.7.1 FINAL SELF-EVALUATION REPORT

TITLE: GREEN ROOF IN OPEN 011

Subtitle: Torino

Version 2
04 2022

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1. Background and objectives

1.1. Challenges and solutions

The challenge for the city is to think about new ways to recover and use water. The opportunity to apply in practice in a pilot some of the innovative practices on the water cycle allows both to build knowledge within the municipal technical offices and to tell all citizens what steps can be taken together towards the preservation of a resource so important.

The pilot represents an opportunity to develop a strategy for rooftop farming as a solution for the resilient city of tomorrow in CE (and beyond). The pilot will help Turin and other public authorities to define innovative “Green & blue infrastructure strategies” to feed the future “Local Environmental Adaptation Plan” in line with the “Mayors Adapt” initiative.

The pilot is implemented at the site originally planned at the proposal phase. Open 011 is a Youth Hostel built for the Olympic Games 2006 in a former 1940’s Factory. A big terrace facing south is available to be transformed together with a big metal roof to harvest from the rainwater and a garden for the overflow.

The pilot takes place on the roof of a public building offering students’ housing. The building is ECOLABEL EU certified and it is already the place where other ICT devices have been implemented to control the building’s environmental performance: a temperature monitoring system, to compare internal and external temperatures through data logger; a weather station. The dissemination and education potential is high, due also to its use.

The pilot consists of building a rooftop garden with green roofing tech and a greenhouse on a public building to test & demonstrate the results of RW-based aeroponic cultivation and a linked closed food production cycle.

Moreover, the pilot follows the sustainable water management principles with a rainwater harvesting scheme, aimed to reuse harvested rainwater for green roof and aeroponic irrigation, as well as for pluvial flood mitigation and managed aquifer recharge in urban context.

2. Experience of the pilot implementation

This chapter is to describe the experience, lessons learned during the whole implementation process of the pilots. Please, think about what went easy, what was hard, what problems you encountered during the piloting process etc. What practice would you suggest to follow and what to avoid by any other actors who would think on starting similar initiatives. Of course, you don't have to write to all sub-chapters, but this is an important part of the report, as these are important experience to be rolled out.

Here, we would not set any page limits, as every experience is important.

2.1. Lessons learned from the planning phase

The following lessons learned emerged from the planning phase, according to the interview done to Arch. Alessandra Aires (July 2021), the technician of Municipality of Turin who followed the design all the phases of pilot implementation:

- The planning of the pilot was relatively easy
- it was easy to find a place willing to implement the innovative solution (Hostel Open 011)
- once identified the site, it was also easy and fast to design the pilot, especially thanks to the involvement of experts in the sector of NBS and sustainable water management (FBR and IRIDRA)
- It was useful and enriching the possibility to work with international experts in innovative sectors. Particularly, the contribution of FBR was very valuable, since it always pushed the Municipality to go beyond the "design as usual", being ambitious in the design purposes. On these regards, it was also very useful and inspirational to have access to international innovative experiences, through technical meetings, guidelines, etc. It was particularly useful to have the feeling that innovation was successful implemented in other context ("if it worked there, why it cannot implement here?"). To this aim, the potentiality of cross fertilization of project like CWC was very valuable.
- The most difficult aspect of the design phases was to deal with retrofitting schemes; while the design of new building would have not given particularly difficulties, designing in an existing urban environment was quite challenging. Since the building was existing (built in 1940) some technical, aesthetic, and infrastructural barriers had to be solved, modifying the original preliminary design in the definition of the detailed design. We could not harvest the entire roof surface, since part of the roof drainage is conveyed on the side opposite to the one of interest, i.e. in the main road instead to the internal court. These difficulty was particularly relevant in defining the bill of quantity, making uncertain the amount of material requested for the retrofitting as well as the kind of work requested. As lesson learned, it could be advised for future retrofitting in similar projects to foreseen a suitable budget, which could permit to have a certain flexibility (at least ± 20%) to fit with the existing building context; this is even more true if the project foresee co-design activities, where additional requests could rise with a budget that cannot permit their fulfilment.

2.2. Lesson learned from the procurement phase

The procurement phase was hard in any of its stages, representing the most important lessons learned from the implementation of the pilot in Turin, which can be summarised in the strong need of bureaucratic changes to speed-up the realisation of similar public works in Italy.

