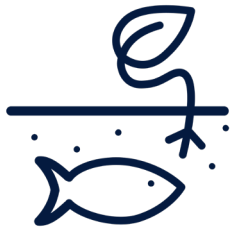


Living Lab Turin, Italy

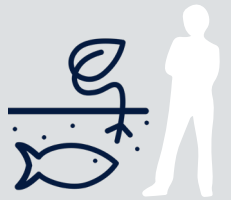


NBS 4

Aquaponics as soil-less agriculture on polluted sites



Aquaponics test system



NBS description

The NBS implementation of low-cost aquaponics systems for horticultural cultivation by Grow Up comprises three scales:

- **Micro plant:** educational scope, consisting of cultivation and flotation tank (raft bed) designed for leafy vegetables and a growth bed with a solid base (media bed) including a flood-and-drain irrigation system through a bell-shaped siphon and a tank for fish breeding. Cultivation surface of about 2 sqm with a rich cultivation variety.
- **Mini plant:** educational scope. Cultivation surface of 11,5 sqm, with 3 types of growth beds, considered most efficient aquaponics system: raft bed with floating system for leafy vegetables; the flood-and-drain media-bed for root vegetables; wicking bed with radical fert irrigation system for underground vegetables.
- **Semi-commercial plant:** all types of growth beds, cultivation surface of 50 sqm. It was installed ensuring a semi-commercial production and educational and demonstrative dimension.

The aquaponic systems are largely made of wood components for ease of self-construction (fig. . The type of fish for farming is limited to non-edible goldfish and COY carps for simplicity.

Mitte Garten's aquaponics system is based on cultivation by a tank containing plants and fish connected through mutual exchange of resources.

The wooden tank is insulated in polystyrene and contains herbivore Asian fish particularly efficient well-functioning. Cultivating leafy vegetables such as lettuce, beets and basil, floating on hard plastic sowing tray. To distribute oxygen to fish and plant roots, the water is ventilated through a compressor pushing high-pressure water in the pipes situated on the bottom of the tank.

Aim & goals

The overall goal is to test aquaponics systems in an urban context in the post-industrial district Mirafiori Sud. In synergy with diverse stakeholders including professional farmers, social and non-profit organization and citizens in participatory, scalable, technologically advanced and sustainable processes.

Grow up test aquaponic horticultural cultivation through the planning, building and management of three demonstration plants:

- (1) a micro plant,
- (2) a mini plant installing together with residents of the Comunità Giulia;
- (3) a semi-commercial plant. Carried out by Mitte Garten

Mitte Garten's goal is to complement and support the systematic actions on urban green and food currently ongoing in Mirafiori Sud district, in particular those developed within ProGleg.

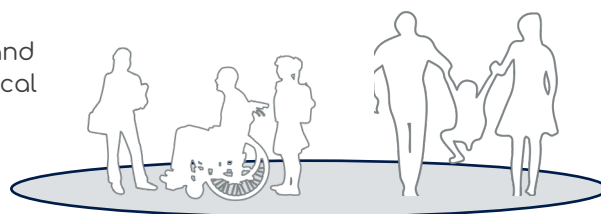


Grow Up installed two plants in Mirafiori Sud district: micro + semi-commercial plant
Mitte Garten's greenhouse is in close proximity

GPS coordinates: 45.01263, 7.62642

Target groups (beneficiaries)

- Citizens
- Agricultural operators
- School professionals and students involved in educational courses
- People with disabilities - including autistic students and students with learning difficulties, adults in care of local residential communities
- Rehab patients
- Customers buying plants at the greenhouses
- Potential investors in aquaponics systems



Stakeholder constellations

Main responsible partner

Grow up is an initiative of young farmers forming a social and agricultural company, innovative startup with a social vocation and social company responsible for:

- constitution of a Temporary Association of Purpose (TAP) with other partners involved (Soluzioni Artistiche APS, Il Laboratorio CTM, ARCI Servizio Civile Piemonte) dated 14/01/2022, called Mirafiori Urban Testing;
- coordination of TAP; management of the relationship with the City of Turin;
- participation in the construction of the system.

Mitte Garten responsible for building the greenhouse facilities on their own.

