REPAiR

REsource Management in Peri-urban AReas: Going Beyond Urban Metabolism

D 5.1: PULLs Handbook

Version 3.0

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Acronyms and Abbreviations

CA	Consortium Agreement
CE	Circular Economy
CFS	Certificate on the Financial Statement
DMP	Data Management Plan
DoA	Description of Action
EB	Executive Board
EC	European Commission
ECA	European Court of Auditors
ECAS	European Commission Authentication Service
EIS	Eco-Innovative Solution
EU	European Union
FSIGN	Project Financial Signatory
GA	Grant Agreement
GDSE	Geo-design Decision Support Environment
GF	Guarantee Fund
LL	Living Labs
LEAR	Legal Entity Appointed Representative
LSIGN	Project Legal Signatory
OLAF	European Anti-Fraud Office
PaCo	Participant Contact
PM	Person Month
PO	Project Officer
PULL	Peri-Urban Living Lab
SC	Steering Committee
SP	SharePoint
UB	User Board
UoR	Use of Resources
WP	Work Package

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Publishable Summary

REPAiR will provide local and regional authorities with an innovative transdisciplinary open source Geodesign Decision Support Environment (GDSE) developed and implemented in Peri-urban Living Labs (PULLs) context, in six metropolitan areas namely Naples, Ghent, Hamburg, Pécs, Łódź and Amsterdam.

PULLs are physical and virtual environments, in which public-private-people partnerships experiment an iterative method to develop innovations that include the involvement of end users. In the REPAiR PULLs, different areas of expertise from diverse partners are needed for a good development of the activities, with the aim to meet the needs of the stakeholders by innovation.

The innovation concept here is used in the sense of a difference between an existing entity (a product, a policy, a service, etc.) and customers' expectations. The elements of innovation can be technological factors, better working conditions or methods of entity delivery, etc., because to innovate means to be creative, learning from mistakes. This means also to learn and share information about what went wrong, in order to use it in upcoming phases.

PULLs are both approaches and instruments, at the same time, to improve the innovation capabilities and competitiveness of territories and their populations. Thanks to the PULL approach, policy makers can face various socio-economic challenges of their territories, improving social inclusion. Typically useful for the interpretation of complex real life environments, PULLs are recognized as users-friendly instruments and processes to promote open innovation in several European regions. In this way complex solutions are identified, tested and transformed into prototypes (Innovation Alcotra, 2013).

In other words, a PULL is a "user-driven open innovation ecosystem" (EC, 2009) that utilizes the fruitful participation of business, citizens and governments in the research process; this approach is helpful in order to better understand the current behaviors and user patterns.

Co-creation, one of the main and transversal components of a PULL, is the process that produces a product or a service as a result of a cooperation between the collaboration of end-users and other stakeholders that work in the common environment of a PULL (Innovation Alcotra, 2013). Cities as complex systems, characterized by Urban Metabolism and increasing challenges, demand co-creation (Gemeente Rotterdam, IABR, FABRIC, JCFO, & TNO, 2014).

PULLs identify sustainable activities that are coherent with the territory and competitive in some ways if compared with global economies, and put them in contact with the ones that already exist in the same area.

In REPAiR, Peri-Urban Living Labs are organised in six metropolitan areas across Europe, as stated above, as important part of the decision support environments where representatives of universities, governance, corporations, local communities and, in addition, individuals make decisions that are based on their role and expertise, and that are site specific. In this framework, design professionals, information technologists and scientists give contributions and support the decision-making process related to what to do and how to do that in each case study area. In order to make a decision that must be particularly appropriate for the different case studies, it is necessary to identify and compare several opportunities and alternatives that should be developed in the six Peri-Urban Living Labs (PULLs), based on the knowledge gained on the specific place and the evaluation of its current state. The different disciplines involved in the PULLs apply various methods that can interact, to imagine and select change models working at different scales simultaneously.

1 Introduction to the Horizon2020 Project “REPAiR”

1.1 Horizon 2020 Project REPAiR

The H2020 Research & Innovation Action project REPAiR (REsource Management in Peri-urban Areas: Going Beyond Urban Metabolism) is developing and implementing a tool that supports local and regional authorities reduce waste flows in peri-urban areas.

A shift towards a more Circular Economy (CE) is crucial to achieve more sustainable and inclusive growth. According to the above aim, the REPAiR project will provide a Geodesign Decision Support Environment (GDSE). This environment will assist local and regional authorities in reducing waste flows by helping them to create integrated spatial development strategies that are both specific for the place at hand, transdisciplinary and eco-innovative. The GDSE will be developed and implemented in “Living Labs” (LLs) activated in six metropolitan areas, namely Naples, Ghent, Hamburg, Pécs, Łódź and Amsterdam.

REPAiR is also connected to and supported by the joint TU Delft, Wageningen UR and Boston MIT initiative in Amsterdam, the AMS Institute. The AMS Institute in particular focuses on the research theme “Circular City”.

1.2 Methodological Guidelines for PULLs as an innovative planning tool

Across Europe, Living Labs (LLs) have been recognized as successful instruments for speeding up the innovation process, co-creating and improving innovative ideas, investigating and creating business opportunities for different case study areas.

After the shift from a model of economy based on products towards a kind of service economy, LLs are taking place as effective tools to promote open service innovations. The services provided by LLs are generally always open source and available on line, and furthermore interactive.

As previously stated, innovation in an LL overcomes the technological factor and is referring to the generation and testing of new ideas and solutions that, in the case of REPAiR, flow into Eco-Innovative strategies, developed in co-creation with multiple stakeholders, considering the human dimension as an essential component. The human (user, citizen) is recognized as a source of innovation and not just as a user or consumer in a narrow sense, as being an object for R&D activities (Higgins & Klein, 2011). This is why working with innovation means to take the risk of a more

dissipative process, in terms of costs and time, deriving also from the coordination of the different actors.

There is a twofold definition for LLs that REPAiR takes into consideration: they are both environments (physical and virtual), and a methodology for innovation (Ståhlbröst & Holst, 2012).

Literature about LLs is extensive; however, it is not sufficient to only explore literature to understand the dynamics of such laboratories; many aspects are learned by doing during the process of the Living Lab, where planning and design interplay (Concilio & Rizzo, 2016; Cerreta & Panaro, 2017), including several and different stakeholders.

2 The Living Lab Methodology

2.1 LL approach through Theory and Literature review

2.1.1 Living Lab methodology across Europe

A Living Lab (LL) is a widely used method for innovative planning processes. Already in 2006 ENOLL, the European Network of Living Labs (Fig. 1), was founded to establish a network of active LLs, today with a total number of 170 worldwide. It represents a platform for best practice exchange, sharing, learning and support, offering to the members an international recognition (ENoLL, 2016).

Figure 1: Map of Living Labs in Europe

Source: ENOLL website (ENoLL, 2016)

LLs are physical and virtual environments, in which public-private-people partnerships experiment with an iterative method to develop innovations that include the involvement of end users. In LLs, different areas of expertise from diverse partners are needed for a good development of the activities, with the aim to meet the needs of the stakeholders by innovation. LLs are instruments that can be used to improve the innovation capabilities and competitiveness of territories. Thanks to the LL approach, policy makers can face the many socio-economic challenges of their territories, improving social inclusion. Typically useful for the interpretation of complex real-life environments, LLs are recognized as instruments to promote open innovation in several European regions, guided by researchers and experts. In this way, complex solutions are identified, tested and transformed into prototypes (Innovation Alcotra, 2013). Table 1 presents a comparison of different research approaches.

RESEARCH (User labs)	ACTION RESEARCH	LIVING LAB
Controlled environment	Real-world setting, yet typically confined to an organisation or department	Real-world setting, involving multiple stakeholders from multiple organizations and their interaction
Limited, clearly assigned role of users	Not specific about user role	Active role of users as co-innovators; exposing technology to the creative & destructive energies of the users; facilitating dynamics of collective action
Designed for replicability	Active (social and political) role of researcher in the research setting	Multi-disciplinary research teams actively involved in the research settings, confronted with the technical, social and political dynamics of innovation, at times even driving the agenda
Design for observation of outcome	The research observe and take part in the creation of an outcome	Joint collaboration to create a desired outcome

Table 1: Comparison of research approaches

Source: Higgins & Klein (2011)

In other words, an LL is a "user-driven open innovation ecosystem" (EC, 2009) that utilizes the fruitful participation and involvement of business, citizens and governments in the research process; this approach is helpful in order to better define the current behaviours and user patterns.