The best way to represent the difficulties encountered in the procurement phase is to sum-up the different stages, which are following reported:

- The planning phase, including the detailed design, was completed in only 1 month in November 2020
- However, the construction started only in July 2021, i.e. 8 months after the completion of the design due to the following steps
  - the Municipality has chosen the fastest procedure for public work realisation according to Italian law, i.e. the direct procurement without tender (possible below for procurement with a value lower than 100.000 €), which permitted a fast procurement at Municipal level (less than 1 month); it must be noted that, in case of higher procurement value, additional procurement time would have been needed for public consultation according to Italian law (project approval, request of stakeholder opinion, etc.)
  - the longest time was lost to receive the official approval on financial suitability of the selected construction company, which lasted about 5 months; this phase is managed at National level and requests the check of legal status of the company at the Court (no past failure of the company, no trial record, not under legal trials, etc.) and the regularity with taxes payments
  - finally, another month was needed to verify the financial documents provided by the construction company (bank guaranty)
- The main lesson learned, therefore, is that the jungle of stages requested for public work in Italy should be updated in accordance to EU law, as already requested by European Commission in the framework of Next Gen EU
- Another important negative feedback of such long and difficult procurement phase is the risk to hinder the willingness of realization of new public works which rely on the need to rapidly spend the available resources; since this seems to be the rational of EU funding for innovation, this risks to hinder the innovation itself in public sector, since public sector could be tempted to not enter in this procurement phase for innovation, which risks to fail due to the not ability to spend in time the available funds.

2.3. Lessons learned from the construction/installation phase

The construction work started the 19th July 2021 and are currently planned to be concluded by the end of December 2021. Hence, only few lesson learned are reported, according the problems encountered up to now:

- There was an unexpected work to be done on the roof, which could not be known until the work started, that delayed the process. Therefore, the works are in late in comparison to originally planned schedule. This confirms the lesson learned during the planning phase to be more flexible in the definition of the budget for the realisation of similar works in built environment.

2.4. Lessons learned from operation

The greatest difficulty encountered in the operational phase is due to the difficult availability of materials in the post covid19 period. In addition, the cost of materials went up considerably and additional unplanned work on the electrical system was required. The city also assessed that the operators of Open 011 could not immediately take over the running of the greenhouse, so it will provide an additional service of training and supplying the materials needed to grow the vegetables.

After implementation, as of December 2021 the entire Po Valley experienced a long period of drought that still has not passed. There have been some rains but short and sporadic and it has not been possible to collect water in the reservoirs nor to start the monitoring of water quality. The event was unpredictable and absolutely not usual in Turin.

3. Timeline and responsibilities

Please, in the table below indicate the timeline related to the different stages of pilot action / investment preparation, implementation and evaluation. It is the same table as the one in the intermediate report, please update that.

Activity	*Start Date*	*End date*	*Status*	*Responsible*	*Involved people / stakeholder*	*Comment*
1. Design	May 2020	November 24th, 2020	approved	Aires Alessandra	Iridra, Smat	
2. Procurement		December 21st, 2020	approved	Aires Alessandra		
3. Tender	December 23rd, 2021	February 10th, 2021	approved	Giorgio Marengo		
4. Procurement legal check	February 10th, 2021	June, 2021	approved	Procurement Office		
5. Construction site	July 2021	October 2021	Construction work under development	Aires Alessandra	private company Romeo Vivai	An unexpected work to be done on the roof, which could not be known until the work started, delayed the process, which were expected tob e concluded by the end of September 2021
6. Monitoring	October 2021	March 2022	Monitoring contract with Smat signed	Laura Ribotta	Smat (Water Utility)	

4. Costs

Please, give a short assessment on the costs of the pilot, from a 'lessons learned point of view'. Provide a quick assessment on the planned budget, what elements popped up during the implementation that was not planned, how well the prices were estimated, any problems that came up, what changes needed etc. We recommend using the below table format.

It must be noted that the long procurement phase according to Italian law aim to reach the implementation phase with an as safe as possible working cost estimation. This also means that Italian law does not permit any significant change in the allocated budget for construction costs during the implementation phase. For this reason, the column "Real amount" was left empty.

Max. 2 pages

Cost type (e.g. planning, construction, etc.)	Description of cost (what is included into the contract, what was delivered, etc.)	Planned amount in AF (EUR)	Real amount (based on contract) (EUR)	Description
1. Rainwater harvesting tank plus stormwater filter	■ Concrete rainwater harvesting tank (13 m3) ■ stormwater filter ■ piping ■ concrete and excavation works ■ pump and electrical panel for reuse of harvested rainwater	€ 10,387.45	N/A	
2. Retrofitting works on existing drainpipes	■ all works required to retrofit existing drainpipes, including excavation and new required piping material ■ stormwater filters on drainpipes	€ 800.47	N/A	
3. Storage tank on terrace for aeroponic	■ polyethylene storage tank (1200 liters)	€ 932.49	N/A	