ProGReg partners involved

City of Turin, EU Funds and innovation Dept. tendering procedures, administrative monitoring and accounting activities,

University of Turin - Department of Agricultural, Forest and Food Sciences, provided scientific supervision of both projects, communication initiatives with citizens

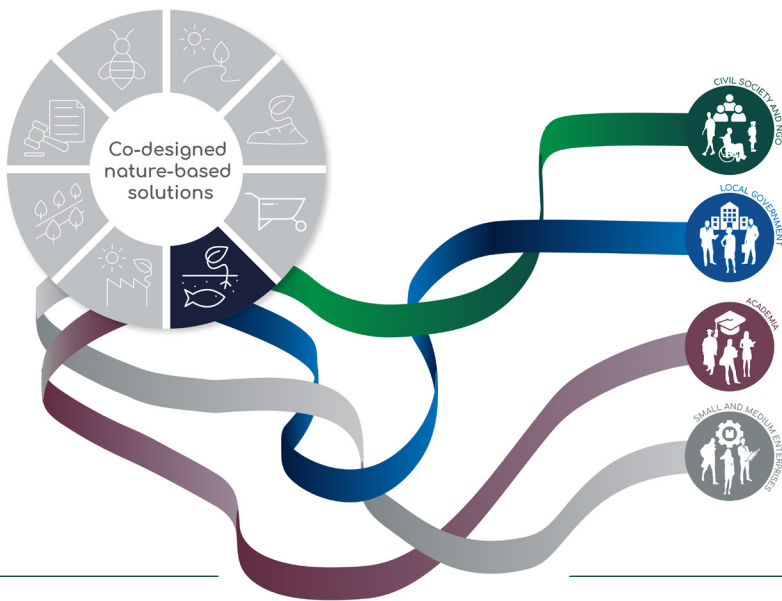
Fondazione della Comunità di Mirafiori Onlus developed educational courses in aquaponics and sustainable agriculture for Mitte Garten, providing acquired skills to students of I.I.S. (Secondary School) Sella.

Other stakeholders involved

- NGO Associazione Miravolante: organisation whose goal is the development and improvement of life quality of Mirafiori Sud district.
- Soluzioni Artistiche APS: non-profit organisation since 2019, developing initiatives for social and cultural promotion. Focused on participation & regeneration in urban and peri-urban contexts. Provided consolidated managerial experience, scientific and technical support, impact assessment and social agriculture.
- Il Laboratorio CTM and ARCI Servizio Civile Piemonte provided heritage experience in social entertainment in Mirafiori Sud and coordinated the second-level Network of Organizations of the Third Sector.
- SME Aquaponic Design APS provided professional expertise in planning, realization and management of aquaponic plants.
- Confagricoltura Torino provided technical agronomic expertise and staff;
- SME Teoresi Group provided staff of engineers and technological experts.
- Residential local communities for adults with disabilities (Il Margine, I Passi, Centro Puzzle) to visit the plant, users co-manage and co-maintain the plant.



Co-design activities, stakeholder engagement, and pre-implementation activities



Co-design involved a multi-stakeholder network of private sector companies, members of the civil society, academia and the local authority with a strong educational focus.

Planning and preparatory activities (administrative and technical procedures)

Grow Up constituted a Temporary Organisation of Purpose with some of the stakeholders involved (Soluzioni Artistiche APS, Il Laboratorio CTM, ARCI Servizio Civile Piemonte) dated by 14/01/2022, named Mirafiori Urban Farming in order to realize the ProGReg Aquaponic project in 2022.

Co-design and engagement activities

Ongoing co-design processes for both projects open to different population groups for active involvement in testing the aquaponics system. Co-design activities also offered a source of inspiration for other initiatives, i.e. supporting entrepreneurship and initiatives aimed at promoting and valorising agricultural areas, including the Gardens in Cascina Piemonte - Orti Generali (NBS 3).

Co-design activities addressed at schools are part of educational courses developed by Fondazione della Comunità di Mirafiori Onlus with students of I.I.S. (Secondary School) Sella. Inclusive activities with people with disabilities, children with learning difficulties, and autistic students of a professional training school through visits and internships. Adults in care of local residential communities were included in the management and maintenance of the aquaponic plant.



