proGIreg

Implementation Monitoring Report n. 1

Deliverable 3.3

Work Package: 3

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Document revision history

Version	Date	Modification reason	Modified by
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2			
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Partner organizations

No.	Name	Short name	Country
1	Rheinisch-Westfaelische Technische Hochschule Aachen	RWTH	Germany
2	Stadt Dortmund	DORTMUND	Germany
3	City of Turin	COTO	Italy
4	Grad Zagreb	ZAGREB	Croatia
21	Università degli Studi di Torino	UNITO	Italy
22	Consiglio Nazionale delle Ricerche	CNR	Italy
33	Ningbo Municipal Center for Forestry Science & Technology Services	FBNC	China (People's Republic of)

Abbreviations

EC: European Commission

ERDF: European Regional Development Fund

FC: Follower Cities

FRC: Front Runner Cities

GA: Grant Agreement

GI: Green Infrastructure

GIS: Geographic Information System

IP: Implementation Plan

LL: Living Lab

MS: Milestone

NBS: Nature-Based Solutions

NGO: non-governmental organization

proGIreg: productive Green Infrastructure for post-industrial urban regeneration

RA: Risk Assessment analysis

TRL: Technology Readiness Level

WP: Work Package

Executive summary

The Deliverable 3.3 constitutes the first of two deliverables, provided by COTO as WP3 coordinator, dedicated to monitoring the implementation of NBS in each Living Lab of FRCs. The goal of this document is to introduce the goals, the activities and the methodology used to set the monitoring activities for the proGIreg NBS implementation by giving also some intermediate results.

The integration of all the tools (NBS timeline, risk assessment analysis, implementation plan) described in the document will allow to support, coordinate and facilitate not only the physical interventions but also accompanying the FRCs in coherently report the efforts produced, the results obtained and the challenges addressed.

The results of this deliverable explain that the implementation phase is longer, more complex and articulated than expected. The role of cities is therefore central to achieving what has been planned. The collaboration between the different local actors involved, the exchange of information between the FRCs and with FC, as well as the integration between the different WPs of proGIreg represent challenging tasks for the coming months.

1 Introduction

1.1. Introduction to the project

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 deindustrialisation, 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.
Through the implementation of green infrastructures (GI), proGIreg 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. Introduction to the Deliverable

The Municipality of Torino (COTO) is the coordinator of WP3 NBS pilot implementation. This WP is dedicated to:

- the definition of a common methodology for implementation (Task 3.1);
- the maintenance and follow up of the implementation (Task 3.2);
- the production of a “Living Lab Implementation Plan" in each of the four FRCs (Tasks 3.3/4/5/6).

These tasks will assure the maintenance and follow-up of the work plan set out for each LL supporting the execution of planned activities in line with the proGIreg timeline and budget.

1.3 Objectives and methods

The objectives of the WP3 are outlined in the GA and are briefly reported here:

- monitoring the LLs overall progress, ensuring the effective performance and the quality of the procedures, with a special focus on ex-ante risk analysis and the definition and constant updating of best adapted mitigation strategies;
- developing the methods for data collection in the LLs in cooperation with WP4;
- coordinating collaboration and relations within the project consortium, ensuring an efficient flow of information towards the other WPs especially WPs 4, 5 and 6.

The monitoring activities of WP3 should also:

- support local stakeholder group meetings to assess the evolution of the project, analyse risks and gather feedback of the ongoing activities, ensuring a fair decision-making process;
- handle questions related with the legal, administrative, contractual and financial management

To accomplish these activities, COTO decided to:

- start the monitoring activities earlier than the official timeline (M 20- January 2020) by testing and sharing monitoring tools since the beginning of the project (Autumn 2018)

- produce an ex- ante risk assessment analysis and update it periodically

- ensure a proactive interaction among FRC and the project coordinator by sending regular emails and organizing web and face to face meetings.

- allow feedback, facilitate deep understanding of the methods and tools and share intermediate results by producing informal guidelines and reports of the activities

The following picture illustrates the timeline of the WP3 actions by highlighting activities, tools and deliverables to be produced.

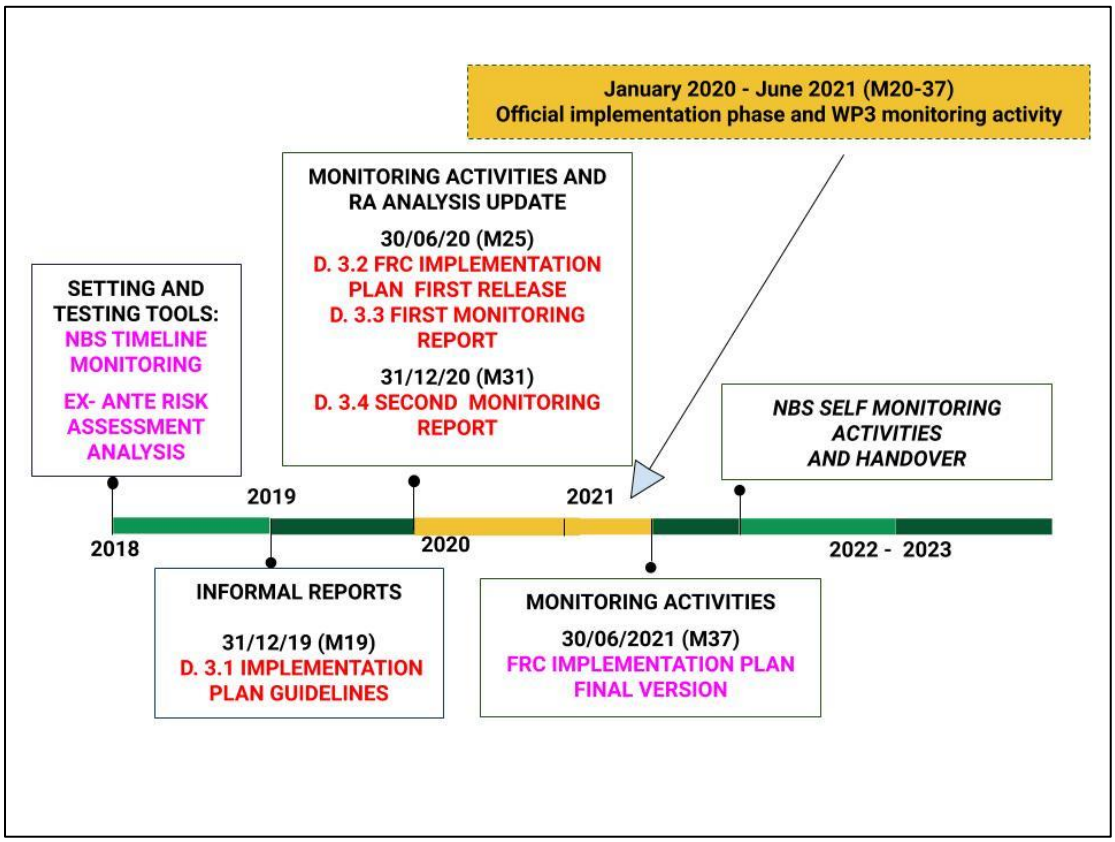


Figure 1 - WP3 activity timeline

While the WP3 Deliverables are to be produced within the official timeline (M19-32) of the implementation phase (M20-M37), the WP3 NBS monitoring activities encompass a wider range of time, covering almost the whole duration of the project.
The goal is to allow the FRCs to have, by the end of implementation phase, the necessary knowledge and information not only to monitor the results of the implementation phase until the end of the project but also to ensure a successful handover and long-term sustainability of the realized interventions.
It is worth mentioning the importance of integration and cooperation among a specific sphere of intervention, the interlinkages and cooperation between WPs (see chapter 2 of D.3.1, Report on common methodology for implementation).
The following picture shows the connections and the flow of information and contents produced with WP3.

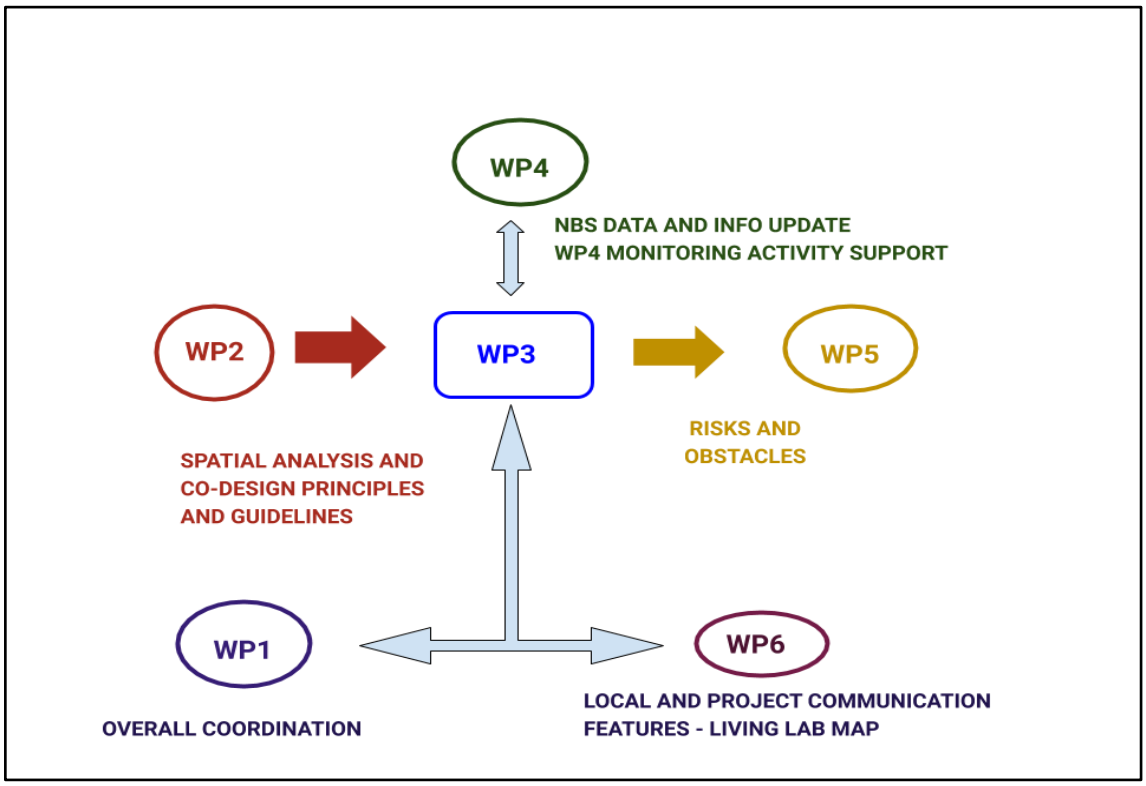


Figure 2 - WP3 connections with other WPs

The connection between WP3 and the Coordinator (WP1) follows a consolidated exchange, communication and consortium management pattern, while the other linkages are conceived as specific proGIreg contribution to the overall project goals.

The WP2, within its activity, has realized a spatial analysis of the Living Lab areas in FRC, providing some notable features in order to define local indicators and challenges and to produce the framework context as a starting point to design and implement coherent and effective actions.

The cooperation with WP4 has been related to the provision of data and the support and management of field research activities (General questionnaire, sensors installation and other WP4 monitoring activities). A constant exchange of information has been started and has to be improved in order to produce and realize coherent analysis and outcomes.

The results of the monitoring activities of WP3, especially those produced by the risk assessment analysis, should contribute to identify obstacles and barriers to the implementation, main focus of WP5 activity.

The Implementation Plan will have, as an annex, a Living Lab Map, produced with a common layout realized by WP6. Each Living Lab Map will graphically show the outcomes came out from the implementation of activities. It is a powerful tool in order to display the concrete results of proGIreg NBS realized in each Living Lab of FRC. It will contain some brief information about the status, the localization and the partners involved in each NBS related actions. It will also be used as a tool to plan further interventions and possible replications.

A second sphere of integration and coherence needed is within the tools and outcomes proposed and used in WP3 activities: the Implementation Plan template provided in the D.3.1 is conceived to collect all relevant information about NBS implementation (by also providing a framework- i.e. each Living Lab- contextualization and a summary of the results) and should be used as a working tool even to monitor the process of implementation. The information provided by the FRCs within that Deliverable (D.3.2 Living Lab Implementation Plans), constitutes the evidence data and source of knowledge to profitably check and monitor the present and future efforts in order to realize each local intervention.

ProGIreg deals with nature and urban contexts where the interactions are articulated and the actors involved are several and diverse sometimes with divergent perspectives, skills and goals. The task to gather, summarize and analyse such long lasting and complex activities is challenging also because of the complexity and peculiarity of technical language used.
That's why we have proposed to split each single intervention in more detailed activities in order to exactly define how (and when) the NBS will be implemented (see next chapter).

Methodologically, there is a need to balance the analysis of each single intervention (NBS level) with a wider contextualization of the area (and of the City) where the NBS will be implemented (Living Lab level). In fact, the logic, the motivation and the outcome of a single intervention must be aligned to a territorial, social, economic and political direction and strategy. Moreover, each single intervention bears on the analysis and activities carried out during proGIreg project lifetime and will allow to produce concrete output only if the project strategy is fully understood and critically applied by tailoring the interventions to fit with local needs and challenges. The NBS monitoring activities will try to involve, by analysing each of the above-mentioned factors, these different features of proGIreg.

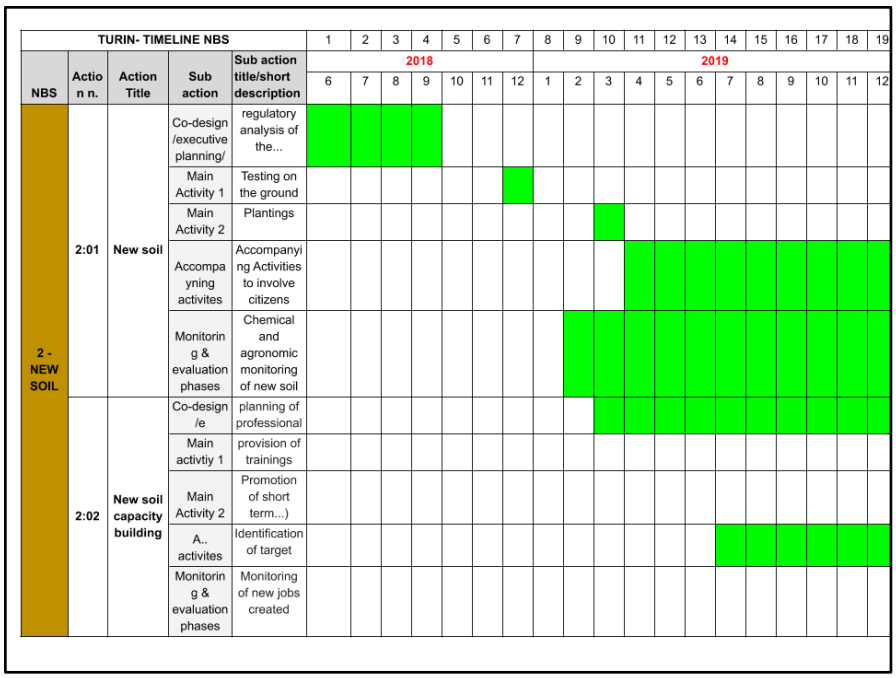
Given to this, the monitoring tools are conceived to match two different perspectives of analysis: the process of implementation, by monitoring the development of works and highlighting the status quo, the next step, the difficulties and achievements as well as the production of concrete outcomes realized during the project (effectiveness monitoring).

