into practice, since the City has been a candidate to become a partner of proGireg, has been the **diffused green development approach**: the idea is to carry out multiple interventions, of limited but generative scope, in a widespread and fragmented way along a vast and fragmented territory. Secondly, **a strategy for the activation of abandoned areas and places has been carried out: small interventions that help in bringing back the interest of the community and politicians in that area**. Finally, we worked **to build large partnerships and synergies** with local key actors believing, as also identified as a significant methodological element of proGireg (Quadruple Helix approach), that thanks to the involvement of different key actors we could obtain greater and lasting benefits over time.

In this sense, without detracting the important contributions of the all partners, the role of the Mirafiori Foundation, as a partner rooted, recognized and very active in the territory, has allowed it to reach different groups of citizens (from students to neighborhood associations) and involve them in the implementation activities.

If we look at the socio- economic features and the problems and challenges identified thanks to WP2 and summarized in chapter 2, we can try to summarize some elements of analysis that the proGireg project and the NBS implementation have faced.

Even if the NBS (3.3 and 5.4) are not completed, we can already say that the objective of **revitalizing abandoned spaces** (generally former industrial plants or abandoned grey areas) has been achieved thanks to the activities of proGReg. In fact, at the property located in Via Onorato Vigliani 102 (renamed **WOW**) some interventions have been carried out with the aim of activating a place (owned by the Municipality) long abandoned and therefore perceived as unsafe by citizens. In this sense, specific procedural steps have been taken to allow a private entity to operate, for public purposes, on a publicly owned building. In addition, the design for the temporary use of the structure was experimented.

These activities have also made it possible to transform a place perceived as insecure into a living area where nature-related activities can be carried out. A public space then, which has begun to be returned to the citizens. There is no doubt that given the size and state of the building, additional resources and commitment will be needed to ensure that the space returns to be a point of reference for the neighborhood and the city. but certainly a first step has been taken thanks to proGReg.

With similar intention, NBS 3.2: Gardens in Cascina Piemonte (Orti Generali), allowed an NGO to completely transform an abandoned and unsecure area in a lively and crowded community

Almost all the NBS implemented in Turin focus on fostering participation and active citizenship. The civic engagement is intended also as an antidote or cure for isolation and loneliness which, as outlined in chapter 2, represents a critical factor for many (elderly and single-parent families first and foremost) inhabitants of the district.

It worth mentioning that these involvement activities (especially in NBS 5.3 and 8.1) have also been addressed **to marginal groups (disabled people, homeless, etc.) thus achieving proGReg inclusion objectives.**

In relation to the characteristics of the district, in this case physical, we tried to provide for the uneven distribution of greenery (and the consequent fragmentation and separation of the different areas of the Mirafiori District) through the NBS 6.1 and 6.2, carrying out interventions that allow to cross and to reach green areas of the neighborhood remaining on natural paths, adequately marked and enhanced.

With regard to health and pollution issues, it seems too early to assess the benefits of NBS and reference is to WP4 monitoring and evaluation activities. But **proGReg has certainly contributed to regenerate and recover the district:**

- **by disseminating ideas and examples of good practice as seeds for future developments;**
- **by contributing to build a new and green identity of the District.**

As noted in Chapter 1, due to the large number of actors involved and the NBS implemented in Turin, it was necessary to set up a management structure to coordinate the tasks, also ensuring a communication channel among them and managing continuous contact-feedback. Secondly, thanks to the identification of specific resources, a common narrative and communication strategy and plan has been built.

The key innovation features of the implemented NBS

NBS 2.1 (New soil production in a plot of land of about 2000 s.m. within Sangone Park) was considered a core intervention in the Turin Living Lab. The outcome of this experimentation, **a new regenerated soil, has a great potential impact on the future urban development in Turin and beyond.**

Many NBS in Turin are carried out together with students and teachers from almost all schools of Mirafiori Sud district (of all grades). We believe that these activities constitute a positive and easy entry point to foster awareness and knowledge among young generations.

As indicated above and in the monitoring deliverables (D.3. first implementation monitoring report), administrative procedures have very often caused delays and obstacles to a rapid implementation. COTO has worked hard on this issue trying to overcome the bureaucratic obstacles that, in the first place, hinder the construction of public-private partnerships. For this reason, the City has identified some models of agreement:

- **Experimental agreement:** the City adopted this partnership agreement to facilitate the testing (i.e innovative solutions) on specific topics selected by the City. In this contract, the duties and rights of the City and the proposing companies have been specified; the methods and duration of the trials; the regulations relating to the publicity of the initiative.
- **Collaboration pacts:** under the rules stated by the local **Regulation on Urban Commons** this new tool allows active citizens (informal groups, associations, NGOs) to be engaged in the management of urban commons. These pacts are a powerful tool to trigger a widespread civic sense and to foster the idea of a change in the type of relation between residents and the local authority.
- **Temporary use concession:** this contract allows private actor to work in public buildings and areas. It is a quite simple and easy procedure aimed at facilitate the revitalization of abandoned or underused buildings. This contract helps in finding private ideas or solutions in case the city still has not decided (or hasn't find the resources) the final destination of the area.
- **Convention for public works:** this is a traditional public contract used in this case thanks a specific article of the public tender law (D.lgs 50/2016), that allows a private actor to carry out works, with own resources, for public purpose.

It is not possible to go into the specifics of each agreement here, but we believe that a consideration on these forms of agreement can be very useful, both for FRC and FC. Despite the various legislative constraints to which nations and cities are subject, it is important find innovative tools in order **to increase public-private synergies** and ultimately guarantee resources for urban development projects.

As previously indicated, the **issue of sustainability** is linked, first, to the short-term (after the implementation phase and until the end of the project in 2023) maintenance of the works carried out. In the monitoring deliverable (D.3.3) this issue has already been identified and please refer to that document for further details. Here it seems appropriate to point out that the issue is strongly perceived by all the actors involved.

The issue of long-term sustainability (after the end of the project) is even more challenging, and it will be needed to take it in great consideration.

The diffused development approach has made it possible to carry out numerous interventions. However, the NBS implemented are often small and the effects of these solutions both in terms of improving environmental conditions and as positive tools for climate risk mitigation (i.e. heat islands) have yet to be assessed.

The added value of proGlgreg NBS in Turin, lies in achievement of social inclusion goals as social inclusion, livability, and new community identity.

More generally, and in line with what has just been written, it will be necessary to identify additional resources to support, in the long term, new urban regeneration programmes and activities. With this perspective it will be interesting to investigate the possibilities of dissemination and replication in other city contexts of the NBS realized in Mirafiori Sud (see replication workshop by WP2).

ProGlgreg in Turin has already served as an attractor of additional resources and urban development projects in the Living Lab area. A National fund for research on smart agriculture and innovative collaborative gardens (MIUR) and “**AXTO** action” (National Operational Programme "Citta' Metropolitane" (NOP Metropolitan Cities) have brought funds to support innovative testing and social inclusion activities in Mirafiori Sud District.

Moreover, the knowledge acquired with proGlgreg activities will be used to implement green corridors (NBS 6.1) within other EU funded project (**ToNite** - Urban Innovative Action programme) to be implemented in other part of the city.

Finally, it will be necessary to further investigate the possibility of generating innovative business models starting from the NBS implemented.

It's worth mentioning the creative responses to Covid-19 restrictions. COTO and other partners have developed ideas and activities to overcome the physical distancing imposed by the authorities in order to reduce the chances of virus infection by continuing the implementation activities. Please see D.3.3. (First implementation monitoring report) for details.

4.3 Further developments

This chapter will be completed after the end of the implementation phase. As a first lesson learnt we can highlight the importance of a grassroots participation to foster citizen awareness and public goods ownership.

The contribution of the results obtained in relation to an integrated urban planning with NBS and GI is still to be discussed. Undoubtedly this also represents a great challenge in terms of sustainability of the initiatives realized by proGlgreg.

During the implementation phase it is our intention to involve all partners and stakeholders in order to understand what results have been perceived and what possible developments these actions can be undertaken both as a future development of the living lab and as integration of the NBS in urban planning tools.

COTO is strongly interested in continuing to work both in the Mirafiori Sud district and on NBS issues. At the moment the City is partner of three European projects that, also learning from the knowledge and results (and critical points) obtained with proGIreg, will develop initiatives consistent with what has been achieved with this project:

City Water Circles (CWC - Interreg Central Europe): Urban Cooperation Models for enhancing Water Efficiency and Reuse in Central European functional urban areas with an integrated Circular Economy approach. The CWC project aims to help municipalities to reform outdated urban water infrastructure systems via applying a circular economy approach, which offers many economic and environmental benefits.

CONEXUS (Co-Producing Nature-Based Solutions and Restored Ecosystems: Transdisciplinary Nexus for Urban Sustainability - Horizon 2020): the aim is to develop multifunctional micro green areas, identifying new opportunities for retrofitting public areas previously dedicated to street waste collection, establishing sustainable urban drainage systems (SUDS), increasing biodiversity and improving health and well-being. The pilot project will test the latest generation design with approaches combining shading and rainwater management services and integration with street furniture.

Fostering the Urban food System Transformation through Innovative Living Labs Implementation (**FUSILLI** - Horizon 2020): The aim of FUSILLI is to support cooperation and knowledge sharing and mutual learning of the food system transformation. The main objective is to build an urban food plan to reach an integrated and safe holistic transition towards healthy, sustainable secure, inclusive, equitable and cost-efficient food systems, through feasible and replicable innovative urban policies leading to deploy improving actions in all stages of the food value chain. The testing locations selected by the City will be in Mirafiori South District.

Annex 1: Turin Living Lab Map

Mirafiori Sud Living Lab Torino | Mirafiori Sud Living Lab Turin

Mappa del Living Lab | Living Lab map

Update: JUNE, 2020



Obiettivi e vision generale del LL
Living Lab goals and overall vision


Rigenerare e valorizzare le aree insicure o abbandonate del quartiere di Mirafiori coinvolgendo i cittadini nella progettazione e gestione di spazi verdi pubblici.
To regenerate and enhance the abandoned or unsafe areas of the Mirafiori district by involving citizens in the design and management of public green spaces.

Promuovere nuove professionalità e modelli di business basati sulle soluzioni naturali.
To promote new professionalism and business models based on natural solutions.

Valorizzare i benefici multipli (sociali, ecologici, economici e per la salute) delle soluzioni naturali inserendole negli strumenti di pianificazione e rigenerazione urbana.
To demonstrate the multiple benefits (social, ecological, economic and health) of nature-based solutions as an integral tool of urban planning and regeneration.