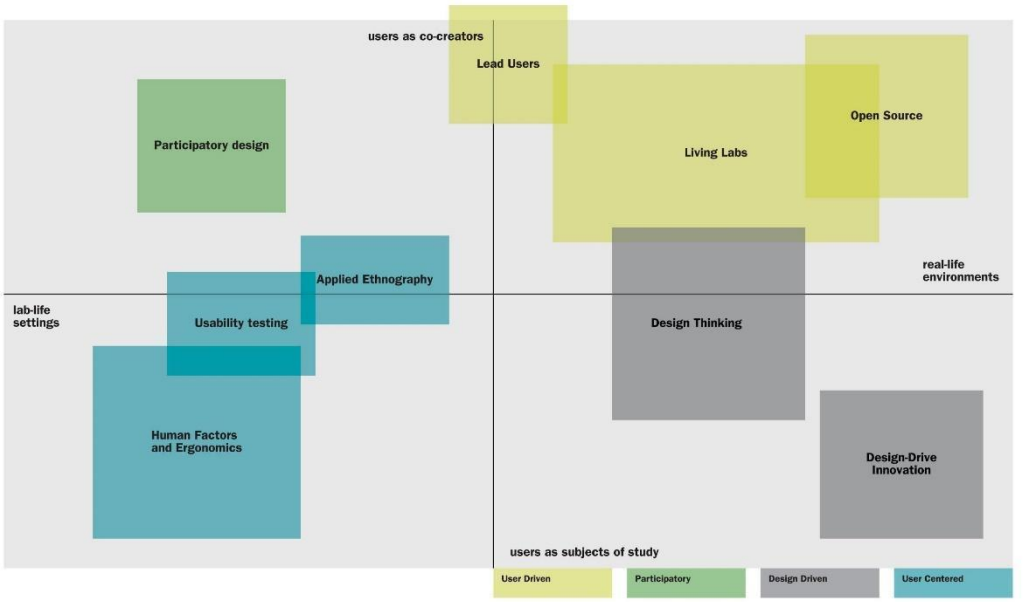


Figure 2: Living Labs in decision contexts

Source: Cerreta & Fusco Girard (2017)

Indeed, the active role of users as co-creators or co-innovators recognizes that users working in real-world environments, and are actively solicited in order to inform technology development and innovation. In these cases, Living Labs have been positioned as platforms for user-driven innovation. However, as the numbers of users and organizations involved expanded to larger social entities, such as local or regional communities, they became more open-ended as more stakeholders became involved. It is thus important to distinguish between those who are centrally involved as users, developers, or beneficiaries, and those who show interest but are peripheral to the innovation process (Higgins & Klein, 2011).

The type of participant driving the innovation activities can be used to categorise living labs into utilizer-driven, enabler-driven, provider-driven, and user-driven (or

user-community-driven) LLs (Leminen & Westerlund, 2012). The characteristics of each type are shown in Table 2.

CHARACTERS	TYPE OF LIVING LABS			
	Utilizer-driven	Enabler-driven	Provider-driven	User-driven
Purpose	Strategic R&D activity with preset objectives	Strategy development through action	Operation development through increased knowledge	Problem solving by collaborative accomplishments
Organisation	Network forms around an utilise, who organises action for rapid knowledge results	Network forms around a region (regional development) or a funded project (e.g., public funding)	Networks forms around a provider organisation/s	Network initiated by users lacks formal coordinator mechanisms
Action	Utilizer guiders information collection from the users and promoters knowledge creation that supports the achievement of preset goals	Information is collected and used together and knowledge is co-created in the network	Information is collected for immediate or postponed use; new knowledge is based on the information that provider gets from the others	Information is not collected formally and builds upon users' interests; knowledge is utilized in the network to help the user community
Outcomes	New knowledge for product and business development	Guided strategy change into a preferred direction	New knowledge supporting operations development	Solutions to users' everyday life problems
Lifespan	Short	Short/medium, long	Short/medium, long	Long

Table 2: Types of Living Labs

Source: Leminen (2015)

According to Leminen (2015), the LL approach offers benefits to companies, users, developers, and public financiers. Companies benefit through cost-efficient access to end-user data and user experiences. They also save money by being able to make changes to a product much earlier in the development process based on user feedback. Over the long term, LL activities also tie customers to a company and its activities. Users gain opportunities to influence the development of products. They also benefit from the solutions that are developed, which in many cases are solving problems that affect their everyday lives and which may have been otherwise unsolvable. Users also may perceive the new, user-driven products to be more functional because of the co-creative development process. LLs also contribute to the core activities of developers; the living labs bring opportunities and resources, and the developers bring their capabilities to develop real-world solutions to the users' problems. In addition, public financiers benefit from activities and outcomes that support their objectives. In addition to the benefits to participants, LLs also provide advantages over other types of innovation activities. Table 3 presents the advantages of an LL approach.

AREA	ADVANTAGE
Innovation	• Enhance learning (Abowd, 1999, Bajgier et al., 1991) • Tackle complex real-life problems (Bajgier et al., 1991; Mulder et al., 2008) • Foster vertical integration (Eriksson et al., 2005) • Enhance dialogue between different stakeholders(Schaffers & Kulkki, 2007) • Share experiences (Schaffers & Kulkki, 2007) • Enhance SME incubation (Van Rensburg et al., 2007) • Filter problems (Shuurman & Marez, 2009) • Enable open collaboration between actors (Bergvall-Kareborn et al., 2009) • Enhance multi-organizational collaboration (Kviselius et al., 2009) • Act as a focal point for multi-organizational collaboration (Kviselius et al., 2009) • Engage all key actors for innovation (Mulder & Stappers, 2009) • Understand innovation (Mulder & Stappers, 2009) • Enable unique knowledge (Dutilleul et al., 2010) • Access real interaction data and real application contexts (Azzopardi & Balog, 2011) • Motivate users (Stahlbrost & Bergvall – Kareborn, 2011) • Enhance sustainable solution development (Liedtke et al., 2012)
Context	• Can be used in different contexts (Eriksson et al., 2005) • Provide an environment to study richness of complex user behavior and use of technology in home (Intille et al., 2005, 2006) • Integrate multi-contextual sphere, i.e, regional and cultural diversity (Feurstein et al., 2008) • Catalyze rural and regional system of innovation (Schaffers & Kulkki, 2007) • Integrate fundamental and applied research (Mulder & Stappers, 2009) • Empower rural communities in developing countries (Mutanga et al., 2011) • Advance smart city operations (Ballon et al., 2011) • Upscale urban development (Ballon et al., 2011) • Provide assets for the innovation environment (Schaffers et al., 2011)
Business	• Create new business opportunities (Kviselius et al., 2009; Niitamo et al., 2012)
Opportunities	• Localize products (Feurstein et al., 2008) • Lead to unexpected market opportunities (Mavridis et al., 2009)

Table 3: Advantages of LL approach

Source: Leminen (2015)

However, applying an LL methodology can be challenging from several points of view. Indeed, LLs generally work across different national borders, involving users since the beginning of the process; therefore, their logistic organisation present objective difficulties, such as the organisation of physical meetings between the different partners to discuss and test the solutions that have been identified cannot happen anytime; problems in communication and coordination, and language barriers could be found too. In addition, partnerships in cross-border LLs are based on trust and needs long time to be built and to last over time (Ståhlbröst & Holst, 2012).

2.1.2 Living Lab: some definitions

The explorative literature review about LLs is an essential requirement for understanding the method and applying it to the research project. Through the literature review a series of definitions is provided to define the scope of the LLs as innovative tools for planning (Eskelinen et al., 2015).

An LL is a real-life test and experimentation environment where users and producers co-create innovations. LLs have been characterised by the European Commission as Public-Private-People Partnerships (PPPP) for user-driven open innovation (CoreLabs, 2008).

An LL is a “functional region” where stakeholders formed a Public-Private-Partnership (PPP) of industries, SMEs, public agencies, universities, institutes and people collaborate for creation, prototyping, validating and testing of new services, products and systems in real-life contexts. Such contexts are cities, villages and rural areas as well as industrial plants (Eriksson et al., 2005).

An user-centric research methodology for sensing, prototyping, validating and refining complex solutions in multiple and evolving real-life context (Ballon et al., 2005).

An experimentation environment in which technology is given shape in real-life context and in which (end) users are considered co-producers (Feurstein et al., 2008).

LLs are collaborations of public-private-people partnerships in which stakeholders co-create new products, services, businesses and technologies in real-life environments and virtual networks in multi-contextual spheres (Bergvall-Kåreborn, et al., 2009).

An LL is a user-centric innovation milieu built on everyday practice and research, with an approach that facilitates user influence in open and distributed innovation

processes engaging all relevant partners in real-life contexts, aiming to create sustainable values (Leminen & Westerlund, 2011).