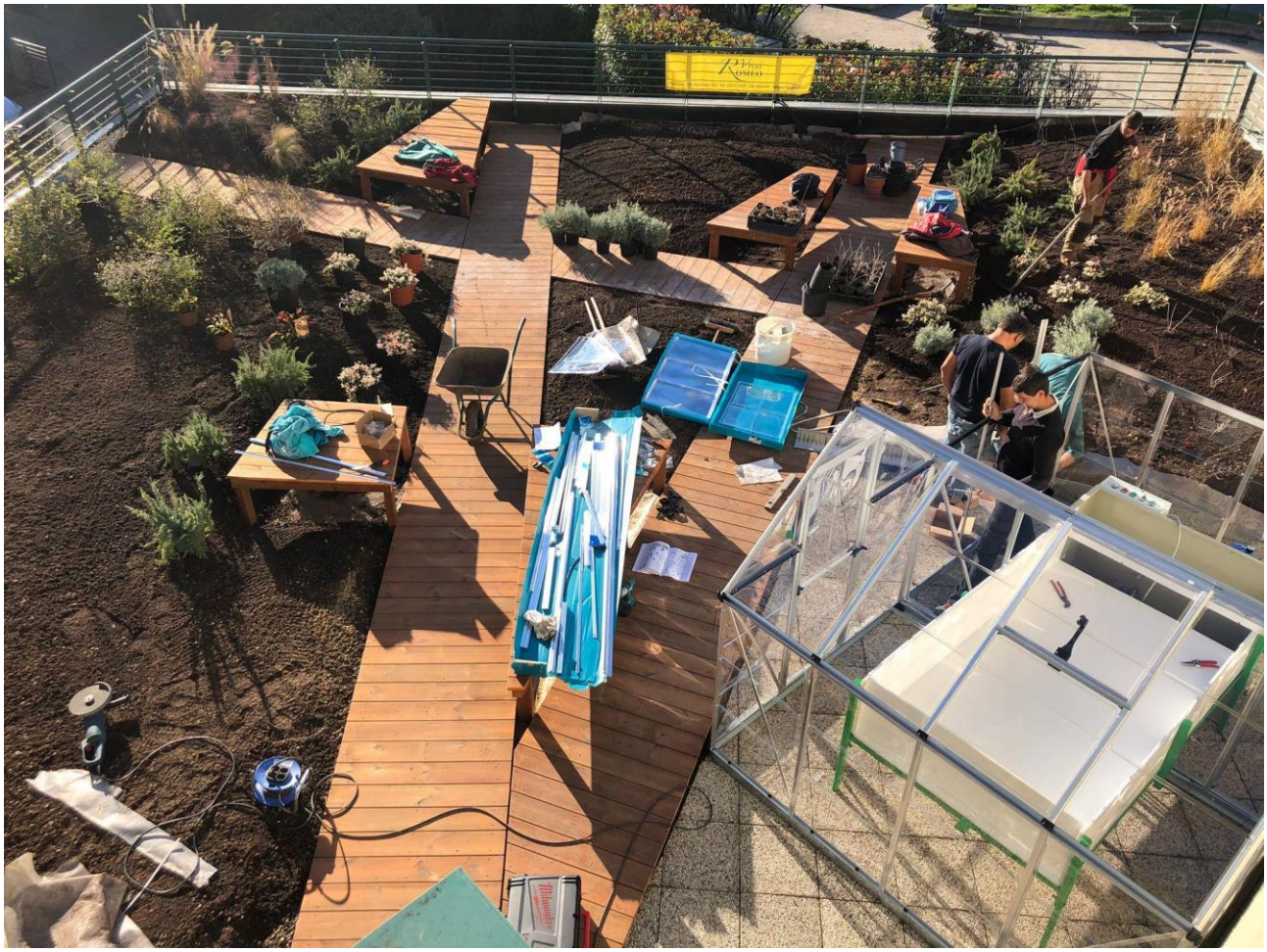
4.1 Green roof: layers	■ green roof layer according to UNI 11235 standards ■ specific substrate for intensive green roof	€ 11,564.20	N/A	
4.2 Green roof: irrigation system	■ irrigation system, piping and control panel	€ 1,162.36	N/A	
4.3 Green roof: plants	■ biodiverse plants (shrub, climbing, meadow, aromatic) ■ include also the plantation works	€ 3,936.67	N/A	
4.4 Green roof: pedestrian path paving	■ pedestrian path for access and usage of intensive green roof	€ 6,919.08	N/A	
4.5 Green roof: benches	■ benches for green roof furniture	€ 1,608.43	N/A	
4.6 Green roof: emergency water supply	■ emergency water supply in case of lack of harvested rainwater for irrigation	€ 232.83	N/A	
4.7 Green roof: others retrofitting works	■ general works to make suitable the existing roof to install a green roof	€ 0.00	N/A	Works paid by the Open 011 Hostel owners
5.1 Aeroponic: greenhouse	■ greenhouse structure to host the aeroponic	€ 2,856.07	N/A	
5.2 Aeroponic: aeroponic system	■ aeroponic system for food production,	€ 5,375.00	N/A	

	including fertigation system, nebulization, food baskets, etc.			
5.3 Aeroponic: electrical works	■ electrical works to provide electricity to the aeroponic	€ 334.61	N/A	
6.1 Rain garden: material and works	■ construction material (gravel, earth, geotextile, pipes) ■ realization works (e.g. excavation)	€ 2,091.23	N/A	
6.2 Rain garden: plants	■ various aquatic and semi-aquatic plants	€ 1,017.75	N/A	
7. Costs for safety in realization works according to Italian law	■ dedicated budget to guarantee the safety of the workers, according to Italian law	€ 2,000.00	N/A	
8.1 VAT for works (10%)	■ taxes on works and work material	€ 4,921.86	N/A	
8.2 VAT for safety	■ taxes on worker safety expenses	€ 200.00	N/A	
8.3 Budget for Contractor	■ budget for the Contractor for variation of the works during construction phases	€ 819.50	N/A	

5. Results

Here, you should summarize the main results achieved by the implementation of the pilot.