Dettagli sulla NBS 2 | Details on NBS 2

NEW REGENERATED SOIL THANKS TO BIOTIC COMPOUNDS FOR URBAN FORESTRY AND URBAN FARMING



Produzione di nuovo suolo rigenerato nel Parco Sangone.
Description: Creazione di un'area di "foresta urbana" lungo le sponde del Sangone attraverso l'utilizzo di suolo rigenerato (New Soil), a base di inerti e compost da FORSU e biostimolanti innovativi.
Partners: Dual, Envipark (Acea e ccs come terze parti), Unito (DISAFA e Dip. Chimica), Città di Torino.

New Soil production in Sangone Park.
Description: Creation of an area of "urban forest" along the banks of the Sangone through the use of regenerated soil (New Soil), based on aggregates and compost from FORSU and innovative biostimulants.
Partners: Dual, Envipark (Acea e ccs as third parts), Unito (DISAFA and Dip. Chimica), City of Turin.

Dettagli sulla NBS 3 | Details on NBS 3

COMMUNITY-BASED URBAN FARMS AND GARDENING ON POST-INDUSTRIAL SITES



Recupero rovine Castello di Mirafiori.
Description: Trasformazione paesaggistica per valorizzazione area di interesse storico-ambientale.
Partner: Associazione Clorofilla.

Castello di Mirafiori ruins recovery.
Description: Landscape transformation for enhancement of an area of historical and environmental interest.
Partner: Associazione Clorofilla.



Orti Generali.
Description: Orti individuali e collettivi assegnati con contributo spese ai singoli cittadini, area didattica comune per attività formative e associative.
Partner: Associazione Clorofilla.

Gardens in Cascina Piemonte (Orti Generali).
Description: Collective gardens rented to individual citizens, common educational area for training and community activities.
Partner: Associazione Clorofilla.



Giardini fioriti al WOW.
Description: Giardino in cassone e arnie.
Partners: Orti Alti, Fondazione Mirafiori, Miravolante, Città di Torino.

Pollinator friendly gardens at WOW.
Description: Box gardens and beehives.
Partners: Orti Alti, Fondazione Mirafiori, Miravolante, Città di Torino.



Orto a scuola in cassone.
Description: Realizzazione o integrazione di orti didattici in cassone e di laboratori scientifici rivolti alla scuola primaria e superiore sui temi di proGREG.
Partners: Fondazione Mirafiori, Miravolante, Unito (DBios e DISAFA).

School garden in box.
Description: Realization or integration of educational gardens and scientific laboratories aimed at primary and high schools on the topics of proGREG.
Partners: Fondazione Mirafiori, Miravolante, Unito (DBios e DISAFA).



OrtoMobile in cassetta nelle scuole.
Description: Fornitura di uno stock di cassette per la realizzazione di "micro-orti" e compostiere per le scuole e corso pratico per gli insegnanti.
Partners: Iter, Unito (DBios e DISAFA).

Micro vegetable gardens in schools.
Description: Supply of a stock of wood cassettes for the realization of "micro-garden" and composters for schools and practical course for teachers.
Partners: Iter, Unito (DBios e DISAFA).



Orti comunitari a scuola.
Description: Orto didattico in cassone.
Partners: Iter, Liceo Scientifico Primo Levi, Unito (DBios e DISAFA).

Community school gardens.
Description: Vegetable garden in wood boxes (raised bed).
Partners: Iter, Liceo Scientifico Primo Levi, Unito (DBios e DISAFA).




Orto tra le case.
Description: Posizione di cassoni fissi per orticoltura urbana.
Partner: Fond. Mirafiori, Miravolante.

Gardens between houses.
Description: Placing of fixed containers for urban horticulture.
Partners: Fond. Mirafiori, Miravolante.

Dettagli sulla NBS 4 | Details on NBS 4

AQUAPONICS AS SOIL-LESS AGRICULTURE FOR POLLUTED SITES



Test di acquaponica.
Description: Sistema di acquaponica su piccola scala, progettato dalla comunità, e installato in un sito pubblico attualmente abbandonato.
Partner: Città di Torino.

Aquaponics test.
Description: Small-scale community - designed aquaponics system, to be set up on an abandoned public site.
Partner: City of Turin.

Dettagli sulla NBS 5 | Details on NBS 5

CAPILLARY GI ON WALLS AND ROOFS



Nuovo tetto verde Casa Nel Parco.
Description: Ripristino dell'accesso del tetto verde di Casa Nel Parco
Partner coinvolto: Città di Torino, Fondazione Mirafiori.

New green roof at Casa nel Parco.
Description: Restoration of the Casa nel Parco green roof access
Partners: City of Turin, Fondazione Mirafiori.



Parete verde a scuola.
Description: Parete indoor con sistema a vaschette estraibili. Progettazione partecipata e co-gestione per la cura delle pareti con coinvolgimento di studenti e personale scolastico.
Partners: Città di Torino, Politecnico di Torino (DAD e DIATI).

Green Wall at school.
Description: Green indoor wall with removable tray system. Participatory processes and co-management for the maintenance of the green walls with the students and the school staff.
Partners: City of Turin, Politecnico di Torino (DAD and DIATI).



Parete verde dormitorio senzateetto.
Description: Parete verde autoportante esterna, con vaschette rimovibili e tasche in feltro. Progettazione partecipata e co-gestione per la cura delle pareti con coinvolgimento degli utenti.
Partners: Città di Torino, Politecnico di Torino (DAD e DIATI).

Green wall at homeless shelter.
Description: Outdoor self-supporting green wall, with removable trays and felt pockets. Participatory design process/co-management for the maintenance together with the users.
Partners: City of Turin, Politecnico di Torino (DAD and DIATI).

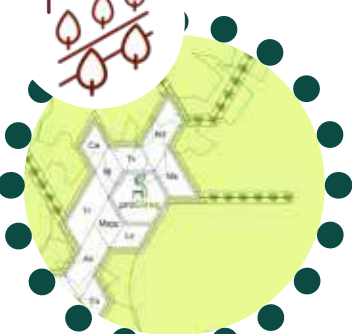


Tetto verde al WOW.
Description: Realizzazione di un tetto verde estensivo sull'edificio WOW.
Partners: OrtiAlti, Città di Torino.

Green roof at WOW building.
Description: Realization of an extensive green roof WOW building.
Partners: OrtiAlti, City of Turin.

Dettagli sulla NBS 6 | Details on NBS 6

ACCESSIBLE GREEN CORRIDORS




Corridoio verde.
Description: Realizzazione di un percorso verde e pollinator friendly.
Partner: Città di Torino.

Green corridor.
Description: Creation of a green and pollinator friendly course.
Partner: City of Turin.

Dettagli sulla NBS 6 | Details on NBS 6

ACCESSIBLE GREEN CORRIDORS




Valorizzazione del patrimonio naturalistico nel corridoio verde.
Description: Potenziare la fruizione dell'area naturalistica 6.1 e promuovere l'utilizzo della pista ciclabile tramite segnaletica verticale e arredo urbano.
Partner: Città di Torino.

Local natural heritage enhancement in green corridor.
Description: Enhancement of the naturalistic area 6.1 and promotion of the cycling path through the creation of vertical signage and street furniture.
Partner: City of Turin.

Dettagli sulla NBS 7 | Details on NBS 7

LOCAL ENVIRONMENTAL COMPENSATION PROCESSES




Sponsorizzazione del bosco a scuola.
Description: Intervento di messa a dimora di alberi in un cortile scolastico oggi impermeabile grazie alla sponsorizzazione privata.
Partner: Città di Torino.

Sponsorship for school's forest.
Description: Planting intervention of trees in a school yard which is now waterproof thanks to private sponsorship.
Partner: City of Turin.


Dettagli sulla NBS 8 | Details on NBS 8

POLLINATOR BIODIVERSITY IMPROVEMENT ACTIVITIES AND CITIZEN SCIENCE PROJECT



Giardino farfalle nelle scuole e presso centri per disabili mentali.
Description: Realizzazione di un corso e di varie attività formative sulla vita delle farfalle. Supporto alla realizzazione del giardino delle farfalle.
Partners: Unito (DBios) e Unito (DISAFA).

Butterfly gardens in schools and for disadvantaged people.
Description: Realization of training activities on the life of butterflies. Supporting the creation of the butterfly garden.
Partners: Unito (DBios) e Unito (DISAFA).



Transetto presso Orti Generali.
Description: Biomonitoraggio con il metodo del transetto.
Partners: Unito (DBios) e Unito (DISAFA).

Transect in Orti Generali.
Description: Biomonitoring with the transect method.
Partners: Unito (DBios) e Unito (DISAFA).

Partner locali proGREG (e altri importanti stakeholders)
Local proGREG partners (and other important stakeholders)



Legenda | Legend

Soluzioni nature based
Nature based solutions

-  Rigenerazione di suolo
NBS 2: Regenerating soil
-  Orticoltura di comunità
NBS 3: Community urban gardening and farming
-  Acquaponica
NBS 4: Aquaponics
-  Tetti verdi e verde verticale
NBS 5: Green roofs and vertical gardens
-  Migliorare l'accessibilità ai corridoi verdi
NBS 6: Improving accessibility to green corridors
-  Processi di compensazione ambientale
NBS 7: ICT Tools
-  Insetti impollinatori e biodiversità
NBS 8: Pollinator biodiversity

Stato di implementazione
Implementation status

-  Realizzato
implemented
-  In corso
in progress
-  Programmato
in planning
-  Idea per il futuro
idea for the future

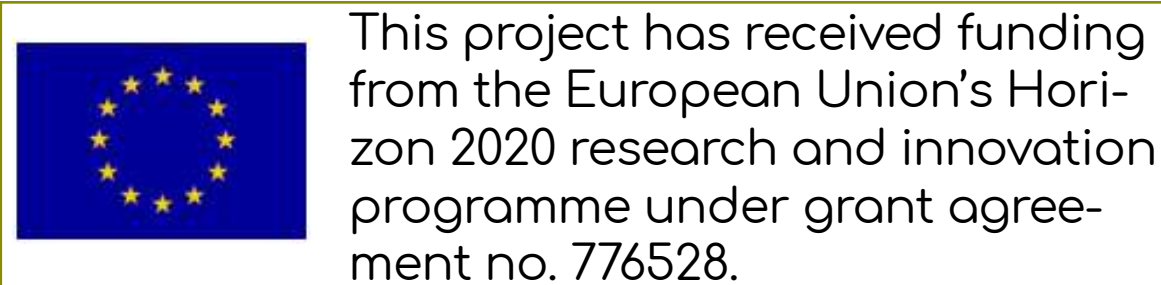
Legenda dei colori
Colour palette

-  Parchi/aree verdi
parks/green spaces
-  Zone boschive
Forest
-  Fiumi/laghi
waterways/lakes
-  Costruito
built up areas
-  Aree industriali
industrial areas
-  Confini del Living Lab
Living Lab area boundary