Experimentation environments: the LL areas are physical regions or virtual realities where stakeholders can form public-private-people partnerships (4Ps) of firms, public agencies, universities, institutes, and users all collaborating for creation, prototyping, validating, and testing of new technologies services, products and systems in real life (Jie, 2016).

An LL is a systematic approach that integrates research and innovation by collaborating with multiple stakeholders (public-private-civic partnerships) to co-create, develop and validate new products, services, businesses and technologies for sustainable value in territorial ecosystems in which the user is actively involved (Concilio, 2016). LLs have emerged as an approach to experimentation in real-life city settings. They can be defined as sites (buildings, streets, and districts) devised to design, test and learn from social and technical innovation in real time. An ULL can be understood as a particular type of regional innovation network that puts the emphasis on the residents and their communities.

The sum of previous definitions identifies an LL as a real-life testing environment, where Public-Private-People Partnerships (and among them researchers and experts) interact.

One of the specific innovations, in comparison to other forms of participatory processes, is to put these Public Participation Processes into real contexts, and giving them space to co-production/co-creation activities. Whereas other forms of collaborative planning stop at the turning point of public consultation, an LL can be defined as a real context of collective capacitation.

Co-creation, in particular, refers to a paradigm of mutual help and competences sharing, where anyone can be the conveyor of its own knowledge, its own experiences (they are the *users*). The innovation of the methodology starts from this user-centric ensemble, putting together expectations (as in past participatory processes), but also turning the users themselves in future co-creators.

The process itself is aimed at establishing innovative ideas and productive methodologies, designing and implementing cooperative and joint experimental activities, that result in collective learning and in shared understanding.

An LL is a kind of practice–based innovation environment, able to create cross–boundary arenas where different actors interact in a context for new models of urban activism.

2.1.3 How REPAiR builds on the literature review for the setting of the Living Labs

REPAiR considers several common points from the literature definitions stated above.

An LL is a method that leads to an innovative research product, and is based on:

- co-creation, with as many as possible involved stakeholders (public-private-people);
- collaboration between industries, Small and Medium Enterprises (SMEs), public agencies, universities, institutes and people;
- a multi-user-centered approach;
- an interdisciplinary approach;
- a real-life design.

REPAiR implements LLs for six European Peri-Urban Areas: the Peri-Urban Living Labs (PULLs); in these physical and virtual environments, key actors and stakeholders, representatives of regions, municipalities, corporations, people, citizens and individuals, design professionals, information technologists, scientists, and students collaboratively generate new ideas, creative innovation and strategies for the development of CE, in co-creation sessions. The PULLs extend the LL concept by integrating the terms above and incorporating Geodesign and the application to the field of waste and resource management.

Based on the pilot cases of Amsterdam and Naples a preliminary structure is developed and presented, constituted by iterations of design studios coinciding with GDSE testing, knowledge transfer and stakeholder participation workshops, in which the results of student work and research activities of the other consortium members are integrated.

The aim of the PULL process is to establish an approach to change mindsets and current behaviour with reference to inadequate models of waste management and urban metabolism. The additional point of REPAiR LLs will be the process of empowerment of the participants of the LL, in addition to the co-creation activity, that will eventually result in one or more eco-innovative solutions (see dedicated paragraph 3.3.1, in this Handbook).

Empowering participants of the LL means to create a collaborative context of co-creation that will survive the duration of the project. Furthermore, ideas and strategies developed in the LL will be correctly exploited as long as there is a contemporaneous learning process for the stakeholders involved.

Technically diversified competences are inside the Labs, at each level (people, leaders, politics, students, etc.) in order assure that the eco-innovative solutions (see dedicated paragraph 3.3.1, in this Handbook) are developed in co-creation instead of leading processes. In this way, they help to stimulate the creation of new services, not only projects, in order to (re)activate locally economic processes, overcoming not only physical and environmental, but also economic and social vulnerability.

Exploring the spatial organization of the waste flow systems, and of the geography of Wastescapes in the case studies, REPAiR PULLs will result in innovative methods of acting, connected to resilience in human behaviours, changing life cycles, in deep relation with the principles of Circular Urban Metabolism - CUM (Allen et al., 2012; Girardet, 2004).

The co-creation builds on these multidimensional and multicontextual strengths of LLs. Furthermore, the innovative methodology will continue in the co-evaluation of physical and socio-economical results, in a multidimensional way: physical asset, environmental and socio-economic impact, economic and financial feasibility.

Testing the solutions means to build in each phase on the interaction among all the stakeholders, to stress out the issues of each model, in a co-evaluation process. The developed impact and decision models will allow the validation of alternative design scenarios and therefore promote sustainable urban developments.

Generally the PULLs as a method should be developed and tested in the two pilot cases, than investigating and implementing their transferability in the follow-up cases.

2.2 Co-creation as one of the main components of Living Lab Environments

Co-creation is the process that leads to a product or a service as well as to ideas, concepts and strategies, as the result of a cooperation between end-users and other relevant stakeholders that work in the common environment of LLs (Innovation Alcotra, 2013).

LLs are defined as flexible ecosystems (EC, 2009) in which a real-time collaboration between different actors exists.

Soile Juujarvi and Kaija Pesso explain the actor roles in an Urban Living Lab starting from the experience of Suurpelto in Finland (Juujärvi & Pesso, 2013). They point out that the involvement of citizens and other LL actors in the process of planning is increasing; this with the aim to meet the needs of citizens, avoid social problems

and co-create value. In addition, they show that urban areas can be considered as technology-assisted research environments and natural places to develop LLs; therefore, urban areas in which there are active LLs, developing innovative solutions are more attractive for inhabitants that consider them as added value for the area. Juujarvi and Pesso define an urban LL as a multi-actor network for innovation in which ordinary people, from different sectors but with common aims, want to solve their real-life problems, learning by doing. LLs are especially suitable to solve problems in environments of "organized complexity" (Juujärvi & Pesso, 2013) composed by several organizations that work with a top-down approach for planning that need to be combined with the bottom-up solutions and innovation processes. Other crucial actors in LLs are the university students that are seen as innovators able to develop surprising new ideas and solutions. In LLs citizens are the core actors that can develop urban innovations (Eskelinen et al., 2015). They will design their own solutions, feeling the ownership for their own ideas.

Example of co-creation Actors in the Naples case

In the Naples case, the core actors involved in the co-creation process are selected among public entities and waste management companies representatives, among professionals and experts, among local associations of citizens related to waste cycle and Wastescapes issues.

Example of co-creation Actors in the Amsterdam case

Generally, LLs seem to be very suitable for facing wicked problems, and situations in which solutions are more difficult to be found because of complex networks of stakeholders (Eskelinen et al., 2015).

In LLs, complex problems are unpacked into small but feasible issues that can be addressed to make significant steps forwards (Eskelinen et al., 2015).

An LL can be understood as a planning tool that boosts innovation, being articulated in different aspects:

- LL as technology–driven research environment;
- LL as testing environment for know–how and tools;
- LL as an arena for self–organising groups.

Each of these aspects can interact with others and help to activate a process able to find a win-win-win strategy, which implements the principles of circular economy.

In the Amsterdam case, the stakeholders involved in the LL are chosen among professionals and experts (e.g. experts from the waste management sector, NGOs focusing on circular economy, local and regional planning authorities, real estate developers and consultancies); in addition, experts are also represented by the university students involved in the research from TU Delft and the AMS Institute.

2.3 Applied methodology in REPAiR research project

In REPAiR, LLs are organised in six peri-urban areas across Europe as decision support environments where representative of universities, governance, corporations and, in addition, individuals discuss decisions in relation to strategies for a better waste and resource management integrated with spatial development strategies. In this framework, design professionals, information technologists and scientists give contributions to decide what to do and how to do that in each case study area. In order to make a decision, which must be site-specific, it is necessary to identify several opportunities and compare different alternatives that should be developed in the Peri-Urban Living Labs (PULLs), after the evaluation of the current situation of the place. Each discipline involved in the PULLs has different methods to imagine change models that can work at different spatial scales simultaneously.

In other words, REPAiR PULLs are not the arenas where decisions are made, but more precisely, they are environments that allow to discuss strategies which could have influence on decision making in a region.

Diversities in the approaches are seen as a greatest strength to be kept within the PULLs. Each PULL needs to coordinate the different approaches coming from the different actors and different disciplines involved in the case study areas towards shared alternative solutions and strategies; this point is a difficult one for each PULL and, therefore, should be well addressed through an effective coordination.

According to the Geodesign approach (Steinitz, 2012) that REPAiR applies, PULLs will be organised as collaborative environments in which experts will work together with the people of the place in order to develop shared solutions for change related to the improvement of the waste and resources management sector and to the recycling of Wasted Landscapes within the case study area.