2 The monitoring tools

2.1 Timeline monitoring

The goal of this action is to check if planned activities are suffering delays or advances, unexpected stops or need of reframing. So, through this tool we intend to collect timing and activities by underlying the motivations of possible deviation from the planning phase.

We use the template included in the official proposal of the project to details the schedule of each NBS in each FRC.



TURIN- TIMELINE NBS					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
					2018							2019											
NBS	Action n.	Action Title	Sub action	Sub action title/short description	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
2 - NEW SOIL	2:01	New soil	Co-design /executive planning/	regulatory analysis of the...																			
			Main Activity 1	Testing on the ground																			
			Main Activity 2	Plantings																			
			Accompa yning activites	Accompanyi ng Activities to involve citizens																			
			Monitorin g & evaluation phases	Chemical and agronomic monitoring of new soil																			
	2:02	New soil capacity building	Co-design /e	planning of professional																			
			Main activtiy 1	provision of trainings																			
			Main Activity 2	Promotion of short term...)																			
			A.. activites	Identification of target																			
			Monitorin g & evaluation phases	Monitoring of new jobs created																			

Figure 3 - NBS timeline example

So, every intervention or project inside an NBS was declined in the following categories.

Table 1 - Implementation sub phases

Sub phases title	Description
Co-design/executive planning/technical-administrative-economic-social analysis current situation	The activities to be realized before the implementation phase. Some of these activities were also carried out within the activities of WP2
Main Activity	Where to describe the core interventions

Accompanying activities	Focus on the activities related to the participation and involvement of citizens and stakeholders
Monitoring & evaluation phases	The initiatives related to assessing the implementation and checking the ongoing activities

It has to be stressed that in experimental and nature related activities like the NBS in proGIreg, the last phase (monitoring and evaluation) is often very relevant and has to be considered a core activity that implies the maintenance of the implemented NBS. The concepts of long-term vision and sustainability are crucial issues to be considered. Because of that, following the first testing period, this table was slightly modified in order to better describe each sub action and give more relevance to handover activities (see chapter 2.3).

The table called “NBS timeline” allows the FRC to describe each intervention by scheduling the timing when each single action is planned to be carried out. When completed, the table gives a “snapshot” of the **initial planning phase** in each FRC. Based on this initial picture we established a periodic check of the table. FRCs have sent a compiled table based on this sample every six month:

MONITORING PERIOD: Jan- Jun 2019

NBS	Action n.	Action Title	Sub action title/short description	2019						Notes
				1	2	3	4	5	6	
2 - NEW SOIL	2:01	New soil	regulatory analysis of the situation, identification of natural background values			D	D	D	D	during this period many chemical analysis have be done in order to setting up the basic ingredients and the correct mixture for the new soil application.
			Testing on the ground							it will be done starting from october 2019, having bridge all the administrative barriers
			Plantings							it will be done in october because of admistrative barriers (private work in public area)
			Accompanying Activities to involve citizens to co-design new public functions of the renaturalized area							it will be done after october
			Chemical and agronomic monitoring of new soil		D	D	D	D	D	different type of excavation soils have been analised in order to choose the best one for mix
			Monitoring& evaluation with special regard to administrative and market barriers overcoming	D	D	D	D	D	D	

Figure 4 - NBS monitoring table example

The FRCs were requested to mark with a “D” (intended as ”Done”) if each planned activity was actually realized in the planned timing. In case of delay or advance, the FRCs should write down the motivation of this misalignment.

Approaching this Deliverable, the FRCs were requested to check, integrate and update the file called “NBS timeline 2020” (see the template used in Annex 1). It collects all the information already sent to us and it has to be considered as the first version of the monitoring plan tool adopted in each FRC. Given the early starting of this activity, some interim results will be displayed in Chapter 3.

2.2 Ex-ante Risk assessment

The goal of this activity is to identify risks and hazards that could occur during the implementation phase and cause negative impacts (or at worst block) on the realization of one or more NBS. The request to the FRCs was to engage in the activity all the partners and stakeholders involved to have a collective emersion of possible negative circumstances potentially affecting the implementation. Moreover, the FRCs were also asked to identify actions to avoid or contrast (mitigate) the negative effects of the previously identified risks.
A short and informal guide to implement the RA activity was produced and shared with the FRCs earlier and along with the tables to be filled. The guide, resuming some concrete and recent experiences of RA elaborated in EU projects, has the objective of introduce the logic of RA in proGIreg and explains the steps (phases) to be followed and the tasks that has to be completed. As well, an informal intermediate results report was produced and shared with FRCs in late 2019.
The phases of RA can be summarized as follows:

Risks identification (Phase A): identification of critical issues and comparison about them through the discussion in working groups gradually more and more extended. The working model proposed by Turin is to prepare a first list of topics to be discussed in a meeting (first among colleagues of the office, then among other colleagues from the same Administration, then with the other local partners, then any with other stakeholders involved in the implementation). In Turin, the co-design meetings organised by ICLEI as part of the WP2 activities were also an opportunity to discuss risk assessment issues.

Risk assessment: measurement and assessment (Phase B): the next step is to assess the risk by scoring each risk, which is the sum of two indicators: the probability that that risk may actually occur and the potential negative impact of the risk on the implementation of the individual NBS or the functioning of the LL.

Mitigation measures (Phase C): At this stage, one or more solutions are identified in order to prevent or mitigate the adverse effects of each risk. This phase is built through an open exchange session, collecting all the hypotheses that emerge with a "brainstorming" approach. Then the solutions are elaborated, grouped, and, by trying not to lose the real meaning of the statements, summarized in a synoptic table.

Monitoring and matrix update (Phase D): The tables produced (Annex 3 and 4) constitute the starting point for further comparisons and periodic updates. At the beginning of 2020, a questionnaire (made with a Google form) was prepared for updating it (see chapter 3.4).

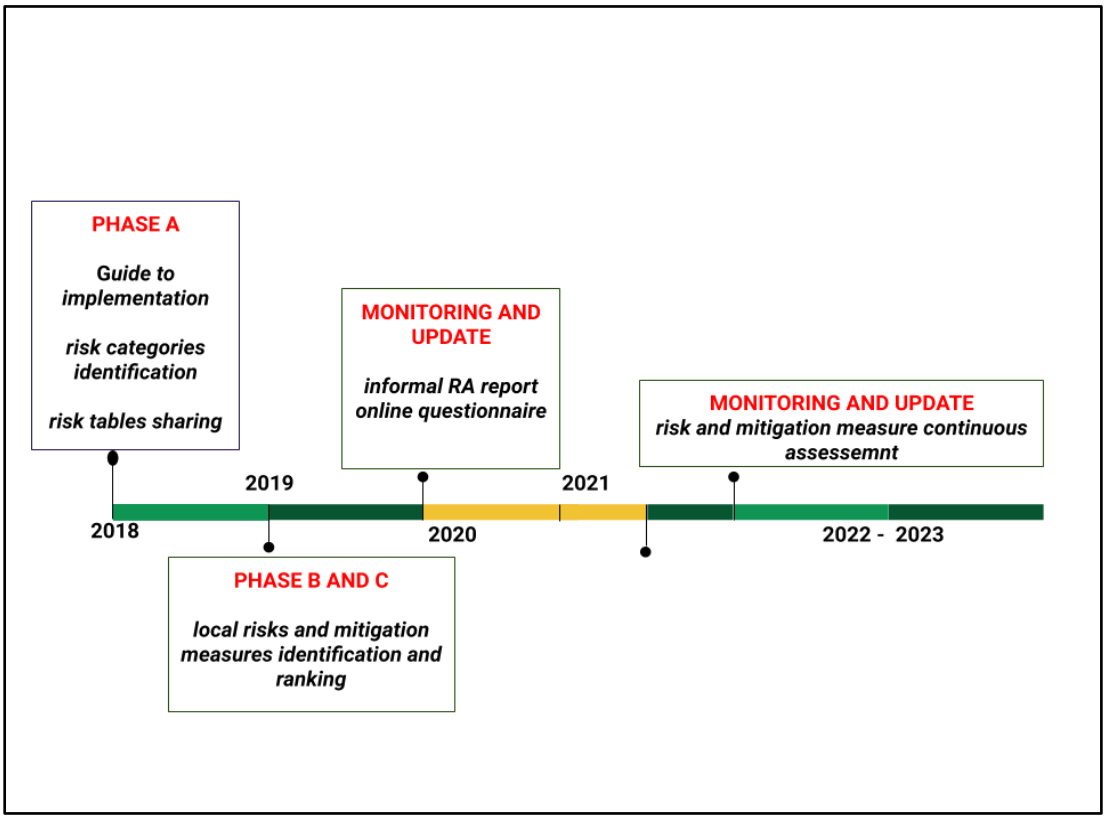


Figure 5 - Risk assessment analysis timeline

2.2.1 Risks, categories and ranking (Phase A and B)

With the aim to collect and divide homogeneously the risks identified in each FRC, we proposed some categories where to include all risks: Technical risks; Economic resources risks; Procedural risks; Societal risks; Others risks. A first good example of contribution by FRC/partners was the identification of a new category called “Ecological risks”. This category was proposed by Dortmund and then adopted in other FRCs. Another category proposed by Dortmund is a category that could be very relevant for proGIreg is the “Internal proGIreg risks” where to report all the risks related to problematic items that can affect the project implementation and integration with others project WP.

The initial established categories were supposed to help the cities in identify and differentiate the risks homogeneously. The cities used them properly (i.e. giving them the same meaning), even some risks are prone to be inserted in more than one category depending on the single element highlighted (i.e. the risk of delay in realizing something - like a green wall- can be provoked by obstacles in the administrative procedures or unforeseen costs).

The proposed working methodology – give an initial set of categories/risks/ with a short general description of it, then collect a first set of risks by each city, then give back to them a revised version of it, was helpful in obtain a set of risks homogeneous in term of categories and comparable in term of hazard identified.

The purpose to give a rank for each risk identified was to exclude from the analysis the risks considered with a small likelihood of occurrence AND little negative impact, and to highlight those risks considered, in terms of likelihood AND effect, crucial for a positive development of

the project activity. In fact, the scores (with a global range from 1-to 9) equal to 1 where potentially excluded from the analysis. Actually, no city gave that score. Vice versa, some cities scored risks with an overall value of 9. Therefore, the cities identified some crucial risks that have to be carefully monitored because their negative effect can be severe **(to be avoided risk)**.

2.2.2 Mitigation measures (Phase C)

The risk assessment activity has the ultimate goal in identify and put in practice activities that will help in prevent, avoid or diminish (mitigate) the negative effects of possible occurring risk. By using the same methodology, in Turin, we had a meeting with local partners allowing us to have a shared set of possible activities to be engaged if a risk occurred or to avoid the occurrence of it. The same did the FRCs.

After receiving all the mitigation measures from each FRC, the set of parameters (risk- rank - mitigation measures) was completed by elaborating a comprehensive table coherent and easy to read. The purpose to facilitate a cross-influence between risks highlighted in the others cities was not followed by FRCs: each city basically kept his set of items by using only the risks and mitigation measures previously identified. This process (phase A, B and C) lasted more than one year, from September 2018 to end of 2019.

2.2.3 Monitoring and updating (Phase D)

In order to monitoring the RA analysis, an online questionnaire was prepared by February 2020. The questionnaire, tailored to each city's risk and mitigation measures previously adopted, was intended as a first check of the contents identified previously. We asked them 4 four questions related to each risk identified:

- Did the risk occur?
- Which measure(s) have you adopted to avoid or mitigate this risk? The ones already identified or others, please specify
- Have you encountered additional (technical, social, economic, ecological, etc.) risks? If so, please give a brief description of this risk/these risks.
- Have you already thought about possible mitigation measures that can be used to solve this/these new risk/s? Please, give a brief description.

This set of questions allowed us to have a first round of check. The results of the questionnaire are reported in the chapter 3.4

2.3 Living Lab Implementation Plan

The Implementation Plan is the main outcome to display and describe the work done to realize the NBSs. It is fully explained and detailed in the D. 3.1 (Common methodology for the implementation).
In this section, we highlight the coherence needed between the IP and the timeline monitoring tools in order to produce uniformed reports.
Secondly, it is worth mentioning that an entire section of the IP (see D.3.1) is dedicated to monitoring activities:

Table 2 - IP section dedicated to monitoring activities

6. State of Play and Monitoring of NBS implementation	
Current situation (to be updated)	Description of main outcomes achieved by the time you complete the IP; update the state of progress of the LL on the ground, highlighting the results achieved along the way. Update this row with new information by not erasing the information written down earlier, so that you can have a sort of journal of the implementation process.
Notes/critical issues/barriers (to be updated) (link to WP5)	Highlight the most critical aspects, or specific issue to be solved. Indicate if the project is facing barriers (administrative, societal, financial and technological) in the development of the activities.
Next steps (to be updated)	Future steps in the short term, highlighting the strategy adopted

Table 2 summarizes some features of the monitoring methodology: the use of monitoring tools as working documents, to be updated and modified over time and the link with the activities of other WPs.

The implementation of such diverse interventions needed a facilitation scheme in order to report coherent and uniformed information. To allow this, we divided the analysis of each intervention in sub-phases, described as follows.

Table 3 - Implementation phases

Implementation Phase	Description
Pre-implementation	This phase describes all activities realized in order to allow the construction works. It is the planning phase where the physical area of implementation of each NBS is selected, where the partners and stakeholders are identified. This phase encompasses also all the administrative procedures (permission, contracting, procurement, etc.) need to allow the implementation. This phase encompasses technical or social analysis in order to choose the content, the technology or the approach to be used to implement the NBS.
Execution/construction	This is the core phase of intervention. It differs very much depending of the nature of the intervention, can last some months as well years. The physical interventions will give the evidence of nature based solutions in urban contexts.
Accompanying activities	The involvement and citizen participation is one the specific aspect of

	proGIreg intervention. The social inclusion goals were concretely fostered by co-design and co-implementation approaches and tailored activities. In the implementation plan, a specific section dedicated to these activities will highlight the proposed approach.
Monitoring, maintenance and handover	The experimental nature of some intervention as well the process of co-design and co-implementation needs to be monitored. The maintenance of the nature based interventions is often an important part of each intervention facilitating citizen involvement and allowing long term sustainability. At the same level of analysis, the need of a positive and sustainable handover will enable the endurance of the interventions realized

This is the complete set of tools proposed for the monitoring of the NBS implementation phase in the FRCs. The results of the activities carried out are detailed in the next chapter.