Scale: 1: 10000

Map by Politecnico di Torino, Dep. Architecture and Design

Productive Green Infrastructure for post-industrial urban regeneration (proGREG)
Email: progereg@la.rwth-aachen.de
Website: www.proGREG.eu



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Zagreb Living Lab Implementation Plan

Deliverable 3.2

Work package: 3

Dissemination level: PU

Lead partner: COTO

Author: Iva Bedenko – ZAGREB

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Partner organizations

No.	Name	Short name	Country
4	GRAD ZAGREB	ZAGREB	Croatia
27	SVEUCILISTE U ZAGREBU ARHITEKTONSKI FAKULTET	AF ZAGREB	Croatia
28	ZAVOD ZA PROSTORNO UREDENJE GRADA ZAGREBA	ZZPUGZ	Croatia
29	KOMFOR KLIMA GRUPA DOO ZA PROIZVODNJU TRGOVINU I USLUGE	KKG	Croatia
30	UDRUGA ZELENE I PLAVE SESVETE	ZIPS	Croatia

Abbreviations

EC:	European Commission
ERDF:	European Regional Development Fund
D. No:	Deliverable Number
FC:	Follower Cities
FRC:	Front Runner Cities
GA:	Grant Agreement
GI:	Green Infrastructure
GIS:	Geographic Information System
IP:	Implementation Plan
LL:	Living Lab
NBS:	Nature-Based Solutions
NGO:	Non-governmental organization
proGInreg:	Productive Green Infrastructure for post-industrial urban regeneration
SOPARC	System for observing play and recreation in communities
TRL:	Technology Readiness Level
WP:	Work Package
DE:	Germany
IT:	Italy
HR:	Croatia (Hrvatska)
CN:	China
BA:	Bosnia and Herzegovina
PT:	Portugal
GR:	Greece
RO:	Romania

1. Introduction

1.1 Project Framework

This document is a living and working document that will produce, at the end of the implementation phase, a comprehensive description about the Living Lab and NBS implemented in Zagreb. The first release of the IP is July 2020. Attached to this document a Living Lab Map displaying graphically a summary of the information of each NBS.

Cities are increasingly facing the effects of climate change. Temperature and precipitation extremes make everyday life difficult, and the importance of green infrastructure as a means of mitigating these extremes in cities is increasingly recognized in Europe and the world. Thus, the City of Zagreb, together with Dortmund, Turin and Ningbo, applied to the European Commission and proposed the proGlgreg project (productive green infrastructure for urban renewal), which aims to raise the quality of life of the local community by introducing nature-based solutions to post-industrial areas in Zagreb Sljeme Sesvete.

The coordinator of local activities of the EU project proGlgreg is the City of Zagreb, the City Office of Strategic Planning and Development of the City, and local partners are the Faculty of Architecture, University of Zagreb, Department of Physical Planning, Komfor Klima Grupa d.o.o., and the Association of Green and Blue Sesvete.

The EU project proGlgreg, funded by Horizon 2020, started in June 2018 and will run for 5 years (until the end of May 2023). The project coordinator is the University of Aachen. For the purposes of the project, the leading cities plan to introduce green solutions in urban areas facing the challenges of post-industrial reconstruction. The accompanying cities in the project are Cascais (Portugal), Cluj-Napoca (Romania), Piraeus (Greece) and Zenica (BiH).

1.2 ProGlgreg in Zagreb

The City of Zagreb and its local partners Zagreb Architecture Faculty, City Bureau for Physical Planning, Green and Blue Sesvete NGO and Komfor Klima Grupa co. will implement five nature based solutions. This will include the elaboration of the necessary technical and construction plans, obtaining of the necessary construction permits, the contracting of all necessary works and services and the management and supervision of the construction works and sites.

The Zagreb LL is located in the eastern neighborhood of Sesvete, 10.2 km from the city centre. Sesvete is a traditional and closely-knit community which has never developed a clear urban form or clear identity in the past. However, thanks to the activities of a local NGO in recent years it is now developing an increased sense of confidence with people demanding better connected public spaces and parks, bike lanes, more public facilities and a hub for start-up businesses and culture, to create a new urban identity.

The surface of Sesvete is cca 165 km² (1/4 of overall surface area of the city), with 70.000 inhabitants (9% city population) and lowest average population age (37.8 y).

The core of the LL will be on the edges of the 128 000 m² brownfield site of the former meat

processing factory Sljeme which is now owned by the Zagreb Holding Company, and transferral of ownership to the City of Zagreb is underway. The LL is located by the railway line, south to the present centre of Sesvete. It is connected to the railway and is part of the economic zone that now lies between the older centre of Sesvete and the new neighbourhood Novi Jelkovec with 11 000 inhabitants.

The project will include several interventions: a new therapeutic garden will be built, the existing city garden will be modernized using innovative groundwater treatment technology, a green wall and roof will be installed on a public building to examine their microclimatic and insulating effect, the info point of the project within the Chess Club Sesvete will be equipped, and the construction of a bicycle path in the profile of the road connecting Sesvetska Sopnica with the area of the former factory will be financed.

Project activities are implemented through several units - NBS (Nature Based Solutions)

Following are the NBSs that will be realized in Zagreb LL:

NBS 3: Community-based urban farming and gardening on post-industrial sites

NBS 4: Aquaponics as soil-less agriculture for polluted sites

NBS 5: Capillary GI on walls and roofs

NBS 6: Making post-industrial sites and renatured river corridors accessible for local residents

NBS 7: Establishing protocols and procedures for environmental compensation at local level

1.3 Management Activities

Upon invitation of Aachen University, the City of Zagreb has chosen a former industrial site in the eastern suburb of Sesvete, and set up a local consortium consisting of the local government body (City of Zagreb), municipal planning bureau (ZZPUGZ), Faculty of Architecture, ZIPS- a local NGO that has together with AF previously developed planning documents to resolve the development problems of the city district, since the former industry is located centrally and divides the neighborhood in half. ZIPS provides a link to the local community and ensures that the needs and aims of the local community are being recognized and respected.

The consortium has appointed a task force of people intensively involved in the project activities, that regularly meets and plans the activities and overcoming of the barriers threatening to slow down or prevent the project's successful implementation.

A wider task force, including all the relevant administrative bodies in the City of Zagreb, and all the partners, has been set up and approved by the Mayor. The wider task force meets annually, but appointed members communicate closely with the partner consortium and assist when needed.

The responsibilities of the main partners are clear and listed in Table 1.

Table 1- Partner and activity

Partner	Specific activities	Cross-sectional activities
GRAD ZAGREB	Overall coordination of the implementation NBS 3 activities, except Info point	Overall coordination Co-design activities WP3 coordination activities
SVEUCILISTE U ZAGREBU ARHITEKTONSKI FAKULTET	NBS 4, 5 and 7	Spatial analysis Co-design activities
ZAVOD ZA PROSTORNO UREDENJE GRADA ZAGREBA	NBS 6 and 7	Spatial analysis Co-design activities Overview and coordination with the national and local policies
KOMFOR KLIMA GRUPA DOO ZA PROIZVODNJU TRGOVINU I USLUGE	Practical expertise with the NBS 4 and 5	Co-design activities
UDRUGA ZELENE I PLAVE SESVETE	Operation of Info point Coordination of local activities NBS 3 and 6	Co-design activities Communication with the local community Field work

2. Our Living Lab

2.1 Our Living Lab

Zagreb is the capital of Croatia, covering 641 km². It has 17 districts and 790,017 inhabitants (2011 census). Zagreb plays a very important role in the wider metropolitan region. Its two neighbouring counties provide a portion of its natural resources and food, as well as providing residential space for commuters who including many workers, students and others. This surrounding area fulfils Zagreb citizens' needs for recreation, nature and housing, thus creating further demand for commuting, suburbanisation and the growth of towns in the area. The population of Zagreb together with the Zagreb metropolitan region, consisting of the larger area of 690 municipalities, includes around 1.1 million inhabitants. In recent years, the suburban population has grown, whilst in contrast, the City of Zagreb, especially its historical centre, has witnessed a decline in population. Zagreb continues to integrate and incorporate former suburbs within its urban fabric. Positioned between the historical centre and the newly planned New Zagreb, the Sava River and its surrounding area form the geographical axis of the city.

Sesvete is a district of the City of Zagreb and a part of the Zagreb urban agglomeration. It is the easternmost neighbourhood of the Zagreb administrative area, covering 20% of the overall surface area of Zagreb. According to the 2011 census, Sesvete has 70,009 inhabitants; the number of households is 22,512 and the number of dwellings 30 256. The population has grown by 10,000 people since 2001, whilst the number of households has grown by 5,000 and the number of dwellings by 10,000. Sesvete has the youngest population in Croatia, with an average age of 38. It is connected to the city centre by railway and several important city roads (Zagrebačka, Branimirova, Slavonska and Vukovarska in the future). The nearby tram station of Dubec may be extended to provide access to the centre of Sesvete. The Sesvete District is also located on important European traffic corridors leading to Budapest, Riga, Germany, Austria, Belgrade, Sofia, Athens and Istanbul. It has an industrial tradition, which has today been replaced with other economic activities including transport, automobile and the construction industry.

2.2 Our Living Lab challenges and goals

The main challenges in the development of the Zagreb living lab come from the outdated planning documents and the lack of inclusive and sustainable principles in the planning. Also, the factory area is positioned in the central area, making it unattractive and unusable to the local residents. The large zone south of the railroad, which divides the district in half, is also planned as an economic/commercial zone, while the demographic boom of the district calls for different functions. As a way of directing the future development towards a green path, the proGReg project introduces new perspectives on soft development through small but eye-opening interventions.

The following territorial levels were used in the spatial analysis, with the first two being also further investigated in the analysis: 1. The City Level (641 km²) – divided into 17 districts, 2.

The Living Lab analysis area – District Sesvete (165.25 km²), bordering on the eastern side with Zagreb and including 36 smaller self-contained settlements. 3. The Living Lab of Zagreb, which primarily consists of the former meat processing factory Sljeme (0.128 km²), and a N-S green corridor connecting with the Sava river. As a community, Sesvete is somewhat traditional and closely-knit.