Each participant of the PULLs must be able to contribute to the design process, identifying how the different contexts should be changed. In other words, imagining how the future of the places and systems of resource management will look like and will be developed, working with the purpose of improving the current conditions and the quality of life in the selected peri-urban areas.

REPAiR takes advantage of the educational programs of the partners who are leading the pilot cases in order to profit from research and design proposals provide in urban planning and design studios as well as by graduation and PhD students supervised by a multidisciplinary research team. The involvement of university education in the PULLs aims on the one hand provide additional input for the identification and analysis of the specific issues and challenges of each case on the other hand students provide an additional group of people to explore eco innovative solutions. Fig.3 gives an overview of teaching activities in relation to the PULL in the pilot cases.

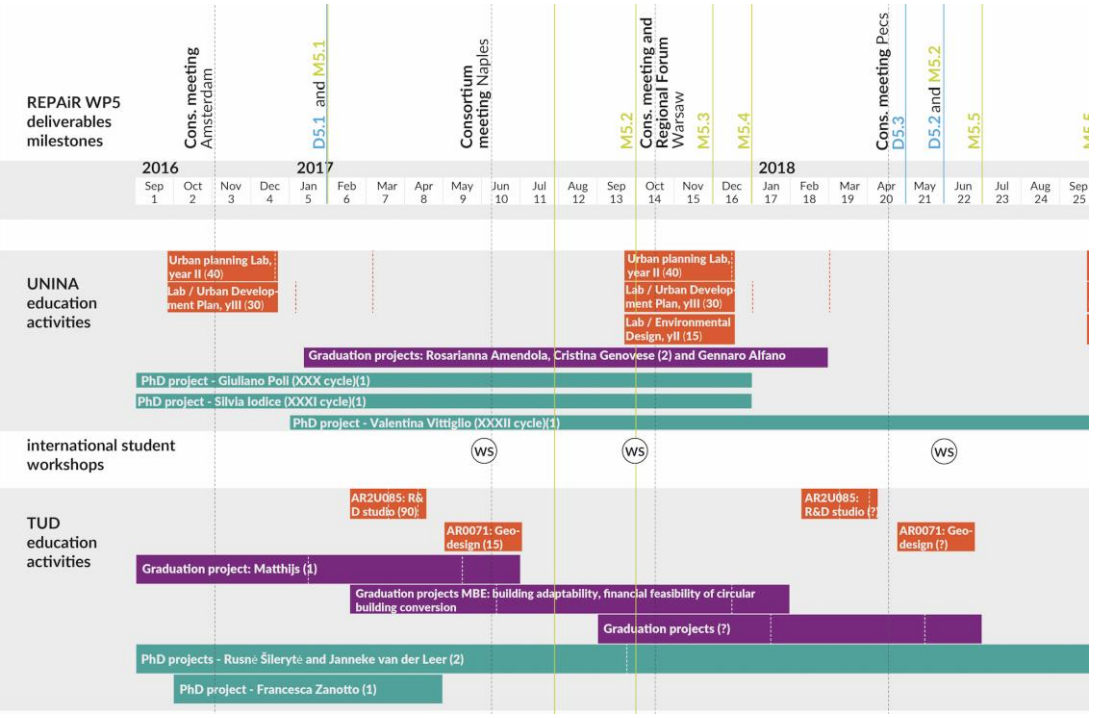


Figure 3: Timeline of education at Unina and TU Delft, related to PULLs respectively in Naples and Amsterdam (overview of the first two years)

Source: Elaboration Janneke van der Leer

Education activities:
BSc and MSc courses/studios/labs: (expected) number of students involved in brackets
MSc graduation/thesis: (expected) number of students involved in brackets
PhD projects: (expected) number of students involved in brackets

Deliverables and milestones:
D5.1 - Methodological guidelines (Handbook) for the PULLs
M5.1 - Definitive location, organisational settings and educational outline for two pilot

PULLs. Amsterdam and Naples ready
M5.2 - International student workshop bringing together the multidisciplinary teams from both pilot cases
M5.3 - First set of solutions for a selection of challenges in pilot cases ready to be integrated into the GDSE ready
M5.4 - Definitive location and organizational settings of PULLs for follow-up studies ready
D5.3 - Handbook: How to run a PULLs
D5.2 - Catalogue of solutions and strategies for AMS and MAN
M5.5 - Final presentation and evaluation of student work of the follow-up PULLs.

The Management Board (MB) of the PULLs leads the Labs and is responsible for concluding and reporting the results. For the actual participation process, different materials and methods will be developed and used, using the GDSE open-source platform, organising workshops, consisting of site visits, thematic mapping, gaming, etc., to assure the sufficient inputs of these parties in the PULLs.

2.4 Some selected examples of Living Labs on waste

In addition to the literature review presented earlier in this handbook, we present review of cases of successful Living Labs on waste topics, in order to define a close link to the REPAiR activities and overall aims.

The following selected cases identify virtuous processes that involve and affect the behavior of the users involved.

Case 1: Portland Sustainability Campus (PSU)

WALL-E (Waste Audit Living Lab Experience)

The goal of WALL-E is to gather valuable campus waste data while providing students with opportunities to make connections between their own behaviors and the campus waste stream and fostering partnerships across the PSU campus community regarding waste management practices. About 2.2 tons of landfill-bound waste have been sorted, weighed, and leveraged to improve the campus waste system.

Flow(s): Solid Garbage, Compost, Special

Scale: From Campus to Portland State

Stakeholders: Academic students, University, PSU staff

Case 2: WEENMODELS Living Lab

WEENMODELS project aims to define and implement a new model of Waste Electrical and Electronic Equipment (WEEE) reverse logistics, which will achieve several goals in the experimentation area:

1) networking; 2) increasing the collection of WEEE amount; 3) improvement of small WEEE collection: to triple, by 2016, the actual rate of small WEEE collected per inhabitant; 4) pollution reduction; 5) control increase; 6) system efficiency increase; 7) waste reduction; 8) eco-business development.

Flow(s): WEEE (Waste Electrical and Electronic Equipment)

Scale: Urban

Stakeholders: Genova Municipality, Citizens, SME

Case 3: Harvard University Living Lab

Harvard University is bringing its students, faculty, and staff together to use the campus and the surrounding community as a test bed to incubate exciting ideas and to pilot promising new solutions to real-world challenges to inform the University's implementation of Sustainability Plans.

WASTE (but not only): Harvard is focused on operating an efficient campus that develops, incentivises and reuses, and minimises the amount of waste.

Flow(s): Compost, E-waste, etc.

Scale: Different scales starting from Harvard Campus

What are the result of this review how to use it in REPAiR?

This short review points out relevant elements for Living Labs methodologies applied on waste topic.

- First of all, the flows can be several, varying in types and amounts; this means that it's up to the people who are leading the LL, to decide which is the more relevant in the case.
- Secondly, the involved stakeholders are as many as possible, representing various interests and decision making levels, but the involvement of students-experts enhances the entire creative process.
- Thirdly, the intervention scale can vary from a small test scale to a wider target area, creating a multiplier effect within the LL.

3 REPAiR Living Lab: a collaborative service-oriented planning

3.1 Towards the REPAiR PULL methodology

The methodological approach to implement in REPAiR PULLs requires the identification of the stages, content and tools able to meet the needs of PULLs and interact with the steps and tools of the Geodesign process. The PULL co-design approach has grown and developed through a range of variations in different settings, applied in universities (to promote student engagement), rural community action groups (to strengthen local development with technology innovation) and, more recently, as a tool for local and regional policy. This latter model, often referred to as a Territorial Living Lab (TLL), aims to promote territorial innovation as a shared objective in the public interest, capable of generating initiatives that both increase the yield on territorial capital and increase citizen well-being and quality of life as a result of engaging all stakeholders in co-designed innovation processes of value creation (Concilio & De Bonis, 2012). At the same time, the Urban Living Labs (ULLs) are configured as an opportunity for creating communities of active citizenship, promoting the co-creativity and representing the micro-centrality able to innovate and support already existing territorial centrality or put new ones (Cerreta & Panaro, 2017). One of the first LL methodology is the FormIT (Ståhlbröst & Holst, 2012), developed to suit and support LL activities. Three theoretical streams inspire it:

- Soft Systems Thinking;
- Appreciative Inquiry;
- Need Finding.

FormIT enables a focus on possibilities and strengths in the situation under study; which is fundamentally different from traditional problem-solving approaches. FormIT strongly stresses the importance of the first phase in the concept design cycle, usually referred to as analyses or requirements engineering. Since this phase creates the foundation for the rest of the process, errors here become very hard and expensive to correct in later stages.