Max. 2 pages



The green roof and the greenhouse

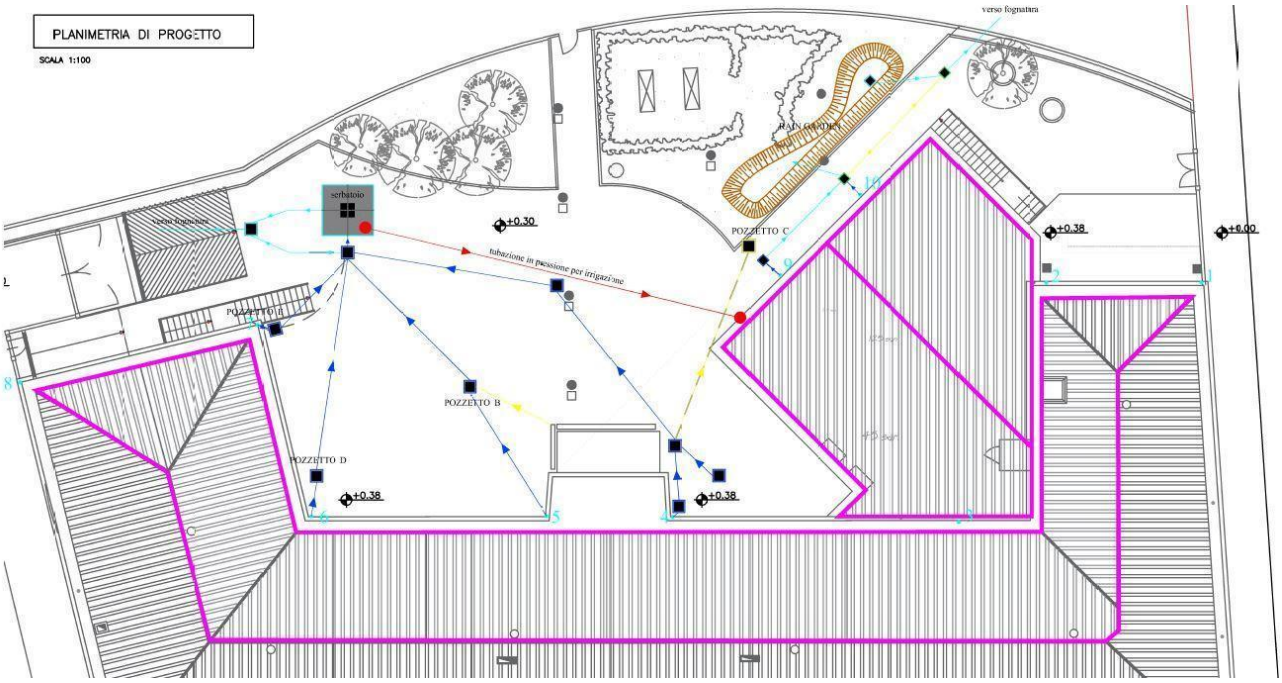
The rain garden

The pilot includes:

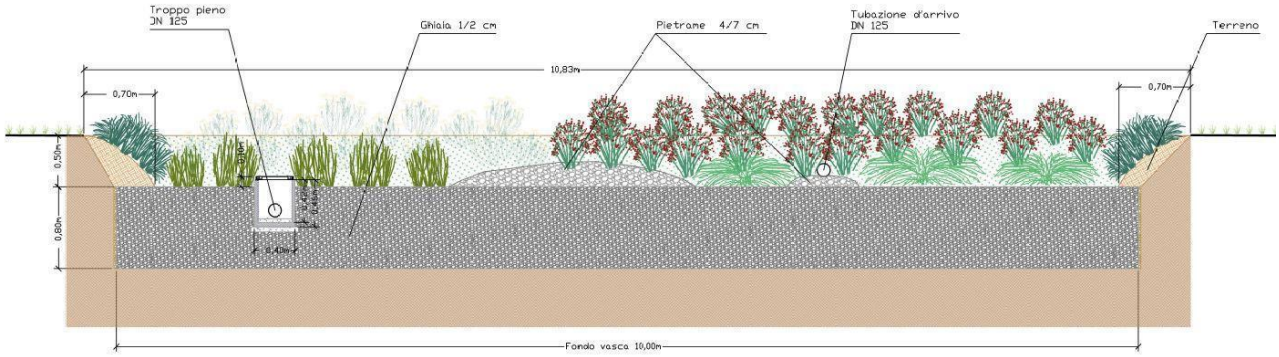
- a new intensive green roof of about 180 m^2;
- an aeroponic system to cultivate food on the green roof;
- a rain garden with a surface area of about 6 m^2, to accumulate and slowly infiltrate part of the harvested rainwater.