Although with an entrepreneurial mind-set, Sesvete has never developed a clear urban form or clear identity in the past. However, thanks to the activities of a local NGO in recent years it is now developing an increased sense of confidence with people demanding better-connected public spaces and parks, bike lanes, more public facilities and a hub for start-up businesses and culture, to create a new urban identity. These objectives have been articulated in the study “Green and Blue Sesvete” (2016) which proposes the development of a new housing area for more than 20,000 inhabitants on a former industrial site, which will connect the two existing neighborhoods. The core of the LL will be the 128,000 m² brownfield site of the former meat-processing factory Sljeme that is now owned by the City of Zagreb. It is located south of the railway line and is part of the economic zone that now lies between the older centre of Sesvete and the new neighborhood development to the South in Novi Jelkovec with 11,000 inhabitants. Its location is adjacent to the present centre of Sesvete. It is connected to the railway and will be well served by the future road network.

Distinctive, tall silo buildings form a unique industrial heritage, which is characteristic of the local identity of Sesvete. Several existing buildings will be reused to accommodate the public facilities, which will be created for the local community. In addition to the architecturally attractive heritage, the new part of the city will be green, sustainable and smart and will promote healthy and sustainable lifestyles, entrepreneurial opportunities and a “share culture”.

The main objective of the brownfield regeneration program in the Zagreb LL is the creation of new public spaces, to ensure spaces for required public facilities and introduce principles of sustainable urban planning. The GI approach must strengthen initiatives regarding urban resilience (low water table, storm water), wellbeing programs (jogging and cycling paths, recreation areas), community activities (urban gardens, green market) and bioclimatic building principles (mitigating city heat islands, natural cooling, green roofs and facades).


3. The NBS in Zagreb

In this chapter, the NBS, which is being implemented in Zagreb, are discussed in detail. The completion of the planned and then carried out activities for the implementation of the individual NBS took place in cooperation with the project partners. The information contained in the NBS tables is also included in the Living Lab Vision Map. The information contained in the individual tables will be regularly updated by the project partners.

Table 2 - NBS to be implemented in Zagreb

NBS type	NBS Title (CTRL+ click to jump to each action)
NBS 3: Community-based urban farming and gardening on post-industrial sites	NBS 3.1: Modernization of existing urban garden
	NBS 3.2: New therapy garden in Sesvete
	NBS 3.3: Info point
NBS 4: Aquaponics as soil-less agriculture for polluted sites	NBS 4: Aquaponic installation
NBS 5: Capillary GI on walls and roofs	NBS 5: Seedling factory with aquaponics installations and green roof
NBS 6: Making post-industrial sites and renatured river corridors accessible for local residents	NBS 6: New cycling track
NBS 7: Establishing protocols and procedures for environmental compensation at local level	NBS 7: New protocols

NBS 3.1: Modernization of existing urban garden

	
1. General information	
Compilation date and update	12/June/2020 - Time 0- Initial version
NBS type	NBS3- Community-based urban farming and gardening on post-industrial sites
NBS title	Modernization of existing urban garden
Brief project synthesis	<p>The "City Gardens" project is an example of sustainable land use in Zagreb, improving the quality of life of citizens and the spatial quality and functions of the urban environment. The aim of the project is to enable citizens to produce food (vegetables and strawberries), herbs and flowers for their own needs. City gardens, besides providing space for healthy food and improving the home budget of citizens, also offer the possibility of traditional food production and coexistence with nature. They enable quality use of leisure time and augment the quality of life of citizens in a social, economic and healthy way. The "City Gardens" project started in September 2013.</p> <p>The procedure for giving garden plots for use is initiated by a public invitation to submit a request for giving garden plots for use for persons residing in the City of Zagreb who do not own, co-own, lease or use any other arable land.</p> <p>An application for the use of a garden plot can be submitted by only one member of the joint household on the Application Form with a Statement to the City Office for Agriculture and Forestry within 15 days from the date of publication of the Public Invitation. The criteria for giving garden plots for use are: the applicant's residence, social status, Croatian veteran status, pensioner status and number of household members, and based on the total points earned, the List for giving garden plots for use on arable land is determined.</p> <p>A contract on the use of a garden plot on arable land for a period of 2 years without financial compensation is concluded with the users, with the possibility of</p>



	<p>extending the use, provided that the user treats it with the care of a good owner.</p> <p>Arable land consists of garden plots up to 50 m² and common parts with common equipment (access roads and paths, wooden and prefabricated storage of tools and organic fertilizers, composters, benches and waste bins, garden gazebos and canopies). The areas of all City Gardens are fenced, and the common part is intended for socializing and recreation of users, for education and workshops.</p> <p>The existing Sesevete city garden will be upgraded with solar purifying water pumps, as the garden is watered directly with underground water. Spores were detected in the water used for the gardens so it needs to be purified.</p> <p>Application of the CPC photoreactor with flexible supported catalyst technology as innovative solution for water purification in the city garden.</p>
Area of implementation	<p>Zagreb's city gardens have become a gathering place for different generations and neighbors who almost never knew each other before. In addition to contributing to the sustainable development of green urban systems, urban gardens bring many benefits. Work and contact with nature enables socializing and relaxation in a green environment, and organic nutrition, in addition to health, also brings secure financial savings. This is how the users of the garden plots described this valuable project of the city of Zagreb in Sesevete. 65 garden plots were distributed to local residents in Rimski put Street in 2014.</p> <p>Approximate coordinates: 45°49'22.2"N 16°06'22.6"E</p>
Target groups (Beneficiaries)	Target groups are citizens of Zagreb who do not own, co-own, lease or use any other arable land.
Timing (start and end date)	Start: 08/2020; End:
Main responsible partner	<p>City of Zagreb</p> <p>City Office for Agriculture and Forestry</p> <p>City Office of Strategic Planning and Development- overall coordinator</p>
ProGireg partners involved	<p>ZIPS- contact point and link to the local community</p> <p>AF- consultation on spatial planning</p> <p>ZZPU- consultation on planning regulations and requirements</p>
Other stakeholders involved	NGOs gathering people who use the gardens
Total Budget	The total sum needed/planned to implement the NBS. Please specify the amount taken from proGireg funds if the budget has been supplemented by other funds. Consider only the costs of purchasing goods and or services directly linked with the implementation.

	<p>proGlgreg Partners funds: Zagreb- 70.000 €</p> <p>Other funds (specify the source): to be updated</p> <p>Total budget of the implementation: to be updated</p>
2. Pre-implementation activities	
Planning and preparatory activities	The purification and solar pumps were developed at the Faculty of Geotechnical Engineering, University of Zagreb
Administrative procedures	The administrative procedure is mainly related to public procurement for the new fixtures.
Technical and social analysis	
Other activities	The preparatory activities include public procurement procedure to provide grounds for successful implementation
3. Management structure and responsibilities	
Main partner (coordinator) and role/function	City of Zagreb, City Office of Agriculture and Forestry, coordinator of activities relating to the garden
2nd Partner and role/function	City of Zagreb, City Office of Strategic Planning and Development, local project coordinator
3rd Partner and role/function	ZIPS, local NGO
4. Co-design activity and stakeholder engagement in planning process	
Stakeholders, engagement processes, in co-design and co-implementation (link with WP2)	<p>Co-design</p> <p>The city gardens project is well established but there is no particular NGO that organizes the users, they are rather gathered through the activities of the City Office of Agriculture and Forestry. This activity was less developed in the codesign workshops as it does not modify the principles of functioning of the gardens, but it is rather a technological improvement.</p> <p>Co-implementation</p> <p>The implementation phase will begin when the design is complete and all the necessary procedures are done.</p>

Notes on major achievements/success factors/critical issues/barriers related to stakeholder engagement (to be updated) (link to WP5)	
Current situation and next steps (to be updated)	
5. Other activities	
Synergies with other proGReg activities	Therapy garden is closely intertwined with the activity of the Info point and can be also connected with the NBS 4/5 self standing fixture as an educational platform. The inclusion and constant dissemination are crucial to ensure activity and awareness of the importance for the local community and beyond
Links with other external project or activity	The NBS is linked also to the city gardens project and the Info point
Business model (link to WP5)	The urban garden is funded by the City of Zagreb, and its maintenance will be included in the maintenance programme.
Technology Readiness Level (TRL) (link to WP5)	Current TRL: 7 Planned TRL: 9
Communication activity (link to WP6)	All project activities are being advertised in the Info point through lectures, exhibitions, discussions, film projections and other events, and the programme of the Info point is published in the local media, especially the social media.
6. State of Play and Monitoring of NBS implementation	

Current situation (to be updated)	
Notes/critical issues/barriers (to be updated) (link to WP5)	
Next steps (to be updated)	
7. NBS maintenance and outlook	
Maintenance	Maintenance of the urban garden will be included in the budget and activity plan of City Office of Agriculture and Forestry.
Sustainability after project conclusion	The urban garden project has been successfully running since 2013, therefore it is safe to expect that the project will continue and that the innovative feature might be replicated in other gardens.
Additional resources	

NBS 3.2: New therapy garden in Sesvete

	
1. General information	
Compilation date and update	12/June/2020 - Time 0- Initial version
NBS type	NBS3- Community-based urban farming and gardening on post-industrial sites
NBS title	New therapy garden in Sesvete
Brief project synthesis	<p>The City gardens project was introduced in 2013, with the aim of using the land owned by the City as gardens for the citizens. While the project implementation started, the idea of conceiving the new garden as therapy garden came up and was welcomed by the partners and local community alike. The codesign workshops were used as opportunity to gather the potential stakeholders and to include them in the planning phase, ensuring that the garden is planned adequately to cater to the needs of all the possible users- local people with various disabilities.</p> <p>Local users are being represented by NGOs who were actively involved in the codesign process, and influenced the design of the therapy garden so it suits the needs of the prospective users.</p> <p>The garden will be managed by the City Office of Agriculture and Forestry and directly by Mali dom daycare center for children with disabilities.</p>
Area of implementation	<p>The therapy garden will be implemented on a portion of land of 5300 m², in the southern part of the Sljeme factory area. The area is currently covered in low vegetation and is situated by the Industrijska road. Implementation will require construction of a sidewalk.</p> <p>Approximate coordinates: 45°49'14.3"N 16°06'28.9"E</p>