Aquaponics beds made of wood

Implementation budget

Total implementation budget: 25.000 €

proGReg Partners funds: 20.000 €

Co-funding by Grow Up and Mitte Garten companies: 5.000 €



Key achievements and implementation results

- Complete implementation of the aquaponic systems in the Living Lab, and dissemination and education activities with the stakeholders.
- Key result represents putting together a new way to cultivate vegetables, using a modern and low-impact technology with the involvement of the community in the ideation, planning and management of the facilities, an added value for a city impacted by air-pollution.
- Including vulnerable groups, making the experimentations accessible within everyone's reach.
- One of **Mitte Garten's** clients became aware of the project and visited the greenhouse. The client showed interest in collaborating and signed up for a paid internship from 1st February 2023.
- **Mitte Garten** are willing to start a collaboration with **Centro Puzzle**, a rehabilitation centre for individuals with brain injuries and recruit patients for the company's workforce.

Critical implementation issues and barriers encountered



For both companies, raw material price increase compromised procuring necessary tools and materials, which slowed down the construction works.

Mitte Garten encountered issues with limited availability of lighting at the test site, impacting negatively on vegetable growth need for light.

Management and monitoring of both projects proved difficult.

The City of Turin organised regular meetings online and onsite for updates on construction and management progress, and exchange information communication materials.

Synergies with other proGReg activities



NBS 3: School Garden in boxes

One of **Mitte Garten** activities comprised involving students with learning difficulties and with HC syndrome of the **ENGIM Training Center** (12, via Torrazza Piemonte), who visited the plant and worked in the greenhouse as interns. The same students have been previously involved in **ProGReg** project: they took care of garden boxes

located near the school. **Il Margine** and **I Passi**, two local residential communities hosting adults with disabilities took also part in other **ProGReg** NBS projects.



NBS 3 Gardens integrated into housing

Key **proGReg** partner NGO **Fondazione della Comunità di Mirafiori Onlus** developed educational courses in aquaponics and sustainable agriculture for **Mitte Garten**.

Links with other external projects or activities

- **Grow Up's** partner **Soluzioni Artistiche APS** participates in the project **CIBBO - Nutrire le Comunità** (Feeding Communities): network of purchasing groups of zero-km food products. **CIBBO** has experience in the management of **Farmers' Market VOV102**, promoted by the City of Turin and Piemonte Region, which is included in the **Torino Food Policy Good Practices**
- **Aquaponic Design APS** (**Grow Up** partner) collaborated with other agricultural aquaponic companies, such as **MontVert FVG** and **Le Serre**. The latter equipped an aquaponic urban plant producing leafy vegetables. The University of Bologna and **Aquaponic Design APS** collaborate in the EU project **Horizon 2020 FoodE**, aimed at realising urban farming aquaponics and hydroponics plants in Bologna, Italy.

Communication activities



Key communication activities and citizen involvement:

- organised onsite visits
- educational activities for adults and students
- regular updates about the experimentations published on **Torino City Lab** website - page dedicated to **Aquaponics**
- **TCL** social networks (see [LinkedIn Page](#)).

Benefits for the Living Lab Mirafiori Sud, Turin

The Living Lab in the Mirafiori district in Turin benefits in multiple ways:

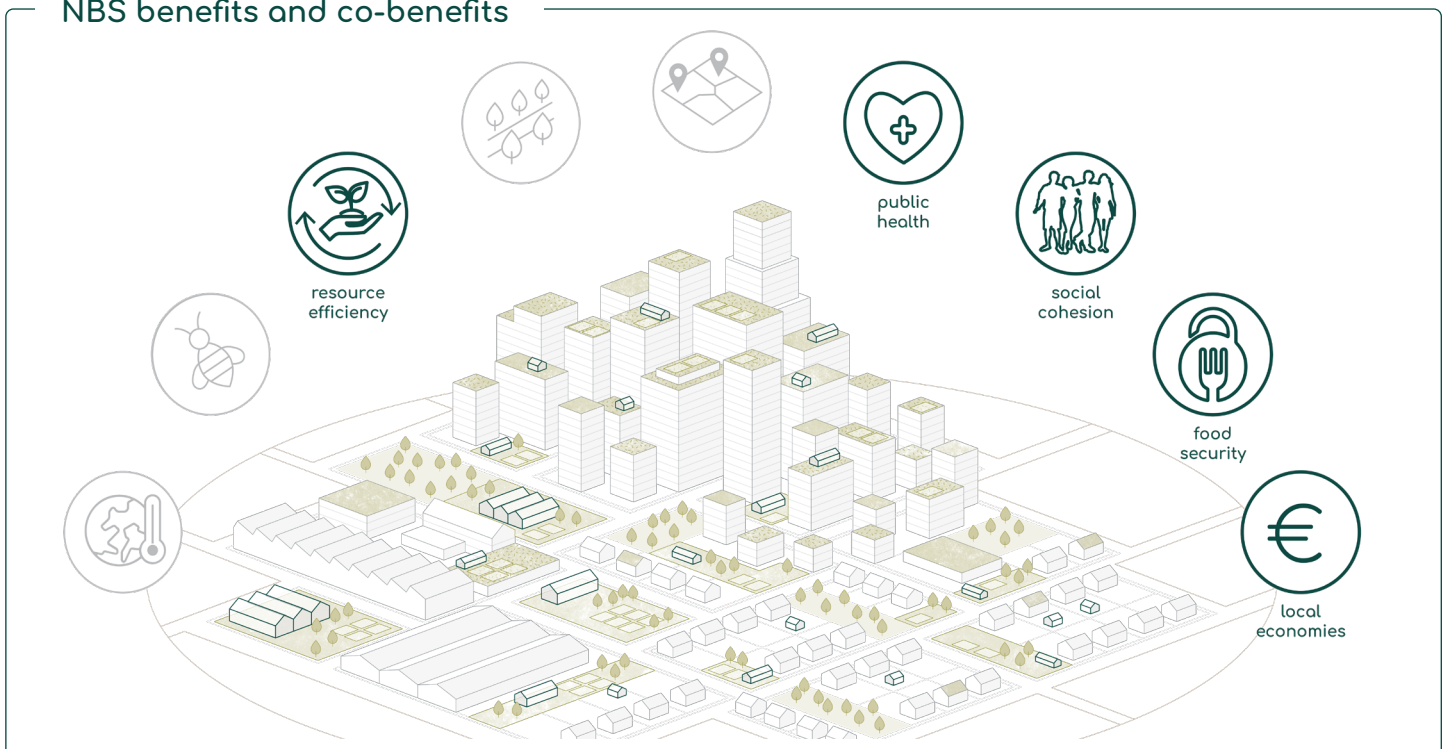
- First of its kind experimentation with aquaponics systems in an urban context in the city of Turin
- Post-industrial areas have been renovated for innovative aquaponics cultivation systems that are not yet widespread.
- Environmental valorisation of underused areas
- Social impact on the community. New and renovated spaces offer educational courses to different citizen groups incl. vulnerable individuals
- Resource and land use efficiency: Plants produced in aquaponics contain no phytochemicals, 95% water saving compared to soil-bound cultivation) and limited space required to cultivate

Maintenance & Sustainability beyond proGReg

Maintenance and sustainability of the aquaponics system can be guaranteed by sustainable business models and synergies with other projects:

- Mitte Garten will ensure maintenance and sustainability by selling leafy vegetables to companies and local restaurants.
- The semi-commercial purpose of the aquaponics plant by Grow Up also produces leafy vegetables sold directly to food companies and local restaurants.
- Integration with the project CIBBO - Nutrire le Comunità. The micro and mini plant are autonomously managed by the hosting subject (Comunità Giulia. Grow Up will keep on assuring assistance to the Comunità beyond proGReg in case of need.
- Source of revenue from educational activities addressed at families, young entrepreneurs and school groups to learn about innovative cultivating technologies and to replicate the solution in other parts of the city

NBS benefits and co-benefits



Fact Sheet



Aquaponics as soil-less agriculture on polluted sites



Aquaponics test system
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🌐 www.progireg.eu
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