This is also the phase in which users can make the strongest contributions by actually setting the direction for the design. Since users' needs and requirements can change as users gain more knowledge and insights into possible solutions, it is important to re-examine their needs continually and make sure they correlate to given requirements.

The FormIT method is iterative and interaction with users is an understood prerequisite, considering that knowledge increases through iterative interactions between phases and people with diverse competences and perspectives. Cross-functional interaction enables the processes of taking knowledge from one field to another to gain fresh insights, which then facilitates innovative ideas.

The FormIT process can be seen as a "spiral" (Fig. 4), in which the focus and shape of the design becomes clearer, while the attention of the evaluation broadens from a focus on concepts and usability aspects to a holistic view on the use of the system.

In the FormIT process there are three main iterative cycles:

- Concept design cycle;
- Prototype design cycle;
- Innovation design cycle.

In each cycle there are three phases: Appreciate Opportunities; Design; Evaluate. At the same time, three aspects are within each phase: Use; Business; and Technology.

Before and after these three cycles, two additional cycles are included in the process:

- Planning;
- Commercialisation.

The FormIT process is oriented to activate LLs able to enable the cooperation among four main stakeholders (companies, users, public organisations, and researchers) and the service is the final result to commercialise.

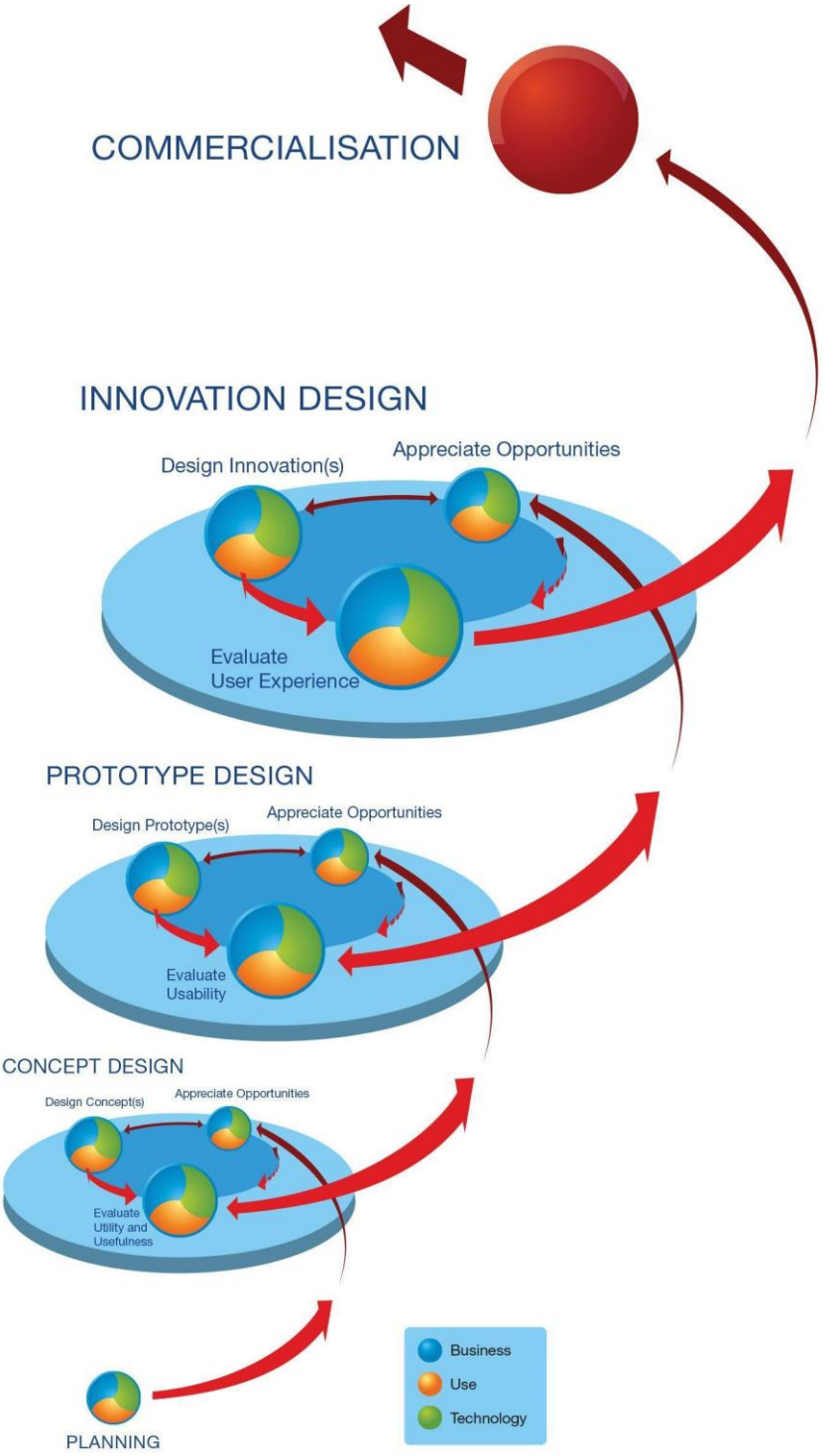


Figure 4: FormIT methodology

Source: Ståhlbröst & Holst, 2012

According to the definition of Ståhlbröst & Holst (2012, p. 3), the concept of "service" is central for an LL process: «A service can be an activity, a performance, or an object. A product may include a service, and a service is produced and consumed at the same time». Indeed, the difference between products and services is recognizable, but can be difficult to grasp. A service is always available: it is on-line, intelligent and cooperative, interactive and offers possibilities to correct and influence the performance of it. A good service is mobile, always in the background and ready to be activated when it is needed. The LL model emerges as an operational framework for the governance of territorial innovation processes, having itself undergone a significant transformation (Concilio et al., 2014).

Since the FormIT methodology, the Living Lab approach has been developed in urban and regional scale, developing open innovation ecosystems and involving different types of users (citizen, resident, student, visitor, etc.). A specific user, recipient of innovations, co-create, experiment and test ideas, products and services. The solutions are designed to develop new forms of productivity and competitiveness as well as to elicit behaviour change towards sustainable one (Panaro, 2015).

An evolution of FormIT methodology, combined with the 4Co model (CoDesign, CoDecide, CoProduce, CoEvaluate) (Pollitt et al., 2006), for implementation in ULL and TLL (Panaro, 2015), is a hybrid methodological proposal able to integrate innovation in public administrations for local co-governance processes, open and inclusive. The methodology has been tested in some experiences of LLs (Cerreta & Fusco Girard, 2017; Cerreta & Panaro, 2017) and considers the FormIT methodology as conceptual framework with cycles of progressive development and relative phases, and the 4Co model provides the objectives and the nomenclature of cycles oriented to the definition of a local co-governance model (Fig. 5).