Target groups (Beneficiaries)	<p>As the project's target groups are disadvantaged and socially excluded, the project has potential to promote their social equality within the community and reduce discrimination and prejudice based on social status, ethnicity, disabilities and other characteristics.</p> <p>Target groups specifically include residential communities of autistic people in the neighboring housing development of New Jelkovec, local people with physical and mental disabilities, children and grown-ups with disabilities from the entire city</p>
Timing (start and end date)	Start: 08/2020; End:
Main responsible partner	<p>City of Zagreb</p> <p>City Office for Agriculture and Forestry</p> <p>Branka Mrakuzic branka.mrakuzic@zagreb.hr</p> <p>City Office of Strategic Planning and Development- overall coordinator</p>
ProGReg partners involved	<p>ZIPS- contact point and link to the local community</p> <p>AF- consultation on spatial planning</p> <p>ZZPU- consultation on planning regulations and requirements</p>
Other stakeholders involved	Mali dom-Zagreb, Daycare center for the rehabilitation of children and youth founded by the City of Zagreb
Total Budget	<p>The total sum needed/planned to implement the NBS. Please specify the amount taken from proGReg funds if the budget has been supplemented by other funds. Consider only the costs of purchasing goods and or services directly linked with the implementation.</p> <p>proGReg Partners funds: Zagreb- 130.000 €</p> <p>Other funds (specify the source): City of Zagreb- to be defined</p> <p>Total budget of the implementation: - to be defined</p>
2. Pre-implementation activities	
Planning and preparatory activities	<p>The therapy garden site and general layout were defined within the codesign workshops, where all the relevant stakeholders attended and became involved in the planning process. The stakeholders include local institutions and NGOs registered in the surrounding area, especially in the New Jelkovec housing estate on the south of the LL area.</p>

Administrative procedures	The land was owned by the Zagreb holding company at the beginning of the project, but in the first semester of 2020 it was acquired by the City of Zagreb. The legal procedures are currently being defined so we expect that the land will be free for planning in the second part of the year. A local firm dealing with landscape architecture is preparing the design of the garden, after getting the task through public procurement procedure.
Technical and social analysis	In the codesign workshops the situation was analyzed and finally the optimal solution was defined as the programme task, which was handed to the landscape architect.
Other activities	
3. Management structure and responsibilities	
Main partner (coordinator) and role/function	<p>City of Zagreb</p> <p>City Office of Strategic Planning, City Office of Agriculture and Forestry, coordinator of activities relating to the garden</p> <p>City Office of Strategic Planning and Development, local project coordinator</p>
2nd Partner and role/function	<p>Mali dom, manages the garden under supervision by City Office of Agriculture and Forestry</p> <p>Mali dom Zagreb is an institution whose purpose is to provide highly specialized and comprehensive services to children with visual impairments and other multiple disabilities in a stimulating and positive environment, that will encourage each child and help them realise and fully develop their potential, to reach their maximum possible level of independence and a sense of self-realization.</p> <p>Mali dom-Zagreb is a public institution founded by the City of Zagreb that operates as a Daycare center for the rehabilitation of children and youth in a new, modern, properly designed and well-equipped center at Trešnjevka. This provides further expansion of the Mali dom-Zagreb's programs and its development towards the referral center in the field of care for children with multiple disabilities.</p> <p>Around hundred children with visual impairments and additional influential disabilities are involved in programs and activities of Mali dom-Zagreb and additional 300 children pass annually through our program of transdisciplinary assessment and counseling.</p>
3rd Partner and role/function	
4. Co-design activity and stakeholder engagement in planning process	

Stakeholders, engagement processes, in co-design and co-implementation (link with WP2)	<p>Co-design</p> <p>In the codesign workshops, the LL partners had mapped out all relevant groups and NGOs, and have been systematically reaching out to them and involving them via meetings and workshops for the therapeutic garden (NBS3). This was facilitated by the fact that different NGOs in the district already cooperate and work together on joint events and workshops The City office of Social Care has provided a list of NGOs and organizations in the area and they were invited to the codesign meeting.</p> <p>Co-implementation</p> <p>The implementation phase will begin when the design is complete and all the necessary procedures are done.</p>
Notes on major achievements/success factors/critical issues/barriers related to stakeholder engagement (to be updated) (link to WP5)	
Current situation and next steps (to be updated)	<p>The codesign process is in its final phase, and when the design is finished and revised by all the stakeholders, the next steps will be laid out.</p>
5. Other activities	
Synergies with other proGireg activities	<p>Therapy garden is closely intertwined with the activity of the Info point and can be also connected with the NBS 4/5 self standing fixture as an educational platform. The inclusion and constant dissemination are crucial to ensure activity and awareness of the importance for the local community and beyond</p>
Links with other external project or activity	<p>The NBS is linked also to the city gardens, especially the Borovje garden that is planned in the eastern part of Zagreb</p>
Business model (link to WP5)	<p>The therapy garden is funded by the City of Zagreb, but additional funding for long-term activity can be searched for in EU funds</p>

Technology Readiness Level (TRL) (link to WP5)	Current TRL: 7 Planned TRL: 9
Communication activity (link to WP6)	All project activities are being advertised in the Info point through lectures, exhibitions, discussions, film projections and other events, and the programme of the Info point is published in the local media, especially the social media.
6. State of Play and Monitoring of NBS implementation	
Current situation (to be updated)	
Notes/critical issues/barriers (to be updated) (link to WP5)	
Next steps (to be updated)	
7. NBS maintenance and outlook	
Maintenance	Maintenance of the therapy garden will be included in the budget and activity plan of City Office of Agriculture and Forestry. The Mali dom organization will organize attendance and maintenance within the budget.
Sustainability after project conclusion	The operating of the therapy garden is in line with the Goal 5 of the City of Zagreb Development Strategy, Improving the quality of life; Priority 5.2 - Social integration of local communities, safety and quality leisure time; Measures 5.2.4. Facilitate greater inclusion of persons with disabilities in the community life and 5.2.5. Facilitate greater community inclusion of children and young people with developmental difficulties. Therefore, the long-term aim of the City is to ensure the operation of the therapy garden.
Additional resources	http://www.malidom.hr/about-us/126

NBS 3.3: Info point

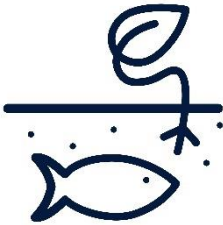

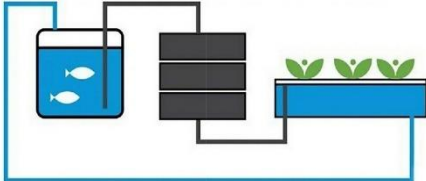
	
1. General information	
Compilation date and update	12/June/2020 - Time 0- Initial version
NBS type	NBS3- Community-based urban farming and gardening on post-industrial sites
NBS title	proGlgreg info point
Brief project synthesis	<p>The City gardens project was introduced in 2013, with the aim of using the land owned by the City as gardens for the citizens. The codesign workshops were used as opportunity to gather the potential stakeholders and to include them in the planning phase for the other NBS activities.</p> <p>The Info point provides a venue for the proGlgreg project activities and their dissemination, as well for promotion of similar and complementary activities, such as tree planting action that took place in Sesvete in October 2019, gathering several hundred people from the surrounding area.</p> <p>The Info point is managed by ZIPS, one of the local partners and a major NGO gathering people of Sesvete and ensuring good visibility in the public.</p>
Area of implementation	The info point is located in the ground floor of the residential building, across the street from the main entrance to the former factory and next to the LL core.
Target groups (Beneficiaries)	Target groups include local farmers and local schools, as well as company owners that wish to benefit from the green technologies.
Timing (start and end date)	Start: 01/2021

Main responsible partner	City of Zagreb City Office of Strategic Planning and Development- overall coordinator
ProGlgreg partners involved	ZIPS- contact point and link to the local community AF- consultation on spatial planning ZZPU- consultation on planning regulations and requirements
Other stakeholders involved	Sesvete Chess Club, who originally used the Info point space before the project
Total Budget	The total sum needed/planned to implement the NBS. Please specify the amount taken from proGlgreg funds if the budget has been supplemented by other funds. Consider only the costs of purchasing goods and or services directly linked with the implementation. proGlgreg Partners funds: Zagreb- 40.000 € Other funds (specify the source): to be defined Total budget of the implementation: to be defined
2. Pre-implementation activities	
Planning and preparatory activities	
Administrative procedures	After the project task and budget are fixed, the City will deal with the administrative procedures necessary to implement the task.
Technical and social analysis	Draft of the technical and social analysis were set in the study, and further actions are being prepared in course of drafting of this document.
Other activities	Further co-design and dissemination activities will take place in Info point before, during and after implementation. Mr Lugovic gave a lecture on vertical gardens and aquaponics in June 2019
3. Management structure and responsibilities	
Main partner (coordinator) and role/function	City of Zagreb City Office of Strategic Planning, City Office of Agriculture and Forestry, coordinator of activities relating to the garden City Office of Strategic Planning and Development, local project coordinator

2nd Partner and role/function	ZIPS, local NGO
3rd Partner and role/function	
4. Co-design activity and stakeholder engagement in planning process	
Stakeholders, engagement processes, in co-design and co-implementation (link with WP2)	<p>Co-design</p> <p>The co-design workshops took place in the Info point, allowing the process to develop on-site. As this particular activity started before the rest of the project, its implementation is finished and it serves as a tool for successful implementation of the other NBS, especially regarding the public involvement and dissemination.</p>
Notes on major achievements/success factors/critical issues/barriers related to stakeholder engagement (to be updated) (link to WP5)	
Current situation and next steps (to be updated)	The next step is installation of the showcase hydroponic and vertical garden mini fixture with the aim of introducing the technology to the local residents and the interested public. Public events will take place in accordance to the epidemiological situation in Croatia.
5. Other activities	
Synergies with other proGReg activities	The NBS is linked to the city gardens. A small-scale vertical garden installation is planned to demonstrate the simple and non-expensive options for the citizens, schools, public institutions and companies. The inclusion and constant dissemination are crucial to ensure activity and awareness of the importance for the local community and beyond

Links with other external project or activity	
Business model (link to WP5)	The Info point is operating with minimal cost, as it fits in regular operation of ZIPS and the partner organization Chess club Sesvete.
Technology Readiness Level (TRL) (link to WP5)	Current TRL: 7 Planned TRL: 9
Communication activity (link to WP6)	The Info point is in itself a communication tool for the proGlgreg project. Other project activities are being advertised in the Info point through lectures, exhibitions, discussions, film projections and other events, and the programme of the Info point is published in the local media, especially the social media.
6. State of Play and Monitoring of NBS implementation	
Current situation (to be updated)	The Info point is operating since the end of 2018., so preparation activities such as codesign and similar workshops, as well as partners' meetings, are being held in the venue.
Notes/critical issues/barriers (to be updated)	
Next steps (to be updated)	The next step is installation of the showcase hydroponic and vertical garden mini fixture with the aim of introducing the technology to the local residents and the interested public. Public events will take place in accordance to the epidemiological situation in Croatia.
7. NBS maintenance and outlook	
Maintenance	The maintenance is organized by ZIPS, as it is their primary headquarters during the project. The City of Zagreb is in charge of equipment and furniture through the project implementation.
Sustainability after project conclusion	After the project ends, ZIPS will continue to organize local events for the residents and interested public, as it is one of their usual activities. All the successfully implemented NBS will have access to this exhibition and discussion venue.
Additional resources	https://zeleneiplavesesvete.com/

