proGIreg

Living Lab Turin

NBS 2

New regenerated soil for urban forestry and urban farming

ENVIRONMENT PARK Parco Scientifico Tecnologico per l'Ambiente

New soil production in Sangone Park

NBS New Soil in Sangone Park

This NBS in the Turin Living Lab Mirafiori Sud experiments with creating an „urban forest“ along the banks of the Sangone river by using regenerated soil (New Soil). The base material derives from deep excavations in Turin, added by compost, zeolites and innovative bio-stimulants (fig. 1,p.6).

- Key ingredient is excavated soil from construction sites in Turin
- Compost from OFMSW for organic matter and nutrients addition (10%)
- Zeolites in the surface layer for decreasing material density and an adsorbent function to retain water
- Mycorrizae as bio-stimulants to improve nutrient uptake and resilience of plants.
- Planting different species in the New Soil area and in an adjacent control area.

This technical NBS requires extensive analysis:

- Plant growth analysis to monitor the effect of new soil on vegetation.
- Chemical characterizations of excavated soil before and after
- Mixing with other ingredients to verify legal compliance and authorization procedures.

Aim & goals

Given competition of land uses in urban areas, the scarcity of the resource soil endangers urban environments. Contamination, poor chemical, physical and biological fertility and high heterogeneity are common traits of urban soils. Previous and ongoing projects have typified soils, fertility and environmental quality. Therefore, the NBS aims at:

- testing and providing soil of good agronomical and environmental quality for new urban green areas and restoration of derelict industrial areas.
- pursuing minimum maintenance of new soil composition.
- investigating the new soil concept at its very base, considering a wide variability of materials that may compose mixtures used as cultivation substrate.
- establishing a sampling strategy, and laboratory and field tests to prepare a methodology for generating new soil, centering on chemical, physical and agronomic quality of materials and mixtures,
- producing guidelines providing best strategy for preparing and utilising new growing medium of starting mineral and organic materials, quality of the site to be restored, type of plants to use.

Area of implementation
2.000 m² in Sangone Park, Mirafiori Sud district, Turin Italy
GPS coordinates: 45.009040, 7.641200

Target groups (beneficiaries)

- City of Turin Green department technicians
- Citizens
- Quarry managers
- Compost producers
- Legislators

Stakeholder constellations

Main responsible partner

Environment Park (coordination)

Envipark coordinated activities by organizing periodic updating meetings between the partners to facilitate constant dialogue