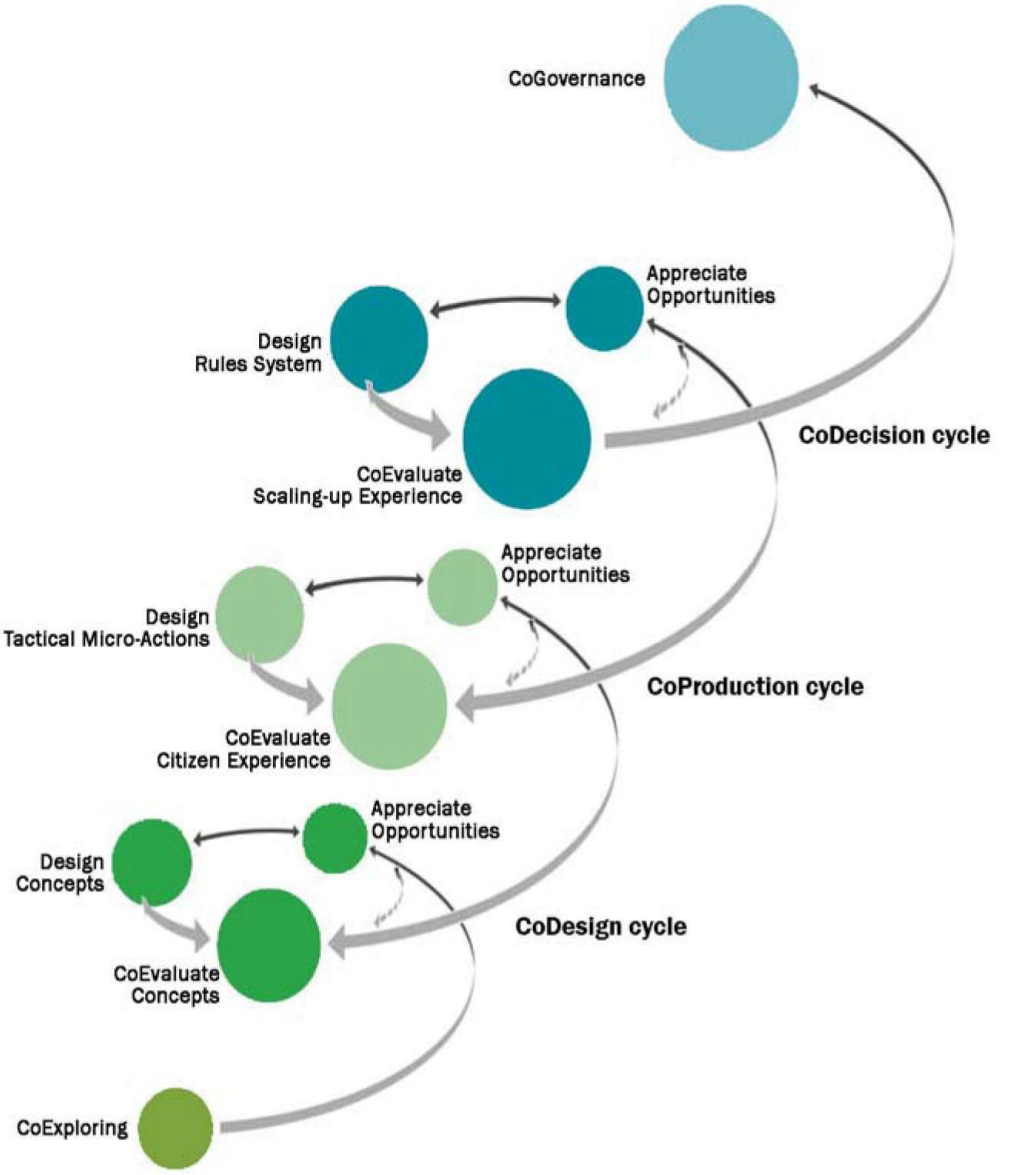


Figure 5: Hybrid methodology for LL

Source: Panaro, 2015

The methodological approach to implement in REPAiR PULLs starts from the above hybrid methodology taking into account the Geodesign framework and the related phases (Figs. 6, 7).

Indeed, Geodesign is a design method, and can be considered a set of techniques and enabling technologies for planning built and natural environments in an integrated process, including project conceptualization, analysis, design specification, stakeholder participation and collaboration, design creation, simulation, and evaluation. The LL and the Geodesign approaches can be considered as two parallel processes in which it is possible to recognise the different interactions between the various phases and the possible feedbacks (Fig. 8).

According to the above considerations, in the REPAiR PULLs the main iterative cycles are:

- Co-Design cycle;
- Co-Production cycle;
- Co-Decision cycle.

In each cycle there are three phases: Appreciate Opportunities; Design; Co-Evaluate.

In Co-Design cycle, the specific sub-phases are: Appreciate Opportunities, Design Concepts, Co-Evaluate Concepts.

In Co-Production cycle, the specific sub-phases are: Appreciate Opportunities, Design Tactical Micro-Actions / Eco-solutions, Co-Evaluate Citizen Experience.

In CoDecision cycle, the specific sub-phases are: Appreciate Opportunities, Design Rules System, Co-Evaluate Scaling-up Experience.

Before and after the three main cycles, two additional cycles are included in the process:

- Co-Exploring;
- Co-Governance.

In LL hybrid methodology CoCreation is a transversal concept that passes through and supports the spiral in its different cycles. Indeed, in REPAiR methodological proposal LL and Geodesign interaction has a Co-Creation context as common framework (Fig. 8).

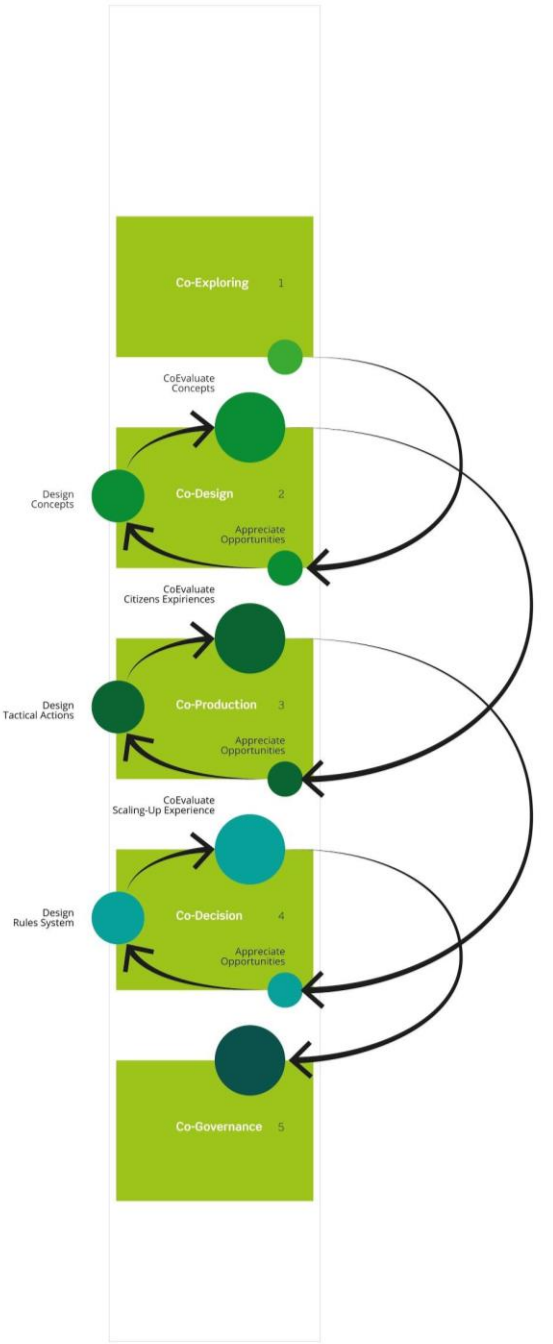


Figure 6: LL hybrid methodology

Source: UNINA team (Elaboration: Cerreta, Inglese, Panaro, Poli)

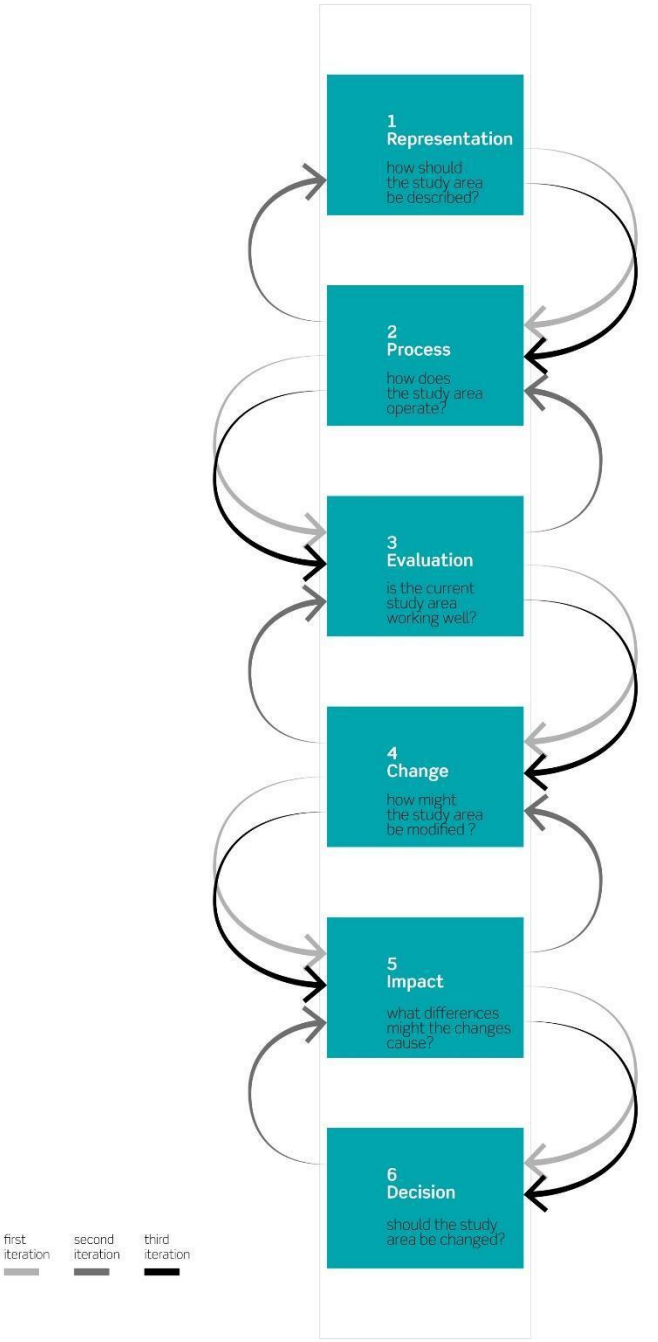


Figure 7: Geodesign methodology

Source: UNINA team (Elaboration: Cerreta, Inglese, Panaro, Poli)