The pilot includes the **following rainwater harvesting** scheme for the total area roof area (about 520 m^2):

- rainwater harvesting from about 230 m^2 of the Youth hostel Open011 roof, collected in a underground storage tank of 13 m^3 and harvested rainwater reused for green roof irrigation;
- rainwater harvesting from other 180 m^2 of Youth hostel Open011 roof, collection in storage tank of 350 liters and harvested rainwater reused for aeroponic irrigation;
- rainwater harvesting from green roof (about 180 m^2) and from the overflow of the aeroponic storage tank, accumulation and infiltration by a rain garden with a surface area of about 21 m^2 and storage volume of about 10 m^3 (corresponding to a rain event of about 20 mm (rain event with a return time of 5-10 years)



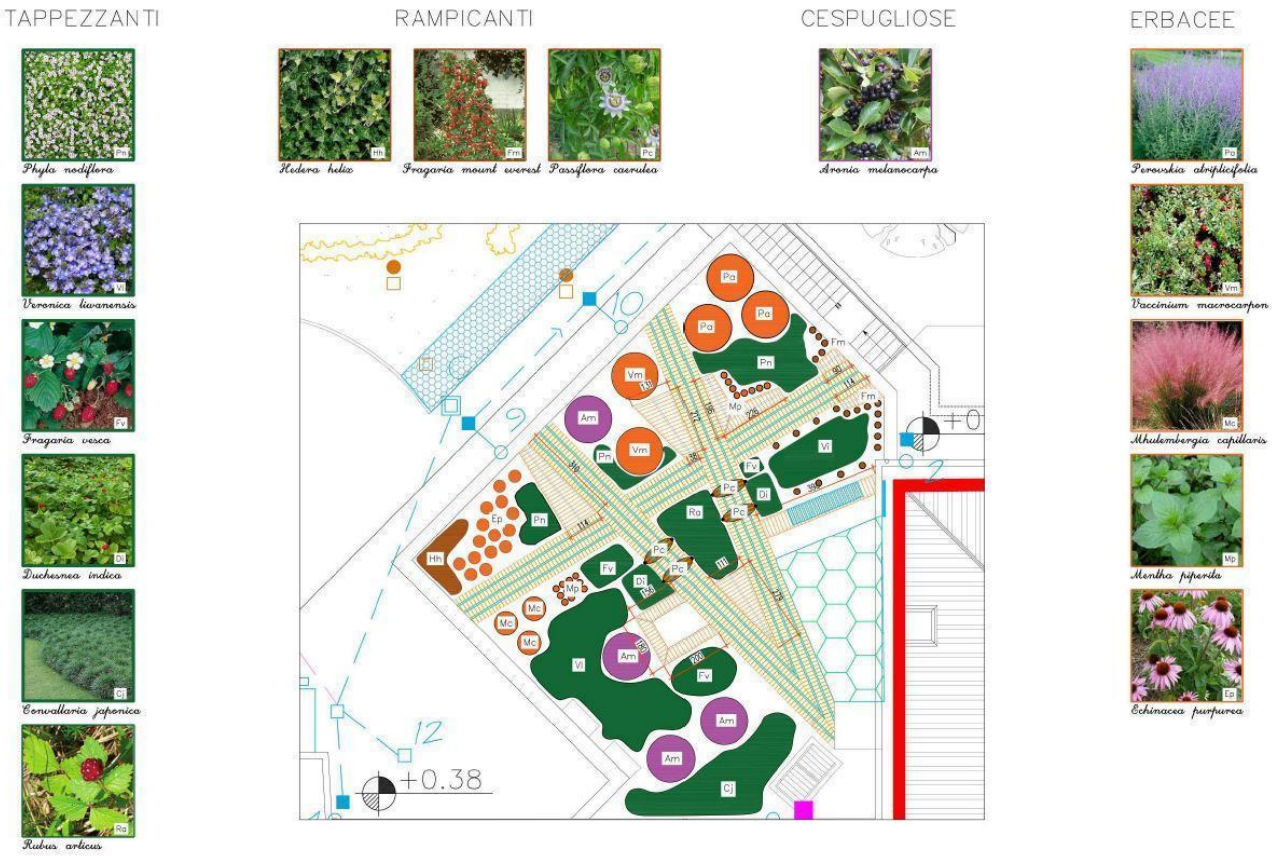
Plan view of rainwater harvesting scheme