3 Intermediate results

3.1 Introduction

The processing of this report, the exchanges with FRC partners and their responses has been roughly affected by the spreading out of the virus COVID-19. All construction and citizen involvement actions have been halted for two or three months at least. This issue not only has generated delays in activities, but also it has made the planning of the activities to be reprogrammed due to the consequences the virus (new restrictions, second wave, etc.). Its overall impact on the project is still unpredictable.
Nevertheless, the state of implementation is, generally speaking, mostly ongoing, some construction activities have started, some other are in an executive planning phase and the construction works will start soon (if COVID-19 will not hit again our countries).
Compared with the initial planning (initial NBS timeline and proposal) some changes may appear remarkable at the detailed level of each single NBS. In fact, we expect cases of abandonment, reframing, changing of location, but also interlinked activities (between different NBS), cross-sectoral initiatives, and unforeseen developments of further opportunities.
The following detailed description of the state of art in each FRC will give a fixed snapshot of an evolving situation, subordinated also to the pandemic legacy.
This chapter will end with a resume of some early achievements and warnings intended as suggestions to the FRCs for the ongoing implementation activities.

3.2 Monitoring results

All the information gathered with this activity are reported in the “NBS timeline monitoring 2020” (Annex 2,). Some information are partially filled, some are missing due to the specific phase of actual planning/implementing status of each single NBS.
There is a great variety in terms of number, type of intervention and NBS selected by the cities to be implemented in respective LL. The single NBS is often composed by an articulated set of diverse initiatives planned to reach a specific target or goal.
The following tables show a comprehensive outlook of some essential information or each NBS in FRC Living Labs. The table gathers the information about updated status of works by sorting the execution or physical construction phase in:

Planned: if the NBS is still on paper and the operative tasks haven’t started yet,
Ongoing working: the construction phase has been activated,
Completed: the works are concluded and the NBS is running (accessible or usable by the public or by specific target group),
Cancelled: the implementation was abandoned.

The second item elaborated in this table is the planned or actual duration of the works needed to complete this phase.
Finally, the column “COVID-19” underline if the virus affected this phase. Notably, even the construction works have not started yet, the pandemic halted meetings, citizen participation and inspection visits.

Execution/construction Phase status in Dortmund

Table 4 - Execution/construction phase status in Dortmund

NBS n.	NBS title	Status	Duration (month)	COVID-19
1.1	Integrating solar energy production on Deusenberg landfill	Completed	Completed in 2017	NO
1.2	Sports infrastructure in an existing park in Huckarde	planned	18	NO
3.1	Food forest and permaculture orchard in Huckarde	ongoing working	25	YES
3.2	Community gardening in Huckarde	planned	4	NO
4	Aquaponics	planned	15	NO
6	Connection of Huckarde borough with the renatured Emscher river and Deusenberg sites	planned	24	NO
8	Improving and monitoring pollinator biodiversity in Huckarde	planned	12	YES

In **Dortmund**, except for the NBS 6.1 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.

With regard to the activities still in the planning phase, some delays are reported:

NBS 1.2 “Sports infrastructure in an existing park in Huckarde”. This NBS had to be completely reframed because the collaboration with IGA (International Garden Exhibition 2027 an important international exhibition dedicated to gardening) has verified a substantial divergence in construction times, so it was decided to move the location of this NBS at Huckarde Park. Construction works are scheduled to begin at the end of 2020.

NBS 4, Aquaponics: A binding contract was signed with the Industrial and Monumental Foundation (IDS) in March 2020 for the use of the area of the Hansa Coking Plant, so that the planned time for the area search was exceeded by about nine months. In addition, 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 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.

NBS 6 “Connection of Huckarde borough with the renatured Emscher River and Deusenberg sites”: a new path will create a barrier-free connection to Deusenberg 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 before the end of 2021.

NBS 8 “Improving and monitoring pollinator biodiversity in Huckarde”: has not a dedicated budget, but it will be merged with NBS3 activities. Whenever establishing an urban garden/farm, it will be integrated with pollinator improvement measures. COVID-19 pandemic has already caused around 5 months of delay. The start of the 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.

Execution/construction Phase status in Turin

Table 5 - Execution/construction phase status in Turin

NBS n.	NBS title	Status	Duration	COVID-19
2.1	New soil production in Sangone Park	completed	3	NO
3.1	Castello di Mirafiori ruins recovery	planned	18	NO
3.2	Gardens in Cascina Piemonte (Orti Generali)	completed	12	YES
3.3	Pollinator friendly gardens (WOW)	ongoing working	7	YES
3.4	School garden in box	ongoing working	12	YES
3.5	Portable school gardens	ongoing working	7	YES
3.6	Didactic box garden	ongoing working	?	YES

3.7	Gardens between houses	ongoing working	12	YES
4	Aquaponic test	planned	9	NO
5.1	New green roof in Casa nel Parco	completed	12	NO
5.2	Green Wall at school (indoor)	planned	7	YES
5.3	Green wall at homeless dormitory (outdoor)	planned	7	YES
5.4	Green Roof at WOW	ongoing working	12	YES
6.1	Green Corridors	planned	12	NO
6.2	Local natural heritage enhancement	planned	8	NO
7.1	School forest sponsorship	planned	30	NO
7.2	Tools for NBS embedded planning	planned	?	NO
8	Butterfly gardens for schools and disadvantaged people	ongoing working	24	YES

In **Turin** there are 3 NBS (out of a total of 18) 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 proGIreg NBS activities. Except for NBS 2 (New soil production in Sangone Park) - where the construction works finished before the start of the pandemic - almost all activities are delayed because of the pandemic. School activities and the ones involving citizens are 6 month - 1 year late because of lockdown (all the accompanying activities under NBS 3/5/8 types). Some of these activities could be re-framed in order to respond to new needs (e.g. the partners of "Gardens Around the houses", NBS3, are thinking to change their action to respond to food emergency issues raised with the virus spread)

Construction sites are 3 - 6 months late because of lockdown during COVID-19 period (all activities under NBS 3 and 5 except for 5.1 already completed). Activities under NBS 4, 6 and 7 are mostly in planning phase and works suffered limitedly the virus restrictions. The operative planning of these NBSs is facing some administrative difficulties that could lead to re-frame them.

Execution/construction phase status in Ningbo

Table 6 - Execution/construction phase status in Ningbo

NBS n.	NBS title	Status	Duration	COVID-19
1	Transforming lake sediment to soil fertilizer	cancelled	-	NO
2	Planting aquatic plants along the shore of the lake	ongoing working	10	YES
3	Procedures for environmental compensation	planned	18	YES

NBS1 in **Ningbo,** due to High levels of heavy metals in sediments was cancelled.

The NBS 2, “Planting aquatic plants along the shore of the lake”, has started its work and the green lake shore today is half converted. During the epidemic outbreak, people were asked to stay isolated. The works on the lakeshore was consequently affected and not well maintained. Actually, it’s returned to normal management.

NBS 3 “Procedures for environmental compensation”: after the identification of the damaged ecological space of the city, the gathering of an integrated dataset of meteorological, hydrological, chemical and ecological parameters has started in order to assess the size of environmental damage and the extent to which stakeholders are affected. When COVID-19 hit China (January 2020), the collection of water samples has been stopped and water quality monitoring is currently not possible. Once outdoor activities will be not restricted, the collection of water samples will restart immediately.

Execution/construction phase status in Zagreb

Table 7 - Execution/construction phase status in Zagreb

NBS n.	NBS title	Status	Duration (month)	COVID-19/EARTHQUAKE
3.1	The Sesvete City Garden – upgrading and new garden	planned	6	NO
3.2	The Sesvete City Garden – New garden	planned	6	YES
3.3	Info Point	ongoing	4	YES

		working		
4	Aquaponics testing installation	planned	6	YES (City budget restrains)
5	Green Roof/Photovoltaic cells/Green wall	planned	6	YES (City budget restrains)
6	New cycling path	planned	4	YES (City budget restrains)
7	New protocols and make changes to its planning procedures and policy development processes	planned	6	NO

In **Zagreb**, the combination of two dramatic events, COVID-19 and the earthquake in March 2020 have caused consequences not yet fully estimated. These two catastrophic events, certainly to be considered as unpredictable risks, have led, among other things, to cuts in municipal budgets that could also affect the implementation of some activities (NBS 4, 5 and 6).

Both activities under NBS 3 (The Sesvete City Garden – upgrading the existing garden and new therapeutic garden) suffered some delay due to administrative and procedural items: the allotment of garden parcels, their modernization, and the acquirement of the land, formerly owned by a private company, have taken more time than expected.

The COVID-19 has strongly limited the activities of NBS 3 (Info point), but the schedule is developing in recent time. Some activities have been conducted online, and parts of medical equipment were produced with the 3D printer.

NBS 7 (New protocols and make changes to its planning procedures and policy development processes): the related activities are carried out in the expected time frame, but the rate of success of implementing the proposals in the regulations and planning documents is still to be evaluated.

If we look at the first NBS monitoring tables already realized in 2018 (preparatory work for this table, included in MS1), we can see some common features of all FRCs: an extension of the implementation phase compared to the official timing indicated in the proposal. This is due to:

- the construction can only start once the conditions allowed it (i.e. administrative tasks, engagement of citizens process). It is also related to conditions strictly linked to a natural intervention, like seasons, climate and weather conditions etc.);

- vice versa, the failure to get started on schedule due to obstacles of various kinds (i.e. ownership of the area where some NBS are to be built).

The commitment of the Municipalities has been really relevant and pivotal in all those pre-implementation activities that have allowed to proceed towards the physical implementation phase. These bureaucratic and negotiation activities, involving administration as well as other local public and private partners, were at the same time onerous and decisive.

The peculiar element of some NBS in which the social accompaniment and involvement activity represents an added value of the project, and it is focused on ownership processes towards citizens (groups of residents, voluntary organizations, students and teachers, etc.).

This element foresees, because its very nature, a long co-design and complementation activity so that the empowerment process can really guarantee such achievement. Similarly, given the experimental nature of some NBS, the monitoring activity (both the one foreseen by WP 4 and the one specifically dedicated to the evaluation of the effectiveness of the implementation, see for example New Soil in Turin) need a constant follow up and maintenance activity.

As a final methodological note, it has to be stressed that **NBS 7** (Establishing protocols and procedures for environmental compensation at local level) has characteristics linked to specific issues, including political and urban planning processes, which perhaps require a slightly different approach compared to activities more focused on physical involvement and implementation. We therefore suggested to create a narrative tool for the work carried out that differs from the NBS sheet used in the IP for the others NBSs.

3.3 Risk Assessment results

The great variety of intervention in each FRC is reflected also in the number and typology of risks and mitigation measures identified. As previously mentioned, there was a little cross contamination between the FRCs, so even the categories have facilitated in working on a common frame of reference, the risks and mitigation measures selected by FRCs are tailored to their specific context. A second element of slight misalignment was the identification of general or common risks (i.e. the risk to have “insufficient budget”, or “no perspective beyond 2023”) together with specific risks resulted from single element of an activity (i.e. unsatisfactory bike lane or property issue of a building). This divergence is probably due to the actual prioritization of risks potentially affecting the implementation.
The contents identified in the first year of activity allowed to identify issues and solutions, thus, the following years will aim to check the actual occurrence of the risks, the impact they produced and above all to understand if **the mitigation measures were able to reduce the negative impact of the risks.**
As ex ante activity, risks and threats that could occur have been identified. However, the perception of the actual occurrence of a risk can be influenced by individual and subjective impression. Moreover, this activity collects "forecasts", thus introducing a further variable that is somehow random. For this reason, the information provided in the following pages is the result of an interpretation of meanings that may in some cases have misunderstood the real meaning of the statements.

Table 8- Risks identified by FRCs

City	N. of risks	Average risk rank	Risks to be avoided
Dortmund	27	4,8	4
Turin	17	4,3	
Zagreb	18	4,5	2
Ningbo	13	3,8	

The table shows the number of risks identified in the first round of consultation. The average risk rank is the media obtained by summing up all ranks in each city. It shows a similar rank in every city, and the vast majority of risks a rank between 2 and 6. Thus, we decided to not give a distinction among the different scores, but a few of them that obtained a rank equal to 9 (top score), so these risks have been taken in special consideration.

The city of Zagreb and Dortmund highlighted some risks that can be summarized as follows:

Table 9 - "To be avoided" risks

IMPLEMENTATION AREAS	Lack of suitable site for implementation. Ownership structure, competing projects, leasing costs, soil contamination […] may make the identification of a site suitable for the NBS concept impossible.
PROCEDURE ISSUES	Delays and complexity of administrative procedures. Problems in carrying out the necessary procedures, planning, public procurement for construction of NBS
RESOURCES MATCHING	Some NBS are "double/ triple-funded" via urban development projects which partly have existed before proGIreg. There are time restraints for proGIreg which need to be regarded. For other NBS projects, proGIreg money may be regarded as leverage money.

All the three risks are caused by **multiple factors** due to the overall complexity of the public management in a local administration dealing with an urban regeneration project where the NBS/green infrastructure are to be the leverage of an integrated sustainable urban plan.

At the same time, these risks are related to the decision-making process and especially to the administrative issues daily faced by the local administration. The awareness of the project partner (the municipalities) about their internal functioning is a crucial factor in implementing the NBS and - at the same time, it is a major obstacle in realizing the planned acidities. So, this awareness has to be transformed in an active commitment in finding the best way to overtake well known issues. According to the results of the questionnaire (see next chapter), these risks have already occurred in the two FRCs that reported them. However, the consequences of these risks have not been so serious for the overall implementation of each LL but have led to delays in the implementation and remodelling of some NBS.

Few common risks were identified in all the four FRCs. As we will see also in the mitigation measures chapter a risk identified in a single city can have different interpretation and various motivations and the mitigation measures can differ as well. Nevertheless, these various answers to slightly different risks (or generating causes) can be useful for other cities facing a similar risk.