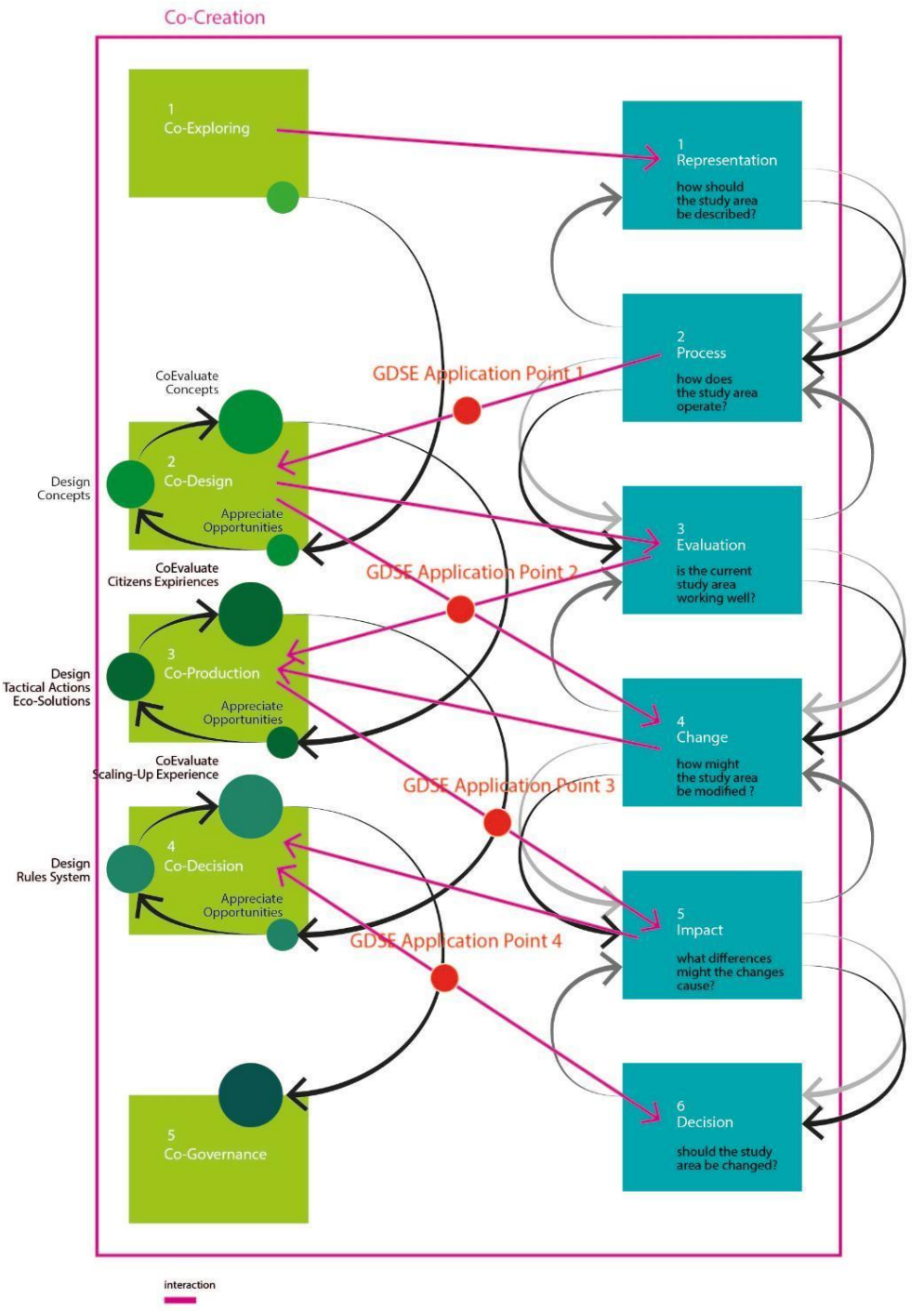


Figure 8: LL & Geodesign interaction: REPAiR methodological proposal

Source: UNINA team (Elaboration: Cerreta, Inglese, Panaro, Poli) and Alex Wandl (TU Delft)

3.2 Co-exploring

3.2.1 A Pre-Lab Phase

The Pre-Lab Phase is very important to build a structure as strong as possible for the future duration of the project. It is important to mix different competences in the definition of the group, of the stakeholders and the case study area. Thus, it is important to understand the overall process in a continuous and communicative approach, where flexibility in the definition of core matters is a key to learn from the process itself.

In order to build trust and confidence between the initial stakeholders, the Pre-Lab Phase can consist of one event or more interactions, as Local Kick-Off Meetings.

3.2.2 How to set a location

In the planning phase, it is important to build a welcoming environment, where mixed competences can be stimulated to knowledge sharing.

Having a physical location does not only coincide with logistic requirements: establishing a place to meet, multiple workstations, documents archives, etc.; it also implies to define a protected environment, full of symbolic meanings, recognisable as the birth point for LL ideas and activities, where the LL core team can be reached and all the stakeholders are welcomed.

The physical location may not consist of just one room, but can be divided into multiple location settings, referring to a singular, recognisable structure (meeting rooms, student rooms, workspaces, etc.).

For the participants comfort, it is essential to think of the logistics aspects of all these spaces, such as good lighting, closeness to open spaces and to a place for a coffee break and refreshments.

In order to make the stakeholders involved more responsible and to raise commitment, it is possible to organise meetings in different locations, in such a way that the actors involved are host institution in turn (Satellite Offices).

Example from Naples

The leading partner for the Naples PULL, UNINA has decided to set up the Lab in a room of one of the main buildings of the DiARC at the University of Naples.

This choice has been driven by several reasons:

- first of all, the coincidence between the main responsible for the Lab and the location, is used to point out the commitment of the partner itself;
- secondly, the University is located in a central area of Naples, easily accessible from the highway (Naples Fast Road "Tangenziale"), from the subway station ("Toledo" or "Dante" station), and in connection with the regional and national railways main station "Garibaldi" station;
- thirdly, the case study area has its core in the municipality of Naples itself, as the main administrative entity within the Metropolitan Area;
- finally, the university building has a full history and clear recognisability among all invited stakeholders.

Meetings with stakeholders will be held in the selected municipalities, whenever possible, in order to enhance their involvement in the process.

Example from Amsterdam

The leading partner for the AMA PULL, TU Delft has decided to set up the main location of the Lab in the spaces of the buildings of Delft University of Technology.

The project area for TU Delft is in Amsterdam and therefore the choice is made to also use rooms in the AMS (Amsterdam Institute of advanced Metropolitan Solutions) as well as in the Valley, a circular hot bed in Haarlemmermeer, as satellite offices, closer to the case study area. Meetings with stakeholder will be held at the AMS whenever possible.

This choice has been driven by several reasons:

- first of all, the co-location of the main responsible for the Lab and the location, is used to point out the commitment of the partner itself;
- secondly, Delft University of Technology is located in an easily accessible location from the railway (from the whole Netherlands and abroad to Delft Station), and by bus from Rotterdam; choosing TU Delft location is key for the involvement of the students in the research;
- thirdly, the Amsterdam Institute of advanced Metropolitan Solutions is a representative location for the meetings with stakeholders;
- finally, the satellite office in the Valley is located within the boundaries of the peri-urban area object of the study.

How to set a location: short tips

Choose a location that fulfills the following criteria:

- good logistics;
- accessibility;
- relevance;
- recognizability;
- satellite offices.

3.2.3 How to define internal roles (Living Lab Research Group)

A Living Lab Research Group has a clear structure that may be composed of sub-groups in order to better define internal roles and competences. The following is a suggested sub-division:

CORE GROUP: a smaller group, composed of a minimum of 3 persons and a maximum of 10 persons, which remains stable for the duration of the entire project and allows to maintain control of the group, to clearly assign responsibility and focus on completing project deliverables. Within the CORE GROUP each partner has designated a person responsible for the management of the Living Lab: the LOCAL COORDINATOR. The Local Coordinator or PULL Leader is the "reference person" of the group locally, and at the consortium level: each coordinator has its counterpart in the other partner cities. The PULL Leader is responsible for the creation of a welcoming environment and for keeping the LL Group on the right track. Some stakeholders may not have prior experience in participatory processes and the coordinator should ensure that all members are feeling at ease and that their views are valid and respected. The PULL Leader can designate one or more PROJECT COORDINATORS. Project Coordinators, among university researchers, are responsible for the content-wise operation and process management of the LL Group. They guarantee on both ends between the LL Group and the consortium the transnational network activity, and provide concrete outputs for the definition of the deliverables. Other important roles in the Core Group can be: reporting responsible, logistics responsible, communication manager. They can refer to one or more people at a time.