Rain garden section

The pilot also follows a **multipurpose design** of the used NBS systems, since both the green roof and the rain garden were designed for urban restoration, amenity increase, and urban biodiversity support. Particularly, the following plant species were selected for the NBS:

- Green roof: *Phyla nodiflora, Veronica liwanensis, Fragaria vesca, Duchesnea indica, Convallaria japonica, Rubus articus, Hedera helix, Fragaria mount everest, Passiflora caerulea, Aronia melanocarpa, Perovskia atriplicifolia, Vaccinium macrocarpon, Mhulembergia capillaris. Mentha piperita, Echinacea purpurea.*
- Rain Garden: *Ribes uva cripsa, Hibiscus palustris, Typha latifolia, Equisetum hyemale, Caraderia selloana, Panicum variegatum, Schoenoplectus lacustris*



Intensive green roof and selected plants

6. Mentoring visit

The mentoring visit took place on 16 November 2021 in telematic mode. Present at Open 011 were Alessandra Aires and Laura Ribotta for Citta' di Torino, Erwin and Norma Nolde for FBR. The visit began with a description of the city's rainwater harvesting system and then moved on to a description of the pilot project.

The green terrace, the greenhouse, the rainwater collection tanks and the rain garden were shown. The project choices and the difficulties encountered were discussed.

7. Monitoring activites and results

Max. 3 pages

The Municipality of Turin has **subcontracted SMAT (local Water Utility) to follow the monitoring activities of the Open 011 pilot**. The subcontract was signed the 23th June 2021 and includes:

- in the storage tank for collection and reuse of harvested rainwater for the green roof installation of no. 1 flow meter in the potable water make-up pipe, 1 flow meter in the flow line to the green roof and 1 level meter. They include a datalogger with the possibility see and download monitored data from a web page
- in the storage tank for collection and reuse of harvested rainwater for aeroponics installation of no. 1 flow meter in the potable water make-up pipe, 1 flow meter in the flow line to the greenhouse. In this case it will not be a datalogger. A UV lamp will be installed for water disinfection.
- water quality analysis in two sites (upstream the storage tank and downstream the tank - after UV disinfection); monitored parameters, E.Coli, Enterococci, Total Coliform, Turbidity, pH, TSS, colour; the expected frequency is one sample per month

After implementation, as of December 2021 the entire Po Valley experienced a long period of drought that still has not passed. There have been some rains but short and sporadic and it has not been possible to collect water in the reservoirs nor to start the monitoring of water quality. The event was unpredictable and absolutely not usual in Turin.

The City and SMAT will proceed with monitoring as soon as possible and are considering how to find new funding to continue monitoring beyond the end of the project.

8. Indicators

Please, use the table form your intermediate report and update the information accordingly.

Indicators	Description	Baseline	Achieved so far	Target value	Measurement/ monitoring method	Regularity of measurement
Output 1	Intensive Green roof	0 m^2	180 m^2	about 180 m^2	N/A	verified
Output 2	Aeroponic	0	1	n°1	N/A	verified
Output 3	Storage tank of harvested rainwater for aeroponic irrigation	0	0.5 m^3	0.5 m^3	N/A	verified
Output 4	Storage tank of harvested rainwater for green roof irrigation	0	5 m^3	5 m^3	N/A	verified
Output 5	Rain garden	0	Surface area: about 6 m^2 Storage volume: about 6 m^3	Surface area: about 6 m^2 Storage volume: about 6 m^3	N/A	verified
Results 1 Harvested rainwater for food production [Unit: m^3/year]	Volume of rainwater harvested and reused for food production in the aeroponic	0 m^3/year (no rainwater harvesting and no reuse)	N/A	volume: to be defined according to the expected water demand of the aeroponic	Volume: flow meter upstream the storage tank Water quality: water quality analysis in two sites (upstream the storage tank and	Volume: continuous Water quality: To be defined according to the available budget

Indicators	Description	Baseline	Achieved so far	Target value	Measurement/ monitoring method	Regularity of measurement
				Water quality: class C for reuse of Regulation (EU) 2020/741	downstream the tank - after UV disinfection); monitored parameters, E.Coli, Enterococci, Total Coliform, Turbidity, pH, TSS, colour	
Results 2 Harvested rainwater for green roof irrigation [Unit: m^3/year]	Volume of rainwater harvested and reused for green roof irrigation	0 m^3/year (no rainwater harvesting and no reuse)	Considering the amount of precipitation recorded for a dry year (2017) and a wet year (2010), the hydrologic balance performed through a Master Thesis with Politecnico di Torino led to the following estimates: - volume of harvested rain water used for green roof irrigation: 130 m3 (dry year) to 260 m3 (wet year), corresponding to approx. 50% (dry year) and 40% (wet year) of the precipitation intercepted by the building.	minimum 40% of annual precipitation	Rainwater station and conversion in harvested volume with simplified water budget model, simulating tank use with runoff coefficient and planned irrigation scheme	Daily (rainfall data)