NBS 4: Aquaponic installation

	 <p>Local community</p>  <p>Sketch of aquaponics</p>
<h3>1. General information</h3>	
Compilation date and update	12/June/2020 - Time 0- Initial version
NBS type	NBS4- Aquaponics as soil-less agriculture for polluted sites
NBS title	Seedling factory with aquaponics installations and green roof
Brief project synthesis	<p>In the project preparation stage, the innovation hub with fab lab in the former administration building was planned in the former administration building of the Sljeme factory. It was planned to target the younger population and network individual and group initiatives, schools, NGO and other groups. The Hub building would have been equipped with green walls and green roof and photovoltaic fixture, and the aquaponics installation placed on the roof.</p> <p>However, in the planning stage in the first year of project implementation it was clear that the HUB implementation will take longer and that the project implementation in the planned timeline might be endangered.</p> <p>The situation with the COVID pandemic and the March 2020 5.5 earthquake in Zagreb and the financial and operational consequences have practically put the HUB project to a halt, so the alternative plan that was developed as a risk management solution.</p> <p>The “Plan B” included designing a new complete solution that integrates green roof, green wall and aquaponics technologies. This scenario would create a new green technology center in the Sljeme factory area. The advantage of implementation of such a comprehensive solution is that the system will be accessible to all citizens, simpler operational management of the system, clear measurement of efficiency and benefits, and participation of a larger number of stakeholders as it is more accessible.</p>

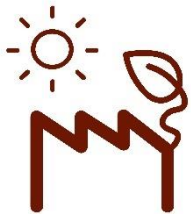
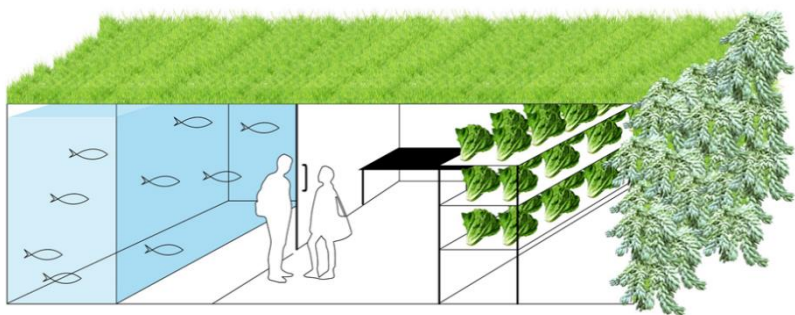
	On one side is the unit housing the aquaponic system with water quality management equipment for fish, processing area, storage area, and packaging area. On the other side is a hydroponic system for growing plants, irrigated with water coming from the pond to the left. An open public space between the two buildings is covered by a green roof and would serve for educations, mini market, STEM workshops, plant transplanting etc. A green wall structure would be erected around the buildings, to protect the area from the sun and to collect the excess rainfall and collect it for later use.
Area of implementation	The original implementation area was at the administrative building, but the new site can be modified as the green technology center. However, the area next to the therapy garden is considered as the optimal site.
Target groups (Beneficiaries)	Target groups include local farmers and local schools, as well as company owners that wish to benefit from the green technologies.
Timing (start and end date)	Start: 01/2021
Main responsible partner	City of Zagreb City Office of Strategic Planning and Development- overall coordinator
ProGReg partners involved	ZIPS- contact point and link to the local community AF- consultation on spatial planning ZZPU- consultation on planning regulations and requirements
Other stakeholders involved	Vesela Motika- The Happy Shovel
Total Budget	The total sum needed/planned to implement the NBS. Please specify the amount taken from proGReg funds if the budget has been supplemented by other funds. Consider only the costs of purchasing goods and or services directly linked with the implementation. proGReg Partners funds: Zagreb- the exact amount still has to be determined Other funds (specify the source): City of Zagreb- the exact amount still has to be determined Total budget of the implementation:
2. Pre-implementation activities	
Planning and preparatory activities	Originally the Faculty of Architecture has drafted the concept design of the HUB building in Sesvete by refurbishing the existing administration building, with the green walls and roof, and aquaponic installation on the roof. After the earthquake Zagreb experienced budgetary cuts which resulted in postponing of

	the implementation of the HUB. The City of Zagreb has ordered a study on implementation of the NBS in the former factory area from the Happy Shovel company, in order to define a new implementation task within the project.
Administrative procedures	After the project task and budget are fixed, the City will deal with the administrative procedures necessary to implement the task.
Technical and social analysis	Draft of the technical and social analysis were set in the study, and further actions are being prepared in course of drafting of this document.
Other activities	Further co-design and dissemination activities will take place in Info point before, during and after implementation. Mr Lugovic gave a lecture on vertical gardens and aquaponics in June 2019
3. Management structure and responsibilities	
Main partner (coordinator) and role/function	City of Zagreb City Office of Strategic Planning, City Office of Agriculture and Forestry, coordinator of activities relating to the garden City Office of Strategic Planning and Development, local project coordinator
2nd Partner and role/function	ZIPS, local NGO
3rd Partner and role/function	Happy Shovel
4. Co-design activity and stakeholder engagement in planning process	
Stakeholders, engagement processes, in co-design and co-implementation (link with WP2)	Co-design Stakeholders were identified and involved in the project during the co-design meetings that took place in Sesvete in 2018 and 2019. Engagement of right partners will ensure successful implementation and longevity of the project activity. Co-implementation The implementation phase will begin when the design is complete and all the necessary procedures are done.

Notes on major achievements/success factors/critical issues/barriers related to stakeholder engagement (to be updated) (link to WP5)	<p>At the moment, the main stakeholders, beside the project partners, are the Happy Shovel company. Other stakeholders are schools and citizen organizations, as necessary mediators to citizen involvement in the project.</p> <p>Installation of a small-scale fixture in the Info point is supposed to make the technology seem more approachable and to encourage the citizens and institutions to learn about the technology and to explore the possibilities of using it</p>
Current situation and next steps (to be updated)	The codesign process is in its final phase, and when the design is finished and revised by all the stakeholders, the next steps will be laid out.
5. Other activities	
Synergies with other proGReg activities	The NBS is linked to the city gardens, especially to the Info point where a small-scale vertical garden installation is planned to demonstrate the simple and non-expensive options for the citizens, schools, public institutions and companies. The inclusion and constant dissemination are crucial to ensure activity and awareness of the importance for the local community and beyond
Links with other external project or activity	
Business model (link to WP5)	Given the high cost of operations of this type of project implementation, the cost-effectiveness of the project is questioned. The solution to the viability of implementing this scenario could be a private public partnership in which the private company could use the NBS for commercial purposes.
Technology Readiness Level (TRL) (link to WP5)	<p>Current TRL: 7</p> <p>Planned TRL: 9</p>
Communication activity (link to WP6)	The NBS will be intensively communicated in the Info point and in local institutions. Link to the city garden project will be stressed and distribution of the local seedlings will be published in the local media, especially the social media.
6. State of Play and Monitoring of NBS implementation	

Current situation (to be updated)	The research study "RESEARCH ON THE SUSTAINABILITY OF IMPLEMENTATION OF NATURE-BASED SOLUTIONS AND LOCAL COMMUNITY INCLUSION" is finished, as a basis for the following steps.
Notes/critical issues/barriers (to be updated) (link to WP5)	
Next steps (to be updated)	The next step is drafting of a technical description and budgetary estimate, as well as a management plan, for the self-standing aquaponic installation, seedling farm and green roof proposed in the study.
7. NBS maintenance and outlook	
Maintenance	The maintenance will be defined in the management plan of the NBS.
Sustainability after project conclusion	Success in the implementation phase and adequate and necessary sharing of the potential benefit of the activity will be key to project success and to sustainability of the activity after ending date of the proGInreg project. As sustainability and replicability are of utmost importance in research projects, great effort needs to be undertaken to ensure sustainability and visibility.
Additional resources	https://www.facebook.com/veselamotikica/

NBS 5: Seedling factory with aquaponics installations and green roof

	
1. General information	
Compilation date and update	12/June/2020 - Time 0- Initial version
NBS type	NBS5- Capillary GI on walls and roofs
NBS title	Seedling factory with aquaponics installations and green roof
Brief project synthesis	<p>In the project preparation stage, the innovation hub with fab lab in the former administration building was planned in the former administration building of the Sljeme factory. It was planned to target the younger population and network individual and group initiatives, schools, NGO and other groups. The Hub building would have been equipped with green walls and green roof and photovoltaic fixture, and the aquaponics installation placed on the roof.</p> <p>However, in the planning stage in the first year of project implementation it was clear that the HUB implementation will take longer and that the project implementation in the planned timeline might be endangered.</p> <p>The situation with the COVID pandemic and the March 2020 5.5 earthquake in Zagreb and the financial and operational consequences have practically put the HUB project to a halt, so the alternative plan that was developed as a risk management solution.</p> <p>The “Plan B” included designing a new complete solution that integrates green roof, green wall and aquaponics technologies. This scenario would create a new green technology center in the Sljeme factory area. The advantage of implementation of such a comprehensive solution is that the system will be accessible to all citizens, simpler operational management of the system, clear measurement of efficiency and benefits, and participation of a larger number of stakeholders as it is more accessible.</p> <p>On one side is the unit housing the aquaponic system with water quality management equipment for fish, processing area, storage area, and packaging area. On the other side is a hydroponic system for growing plants, irrigated with water coming from the pond to the left. An open public space between the two buildings is covered by a green roof and would serve for educations, mini</p>

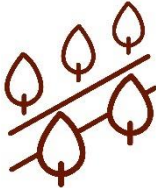

	market, STEM workshops, plant transplanting etc. A green wall structure would be erected around the buildings, to protect the area from the sun and to collect the excess rainfall and collect it for later use.
Area of implementation	The original implementation area was at the administrative building, but the new site can be modified as the green technology centre will be mobile. However, the area next to the therapy garden is considered as the optimal site.
Target groups (Beneficiaries)	Target groups include local farmers and local schools, as well as company owners that wish to benefit from the green technologies.
Timing (start and end date)	Start: 01/2021
Main responsible partner	City of Zagreb City Office of Strategic Planning and Development- overall coordinator
ProGlgreg partners involved	ZIPS- contact point and link to the local community AF- consultation on spatial planning ZZPU- consultation on planning regulations and requirements
Other stakeholders involved	Vesela Motika- The Happy Shovel
Total Budget	<p>The total sum needed/planned to implement the NBS. Please specify the amount taken from proGlgreg funds if the budget has been supplemented by other funds. Consider only the costs of purchasing goods and or services directly linked with the implementation.</p> <p>proGlgreg Partners funds: Zagreb- the exact amount still has to be determined</p> <p>Other funds (specify the source): City of Zagreb- the exact amount still has to be determined</p> <p>Total budget of the implementation:</p>
2. Pre-implementation activities	
Planning and preparatory activities	Originally the Faculty of Architecture has drafted the concept design of the HUB building in Sesvete by refurbishing the existing administration building, with the green walls and roof, and aquaponic installation on the roof. After the earthquake Zagreb experienced budgetary cuts which resulted in postponing of the implementation of the HUB. The City of Zagreb has ordered a study on implementation of the NBS in the former factory area from the Happy Shovel company, in order to define a new implementation task within the project.
Administrative procedures	After the project task and budget are fixed, the City will deal with the administrative procedures necessary to implement the task.