Table 10 - FRC common risks

Risk	N. FRC	Description comments
Vandalism	4	This risk resulted for all self-evident and was no described except as a risk of destroying green infrastructure by unidentified vandals
Insufficient budget	4	The risk is related to financial resources that can be insufficient to finalize the implementation of some NBS. The causes of this lack have been identified with various motivations: more expensive technical equipment, damage, extreme weather conditions; extra money for insurances for equipment; A couple of cities underlined the lack of resources as consequence of bad economic decision making in the management team, or the fact that the budget wasn't estimated in real conditions.
Maintenance costs	3	Another risk that can easily lead to lack of financial resource is the risk related to the maintenance cost of the implemented NBS. This risk can be caused by miscalculated long term costs (maintenance - or lack of long-term budget. Generally speaking, the maintenance of the NBS can needs unforeseen cost. Even the possibility of faulty maintenance (in case of green walls and roofs installations) has been addressed as risk related to the maintenance of the NBS.
Property/ownership	3	The maintenance responsibility can be also derived by lack of agreement about maintenance between the actors and citizens involved. Some cities highlighted possible problems in resolving property rights that can hamper or block the identification of the NBS location.
Perspective beyond 2023	3	Three cities are worried about the long term sustainability of the NBS implemented with proGIreg. Some activities, mostly related to the maintenance costs, will need further resources after the end of the project

Some brief comments to the risk identification activity: **not all the risk can be identified**. The risk labelling (the categories used) can be interpreted variously, and the same risk title can be seen by different point of view (the risk of lack of maintenance for example, can be a problem of financial resources or lack of skills, or responsibility in managing the NBS). Nevertheless, this activity has forced the actors involved in thinking about harms and risks that can affect the implementation. Therefore, it can be very useful if the outcome of this assessment will properly be managed during the implementation phase. With this regard, the mitigation measures phase and its results should be taken in great account by FRCs.

Mitigation measures results

The risk assessment activity has the ultimate goal in identifying and putting in practice activities that will help in prevent, avoid or diminish (mitigate) the negative effects of possible occurring risk. We focus our analysis on the most frequent risks.

Table 11 - Mitigation measures for maintenance cost risk

Maintenance **costs**	Dortmund	Include budget for adjustments
	Turin	As far as possible, the associations that will take care of the design and construction of the NBS will carry out maintenance.

	Zagreb	Include maintenance in the procurement procedure for execution of the NBS
	Ningbo	More publicity, volunteers or schools to maintain

Any unforeseen or higher than budgeted maintenance costs can be avoided in two ways:
by involving stakeholders and citizens in taking charge of the NBS carried out through a progressive path of engagement or by including these costs in the budget of the construction works and therefore in public purchasing procedures (in the case of tenders for works and/or services) or agreements with third parties (in the case of agreements or collaboration pacts). This was done in Turin for several NBS (5.2 and 5.3).
This issue is linked to the sustainability of the NBS both in the short term (until the end of construction works) and in the long term, until the end of the project (2023) and afterwards.

Table 12 - Mitigation measures for insufficient budget risk

Insufficient budget	Dortmund	Careful calculations of possible costs and risks; Use the proGIreg money as leverage for larger implementations Find and add financial sources (third persons or companies/ funding programs/ crowdfunding...). Detected additional revenue streams or new business model to allow higher budgets. Include economic expertise into the project.
	Turin	Reduce the activities Search and find financial resources outside the project.
	Zagreb	The budget for management and maintenance costs could be boosted from other financial sources
	Ningbo	Invest in cooperation with local businesses or governments

While a careful calculation of all the cost (i.e. maintenance costs) is a quite evident issue in helping to prevent excessive costs, there is certainly an awareness of how additional resources are needed. Nevertheless, the resources available can allow to create a driver for further development of the LL. The identification of financing strategies to raise sufficient resources for long-term sustainable interventions is a necessary but potentially fruitful opportunity.

Table 13 - Mitigation measures for property/ownership risk

Property/ownership	Dortmund	Integrate valid laws and regulations into the planning process to aim for realizable ideas as early as possible. Integrate personal expert already in this issue into the planning process. Introduce the project to the stakeholders and potential partners who can support of identifying suitable sites for NBS, e.g. conducting site visits with experts, NGOs, contact persons from Department of Green Spaces in Dortmund, etc. Providing a detailed description of the planned NBS in the "building permit proposal" (case of NBS4), while retaining certain project components with less details in order to maintain a necessary degree of flexibility, especially for co-design and co-implementation activities.

		Seek clarification of requirements; communicate plans to permission authority at an early stage to avoid last minute revision of plans. Time for obtaining “building permission” of NBS (case of NBS4) has to be integrated into time plan. Intermediate activities can parallel be planned to avoid delays resulting in the extended administrative time need for issuing the building permission. Temporary interventions can help to establish a continuous involvement of the target demography in the project. Search for examples of similar projects respective rules.
	Zagreb	Define modes of use and cooperation for construction on the site within the project. The local government, NGOs and other involved stakeholders will work with the owners to ensure cooperation
	Ningbo	Explain the significance of project implementation to government departments and strive for government support

This risk has happened and has led to delays in implementation in both Dortmund and Zagreb. The different solutions to the problem of having identified areas of implementation that were not owned by the cities seemed, for various reasons, an attractive opportunity but it clashed with divergent interests of other, and sometimes more influential, actors.

Table 14 - Mitigation measures for No perspective beyond 2023 risk

No perspective beyond 2023	Dortmund	Start working on follow-up concepts early, convince partners of integration into future projects as soon as possible. Involving local citizens in shaping and implementing activities of NBS and creating a sense of responsibility towards maintaining the NBS beyond the lifetime of proGIreg. Planning of the technical parts and buildings shall be done with regard to easy disassembly and movability.
	Turin/ Zagreb	identify new resources and new projects to be developed with the proGIreg partners to give continuity to the projects started

As indicated in the next chapter, many FRCs partner has identified this kind of risk. Although it is certainly a long-term problem, is already a potential risk and an issue to start to consider. The measures identified propose to work closely with partners already in the long term, and vice versa to carry out kind of activities that can be reused elsewhere. As in the case of other risks, this issue is perceived as the need to find additional resources.

Table 15 - Mitigation measures for internal proGIreg risk

Delays in planned activities	The team will work closely with the other partners to make sure that the NBs are implemented in time. Intensify coordination between people in the decision making process This category of risk has been added thanks to the FRC comparison. It evidently highlights a concern of alignment and consistency between individual NBSs, between FRCs and between different WPs (city offices and state government).
Different progress in each leading city	Communicate more between cities and work groups, and consider the differences in each city to make plans.
Measurement results are not comparable within FRC/ FC (WP 4)	Dialogue and cooperation among local based analyst and proGIreg representatives should be started in order to reduce incomparability or mismatching results

This category of risk has been added thanks to the FRCs contribution. It evidently highlights a concern of alignment and consistency between individual NBSs, between FRCs and different WPs.

3.4 Risk Assessment questionnaire results

The questionnaire was designed as a first working tool to update and check the risks and mitigation measures previously identified. The objective of the questionnaire was to verify:

- whether some risks had already occurred and what mitigation measures have been taken.
- if other risks have emerged
- if the mitigation measures identified or new were carried out

The questionnaire received 15 responses, 12 of which came from Turin and one each from the other 3 FRCs. This big difference in responses is due to two factors:

- the high number of partners and actions carried out in Turin
- the different sharing methods in the FRCs who preferred to respond collectively by filling in only one questionnaire.

Nevertheless, the questionnaire showed that many risks have already occurred and that the related mitigation measures identified have been taken. It is worth mentioning the different risk perception in Turin, where some colleagues identified issues that others denied. Finally, some partners replied that where implementation has not yet started it execution/construction phase, the related risks have not yet occurred.

Table 16 - Risks occurred out of risks identified

City	N. of risks occurred out of total risks identified
Dortmund	15/27
Turin	15/17
Zagreb	5/18
Ningbo	1/13

Table 17 - Main risks identified as occurred in Torino

Risk	N. of time identified as occurred
No perspective beyond 2023	11
Administrative restraints	7
Changes from original planning	6

These two tables indicate the number of risks that have already occurred in FRCs. As the questionnaire received 12 responses in Turin, the second table shows the number of times this risk was perceived as having occurred or being potentially relevant.

The following table summarizes the main issues emerged in the responses to the questionnaire, especially in the part dedicated to mitigation measures.

Table 18 – Technical risks and mitigation measures

Risk title	Notes on mitigation measures
• Construction delay • Experimental errors • Bad maintenance • No reliability on technical equipment • Structural problems in buildings • Unsatisfiable bike lane	Technical risks have not generated significant problems to the FRCs. Dortmund, Zagreb and Ningbo have not reported technical risks in the take-off phase of their NBSs. On the contrary, Turin had to face some challenges in the management of new soil (NBS2), urban gardening (NBS3) and green roofs (NBS5). Due to building works in one of the schools which hosts urban community gardens, the launch of the experimentation was postponed. Moreover, the partners involved in NBS5 had to modify the design of the selected plants to fit with the structures of the buildings. Eventually, bad weather conditions delayed the new soil (NBS2). However, cooperation between Turin partners has turned out to play a key-role to overcome technical risks and finally allow to complete the NBS2.

Table 19 – Ecological risks and mitigation measures

Risk title	Notes on mitigation measures
• Undetected or unresolved soil contamination	The alteration of the production to a soilless system such as mobile units or raised bed-gardens will allow to avoid any contamination
• Negative effect of the NBS (threats to biodiversity of the area) NEW RISK	Maintaining the grassing of green corridors will be useful for the growing of herbaceous plants and the presence of pollinating insects.

Table 20 - Economic resources risks and mitigation measures

Risk title	Notes on mitigation measures
• Insufficient budget for realization • Unexpected safety works • NBS maintenance requires unpredictable costs • The business model of NBS needs to be constantly adjusted • Lack of demand for locally grown products	Dortmund and Turin took over economic risks through an in-depth preliminary strategy, which turned out to be decisive to preserve NBSs. Dortmund realized that the identification of individual mitigation measures required on-site solutions for each NBS, which effectively filled the gaps of unforeseen events. Turin had to deal with the economic sustainability of green roofs. The excessive costs led the City to scale down the experimentation, which was conducted on a smaller area.

Table 21 – Procedural risks and mitigation measures

Risk title	Notes on mitigation measures
• Administrative restraints • Change of key persons	Procedural risks have occurred in each one of the FRC. Dortmund has dealt with building permit, contract of use, governmental restraints and chemical equipment for users. In order to disentangle these knots, the Department of Urban Renewal had previously planned bureaucratic solutions and organized meetings involving experts and stakeholder representative.

	Different procedural risks threatened the path of the Zagreb's NBS. The Croatian local administration had to face property issues related with aquaponics (NBS4), bike lanes (NBS6) and urban gardening (NBS3). In Ningbo the law propensity to communicate between partners was solved by the key-role of the communication responsible, who succeed to motivate all of the involved actors. Likewise, the cooperation between Turin's partners led to accelerate the processes of authorization, which were hampering the take-off of some of the NBSs. Eventually, the spreading of COVID-19 turned out to be a huge barrier, and slowed down the NBSs' experimentation. Specifically, every FRC is working to redesign some of the NBSs which would entail human contacts, such us urban gardening, aquaponics and pollinator biodiversity.

Table 22 – Societal risks and mitigation measures

Risk title	Notes on mitigation measures
• Vandalism • Lack of users and or interest • Unrecognized benefits • Insufficient number of users motivated to engage in project activities • Low public cooperation	Different societal risks characterized the works of Dortmund and Turin. Dortmund had to tackle the lack of users involvement through a communication initiative aimed at underlining the public ownership of the experimentations. A webpage of proGIreg in Huckarde was created to inform the citizens about the different activities taking place in the NBSs and invite the locals to be part of the project. Differently, Turin have been working to prevent vandalism by properly designing NBSs. Moreover, the City planned a shared program of citizens' involvement to engage all of the NBSs' users. Municipal offices have identified community leaders to build ad-hoc strategies, aimed at enhancing the potential impacts of NBSs and adapting them according to the neighbourhoods' necessities. In Ningbo the content of heavy metals in lake sediments is high. If it is converted into fertilizer for planting, low public acceptance will lead to social risks, thus the NBS2 activities were abandoned.

Table 23 – Other risks and mitigation measures

Risk title	Notes on mitigation measures
• Maintenance responsibility • Workers safety • No perspective beyond 2023 • Staff safety • Project settings may have changed from original planning	Some activities, mostly related to the maintenance costs, will need further resources after the end of the project. At the moment, all FRCs have identified this risk in its implementation. However, the municipality of Dortmund is tackling this difficulty by convincing partners to integrate the NBS implemented into future projects as soon as possible. Secondly, a possible mitigation measure is the planning of technical parts and constructions works with regard to easy disassembly and movability Some other mitigation measures are identified by FRCs: start working on follow-up concepts early; identify new resources and new projects to be developed with the proGIreg partners to give continuity to the NBS realized. For instance, in Turin the garden has been realized into a an abandoned multifunctional centre (WOW) and will be managed by a cooperative.

Table 24 – Internal proGIreg risks and mitigation measures

Risk title	Notes on mitigation measures
• Measurement results are not comparable within FRC/ FC (WP 4) • Difficulty in project data sharing	There is a need of communicate more between cities and working groups. At the same time, there is the need to consider the differences in each city in order to elaborate strategic plans tailored on local characteristics and challenges.

Turin

The large amount of responses provides insightful information. Interviewees highlights different opinions on the occurrence of the reported risks. New risks have been identified (i.e. threats to local biodiversity) and new mitigation are indicated (maintenance of the grass along green corridors useful for pollinating insects).

During the lockdown, some activities turned out to be essential to follow up the NBS:

- a remote cultivation support, called “tele-cultivation”: the Associazione Coefficiente Clorofilla (LTP of the City in proGIreg) have digitally cooperated with the gardeners (NBS 3.2 Gardens in Cascina Piemonte) in order to replace them in seeding and maintaining the gardens.
- UNITO’s colleagues working NBS 8 (Butterfly gardens for schools and disadvantaged people) have produced multimedia contents made by mental disables. Additionally, they have launched a social media challenge on Facebook about butterfly recognition, called “Butterfly on ToUr”. They also provided didactic material to some schools and social houses about butterfly and activity to do at home. Moreover, a musical contest for schools was relaunched as a “Do it from your home!” activity.
- The City of Turin by joining the initiative "Skype in the Classroom", is offering to schools the emotion of a field trip using the Teams platform of Microsoft. Classes are connected with NBS 3.2 Gardens in Cascina Piemonte (via video conferences to discover the vegetable garden and hens’ life by an interactive experience.

The high number of NBS that will be implemented in Turin has required to deal with different and articulated administrative procedures of agreement and collaboration. Among the different forms of agreement COTO has worked on, the collaboration pact signed for NBS 3.3 and 5.3 turned out to be one of the most effective as it has allowed a private actor to easily intervene on a public building.

Dortmund

As pointed out, risks considered to be more impactful have generated delays, remodulation and location shifts of some NBS. Nonetheless, they have not jeopardized the overall implementation of the LL in FRCs.

According to the RA activity, even if administrative risks needed to be avoided, they have occurred. Likewise, some difficulties in designing public action on private areas have been hampering some of the NBS. The time taken to issues like permits, agreements with industrial entities and possible synergies with broader planning and policies actors often represent obstacles to implementation and have certainly caused delays in some NBS.
Finally, there is an unexpected risk at NBS 4 of a possible shortening of the term of the lease agreement between FH Südwestfalen (SWUAS) and IDS, so that IDS would have to terminate the agreement at the end of 2022 instead of the official term of proGIreg by May 31, 2023. The reason for this is that the NBS4 site may have to be used as a parking lot for a new event hall in the Hansa coking plant at the beginning of 2023. Another location was already planned as a parking lot for the event hall, but is currently used as a diversion of a road that is currently being repaired due to erosion. This could possibly lead to complications in the implementation of NBS4.