Indicators	Description	Baseline	Achieved so far	Target value	Measurement/ monitoring method	Regularity of measurement
Results 3 Harvested rainwater infiltrated [Unit: m^3/year]	Volume of rainwater harvested and infiltrated by rain garden	0 m^3/year (currently the rainwater collected by the roof is discharged into the sewer)	Considering the amount of precipitation recorded for a dry year (2017) and a wet year (2010), the hydrologic balance performed thorugh a Master Thesis with Politecnico di Torino led to the following estimates: - volume of harvested rain water infiltrated by the rain garden 80 m3 (dry year) to 340 m3 (wet year), corresponding to approx. 30% (dry year) and 50% (wet year) of the precipitation intercepted by the building.	minimum 50% of annual precipitation	Rainwater station and conversion in infiltration volume volume with simplified water budget model, using runoff coefficient and estimated infiltration rate of the rain garden	Daily (rainfall data)
Results 4 Better indoor insulation	Average difference between outdoor and indoor temperature [°C]	Baseline will be defined based on the analysis of temperature sensor before the installation period	N/A	To be defined	Temperature sensor indoor Temperature sensor outdoor or nearest weather station	Daily

Indicators	Description	Baseline	Achieved so far	Target value	Measurement/ monitoring method	Regularity of measurement
Results 5 Environmental education	Participants of environmental education activities on CWC topics based on Turin pilot	0	n°150 (n°10 events)	n°200 (n°13 events) by the end of 2021	N° of participation to environmental education activities	Yearly
Impact 1 Adaptation to climate change and improve resilience to extreme weather events ("Water bombs"): increase retention Impact 2 Enhance the services offered by ecosystems and NBSs Impact 3 Improve the quality of the air and the microclimate [Unit: m^2]	Total area of green roofs created	Current surface of green roof in Turin city to be verified	180 m^2 (Green roof realised at Open 011 as demo site of the CWC project)	50000 m^2 (Target value decided in the CWC Strategic Plan)	N/A	2050 (Long term horizon of the CWC Strategic Plan)

Indicators	Description	Baseline	Achieved so far	Target value	Measurement/ monitoring method	Regularity of measurement
Impact 4 Provide rainwater collection and reuse systems ... buildings within the FUA [Unit: m^3/year]	Increase of rainwater collection and reuse	N/A	Master Thesis with Politecnico di Torino started (Rainwater harvesting at Open 011 as demo site of the CWC project)	Short term horizon: 59.000 m^3/year Long term horizon: 590.000 m^3/year (Target value decided in the CWC Strategic Plan)	N/A	Short term horizon: 2030 Long term horizon: 2050 (CWC Strategic Plan)
Impact 5 Generate consciousness, engagement and awareness among citizens, and improve governance [Unit: no. citizen]	Involve citizens in information, education and awareness activities	N/A	more than 300 (n°10 events done at the Open 011 as demo site of the CWC project)	Short term horizon: 53.400 Long term horizon: 178.000 (Target value decided in the CWC Strategic Plan)	N/A	Short term horizon: 2030 Long term horizon: 2050 (CWC Strategic Plan)

Indicators	Description	Baseline	Achieved so far	Target value	Measurement/ monitoring method	Regularity of measurement
Impact 6	Amount of funds leveraged based on project achievements	0		2,266,927.00 € (national funds)	number of new green and blue infrastructures	once, at the end of the project

9. Pilot upscaling plans

9.1. Peer review visit

The peer review meeting was on 22nd of November 2021 on line. The peer city was Split but also other cities and partners joined the session.

The peer review seen consisted of a first session in which two videos on the pilot project were shown and a first question and answer session, mainly on the technical and economic difficulties and challenges of implementation.

In the second part of the meeting, people were divided into two break-out rooms: one international and one Croatian.

9.2. Mentoring visit

The mentoring visit took place on 16 November 2021 in telematic mode. Present at Open 011 were Alessandra Aires and Laura Ribotta for Citta' di Torino, Erwin and Norma Nolde for FBR. The visit began with a description of the city's rainwater harvesting system and then moved on to a description of the pilot project.

The green terrace, the greenhouse, the rainwater collection tanks and the rain garden were shown. The project choices and the difficulties encountered were discussed.

9.3. Spin-off projects

The activities done by the Municipality of Turin within the CWC cities have been already exploited in a number of potential spin-off projects of interest.

Firstly, the other R&D project on NBS involving the Municipality of Turin, **proGIreg (productive Green Infrastructure for post-industrial urban regeneration - Grant Agreement: No. 776528, 2018-2023)**, was cross-fertilized with the concepts delivered by CWC. Indeed, proGIreg installed an extensive green roof of 140 m^2 on a public building located in Municipality of Turin and implemented by the project partner "OrtiAlti", one of the stakeholder also engaged in the SGM of CWC. Following the request of the Municipality of Turin, irrigation was carried out through the recovery of rainwater, following the CWC principles. In particular, the green roof is now fed by a cistern placed in the nearby garden, with a capacity of 11.000 liter for the accumulation of rainwater, pumped to the roof and connected to the downpipes of the building.