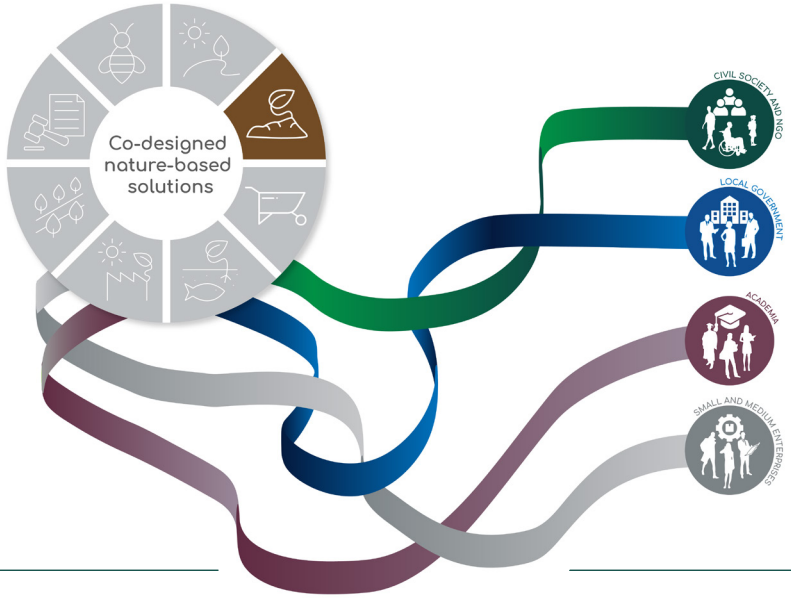
ProGIreg partners involved

- Dual Srl (major part of funds: construction): Collaboration with nurserymen to generate the new soil, transport to the site, planting and maintaining the site during plant growth
- UNITO (monitoring activity): UNITO was responsible for carrying out soil and plant sampling and related chemical analyses
- City of Turin (coordination of administrative procedure): supported Envipark in the coordination, facilitating dialogue with citizens and obtaining authorization for the construction site at local bodies. The municipality disseminated experience with new soil both nationally and at European level. Kick-started the process of modifying local authorization processes to promote the NBS replication based on experiences gained.

Other stakeholders involved

- ACEA (TLP of Envipark, provide compost)
- CCS (subcontracting of Envipark, provide micosat: the biotic compound)
- Arpa Piemonte (TLP of City of Turin, help in administrative barriers)
- Città Metropolitana di Torino (TLP of City of Turin, help in administrative barriers)
- Private gardeners of adjacent municipal gardens
- Representatives of citizen groups

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



The NBS New soil in Sangone Park was conceived and produced in collaboration with diverse stakeholders spanning from private sector companies, research centers to public authorities.

Planning and preparatory activities (administrative and technical procedures)

Planning started in 2016 with the proGIreg research project proposal. The City of Turin (green department) faced the problem of finding soil to build new parks without taking soil from agricultural land. The company Dual srl needed to reuse soil from deep excavation in Turin.

First experiments of mixing soil with compost in urban construction sites proved unsatisfactory. Envipark proposed to use ACEA compost and the biotic compound produced by CCS Aosta, and adding zeolites for water retention capacity and lower material weight (as superficial layer on ground application and roof substrate mixes). Arpa and Città Metropolitana sought to overcome administrative limitations in the use of soil from deep excavation.

Co-design and engagement activities

Co-design activities involved representatives from companies, research centres and authorization bodies depending on the topics covered. Social involvement of the local population is key to increase awareness about the experimental site developments and aims, thus requiring:

- Meetings with neighborhood committees and the owners of the urban gardens located in Mirafiori
- Brief training on new soil organized by actively involved project partners (POLITO, UNITO, City of Turin, Arpa Piemonte (TLP of City of Turin), Città Metropolitana di Torino (TLP of City of Turin).
- Creating a technical table for design and implementation processes of NEW SOIL to decide how on formulate the new soil recipe, analyse regulations for formulating the request to authorization bodies and carry out chemical analyses to support decision making.

Implementation budget

Total implementation budget: 278.000€ from proGIreg funds

Other funds:
- 17.000 € Arpa
- 54.500 € Acea
- 20.000 € CCS Aosta


(c) L. Ribotta

Key achievements and implementation results

The New Soil experimentation allows evaluating market potential of natural solutions that fully meet public authorities' demands for soil used in urban green areas. Therefore, including new soil as a product in regional price lists and public procurement specifications.

- Definining the final material mixture used as 'New Soil' required a number of chemical characterizations in order to comply with legislation standards for land application.
- Setting up a discussion and coordination board with the authorities in order to promote new soil through legislative support to recognize the background values of pollutants in the destined locations of regenerated soil.
- Extensive monitoring of soil samples on both the testing area and the control area by the University of Turin for chemical analyses and PM10 and temperature.
- Obtaining useful indications for the public administration to regulate standards and update bureaucratic processes for including new soil in the urban environment.
- Monthly wetting with 2500 liters of water during very dry weather conditions
- Turin is leading the way to convince road construction authorities to modify price lists, tender specifications and authorization procedures.
- A team at the municipality identifying urban land quality in different areas as a reference for new soil materials quality. In 2021, a resolution by the Piedmont Region approved basic values.