Ningbo
In Ningbo occurred a **fatal risk for NBS1** (Transforming lake sediment to soil fertilizer): the content of heavy metals in lake sediments is too high. If it would converted into fertilizer for planting, low public acceptance will lead to social criticism, thus they decided to leave NBS1 activities. The pre-implementation activities, entailed identification of polluted lakes which led to an in-depth analysis of contaminants in lake sediments. The improvement of sediments proposed by the actors involved was not enough to explain to the local community that the soil will not be polluted and will not cause harm to people and the environment anymore. Ningbo has introduced new solutions to prevent risks already highlighted: in order to have a more effective soil improvement technology they engaged experts in soil improvement to give lectures and/or training. In addition, they decided to facilitate communication between offices through a responsible of coordination who has been managing the exchange of information between experts, staff and project partners.

Zagreb
Due to the delay in the setup of HUB building (NBS 4 and 5), green walls, roofs and photovoltaics risk to not be carried out on time. Thus, the team will work closely with the other partners to make sure that the new HUB will be built in time to implement green walls and roofs, as well as the aquaponics demo installation.
The mitigation measures identified to solve procedural issues (Procurement for construction) by intensifying the coordination between actors in the decision-making process (city offices and state government), will probably not solve the budgetary problems due to city budget cuts.

To sum up, the risk assessment has provided three common reflections on implementing NBS:

First, it has shown which risks have been jeopardizing the NBSs in each of the FRCs. By means of qualitative data, it has pointed out how technical, procedural, societal and economic risks popped up in different contexts. Moreover, it has explained the specific distribution of risks in cities and contextualized its features. This framework has actually allowed all the partners to share their experiences and keep to being updated.

Secondly, it has gathered all the mitigation measures which have been adopted by FRCs. This action enables all of the partners to be inspired from activities adopted in other contexts which can fit on their own risk strategy. In addition, it spreads out the results of the cooperative strategy of proGIreg, thus it increases the visibility of the whole project.
Eventually, the risk assessment has demonstrated to be an effective channel of communication between FRCs. **It has highlighted how the potential difficulties could be common ground for further collaboration between partners.**

3.5 Conclusions and monitoring perspective

This Deliverable is partially focused on presenting the methodology and working tools. Having started the monitoring activity already in 2018, it has allowed us to have some intermediate results such as those illustrated.
By one side, the support to FRCs has been concretized not only by the production and by the sharing of tools but also in repeated comparison activities (both in person as in Cluj-Napoca meeting in 2019, and through web calls dedicated to the topic). These opportunities of comparison proved to be very useful and FRCs are invited to be more proactive.

COTO guarantees continuous support and constant exchange of information but local dynamics, even if they can be labelled in a common way, have relevant context specifications that can be facilitated but not solved with monitoring activities.

In conclusion, we highlight some results that the monitoring activity has achieved together with critical issues or challenges that we think the FRCs should reflect on.
The extension of the implementation time compared to the year and a half (January 2020 - June 2021, as planned in the project proposal and GA) represents, at present, a fact to be considered also during the drafting of subsequent project reports. This factor is certainly due to the complexity of some interventions and perhaps to changes of local context between the writing phase of the application and the actual implementation of the NBS. A second reason for a longer than expected implementation phase is also due to the experimental nature of many interventions (see for example NBS 2 in Turin) in which, although execution/construction phase took place in a few months, a long-lasting monitoring activity will verify the real impact of the intervention. Thirdly, many of the implementation activities involve stakeholders and citizens. This element, characterizing proGIreg interventions, is aimed both at empowering and at fostering ownership by the beneficiaries of the co-implemented NBS. Both these factors certainly require prolonged time and effort.

These elements highlight **the key role of the cities** involved in the project as crucial actors in the implementation process. These bodies are at the same time creators but also they depend on several bureaucratic procedures and administrative constraints.
In this sense, and this information will be clear in the Implementation Plan (D. 3.2), the **pre-implementation phase,** i.e. all those activities that allow the NBS to be implemented in the LL, is often much longer and more difficult than the implementation itself.

It should be noted once again that the COVID-19 (and the earthquake of March 2020 in Zagreb), not only forced to suspend and delay some actions carried out mainly in schools but also questioned their planning for the next school year. In general, environmental variables in activities related to nature (and the direct involvement and active participation of citizens) can compromise the execution of some activities.

As seen in previous chapters, monitoring and risk analysis has **highlighted some delays**. We believe that the objective of all FRCs is to be able to complete all the NBSs indicated in the application phase, even if revised and remodelled according to the evolution of the local situation. In this sense, the invitation also goes to our colleagues in Ningbo, to try to complete the NBS that has been cancelled to date.

The monitoring activity, which is parallel to that of the implementation plan (D.3.3), has allowed already to verify a **difficulty in associating new business models** (and also improvement of the initial TRL) to the NBS that are being implemented. It seems therefore not easy in all NBS to develop market-ready solutions. As far as Turin is concerned, but perhaps also for other FRCs, this is due to the great value given to **possible social impact of the NBSs implemented**. Many NBS are in fact realized with the contribution of professionals with skills in educational, planning and technical (agronomist, biologist, engineer, etc.) sectors. It seems important to concentrate efforts on this critical element in **order to valorise also the economic outcomes of the NBS.**

Finally, it is necessary to improve the **exchange with the Follower Cities** (FC) so that the knowledge acquired, but also the critical issues raised, are not only transposed through the reading of the documentation produced but can actively help to conceive and implement urban programs, plans or policies for NBS.

These critical elements represent challenges that COTO, as WP3 coordinator, will assume to continue in supporting the progress of the implementation phase. More specifically, as part of the risk assessment activities, we will work to assess whether, and to what extent, **the mitigation measures have been successful in preventing or reducing the adverse effect of the risk incurred or predicted.**

Finally, COTO propose to postpone the deadline for delivery of the D.3.4 "Second implementation monitoring report" from December 2020 to June 2021, i.e. at the end of the official implementation phase. In this way, consistently with the methodological approach presented here, that Deliverable will be accompanied by the final version of the IP.

Annexes

1 - NBS Timeline 2020 template

2 - NBS Timeline monitoring 2020

3 - FRC Risk table

4 - FRC Mitigation measure table

ANNEX 1 - TIMELINE 2020 TEMPLATE

Colour the cells if you have worked or if you plan to do the specific action in these months.

Write down here all negative effect the COVID-19 has already or will affect the implementation

NBS	Action n.	Action Title	Sub action	Sub action title/short description	2018	2019		2020											2021							2022		2023	Remarks/Monitoring notes	Activity delay or interruption due to COVID-19 and possible effects
					2° sem.	1° sem.	2° sem.	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	2° sem.	1° sem.	2° sem.	1° sem.		
2 - New regenerated soil	X	Xxxxxx	Pre-implementation	xxxxxxxx																										
			Execution/construction	xxxxxxxx																									xxxxxx	xxxxxx
			Accompaying activites	xxxxxxxx																										
			Monitoring, maintenance and handover	xxxxxxxx																										

Describe each single action briefly. If some activities are not carried out or planned delete the respective row. Give special attention to execution phase

Write down in this column notes and comments updating the information about each action and motivating possible delays and changes

DORTMUND- TIMELINE NBS

NBS	Action n.	Action Title	Sub action	Sub action title/short description	1	8	9	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	44	45	56	Remarks/monitoring notes	Activity delay or interruction due to COVID-19 and possible effects
					2018	2019		2020												2021							2022		2023		
					2° sem.	1° sem.	2° sem.	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	2° sem.	1° sem.	2° sem.	1° sem.		
1 - Leisure activities and clean energy on former landfills	1.1	Integrating solar energy production on Deusenberg landfill		*Completed (in 2017)*																											Completed since 2017. No delays due to COVID-19
	1.2	Sports infrastructure in an existing park in Huckarde	Pre-implementation	*Check project ideas together with other city departments regarding realization options/ Include public via workshops and other appropriate participation processes, close cooperation with/ dependance on IGA 2027.*																										Awareness that implementation timeframes for IGA and proGlreg will not overlap. Consequence: Search for an alternative project site for NBS 1.2. Finding: Sports infrastructure in an existing park within Huckarde settlement	No delays on the implementation as construction work hasn't started yet
			Execution/construction	*Realisation of project ideas (…)*																										Reframing the project	
			Accompayning activites	*Permanent information exchange with other sponsored projects (e.g. Stadtumbaugebiet Huckarde-Nord, IGA, nordwärts)*																											
			Monitoring, maintenance and handover	*Permanent monitoring and project evaluation,also regarding integration into accompanying projects like Stadtumbaugebiet Huckarde-Nord, IGA, nordwärts. Handover after finishing construction and responsibility of maintenance is currently invetigated*																										
3 - Community-based urban farms and gardens	3.1	Food forest and permaculture orchard in Huckarde	Pre-implementation	*Public via workshops and other appropriate participation processes. Identification of project site in St. Urbanus Church and partner for implementation. Communication with site owners and possible partners*																										This has not been done extensively; decision in LL Dortmund to look for suitable sites first (including confirmations from land owners/ repsonsible persons) before stepping into co-design and participation with neighbours, NGOs, civil society in general	Two months delay in the execution of NBS3.1 since the COVID-19 outbreak: (1) workshops with the local citizens have been canceled; (2) delays in delivering planting materials to the site of NBS 3.1, St. Urbanus; (3) delays in planting the intervention area together with the scouts
			Execution/construction	*Project realization and perpetuation*																											
			Accompayning activites	*Communication with the Pastor of the church and possible partners, workshops with the scouts, etc. Continuous exchange with boy and girl scouts for food forest St. Urbanus*																											
			Monitoring, maintenance and handover	*In St. Urbanus (so far key site of NBS3): close cooperation with the church delegates and scout ("Pfadfinder"). High probability of maintenance/further evolution of the area due to the strong committment of chruch and scouts after proGlreg*																										
	3.2	Community gardening in Huckarde	Pre-implementation	*Identification of project site in Gustav-Heinemann park. clarifing whether soil samples had to be taken in the park for urban gardening activities. preparation of use-contract between the City of Dortmund and the Urbanisten. Public via workshops with the school students.*																										A meeting with the Green Space Department at the City of Dortmund was made for the site selection. a section of the Gustav-Heinemann park was identified for NBS3. The nearby school would like to establish a school garden and cooperate with proGlreg. Die Urbanisten met with the Head of School to discuss a cooperation.	No delays due to COVID-19. The implementation starts after signing the Use Contract
			Execution/construction	*Project realization and perpetuation*																										A Use Contract must be signed between die Urbanisten and the City of Dortmund as a prerequisite for the implementation	
			Accompayning activites	*Public via workshops with the school students.Continuous communication with Head of the Gustav-Heinemann school and other involved partners*																											
			Monitoring, maintenance and handover	*Permanent monitoring and project evaluation. Close cooperation with the Gustav-Heinemann School. The project would probably handover to the school. Citizens of Huckarde would also be responsible for the maintenance of the NBS.*																										
4 - Aquaponics as soil-less agriculture for polluted sites	4	Aquaponics	Pre-implementation	*Public via workshops and other appropriate participation processes. Identification of project site and partner. Communication with site owners and possible partners; Aquaponics greenhouse tours for citzien in the existing greenhouse of URBA. Identification of project area and building license and further preparations for project realization:*																										No participation or public relations until a contract was signed	No delays due to COVID-19. Construction work hasn't started yet
			Execution/construction	*Execution can begin after signing the contract and receiving the Building permit from the City of Dortmund*																										leasing contract signed Feb 2020; buidling permission will be submitted to the City of Dortmund - Feb 2020: start working on building permission and building planning / Physical implementation late 2020 and/or 2021	
			Accompayning activites	*public relations, workshops with citizens, etc.: Aquaponic wokshops at schools*																											
			Monitoring, maintenance and	*monitoring of processes and project results*																											
6 - Making post-industrial sites and renatured river corridors accessible for local residents	6	Connection of Huckarde borough with the renatured Emscher river and Deusenberg sites	Pre-implementation	*Internal assessment check with other city departments regarding realization options. Include stakeholders via appropriate participation processes. Feasibility Study. Planning, realisation of project ideas,perpetuation of project ideas within IGA-project*																										No public workshops will be realized for NBS 6 since path planning/ construction is a technical planning. 09/2019: Decision to realize another connecting path to Deusenberg to be able to construct a barrier-free connection without land purchase	No delays due to COVID-19. Construction work hasn't started yet
			Execution/construction	*Call for bids, technical planning of the path, construction*																										The new path will be the barrier-free connection to Deusenberg which will be part of the IGA in summer 2027.	
			Accompayning activites	*Permanent information exchange with other sponsored projects (e.g. Stadtumbaugebiet Huckarde-Nord, IGA, nordwärts)*																											
			Monitoring, maintenance and handover	*Handover after finishing construction and maintenance by city subcompany*																										The local garbage company which takes care of the maintenance of the Deusenberg, will also maintain the new path after realization.	
8 - Pollinator biodiversity	8	Improving and monitoring pollinator biodiversity in Huckarde	Pre-implementation	*Include public via workshops and other appropriate participation processes (not extensively; Identification of project site and partner for implementation: Deusenberg; together with NBS3*																										Evaluation of a previously selected site for NBS8, as well as identifying new potential sites have been done through a field survey with experts in the field of insects diversity and general biodiversity	Around 5 months delay due to COVID-19 pandemic. The start of the 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
			Execution/construction	*Project realization and perpetuation: first seeding of flower fields September 2020*																										NBS 8 is not having an individual budget, but we merge NBS3 and 8 activities as much as possible. Whenever establishing an urban garden/farm, we integrate pollinator improvement measures	
			Accompayning activites	*Public relations, workshops with citizens and children of kindergarten and elementary schools in monitoring the biodiversity in this pre-implementation summer. , etc.*																										Depending when kindergartens and elementary schools are going to open up in the coming weeks (currently closed because of COVID-19) it is intended to activate young citizens for monitoring the biodiversity in this pre-implementation summer.	
			Monitoring, maintenance and handover	*Best cases integrated into the land owners daily practice. The City Department of Civil Enineering (Tiefbauamt) will most likely maintain the implemented sites after proGlreg ends*																										The City Department of Civil Enineering (Tiefbauamt) will be responsible for seeding and maintaining the biodiversity spaces of NBS8 . Most likely the same department will also maintain the implemented sites beyond the proGlreg project time frame	