Secondly, the contacts created during the stakeholder group meeting permitted to start a **Master Thesis with the Politecnico di Torino**. The thesis will regard the hydraulic modelling of the CWC pilot (green roof, rain garden, rainwater harvesting), with two main aims:

- i - estimating the indicators for Results 2 (Harvested rainwater for green roof irrigation) and Results 3 (Harvested rainwater infiltrated) through a modelling approach (software SWMM)

- ii - estimating the impact of the pilot in terms of climate change adaptation, simulating the indictors performance under synthetic rain fall events affected by climate changed atmospheric conditions (e.g. increase of frequency of heavy rainfall)

The Master Thesis Candidate is Paolo Cavallaro, supervised by prof. Fulvio Boano (Politecnico di Torino) and co-supervised by PhD Eng. Anacleto Rizzo (IRIDRA).

Thirdly, Turin Municipality will be involved in the recently H2020 funded project **NICE (Innovative and enhanced nature-based solutions for sustainable urban water cycle - Grant Agreement: No. 101003765, 2021-2025)**, related on NBS for sustainable water management. The project is coordinated by CEETIM (Spain) and counts 14 international partners. One of the partner is Politecnico di Torino and another one is IRIDRA, which supported as sub-contractor the Municipality of Turin within the CWC project. Moreover, Municipality of Turin has signed a commitment letter for the NICE project, giving its availability to host NICE activities in Turin and to install a demo NBS site. As a consequence, Turin will be one of the 11 Urban Real Lab (URL) of the project, which will be coordinated by IRIDRA. The foreseen activities for the Turin's URL regard:

- the realisation of a small demo site for the treatment and reuse of 2 m^3/d greywater with a small green roof in a real context
- a number of co-designed activities related to the involvement of stakeholders in defining the local needs and in developing future NBS up scaling scenarios for the URL

The strong link between CWC and NICE is quite straightforward, making the NICE project a perfect spin-off to continue the activities developed within the CWC project. The strong link is also guaranteed by the presence of IRIDRA in both CWC and NICE projects; particularly, IRIDRA followed all the activities requested by CWC for the definition of the CWC Strategic and Action plans, including the facilitation of the SGMs. Therefore the NICE activities have been included in the CWC Action plans as ongoing actions. Moreover, the group of stakeholders involved in the CWC SGMs will be kept active on CWC topics in the future NICE co-design activities, in which the CWC Strategic and Action plans are expected to guide the up scaling NBS scenario for the Turin's URL.

Finally, the Turin Municipality is applying for **National funds dedicated to the implementation of green-blue infrastructure for climate change adaptation and mitigation (D.D 117-2021)**[1]. The funds are given by the Italian Ministry of Ecological Transition and finance the following green-blue infrastructure:

- urban forests for carbon sequestration
- shading and low heat adsorbing material to fight heat island effects
- green roofs and green walls
- NBS for rainwater harvesting
- NBS for wastewater treatment and reuse, including greywater

The funds are not competitive, since a budget is dedicated to each Italian city above 60.000 inhabitants. Turin, being among the 15 biggest Italian cities, has a significant potential budget available of **2,266,927.00 €**. The grant is only related to the capability of Turin to provide suitable projects of green-blue infrastructure at a basic design level, according to Italian Law. Three on five of the financed green-blue infrastructure (green roofs and green walls; NBS for rainwater harvesting; NBS for wastewater treatment and reuse) are strictly correlated with CWC aims and scope and personnel of Turin Municipality have been encouraged to apply to implement these kind of NBSs also thanks to increased know-how gained during the

[1] https://www.mite.gov.it/pagina/adattamento-climatico

CWC project. Therefore, the NBS that will be realized thanks to this grant can be seen as a spin-off continuation of CWC project, contributing to fulfil Impact 6 expected by CWC, i.e. funds leveraged based on project achievements, for a significant amount of funds. The Municipality has approved the basic design projects the 1st September 2021, the first required step to proceed in funding proposal. After the official funding requested, it is expected the approval by the Italian Ministry of Ecological Transition to proceed in detailed design and implementation of the foreseen NBS.

10. Project follow-up

The city of Turin has acquired experience on the theme of water and its circular management and will therefore be more capable of both replicating similar interventions and suggesting and possibly regulating them

The pilot has already achieved a demonstration and dissemination objective. The greenhouse created under the CWC project will also be an opportunity for training and dissemination on the issues of urban agriculture and food.

The events of prolonged drought in the last year introduce environmental criticalities not present in the city until now that induce a deep reflection on the theme of water recovery and the CWC project has allowed the city to build knowledge and a network of international experts that will be the technical reference point for the years to come.