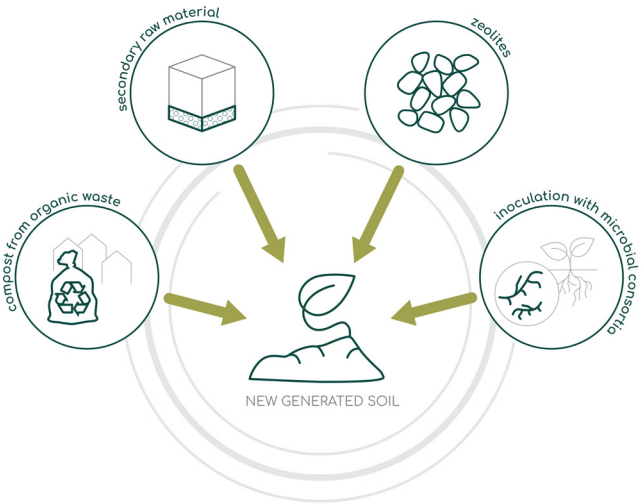


Fig. 1 Biochemical processes to generate new soil (RWTH)

Critical issues and barriers encountered during implementation

- Implementation delays required much effort to keep stakeholders engaged and motivated, and to feel part of the community.
- Plant failures on new soil and control area. Covid-19 restrictions limited access for sampling and watering. Dead plants were replaced in December 2021 by DUALgreen.
- Despite major obstacles in the production and use of regenerated soil, barriers are mostly administrative, not technical (authorizations for use of land from excavation works).
- Compliance between the analytical quality of new soil material mixture and requirements for use in urban application pose implementation barriers. Specific metals may exceed allowed legal values even though these can be found in urban land in which the new soil is to be used.
- Large quantities of new soil analyses composed as a structuring matrix of excavations materials were necessary.
- Providing a guarantee on the homogeneity of the material's chemical composition is not easy, requiring multiple sampling at different material heap depths on-site.
- Samples for chemical analyzes are not always representative of the chemical composition of the entire heap due to the possible non-homogeneity in the composition.
- Long distances between site of destination for new soil and extraction sites may limit widespread use of NBS New Soil

Synergies with other proGIreg activities

NBS8: wildflower lawn attracts pollinating insects

NBS3: pollinator garden: New soil to be used for pollinator garden

NBS3: Orti Generali: flowerbed with new soil to carry out further experiments financed by Axto circular economy project

Links with other external projects or activities

- AxTO circular economy project
- SATURNO project: production of bio-fertilizers from waste

NBS benefits for the Living Lab Turin

The NBS tested a new type of soil already used in other NBS in the Living Lab, thus underlining the experimental purpose and potential uses. Being in a public park, the new soil area presents proGIreg activity to a wide target group.

Communication activities

- City of Turin will give wide publicity of the approved values and the simplification of the procedure for the new soil application.
- Press release to announce the opening of the construction site and articles in the local press.
- Envipark edits Facebook posts on new soil.
- Videos and images of the construction site to make a film describing the action.
- Dissemination of proGIreg and new soil activities during Climathon 2020 Turin (global hackathon on climate change, fully digital on 13 and 14 November 2021).
- The event organized by Envipark and the Municipality of Turin was dedicated to nature-based solutions, involving 72 participating competitors divided into 16 teams.
- Some working groups used the new soil for developing their project work.
- A dedicated Facebook group counts 450 members (https://www.facebook.com/groups/744008156185287).

NBS 2 benefits and co-benefits

Maintenance & Sustainability beyond proGIreg

- Maintenance will be carried out by Dual srl. during proGIreg, the City will take over after project end.
- Following the successful trial outcomes, it is planned to produce a brand for the new soil and to include it in public specifications for the construction of new urban areas.
- Economically, it would be useful to connect the NBS to soil resources already active on the market to structure a list of possible commercial links and collaborations.
- The NBS New soil can be used to implement NBS in other parts of the Mirafiori district and beyond, e.g. urban gardens.

Fact Sheet

Newly planted flowers and trees on new soil area (c) L. Ribotta

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