NINGBO - TIMELINE NBS					1	8	9	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	44	45	56	Remarks/monitoring notes	Activity delay or interruction due to COVID-19 and possible effects
NBS	Action n.	Action Title	Sub action	Sub action title/short description	2018	2019		2020												2021							2022		2023		
					2° sem.	1° sem.	2° sem.	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	2° sem.	1° sem.	2° sem.	1° sem.		
2 - New regenerated soil	1	Transforming lake sediment to soil fertilizer	Pre-implementation	Identify contaminated lakes and determine the experimental location Analysis of pollutants in lake sediments and improvement of sediments using biotechnology																										
			Execution/construction	Use improved sediment fertilizer for urban greening - Activity cancelled																									**High levels of heavy metals in sediments, NBS2 cancelled.**	
			Accompanying activites	Community residents participate in lake environmental protection																										
			Monitoring, maintenance and handover	Chemical monitoring of lake sediments																										
3 - Community-based urban farms and gardens	2	Planting aquatic plants along the shore of the lake	Pre-implementation	Identify the possible areas where to set up green corridors																									Moon Lake Park identified as a greening site.	During the outbreak of the epidemic, people were asked to isolate, the construction period of the lake shore was affected and the lake shore was not well maintained,but now returned to normal
			Execution/construction	Building a green lake shore																									The green lake shore is half done	
			Accompanying activites	Community participation in the design of green lake shore																										
			Monitoring, maintenance and handover	Routine maintenance of green lake shore and monitor the environmental conditions of green lake shore and assess economic and social benefits																									Finally decided to plant aquatic plants along the shore of the lake.	
7 - Establishing protocols and procedures for environmental compensation at local level	3	Procedures for environmental compensation	Pre-implementation	Identify the damaged ecological space of the city																										As coronavirus rages in China, our collection of water samples has been stopped and water quality monitoring is currently not possible.When outdoor activities are not restricted, collect water samples immediately.
			Execution/construction	Collecting the integrated dataset of meteorological, hydrological, chemical and ecological parameters Assess the extent of environmental damage and the extent to which stakeholders are affected																									From January 2020, the collection of water samples has ceased and is expected to restart in July	
			Accompanying activites	Community residents participate in environmental compensation discussions																										
			Monitoring, maintenance and handover	Monitor environmental conditions and collect valid data to assess the extent of NBS impact																									Water quality is being monitored	

TURIN - TIMELINE NBS 2020				1	8	9	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	44	45	56	Remarks/monitoring notes	Activity delay or interruction due to COVID-19 and possible effects
NBS	**Action Title**	***Sub action***	**Sub action title/short description**	**2018**	**2019**		**2020**												**2021**							**2022**		**2023**		
				2°	1°	2°	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	2° sem.	1° sem.	2° sem.	1° sem.		
2 - NEW SOIL	**New soil production in Sangone Park (&professional training)**	***Pre-implementation***	Regulatory analysis of the situation, identification of natural background values																											NO, works terminated before. But accompayning/climathon activites are at risk
		Execution/construction	Testing on the ground - building site - Plantings																											
		Accompayning activites	Accompanying Activities to involve citizens to co-design new public functions of the renaturalized area																										Analytical and monitoring activities on the different components of the new soil were carried out during the spring and summer of 2019. The agronomic monitoring activities of the new soil mixture, on the other hand, began in February during and after laying on the construction site	
		Monitoring, maintenance and handover	Monitoring& evaluation with special regard to administrative and market barriers overcoming																											
		Monitoring, maintenance and handover	Chemical and agronomic monitoring of new soil																											
		Accompayning activites	planning and provision of professional training courses also aimed at creating new jobs																										This activity in under checking the feasibility of its implementation this year or next one	
	3.1 Castello di Mirafiori ruins recovery	*Pre-implementation*	analysis of the needs of the area (maintenance, new plantings)																											NO, the activity with citizen hasn't started yet. But delays in planting and involving citizens are possible
		Execution/construction	maintenance of castle ruins and path (fences) - plantings - historical and natural regeneration of ancient garden Bella Rosin																											
		Execution/construction	- plantings - historical and natural regeneration of ancient garden Bella Rosin																											
		Accompayning activites	Accompanying activities involving local associations and local education system																										The planting has not yet started due to bureaucratic delays for the authorization to intervene on the area	
		Monitoring, maintenance and handover	Monitoring on new plants, tree growth and park use.																										Action to start after planting, in November 2020	
	3.2 Gardens in Cascina Piemonte (Orti Generali)	*Pre-implementation*	Co-planning with local associations on new gardens to be set up																											YES, all the activities with gardener were blocked for 2 months. As a mitigation measure a "tele-cultivation" activity were launched
		Execution/construction	Improvement of road access to the farm																											
		Execution/construction	creation of new gardens in the farm area																											
		Accompayning activites	involvement of disadvantaged people and students in the care and implementation of gardens																											
		Monitoring, maintenance and handover	Monitoring of the widening of the areas destined to the gardens and manutenzione superfici erbose e nuove piantumazioni																											
	3.3 Pollinator friendly gardens (WOW)	*Pre-implementation*	Identification of the area, Identification of association that will take care of maintenance and co-planning,																										The agreemnet between CIty and ONG has been signed at the end of february 2020. So these activites are planned to start from spring 2020	YES, construction worked interrupted for 2 months, now re started. Activities with citizens will be delayed
		Execution/construction	realization of the garden in box																											
		Execution/construction	Apiary installation and honey harvesting																										The collaboration agereemnt with citizen is signed to find interested citiens trought activities open to all citiezens	
		Accompayning activites	Activities open to all citizens; training, accompaniment to care, collaboration agreement																											
		Monitoring, maintenance and handover	biological monitoring of insects and honey																										The garden are under construction and they will be ready by april 2020	
		Monitoring, maintenance and handover	Garden maintenance																											

TURIN - TIMELINE NBS 2020				1	8	9	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	44	45	56	Remarks/monitoring notes	Activity delay or interruction due to COVID-19 and possible effects
NBS	**Action Title**	***Sub action***	**Sub action title/short description**	**2018**	**2019**		**2020**												**2021**							**2022**		**2023**		
				2°	1°	2°	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	2° sem.	1° sem.	2° sem.	1° sem.		
3 - Community-based urban farms and gardens	**3.4 School garden in box**	*Pre-implementation*	Identification of the schools in which to set up the vegetable gardens and coordination on the educational path with the teachers																											YES, all the activties with students and teachers are blocked. Uncertain effects on delays
		Execution/construction	realization of gardens																										The activities in the kidergartens in via Artom and in via Roveda have been delayed due to maintenance works in via Artom and the transfer of the school in via Roveda; co-design and co-implementation in via Artom took place in Autumn 2019, in via Roveda will take place at the beginning of 2020	
		Execution/construction	educational activities in schools based on vegetable gardens																											
		Execution/construction	educational activities also for parents and neighbourhood																											
		Monitoring, maintenance and handover	Maintenace and handover support to students and teachers																										In the first three years proGIreg staff will provide two hours per week for each garden to maintain the garden together with the classes. In the last two years the presence of proGIreg staff will become lighter (14 hours per month overall) and will be aimed at helping teachers and the schools communities to become autonomous in the maintenance of the gardens	
	3.5 Micro vegetable gardens (OrtoMobile)	*Pre-implementation*	Identification of the schools in which to set up the moveble box garden project "OrtoMobile" and coordination on the educational path with the teachers																											YES, all the activties with students and teachers are blocked. Uncertain effects on delays
		Execution/construction	Teacher training based on moveble box garden																											
		Execution/construction	Educational activities in schools for the realization of moveble box garden																											
		Execution/construction	Exhibition and school market of moveble box garden																											
		Monitoring, maintenance and handover	Questionnaire and meetings with teachers to evaluate the experience and realization of the first action report,Evaluation together with the teachers for the replicability of the experience in the school year 2020/2021																											
	3.6 Community school gardens	*Pre-implementation*	Identification of the schools in which to set up the vegetable gardens and coordination on the educational path with the teachers																											YES, all the activties with students and teachers are blocked. Uncertain effects on delays
		Pre-implementation	Workshops for students on: Environmental monitoring; New soil; NBS solutions and vegetable gardens realization																											
		Pre-implementation	Visit study to a structure of the environment sector of the City of Turin																											
		Execution/construction	Realization of vegetable gardens by students																											
		Accompayning activites	Exhibition of vegetable gardens by students																											
		Monitoring, maintenance and handover	Questionnaire and meetings with teachers and students to evaluate the experience and realization of the first action report and Maintenance of the work over time																											

TURIN - TIMELINE NBS 2020

NBS	Action Title	*Sub action*	Sub action title/short description	1	8	9	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	44	45	56	Remarks/monitoring notes	Activity delay or interruction due to COVID-19 and possible effects
				2018	2019		2020												2021							2022		2023		
				2°	1°	2°	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	2° sem.	1° sem.	2° sem.	1° sem.		
	3.7 Gardens between houses	*Pre-implementation*	Edentification also with ATC of the possible areas where to set up kitchen gardens and the people to be involved																											
		Execution/construction	Co-preparation of gardens																											
		Accompayning activites	Events open to the district and school involvement																										All the actions have been delayed due to the procedure to obtain permits to place the boxes on public space; co preparation will start in January 2020	YES, all the activties with citizens and stakeholders are blocked. Uncertain effects on delays
		Monitoring, maintenance and handover	Monitoring maintenance of the area over time																										In the last two years the presence of proGIreg staff will become lighter (4 hours per month overall) and will be aimed at helping citizens to become autonomous in the maintenance of the gardens	
4 - Aquaponics as soil-less agriculture for polluted sites	4.1 Acquaponic test	*Pre-implementation*	Identification of the testing area; Identification of association that will take care of maintenance and co-planning,																											NO, this activy hasn't started yet
		Execution/construction	Realization of aquaponics/ hydroponics installation																											
		Accompayning activites	Activities open to all citizens																											
		Monitoring, maintenance and handover	Monitoring survival fish and growth plants and maintenance																											
5 - Capillary GI on walls and roofs	5.1 New green roof on Casa nel Parco	*Pre- implementation*	Co-planning in devising new uses of the green roof																											NO, construction works terminated before
		Execution/construction	renovation of the roof																											
		Execution/construction	~~green roof set up with new plantings and furnishing elements~~																										This activity has beeen deleted due to lack interest from stakeholders and citizens. The idea is to look for funds in order to find resources needed .	
		Accompayning activites	Involvement of citizens who attend the structure both in terms of design and use																											
		Maintenance and handover	maintenance of the structure over time																											
	5.2 Green Wall at school (indoor)	*Pre- implementation*	identification of the place / places in which to build the walls and the associations that will take charge of them- public tender																											YES, construction works are blocked. Uncertain effects on delays
		Execution/construction	Realization of walls																										Every activity connected with interaction between students, teacher, gardener and experts coul be affected by social distance measure	
		Accompayning activites	Activity with students and teachers to be defined																											
		Maintenance and handover	Monitoring maintenance of the area over time																										2 years maintenace done by the executor (2020- 2022)	
	5.03 Green wall at homeless dormitory (outdoor)	*Pre- implementation*	identification of the place / places in which to build the walls and the associations that will take charge of them- public tender																											YES, construction works are blocked. Uncertain effects on delays
		Execution/construction	realization of walls																											
		Accompayning activites	Activities with care asssitant and users to be defined																										Every activity connected with interaction between people (gardener, experts, homeless) could be affected by social distance measure	
		Maintenance and handover	Monitoring & maintenance of the area over time																											
	5.04 Green Roof at WOW	*Pre- implementation*	identification of the place / preparing activities																											YES, construction worked interrupted for 2 months, now re started. Activities with citizens will be delayed
		Execution/construction	Realization of roof																										There was implemented a low maintenence green roof solution, but still performing for pollinators.	
		Execution/construction	Maintenance of roof																										Maintenance will be guaranted by Associazione Parco del Nobile, once a year.	
		Maintenance and handover	monitoring environmental data (unito)																										UNITO has installed sensors	

TURIN - TIMELINE NBS 2020				1	8	9	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	44	45	56	Remarks/monitoring notes	Activity delay or interruction due to COVID-19 and possible effects
NBS	**Action Title**	***Sub action***	**Sub action title/short description**	**2018**	**2019**		**2020**												**2021**							**2022**		**2023**		
				2°	1°	2°	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	2° sem.	1° sem.	2° sem.	1° sem.		
6 - Making post-industrial sites and renatured river corridors accessible for local residents	**6.01 Green Corridors**	*Pre- implementation*	Identification of places in which to build the green corridors and the associations to involve to share the design																											NO, the activity hasn't started yet. But delays in building and involving citizens are possible
		Pre- implementation	Meet stakeholders to share the actions																											
		Pre- implementation	Multidisciplinary designing																											
		Execution/construction	Approvation of the design and build																											
		Accompayning activites	Involvement of citizens who attend the structure both in terms of design and use																											
	6.02 Local natural heritage enhancement in green corridor	*Pre- implementation*	identification of new nature trails in the park																										The trails will not be in the parks but will connect the park with the green spaces inside the district, in connection with action 6.1	NO, the activity with citizen hasn't started yet. But delays in working and involving citizens are possible
		Execution/construction	Path preparation																											
		Execution/construction	Path realization																											
		Accompayning activites	involvement of citizens ans schools in the creation of paths and use																										in July have been organized meetings with the stakeholders interested in the paths connecting the park and the green areas in the district; new meetings will be organized when action 6.1 plan will be ready	
		Monitoring & evaluation phases	The citizens will be invited to express their appreciation and use of the paths through an app																											
7 - Establishing protocols and procedures for environmental compensation at local level	**7.1 School forest sponsorship**	*Pre- implementation*	Identifiy ICT needs and deploy methods related to NBS topics, track requirements specification (software functions, indicators, ...).																											YES, due to COVID19, the action hasn't started. Meetings will be postponed at the end of may
		Execution/construction	Collect available (geo)datasets useful for local planning and build necessary (geo)datasets when not available.																											
		Execution/construction	Build planning and monitoring tools based on requirements specifications.																										It was identifield an action for private sponsorship: green courtyards in school instead of asphalt. The action need the cooperation of green department, school building department.	
		Monitoring & evaluation phases	Collect and analyze data useful for assessing the impact of NBS.																											
8 - Pollinator biodiversity improvement activities and citizen science project	**Butterfly gardens for disadvantaged people**	*Pre- implementation*	Identification of areas and works suitable for the observation of puffs and pollinating insects																											YES, some activities were reframed with social media challenge (FB)
		Execution/construction	job grants for disable people to be involved in citizen science projects																										job grants had been suspended during covid-19 lockdown. It is possible to probably activate new grants in two weeks, but there's not certainty that the activities linked will start.	
		Execution/construction	activity linked to psychic patients who become citizen scientist and are involved in dissemination activities.																										Online activities (social media challenges) are carried on. Uncertain chance to do planned activities at Casa Farinelli and Casa del Mondo Unito (June-July 2020).	
		Accompayning activites	events open to the district and schools																										every activity connected with interaction between students, teacher, gardener and experts coul be affected by social distance measure	
		Monitoring & evaluation phases	biodiversity monitoring																											
		Maintenance and handover	Green areas and / or monitoring activities will be mantain by institutions where we operate (schools, associations, cooperatives)																										Pollinators monitoring at Parco Piemonte by Unito researchers has started late (May 2020). No monitoring activities carried out with patients.	