Technical and social analysis	Draft of the technical and social analysis were set in the study, and further actions are being prepared in course of drafting of this document.
Other activities	<p>Further co-design and dissemination activities will take place in Info point before, during and after implementation.</p> <p>Mr Lugovic gave a lecture on vertical gardens and aquaponics in June 2019</p>
3. Management structure and responsibilities	
Main partner (coordinator) and role/function	<p>City of Zagreb</p> <p>City Office of Strategic Planning, City Office of Agriculture and Forestry, coordinator of activities relating to the garden</p> <p>City Office of Strategic Planning and Development, local project coordinator</p>
2nd Partner and role/function	Happy Shovel company
3rd Partner and role/function	ZIPS, local NGO
4. Co-design activity and stakeholder engagement in planning process	
Stakeholders, engagement processes, in co-design and co-implementation (link with WP2)	<p>Co-design</p> <p>Stakeholders were identified and involved in the project during the co-design meetings that took place in Sesvete in 2018 and 2019. Engagement of right partners will ensure successful implementation and longevity of the project activity.</p> <p>Co-implementation</p> <p>The implementation phase will begin when the design is complete and all the necessary procedures are done.</p>
Notes on major achievements/success factors/critical issues/barriers related to stakeholders engagement (to be updated) (link to WP5)	<p>At the moment, the main stakeholders, beside the project partners, are the Happy Shovel company. Other stakeholders are schools and citizen organizations, as necessary mediators to citizen involvement in the project.</p> <p>Installation of a small-scale fixture in the Info point is supposed to make the technology seem more approachable and to encourage the citizens and institutions to learn about the technology and to explore the possibilities of using it</p>

Current situation and next steps (to be updated)	The codesign process is in its final phase, and when the design is finished and revised by all the stakeholders, the next steps will be laid out.
5. Other activities	
Synergies with other proGlgreg activities	The NBS is linked to the city gardens, especially to the Info point where a small-scale vertical garden installation is planned to demonstrate the simple and non-expensive options for the citizens, schools, public institutions and companies. The inclusion and constant dissemination are crucial to ensure activity and awareness of the importance for the local community and beyond
Links with other external project or activity	The NBS is linked to the city gardens, especially to the Info point where a small-scale vertical garden installation is planned to demonstrate the simple and non-expensive options for the citizens, schools, public institutions and companies.
Business model (link to WP5)	Given the high cost of operations of this type of project implementation, the cost-effectiveness of the project is questioned. The solution to the viability of implementing this scenario could be a private public partnership in which the private company could use the NBS for commercial purposes.
Technology Readiness Level (TRL) (link to WP5)	Current TRL: 5 Planned TRL: 8
Communication activity (link to WP6)	The NBS will be intensively communicated in the Info point and in local institutions. Link to the city garden project will be stressed and distribution of the local seedlings will be published in the local media, especially the social media.
6. State of Play and Monitoring of NBS implementation	
Current situation (to be updated)	The research study "RESEARCH ON THE SUSTAINABILITY OF IMPLEMENTATION OF NATURE-BASED SOLUTIONS AND LOCAL COMMUNITY INCLUSION" is finished, as a basis for the following steps.
Notes/critical issues/barriers (to be updated) (link to WP5)	

Next steps (to be updated)	The next step is drafting a technical description and budgetary estimate, as well as a management plan, for the self-standing aquaponic installation, seedling farm and green roof proposed in the study.
7. NBS maintenance and outlook	
Maintenance	The maintenance will be defined in the management plan of the NBS.
Sustainability after project conclusion	Success in the implementation phase and adequate and necessary sharing of the potential benefit of the activity will be key to project success and to sustainability of the activity after ending date of the proGInreg project. As sustainability and replicability are of utmost importance in research projects, great effort needs to be undertaken to ensure sustainability and visibility.
Additional resources	https://www.facebook.com/veselamotikica/

NBS 6: New cycling track

	
1. General information	
Compilation date and update	12/June/2020 - Time 0- Initial version
NBS type	NBS6- Making post-industrial sites and renatured river corridors accessible for local residents
NBS title	New cycling track
Brief project synthesis	A new 850 m long cycling path will connect Sljeme brownfield area with Novi Jelkovec neighborhood. The cycling track is part of the newly planned road, defined in the detailed plan of the former factory area.
Area of implementation	The new cycling track is stretching on a North-South axis, leading from the middle part of the New Jelkovec housing estate up to the south of the former factory, connecting the estate that is today badly connected, with no direct road and no pedestrian path, making the Novi Jelkovec ghetto-like.
Target groups (Beneficiaries)	Target groups are all residents of the Novi Jelkovec housing estate, especially the young and active. However, introduction of a well-planned and safe cycling path will encourage people from all age groups to engage in a more active lifestyle, and also make the swimming pool and sports facilities accessible to the

	other residents of Sesvete.
Timing (start and end date)	Start: 12/2020
Main responsible partner	City of Zagreb City Office of Strategic Planning and Development- overall coordinator The Road Sector of the City Office for Physical Planning, Construction of the City, Utility Services and Transport, coordinator of road planning and construction
ProGlgreg partners involved	ZIPS (Green and Blue Sesvete NGO) - contact point and link to the local community AF (Zagreb Faculty of Architecture)- consultation on spatial planning ZZPUGZ (City Bureau for Physical Planning and Development) - consultation on planning regulations and requirements
Other stakeholders involved	
Total Budget	The total sum needed/planned to implement the NBS. Please specify the amount taken from proGlgreg funds if the budget has been supplemented by other funds. Consider only the costs of purchasing goods and or services directly linked with the implementation. proGlgreg Partners funds: Zagreb- 100.000€ Other funds (specify the source): City of Zagreb- to be defined Total budget of the implementation: - to be defined
2. Pre-implementation activities	
Planning and preparatory activities	The cycling path is part of the road that is planned to be built, and the City of Zagreb is taking care of all the activities.
Administrative procedures	The construction permit will be obtained by the City after the acquisition of the land is finished. The city will organize and manage the construction documents and the construction itself.
Technical and social analysis	

Other activities	
3. Management structure and responsibilities	
Main partner (coordinator) and role/function	City of Zagreb City Office of Strategic Planning and Development, local project coordinator
2nd Partner and role/function	ZZPUGZ (City Bureau for Physical Planning and Development) - consultation on planning regulations and requirements
3rd Partner and role/function	AF (Zagreb Faculty of Architecture)- consultation on spatial planning
4. Co-design activity and stakeholder engagement in planning process	
Stakeholders, engagement processes, in co-design and co-implementation (link with WP2)	Co-design The detailed design of the cycling track was defined in course of co-design among the partners, in order to fit into the green infrastructure requirement criteria. The original concept design was modified in order to enable smooth cycling with as little interruptions as possible and to create potential of a wider green zone to the east of the road. Co-implementation The implementation phase will begin when the design is complete and all the necessary procedures are done.
Notes on major achievements/success factors/critical issues/barriers related to stakeholder engagement (to be updated) (link to WP5)	
Current situation and next steps (to be updated)	The cycling path design is in the final stage, and the next step is obtaining of a location permit. After that, acquisition of land from the private owners will begin.
5. Other activities	
Synergies with other proGReg activities	The cycling path is connected to all the NBS as it connects physically the large portion of the local inhabitants and users of the future NBS- especially urban garden and therapy garden.

Links with other external project or activity	The cycling path is part of the newly planned road- Road 6, connecting Novi Jelkovec and the center of Sesvete. Future expansion across the railway is expected.
Business model (link to WP5)	The road is financed from the city budget, and its maintenance will be also part of the road maintenance programme of Zagreb.
Technology Readiness Level (TRL) (link to WP5)	Current TRL: 8 Planned TRL: 9
Communication activity (link to WP6)	All project activities are being advertised in the Info point through lectures, exhibitions, discussions, film projections and other events, and the programme of the Info point is published in the local media, especially the social media.
6. State of Play and Monitoring of NBS implementation	
Current situation (to be updated)	The implementation is still expected, currently the City is in preparation of buying land for the new road, and it will begin after the parceling project is finished.
Notes/critical issues/barriers (to be updated) (link to WP5)	The main barrier at the moment is the time-consuming procedure of land acquisition, and the possibility of reluctance of some of the land owners to sell the land.
Next steps (to be updated)	After the land acquisition process is over, the construction permit will be obtained and the construction can begin.
7. NBS maintenance and outlook	
Maintenance	The cycling track will be part of the city street and road network, and will be maintained within the regular city road maintenance program.
Sustainability after project conclusion	The cycling track is expected to be used by many of the 5000 inhabitants of the Novi Jelkovec housing estate.
Additional resources	

NBS 7: New protocols



1. General information

Compilation date and update	12/June/2020 - Time 0- Initial version
NBS type	NBS7- 7 - Establishing protocols and procedures for environmental compensation at local level
NBS title	New protocols and changes to planning procedures and policy development processes
Brief project synthesis	The procedures and regulations in Croatia aren't up-to-date with contemporary needs and requirements of the changing climate and endangered nature in the cities and beyond. To rectify that, the proGireg team is going to prepare guidelines for changing of the existing regulations in line with the recognized needs, monitor the situation and initiate the procedure of policy change when the opportunity is recognized.