ZAGREB - TIMELINE NBS

NBS	Action n.	Action Title	Sub action	Sub action title/short description	1	8	9	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	44	45	56	Remarks/monitoring notes	Activity delay or interruction due to COVID-19 and possible effects
					2018	2019		2020												2021							2022		2023		
					2° sem.	1° sem.	2° sem.	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	2° sem.	1° sem.	2° sem.	1° sem.		
3 - Community-based urban farms and gardens	3.1	The Sesvete City Garden – upgrading the existing garden	Pre-implementation	Preparatory activities																											
			Execution/construction	Construction and management																										January 2021 new beginning date for construction	The usual activities relating to the allotment of garden parcels have been delayed. The procedure for modernization is taking slower than expected.
			Accompaynin g activites	Co-design and defining partnerships and involvement of educational and civil society institutions as well as local community																											
			Monitoring, maintenance and handover																												
3 - Community-based urban farms and gardens	3.2	Info Point	Pre-implementation																												
			Execution/construction																												
			Accompanying activites	Workshops, lectures and other events with the project partners and the general public																										Due to COVID-19 crisis, the activities involving groups of more than 5 people in the Info point have been very limited but the schedule is developing in recent time. Some activities have been conducted online, and parts of medical equipment were produced with the 3D printer.	
			Monitoring, maintenance and handover																												
3 - Community-based urban farms and gardens	3.3	The Sesvete City Garden – new therapeutic garden	Pre-implementation	Co-design, concept design following the consultations with partners, preparatory activities regarding water pumps and if necessary, environmental assessment study, to be determined by the Ministry of Environment																											
			Execution/construction	Construction and management																										January 2021 new beginning date for construction	The delay in activities is the result in property issues, as the land was property of Zagreb Holding Company at the beginning of the project, and the City acquired the land but the procedure was slower than expected, delaying the beginning of the implementation
			Accompanying activites	Involvement of local residents and local NGOs																											
			Monitoring, maintenance and handover																												
4 - Aquaponics as soil-less agriculture for polluted sites	4	Aquaponics testing installation	Pre-implementation	Public procurement and co-design activity																											
			Execution/construction	Installation																										January 2021 new beginning date for construction	Cuts in the city budget following the earthquake, relating to the part of the financing provided by the City of Zagreb, have interfered with the implementation of the HUB_S, so the implementation of the NBS will be planned differently, on smaller sites.
			Accompaynin g activites	Co-design and defining partnerships and involvement of educational and civil society institutions as well as local community																											
			Monitoring, maintenance and handover																												
5 - Capillary Gl on walls and roofs	5	Green Roof/Photovoltaic cells/Green wall	Pre-implementation	Public procurement and co-design activity																											
			Execution/construction	Installation																										January 2021 new beginning date for construction	Cuts in the city budget following the earthquake, relating to the part of the financing provided by the City of Zagreb, have interfered with the implementation of the HUB_S, so the implementation of the NBS will be planned differently, on smaller sites.
			Accompaynin g activites	Co-design and defining partnerships and involvement of educational and civil society institutions as well as local community																											
			Monitoring, maintenance and handover																												

ZAGRESS - TIMELINE NBS

NBS	Action n.	Action Title	Sub action	Sub action title/short description	1	8	9	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	44	45	56	Remarks/monitoring notes	Activity delay or interruction due to COVID-19 and possible effects
					2018	2019		2020												2021							2022		2023		
					2° sem.	1° sem.	2° sem.	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	2° sem.	1° sem.	2° sem.	1° sem.		
6 - Making post-industrial sites and renatured river corridors accessible for local residents	6	New cycling path	Pre-implementation	Network planning and selection of the corridor																										Construction postponed, new date to be defined	The delay in procedure for the cycling path is unrelated to the COVID-19 crisis, but budgetary cuts following the earthquake have greatly slowed down the procedure, especially the part relating to acquisition of land.
			Execution/construction	Construction																											
			Accompanying activites	Exploring possibilities of expanding the green area along the cycling path																											
			Monitoring, maintenance and handover	Monitoring & evaluation phases																											
7 - Establishing protocols and procedures for environmental compensation at local level	7	New protocols and make changes to its planning procedures and policy development processes	Pre-implementation	Co-design/excutive planning/technical-administrative-economic-social analysys current situation																											The activities are carried out in the expected time frame, but the rate of success of implementing the proposals in the regulations and planning documents is still to be seen.
			Execution/construction	Drafting of measures proposal																										09/2020 new date for measures drafting	
			Accompanying activites	Workshops and communication																											
			Monitoring, maintenance and handover	Monitoring of implementation & evaluation phases																											

ANNEX 3 - FRC RISK TABLE

DORTMUND				TURIN				ZAGREB				NINGBO			
Category	**Title**	**Description**	**Score**	**Category**	**Title**	**Description**	**Score**	**Category**	**Title**	**Description**	**Score**	**Category**	**Title**	**Description**	**Score**
Technical risks	No reliability on technical equipment	Failure of equipment due to poor quality or electric shutdown (e.g. on critical cooling infrastructure)	**2**	Technical risks	tural problems on buil	The building where the green roof is foreseen has structural problems not detected before (in planning phase)	**4**	Technical risks	Bad maintenance	The risk of faulty maintenance of the installation of green walls and roofs	**3**	Technical risks	Experimental error	When analyzing the composition of lake sediments, the experiment has errors.	3
Ecological risks	Soil quality is too poor to use post-industrial areas for implementation of NBS	Soil contamination due to former cokery use is still too strong to be used for urban agriculture.	**3**	Technical risks	Construction delay	The construction works take more time then expected	**6**	Technical risks	Construction delay	Risk of delay of construction works	**6**	Technical risks	Soil improvement technology is not special	Poor effect when using biotechnology to improve lake sediments	6
Ecological risks	Unexpected contamination	Undetected soil contamintation may lead to increased costs and inedible crops.	**3**	Ecological risks	nexpected contaminati	Undetected soil contamintation may lead to increased costs for remediation and the land could be not available for the administrative and techcal procedure on contaminated sites	**3**	Technical risks	Unsatisfiable bike lane	Risk of the new bike lane being built without implementing satisfying safety and quality measures	**2**	Ecological risks	Destroy biodiversity	The construction of new green corridors has destroyed the original biodiversity of the area.	3
Ecological risks	Adverse ecological conditions	Local conditions (climate, soil, intensity of public use) may turn out to be disagreeable for some species and cause them fail. Conditions my be changed by developments in surrounding area (e.g. buildings, trees, drainage), which in turn may necessitate alterations in planting.	**2**	conomic resources ris	rks on building or com	unexpected safety works needed for realization of green roof e.g.	**5**	Economic resources risks	Insufficient budget for realization	Insufficient means in the city budget for management of the planned therapy garden	**6**	Economic resources risks	Insufficient budget	Not enough funds for soil improvement and corridor construction	4
Economic resources risks	Insufficient budget for realization	money for NBS implementation may not sufficient due to unforseeable reasons (more expensive technical equipment than expected, damage, extreme weather conidtions like hail or storm…) or bad economic decisionmaking in the management team, extra money for insurances for equipment is needed	**6**	conomic resources ris	**Maintenance costs**	The maintenance of the NBS needs cost unforeseen	**4**	Procedural risks	Aquaponics management	Risk of organization and management of the aquaponic system	**6**	Economic resources risks	Maintenance costs	NBS maintenance requires unpredictable costs	4
Economic resources risks	Maintenance costs	Risk of miscalculated longterm costs (maintenance - especially for fruit trees), or lack of longterm budget (responsibility?).	**4**	conomic resources ris	**cient budget for reali**	the budget wasn't estimated in real conditions	**6**	Procedural risks	Property issues for aquaponics	Problems in solving property issues for the location of aquaponic installation	**3**	Procedural risks	Business model NBS integration and upgrade	In order to adapt to the market, the business model of NBS needs to be constantly adjusted. If the update is not timely, it will be blocked	5
Economic resources risks	Unforeseen rehabilitation and preparation costs	Undetected soil contamintation or unconsidered on-site structures (possibly subterranean) may lead to additional costs, especially if concept is not adapable.	**6**	Procedural risks	ditional cost for accide	fire or other accidents can increase unexpected costs	**2**	Procedural risks	Property issues for bike lane	Slow settlement of property rights related to the bicycle route and its extension - obstacles in issuing the permit	**6**	Procedural risks	Property issue	Due to land property issues, it is not possible to determine where to establish a green corridor	5
Procedural risks	Other project / policy priorities	Other projects or policies which are now focused on within the Living Lab may impose changes to NBS concept pursuing their own their planning purposes. Possible opposition by other user groups on sites.	**6**	Procedural risks	**ive procedures / Proc**	The administrative items that take more time than expected	**6**	Procedural risks	Property issues for land	Procedural risk where the land owners refuse to sell the land necessary for construction of the new road with the bike lane to the City of Zagreb	**2**	Procedural risks	Poor communicatio n between personnel	Poor communication between project hosts, members and experts, leading to project delays	3
Procedural risks	Building permission reduced	Not all ideas as a result of citizen empowerment regarding designing, constructing, and operating aquaponics plant may be able to be realized due to different description within building permission.	**6**	Procedural risks	of cooperation of stake	Partner or stakeholders could be not fully committe or people involved can change their working status (because change of job)	**4**	Procedural risks	Property issues for garden	Problems in resolving property realations for the location of a new garden	**3**	Societal risks	Low public cooperation	The public is dissatisfied with the planning of the corridor and opposes the construction of the corridor	3
Procedural risks	Governmental restraints	EU or federal laws may lead to delays, e.g. the revised EU data protection law of 2018.	**4**	Societal risks	**Lack of interest in NB**	Decrease in citizen involvement during the implementation and subsequent maintenance of NBS	**3**	Societal risks	Lack of interest in aquaponics	Insufficient number of users among citizens interested in food production with aquaponics system	**4**	Societal risks	Vandalism	Low quality of residents, destroying green plants	3
Procedural risks	Change of key persons	Key project managers leave jobs	**4**	Societal risks	**Vandalism**		**3**	Societal risks	Unrecognized benefits of NBS5	Failure of the local community to recognize the benefits of green walls	**4**	Others risks	Staff safety	Injuring people during the experiment and construction process	3
Procedural risks	Wrong use of technical/ chemical equipment by users	Especially for the aquaponics plant the correct usage is crucial. Due to cost-intensive investments, wrong use can lead to harms with crucial financial or time risks.	**6**	Societal risks	demand for citizen in	Citizen already involved in other projects can be overwhelmed by further requests from proGIreg activities	**5**	Societal risks	Unrecognized importance of therapy garden	Failure of local stakeholders to recognize the importance of therapy garden and its role in the community	**2**	Others risks	No perspective beyond 2023	The deadline for the project is 2021, and the maintenance and monitoring of the corridors in the later period cannot be carried out.	4
Societal risks	**Lack of users**	projects are either not interesting enough for citizens to participate or involvment strategy has not been well enough worked out and/ or communicated	**3**	Societal risks	**Unrecognized benefit**	The direct beneficiaries of the project do not perceive the advantages and therefore do not believe in the project itself	**6**	Societal risks	Lack of users	Insufficient number of users motivated to engage in project acitivites	**3**	Internal proGIreg risks	Different progress in each leading city	Due to differences and project durations between citys, Ningbo and other cities are inconsistent in progress, resulting in difficulty in project data sharing	4
Societal risks	**Lack of interest**	Urban Gardening / Food Forest: Loss of public interest due to long developement period, or due to contaminated crops (see above). Dissatisfaction / Disappointment with first implementation may also cause a loss of public commitment.	**4**	Others risks	ct partners are heterog	Implementation of all NBS is regarded as a common effort of all internal and external project partners involved; an open, constructive and trustful cooperation is the basis for good result.	**2**	Societal risks	Lack of users for bad location of garden	Insufficient number of users of the therapy garden because of its position	**4**				50
Societal risks	Lack of demand for locally grown products	The success and continuation of the NBS (3 + 4) depends among other things on a demand for locally grown products and in this regard also to the proper choice of products for which there is a market.	**3**	Others risks	perspective beyond 20	Project is not sustainable without funding	**6**	Societal risks	Vandalism	Vandalism risk (for all the NBS except 7)	**4**				
Societal risks	**Vandalism**	In addition to financial risks, vandalism may lead to project delays	**6**	Others risks	from today´s project e	Local NBS descriptions for FRC have been worked out about end of 2017/ beginning of 2018. Since then, project settings may have changed due to ongoing planning procedures thus creating a new setting for NBS thus creating the need to adapt descriptions. Alternatives can (not) be worked out and approved.	**3**	Internal proGIreg risks	Guidelines implementation issues	Risk of possible non-implementation of guidelines that will be made within the project	**6**				
Others risks	Project partners are heterogeneous	Implementation of all NBS is regarded as a common effort of all internal and external project partners involved; an open, constructive and trustful cooperation is the basis for good result.	**2**	Internal proGIreg risk	are not comparable w	Each city uses non-calibrated measurement tools and unnormed methods to collect data. Data will hardly be comparable within FRC and FC. Moreover, time frames for the measurements are too short e.g. for climate data to be able to derive resilient results. It will be difficult to derive NBS-specific consequences from data.	**4**								
Others risks	Maintenance responsibility	Urban Gardening / Food Forest: Lack of agreement about maintenance responsibilities / liability for safety of users, resulting in inadequate quality of facilities (e.g. garbage collection, tree stability checks, state of paths/accessibility …)	**6**												
Others risks	Workers safety	Persons get injured while working in the greenhouse.	**6**												
Others risks	No perspective beyond 2023	project is not sustainable without funding	**2**												
Others risks	Definition of NBS differs from today´s project expectation or project setting.	Local NBS descriptions for FRC have been worked out about end of 2017/ beginning of 2018. Since then, project settings may have changed due to ongoing planning procedures thus creating a new setting for NBS thus creating the need to adapt descriptions. Alternatives can (not) be worked out and approved.	**6**												
Internal proGIreg risks	Measurement results are not comparable within FRC/ FC (WP 4)	Each city uses non-calibrated measurement tools and unnormed methods to collect data. Data will hardly be comparable within FRC and FC. Moreover, time frames for the measurements are too short e.g. for climate data to be able to derive resilient results. It will be difficult to derive NBS-specific consequences from data.	**4**												
Internal proGIreg risks	Not all measurement results are directly linked to NBS (source consequence)	Goal is to find out links between sources and consequences of implemented NBS. Not all measured indicators are suited to fulfil this these goals.	**6**												

RISKS TO AVOID			
Procedural risks	Lack of suitable site for implementation	Ownership structure, competing projects, leasing costs, soil contamination […] may make the identification of site suitable for the NBS concept impossible.	**9**
Procedural risks	proGIreg project timeframes diverge from other funded urban development projects	Some NBS are "double/ triple-funded" via urban development projects which partly have existed before proGIreg respectively which are overlayed with projects of regional/ international importance (e.g. IGA). There are time restraints for proGIreg which need to be regarded. For other NBS projects, proGIreg-money may be regarded as leverage money.	**9**
Procedural risks	Delay of project implementation due to longer time for building permission	For construction and operation of an aquaponics system a building permission is needed. As this system is a novelty the permission process may take longer than usually. Building permissions are complex and need to regard numerous requirements (fitting into historic buildings, veterinary approval,...)	**9**
Others risks	No areas for all NBS available within Living Lab	Living Labs are situated within urban areas. Therefore several interests exist to use areas of green infrastructure (lots for buildings, parks, nature reserves recreational areas,…). As the size of Living Labs is restricted this may lead to competition of space.	**9**

RISKS TO AVOID			
Procedural risks	HUB building construction	The risk that the HUB building will not be carried out within the planned timeline, which means that green walls and roofs and photovolataics would not be carried out within the deadline	**9**
Procedural risks	**Procedure issues**	Problems in carrying out the necessary procedures, planning, public procurement for construction of NBS	**9**

ANNEX 4 FRC MITIGATION MEASURES

DORTMUND			TURIN			ZAGREB			NINGBO		
Category	**Title**	**Mitigation measures description**		Risk title	**Mitigation measures description**	**Category**	**Risk title**	**Mitigation measures description**	**Category**	**Risk title**	**Mitigation measures description**
Technical risks	No reliability on technical equipment	Cold redundancy of equipment: Critical equipment is purchased with one spare which is stored close to the site. Hot redundancy: Redundant implementation of the technical concept with failover procedures. Emergency power generator. Oxygen gas cylinder and emergency aeration valve for the aquaculture. Low stocking densities in the aquaculture. Use well-known equipment brands, make use of smaller experiments to test new/ unknown equipment.	Technical risks	Structural problems on buildings	In case of structural problems on a building, such as the roof that can not support the weight of a garden on the roof, since there are no resources for structural interventions, we will have to look for another building or modify the design of the NBS to be structurally compatible.	Technical risks	Bad maintenance	Include maintenance in the procurement procedure for execution of the NBS	Technical risks	Experimental error	Set up more experimental samples for comparison, repeat the experiment
Ecological risks	Soil quality is too poor to use post-industrial areas for implementation of NBS	Light soil contamination has to be checked/monitored when producing food. The food products have to be tested. If the quality of the products (herbs, berries, nuts, vegetables,…) is too low for soil-bound food production, other activities have to be followed: on-site it can adjusted to a biodiversity area (NBS 8) with flowers, etc. without growing food or the production has to be altered to a soilless system (mobile units, raised bed-gardens, etc.) to avoid any contamination originating from the soil	Technical risks	Construction delay	In the event of delays in the execution of work due to technical e reasons, efforts are to be made to find and overcome soon this risk	Technical risks	Construction delay	The contract will be drafted in a way that delays will be sanctioned	Technical risks	Soil improvement technology is not special	Ask soil improvement experts to give lectures and training
Ecological risks	Unexpected contamination	Checking whether soil can be cleaned up within a decent financial effort or whether uncontaminated soil can be added on top	Ecological risks	Unexpected contamination	In case of problems related to soil contamination, since there are no financial resources for remediation, nor the necessary technical and administrative time, the only solution would be to change site	Technical risks	Unsatisfiable bike lane	The municipal government will work on modifying the road 6 project to ensure good placement of the bike lane, and the possible location of the park along the southern part of the road 6	Ecological risks	Destroy biodiversity	When constructing a new corridor, try to select the original local species. It is best to ask relevant experts for guidance.
Ecological risks	Adverse ecological conditions	depends on the sites proGIreg is able to implement the NBS on; plants which are able to survive and prosper under local conditions have to be selected and planted	Economic resources risks	More works on building or common good	If unplanned work on buildings or assets is needed, an attempt will be made to find out how to move resources from other activities, or public or private funding will be searched for to cover the costs.	Economic resources risks	Insufficient budget for realization	The budget for management of the therapy garden could be boosted from other financial sources	Economic resources risks	Insufficient budget	Invest in cooperation with local businesses or governments
Economic resources risks	Insufficient budget for realization	Keep careful calculations considering above mentioned risks and include budget for adjustments. In case of larger implementations proGIreg money can be seen as leverage money and added with other financial sources (third persons or companies/ funding programs/ crowd funding,...). Additional revenue streams or new business models have to be detected to allow higher budgets. Include economic expertise into the project.	Economic resources risks	Maintenance costs	As far as possible, maintenance will be carried out by the associations that will take care of the design and construction of the NBS.	Procedural risks	Aquaponics management	A good management plan, education of the involved actors, involve higher education institutions	Economic resources risks	Maintenance costs	More publicity, volunteers or schools to maintain
Economic resources risks	Maintenance costs	Keep careful calculations considering above mentioned risks and include budget for adjustments. In case of larger implementations proGIreg money can be seen as leverage money and added with other financial sources (third persons or companies/ funding programs/ crowd funding,...). Additional revenue streams have to be detected to allow higher budgets, if necessary. Include economic expertise into the project.	Economic resources risks	Insufficient budget for realization	In the event that the economic resources are not sufficient for the implementation of the envisaged NBS, efforts will be made to reduce the activities or to seek economic benefits outside the project.	Procedural risks	Property issues for aquaponics	The City of Zagreb and Zagreb Holding Company will define modes of use and cooperation for construction on the site within the project	Procedural risks	Business model NBS integration and upgrade	Implement monitoring market dynamics and do market research
Economic resources risks	Unforeseen rehabilitation and preparation costs	Include budget for adjustments (buffer). Depends on the sites proGIreg is able to implement the NBS on: either individual mitigation measures required on-site or if the site cannot be used for implementation another location has to be found.	Procedural risks	Additional cost for accidents	In the event that the economic resources are not sufficient, efforts will be made to reduce the activities or to seek economic benefits outside the project.	Procedural risks	Property issues for bike lane	The local government, NGOs and other involved stakeholders will work with the owners to ensure cooperation	Procedural risks	Property issue	Explain the significance of project implementation to government departments and strive for government support
Procedural risks	Other project / policy priorities	Find a win-win-solution or at least a compromise to meet all project ideas. Regular information exchange within project partners (e.g. jour fixe) and updates on other projects within the LL are important throughout the project process.	Procedural risks	Administrative procedures / Procedure issues	In the event of delays due to administrative reasons, efforts are to be made to encourage the various unit/sector to work together and speed up the implementation of the tasks.	Procedural risks	Property issues for land	The local government, NGOs and other involved stakeholders will work with the owners to ensure cooperation	Procedural risks	Poor communication between personnel	Organize a person to be responsible for coordinating feedback from experts, staff and project hosts
Procedural risks	Building permission reduced	Valid laws and regulations have to be followed when planning the NBS implementations and have to be integrated right from the beginning to aim for realizable ideas as early in the process as possible. Integrate permission personal already into the planning process. Project description of the building permission needs to be as precisely as needed but as inprecisely as possible in order to preserve a needed amount of flexibility.	Procedural risks	Lack of cooperation of stakeholders	Involve in the implementation phase stakeholders already locally active or community leaders	Procedural risks	Property issues for garden	The City of Zagreb and Zagreb Holding Company will define modes of use and cooperation for construction on the site within the project	Societal risks	Low public cooperation	Conduct multi-channel publicity and involve the public in corridor design
Procedural risks	Governmental restraints	see comment above: all laws and regulations which might influence the NBS planning and implementation need to be thoroughly integrated into the process - in case of upcoming unforeseen restrictions, the actors involved have to decide on viable solutions guided by the local proGIreg partners. Project implementation needs to be done as far as possible up to the point where restrictions obey further actions.	Societal risks	Lack of interest in NBS	Incentives to take care of NBS; Open Day; Defintion of benefits citizen can have from NBS; brand identity; Schools (pupils) to take responsabilities for NBS care; involvemtent of other actors (mediators; community leaders, etc.)	Societal risks	Lack of interest in aquaponics	The aquaponic managing authority together with the local NGOs and other involved stakeholders will make sure that the public is informed of the new technology and possibilities of use and commercialization	Societal risks	Vandalism	Enhance quality education for residents and impose fines when necessary
Procedural risks	Change of key persons	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.	Societal risks	Vandalism	Design NBS to avoid avandalism; communicate the value of NBS; Invrease numbers of people to use NBS; involve people prone to vandalism	Societal risks	Unrecognized benefits of NBS5	The Info point and HUB_S will provide information and materials to the interested public, as well as organizing events	Others risks	Staff safety	Safety education is is necessary , purchase life insurance for experimenters and construction workers.
Procedural risks	Wrong use of technical/ chemical equipment by users	The users have either prove their expertise or have to be trained by specialists (e. g. for Aquaponics a group of experts from die Urbanisten, APM, hei-tro and/ or SWUAS).	Societal risks	Excessive demand for citizen involvement	Defintion of a common programme of citizen involvement; identity champions; bring stakeholders on board; involvement of real future users in the management of NBS	Societal risks	Unrecognized importance of therapy garden	Raising of public awareness of the importance and benefit of the NBS to the local community and the City, organizing press and social media coverage	Others risks	No perspective beyond 2021	identify new resources and new projects to be developed with the progireg partners to give continuity to the projects started
Societal risks	**Lack of users**	The co-design process and involvement of local people and citizens has to be taken serious t 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.	Societal risks	Unrecognized benefits	Infopoint; champions as testimonials	Societal risks	Lack of users	The local NGOs and other involved stakeholders will make sure that the public is informed of the NBS and possible public involvement	Internal proGIreg risks	Different progress in each leading city	Communicate more between cities and work groups, and consider the differences in each city to make plans.
Societal risks	**Lack of interest**	Events, discussion rounds, workshops, etc. could be possible ways to mitigate shrinking interest over time. It would be good to offer courses, informal meetings, for people closely and/or loosely attached to the NBS implementations to have their interest over the project lifetime.	Others risks	Project partners are heterogeneous	Openness and transparency approach are to be guaranteed in all the design and implementation phases. Meeting, reporting and all the efforts to be inclusive should be activated	Societal risks	Lack of users for bad location of garden	In the codesign process, the optimal site of the new garden will be defined. It is important to combine more than NBS to raise interest of the public and stakeholders.			
Societal risks	Lack of demand for locally grown products	The price has to be suitable for the customers. Producers should get involved in regional marketing networks or change product range.	Others risks	No perspective beyond 2023	identify new resources and new projects to be developed with the progireg partners to give continuity to the projects started	Societal risks	Vandalism	Raising of public awareness of the importance and benefit of the NBS to the local community			
Societal risks	**Vandalism**	Selection of vital NBS sites within public space: presence of people may help against possible vandalism as well as light protection measures (e.g. fences, gates, video surveillance) or inclusion of potential offenders and early contact to local teenagers. Promote ownership of NBS by the public.	Others risks	Definition of NBS differs from today´s project expectation or setting	NBS redesign will allow to better tune the needs with progireg goals and methods. Alternative design or implementation actions have to be carried out	Internal proGIreg risks	Guidelines implementation issues	Mobilising and educating relevent stakeholders and politicians, promoting NBS in local comunity and working on the feasibility issue			
Others risks	Project partners are heterogeneous	Heterogeneity should be regarded as a chance/an advantage. Meetings and discussions shoul try to solve any upcoming problems/conflicts among partners. Finding ways and methods to cooperate and for mutual understanding.	Internal proGIreg risks	Measurement results are not comparable within FRC/ FC (WP 4)	Dialogue and cooperation among local based analyst and progireg representatives should be started in order to reduce incomparability or mismatching results						
Others risks	Maintenance responsibility	Contribute to a high degree of identification between project partners and citizens involved. See comment above concerning maintenance.									
Others risks	Workers safety	The users have either prove their expertise or have to be trained by specialists (e. g. for Aquaponics a group of experts from die Urbanisten, APM, hei-tro and SWUAS) which are responsible for safety issues. Standard Operational Procedures (SOP) for tasks should be defined and made available to those who are going to work on the task. Furthermore, a first aid kid needs to be present. Arrange insurances for acitve project supporters.									
Others risks	No perspective beyond 2023	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.									
Others risks	Definition of NBS differs from today´s project expectation or project setting.	As an ongoing process there will be further changes/adjustments in the concrete implementation of NBS - depending also on the WP2 process. These changes have t be recorded to allow traceability.									
Internal proGIreg risks	Measurement results are not comparable within FRC/ FC (WP 4)	This aspect may not be solved, but there are some measures to reduce incomparability. Incomparability has to be presented transparently and accepted or may be corrected mathematically in case of systematic differences.									
Internal proGIreg risks	Not all measurement results are directly linked to NBS (source - consequence)	See comment above. Measurements of NBS implementations could only be traced adequately over longer time. Limitations have to be accepted.									

RISKS TO AVOID		
Procedural risks	Lack of suitable site for implementation	To mitigate the risks the search for potential areas will be open-minded to create a list as long as possible; priorities and ranking will be done parallel/afterwards to approach the owners from the area of highest priority to the lower ones. Looking for sites outside of LL respectively looking for several smaller sites. Seek for cooperation and synergies with other ongoing projects to avoid competition for land.
Procedural risks	proGIreg project timeframes diverge from other funded urban development projects	Dependencies on projects with higher level of attention nationally/ financially (IGA 2017, Stadterneuerungsmaßnahmen,..) need to be solved by reframing the project task, if possible. Synergies should be looked for.
Procedural risks	Delay of project implementation due to longer time for building permission	Seek clarification of requirements, communicate plans to permission authority at an early stage to avoid last minute revision of plans. Integrate valid laws and regulation into the planning process to aim for realizable ideas as early as possible. Time for building permission of NBS4 has to be integrated into time plan (+buffer). Intermediate activities can be planned and implemented on the same space. Temporary interventions can help to establish a continous involvement of the target demography in the project. Search for German-wide examples of similar projects respective rules.
Others risks	No areas for all NBS available within Living Lab	The search for potential areas will be open-minded to create a list as long as possible; priorities and ranking will be done parallel/afterwards to approach the owners from the area of highest priority to the lower ones. Looking for sites outside of LL respectively looking for several smaller sites instead of one large site.

RISKS TO AVOID		
Procedural risks	HUB building construction	The AF team will work closely with the other partners to make sure that the new HUB is built in time to implement green walls and roofs, as well as the aquaponics demo installation
Procedural risks	**Procedure issues**	Intensify coordination between people in the decision making process (city offices and state government).