	The Zagreb local task force will prepare the necessary documents and use the experience of implementation of the local measures to identify the policy changes needed.
Area of implementation	The overall LL area will be used as a testing field of policies and procedures
Target groups (Beneficiaries)	
Timing (start and end date)	Start: 06/2019
Main responsible partner	City of Zagreb City Office of Strategic Planning and Development- overall coordinator
ProGlgreg partners involved	ZIPS- contact point and link to the local community AF- consultation on spatial planning ZZPUGZ- consultation on planning regulations and requirements
Other stakeholders involved	Local government bodies, Ministry of Construction
Total Budget	The total sum needed/planned to implement the NBS. Please specify the amount taken from proGlgreg funds if the budget has been supplemented by other funds. Consider only the costs of purchasing goods and or services directly linked with the implementation. proGlgreg Partners funds: Zagreb- 70.000 € Other funds (specify the source): to be defined Total budget of the implementation: to be defined
2. Pre-implementation activities	
Planning and preparatory activities	The proGlgreg local consortium uses the opportunity of regular task force meetings to discuss and define the necessary direction
Administrative procedures	After the project task and budget are fixed, the City will deal with the administrative procedures necessary to implement the task.

Technical and social analysis	Draft of the technical and social analysis were set in the study, and further actions are being prepared in course of drafting of this document.
Other activities	
3. Management structure and responsibilities	
Main partner (coordinator) and role/function	City of Zagreb City Office of Strategic Planning, City Office of Agriculture and Forestry, coordinator of activities relating to the garden City Office of Strategic Planning and Development, local project coordinator
2nd Partner and role/function	ZZPUGZ, coordinator and maker of planning regulations
3rd Partner and role/function	AF, actively involved in implementation of green directives into local policies
4. Co-design activity and stakeholder engagement in planning process	
Stakeholders, engagement processes, in co-design and co-implementation (link with WP2)	Co-design The co-design is planned in the joint work of the task force which drafts the documents and proposals of policy changes following the implementation activities and recognized risks/barriers, integrating the new knowledge in the document outline.
Notes on major achievements/success factors/critical issues/barriers related to stakeholder engagement (to be updated) (link to WP5)	
Current situation and next steps (to be updated)	The task force will meet regularly and draft the necessary documents following the implementation activities and recognized risks/barriers, integrating the new knowledge in the document outline.
5. Other activities	

Synergies with other proGReg activities	The NBS is linked to all the other NBS, as it uses knowledge and expertise derived from implementation of other NBS to create an outline of necessary changes in the policies.
Links with other external project or activity	The AF team is actively involved in the drafting of the national programs for local governments on the topics of green infrastructure and circular economy, topics complementary with the proGReg topics.
Business model (link to WP5)	
Technology Readiness Level (TRL) (link to WP5)	Current TRL: 6 Planned TRL: 9
Communication activity (link to WP6)	The actions related to the policy changes will be advertised in the social and local media, and when possible in the Info point.
6. State of Play and Monitoring of NBS implementation	
Current situation (to be updated)	The actual policies are not completely in line with the contemporary needs and directions of green development, so the local team will prepare the documents for policy changes on all necessary levels.
Notes/critical issues/barriers (to be updated) (link to WP5)	
Next steps (to be updated)	
7. NBS maintenance and outlook	
Maintenance	
Sustainability after project conclusion	
Additional resources	

4. Living Lab results and perspectives

4.1 Conclusions of the Implementation phases

In June 2020, the only finished activity is the Info point, operating since December 2018 and finished/equipped in the summer of 2019. Currently the other NBS are in various phases of planning.

4.2 Results obtained and points of criticism

This paragraph will be completed at the end of the implementation phase

4.3 Further integrations

The project activities are in part temporary/mobile and in part permanent. The info point might over live the project as a local venue for communication of the institutions and the public, and as a sort of “speakers’ corner” for the green and new initiatives. The urban garden and the therapy garden will serve as a pilot project for the innovative purification method and a public therapy garden, since most therapy gardens are connected and open to a specific institution.

The local seedlings factory and aquaponic installation will be an experiment and its sustainability will depend on its success in engaging the local people, especially the users of the urban garden.

The cycling track is part of a planned road, and its maintenance is in the city road maintenance plan.

The policy change NBS is turning out to be among the most important activities in the project, so the partners will work hard to include the draft changes and new items in the local and national policies, in order to provide long-term sustainability of the project principles.

Annex 1: Zagreb Living Lab Map

Ciljevi Living Laba
Living Lab goals

Gradovi se sve više suočavaju s posljedicama klimatskih promjena te se u Europi i svijetu sve više prepoznaje važnost zelene infrastrukture kao sredstva za ublažavanje ekstrema u gradovima. Grad Zagreb zajedno s Dortmundom, Torinom i Ningbom kroz projekt proGReg (produktivna zelena infrastruktura za urbanu obnovu) radi na podizanju kvalitete života lokalne zajednice uvođenjem rješenja temeljenih na prirodi uzimajući u obzir potrebu za produktivnošću.

Cities are increasingly facing the effects of climate changes so the importance of green infrastructures is being recognized in Europe and in the world as a means of mitigating extremes in the cities. City of Zagreb together with Dortmund, Turin and Ningbo through the proGReg project (productive green infrastructure for urban regeneration) works to raise the quality of life of the local communities by introducing nature-based solutions considering the need for productivity.

NBS 7: Uvođenje NBS-a u regulativu
NBS 7: Introducing NBS into regulation

- * uspostavljanje protokola i procedura za okolišnu naknadu te prilagodba regulative kako bi se olakšalo uvođenje zelenih rješenja.
- * establishment of environmental compensation protocols and procedures and adjusting regulations to facilitate green solutions.



NBS 3: Izgradnja novog terapijskog vrta, modernizacija postojećeg gradskog vrta uz korištenje inovativne tehnologije pročišćavanja podzemnih voda, Info centar projekta

NBS 3: Construction of a new therapeutic garden, modernization of the existing city garden using innovative groundwater treatment technology, project Info point

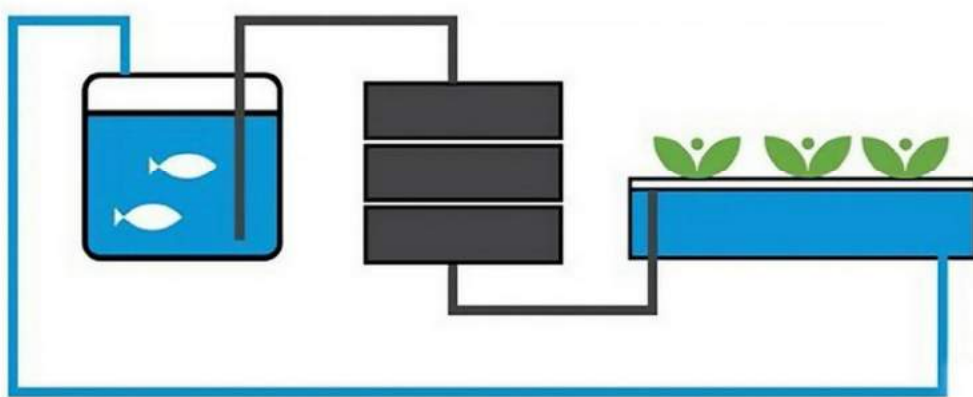


The site of new therapeutic garden

Info point

NBS 4: Pokazna instalacija akvaponike u svrhu upoznavanja lokalnog stanovništva s tehnologijom

NBS 4: Demonstration installation of aquaponics in order to introduce this innovative technology to the local community



Shematic aquaponic tehnology

NBS 5: Zeleni zid i krov na javnoj zgradi kako bi se ispitao mikroklimatski i izolacijski efekt

NBS 5: Green wall and roof on a public building to test the microclimate and isolation effect



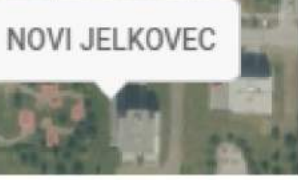
HUB building

NBS 6: Izgradnja nove biciklističke staze u koridoru ceste koja povezuje Novi Jelkovec s područjem bivše tvornice

NBS 6: Construction of a new cycle path in the road corridor linking Novi Jelkovec with the area of the former factory



Sijeme Sesvete factory



NOVI JELKOVEC



Rješenja temeljena na prirodi
Nature - based solutions

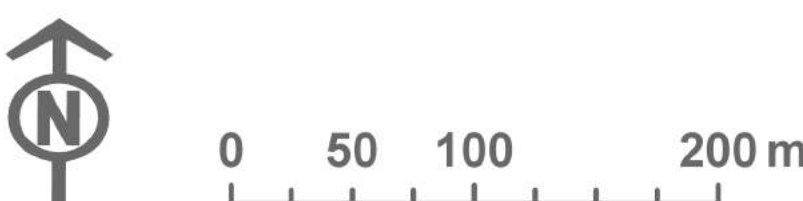
- Modernizacija postojećeg gradskog vrta
NBS 3: Modernization of the existing city garden
- Novi terapijski vrt
NBS 3: New therapeutic garden
- Akvaponika
NBS 4: Aquaponics
- Zeleni zidovi i krovovi
NBS 5: Green walls and roofs
- Nova biciklistička staza
NBS 6: New bicycle lane

Provedbeni status
Implementing status

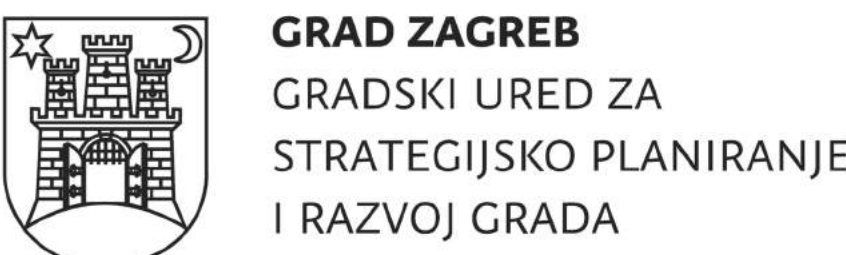
- Planirano
In planning
- Provedeno
Implemented

proGReg infocentar
proGReg infopoint

- Vodotoci
Waterways
- Park
Park
- Šuma
Forest
- Neuređene zelene površine
Undeveloped green area
- Prometna infrastruktura
Road infrastructure
- Zgrade
Buildings
- Gospodarske zgrade
Commercial buildings



Koordinator lokalnih aktivnosti / Coordinator of local activities:



Lokalni partneri projekta / Local project partners:



Productive Green Infrastructure for post-industrial urban regeneration (proGReg)
Email: progireg@zagreb.hr
Website: www.proGReg.eu



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