Overall, PULL meetings and PULL workshops are organized by PULL Leader with the help of the whole core group. Logistics and communication responsible are useful to organize locations, set the meetings, send invites, etc.

Example from Naples

The PULL Leader of the LL in Naples is Libera Amenta, PhD, on behalf of Prof. Michelangelo Russo.

Example from Amsterdam

The PULL Leader of the LL in Amsterdam is Associate Prof. Hilde Remoy.

OPEN GROUP: a much larger group, composed of other possible stakeholders, able to be adapted along the way. According to the needs, the open group allows to increase the participation of new relevant stakeholders that can perform ad hoc interventions on a specific topic or activity, at any time during the project.

For the same purpose, **THEMATIC SUB-GROUPS** can be created. They can be defined on the basis of a main theme and several secondary issues. This organisation based on thematic subgroups may be more interesting for stakeholders and allows a check evolution of each group.

The scheme below shows the internal roles and hypothetical sub-groups (Fig. 9):

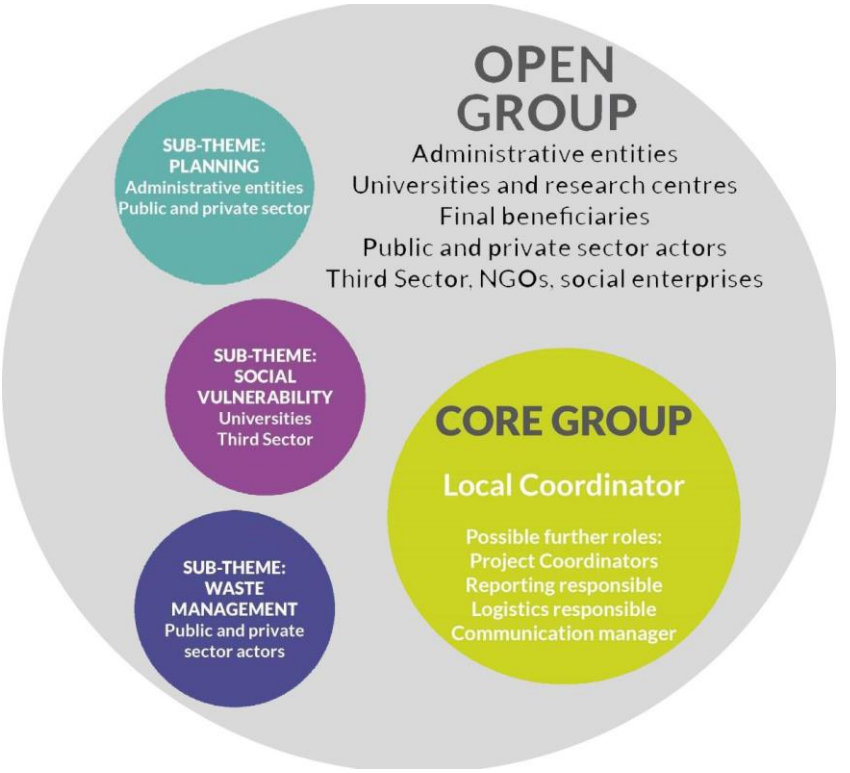


Figure 9: Internal roles within LLs

Source: UNINA Team

How to define internal roles: short tips

For every PULL, the following roles could be defined:

- local coordinator/PULL leader;
- project coordinator(s);
- core group;
- flexible open group;
- thematic sub-groups.

3.2.4 How to Choose Case study areas

Each case-study area definition is unique, in terms of the local context, the subject matter and coverage (thematic and spatial).

Methodological indications for the delineation for the focus area are given in the D3.1 Internal Guidelines (Handbook), Introduction to methodology for integrated spatial, material flow and social analyses, and they need to be followed.

As part of the LL method, the process of choosing the case study area is as important as the result of the LL.

To comply with this philosophy, the definition should be developed based on the following key principles:

- The selection of the case study area is not a formality to fulfill for the consortium. It can be used by local authorities, to provide an answer to urban issues in terms of waste management aimed at the development of models of circular economy. This is why the area must show clear relations to waste cycles and urban metabolism issues and it has to be as exemplary as possible for the entire Metropolitan Area flows management (scalability and transferability of the process at local level);
- the knowledge generated through the activities of transnational exchange networks should be implemented in the defined area. In this way, the selection of the case study area has to be scalable and transferable to other European cases, with due differences (scalability and transferability of the process at consortium level);
- the defined area should deal with the different dimensions of the problem, e.g. the environmental one, the physical one, the economic one and the social one, considering the various territorial levels relevant for the solutions to be implemented;

- the choice of the area is the result of a pre-Lab participatory process, developed together with the first stakeholders involved. Testing and monitoring the process means that the area can be better defined during the duration of the LL, due to the addition of new stakeholders that can help in specifying the implementation area for the project.

Example from Naples:

The definition of the area in the Naples case study has been carried out in a pre-Lab process, led by UNINA and in collaboration with the REPAiR User Board Members related to the Naples case.

Following the above-mentioned key principles, the defined area is an environmental, physical and socio-economic sample for the matter of waste and resource management. Two site-specific principles are relevant:

- the sample area is not where the issues of waste management are at their most critical point (as in the case of Campania waste bales, famous because of EU sanctions), in order to avoid a media manipulation of the project;
- in some municipalities of the Metropolitan Area of Naples, there are already local groups, involved in other European networks and participatory process. Considering this, UNINA chose not to duplicate or create an additional group, but, after an examination of the existing structure, to implement it by incorporating it.

Below is a map of the chosen area, consisting of eleven municipalities, and a picture of an open-air activity from one of the LLs in the area, coordinated by UNINA.

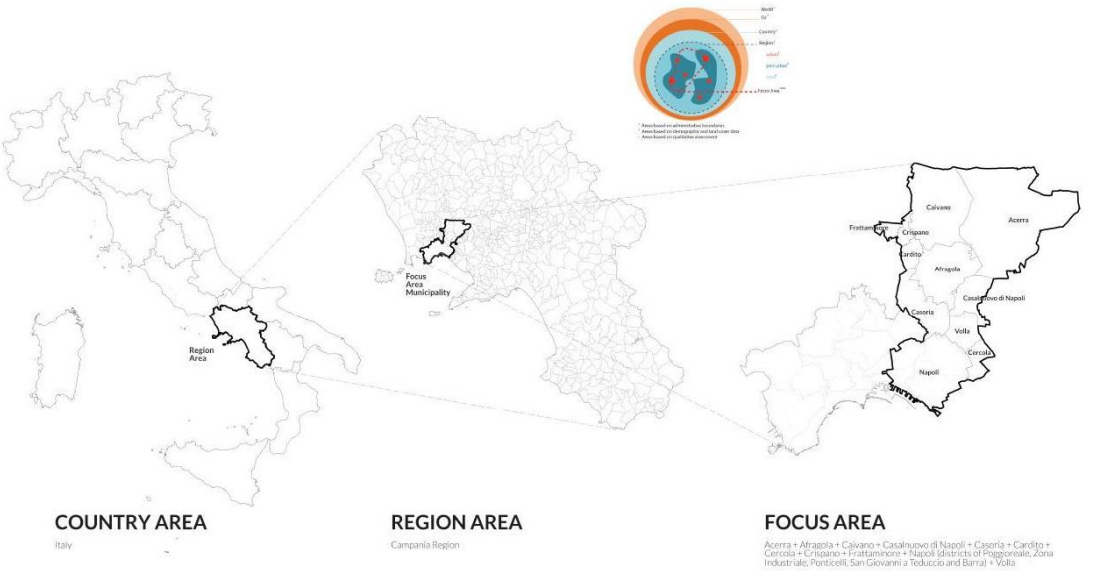


Figure 10: the selected area within the Metropolitan Area of Naples

(see also REPAiR D3.1 "Internal Guidelines

Introduction to methodology for integrated spatial, material flow and social analyses")

Source: UNINA Team

Figure 11: Recovering the wastescapes

Social Gardening activity in a former military area in

Naples Metropolitan Area (Municipality of Casoria)

Source: picture by Alessandro Capozzoli

Example from Amsterdam:

The first definition of the Amsterdam case study area has been done in a pre-Lab participatory process, led by the TU Delft and in collaboration with other local partners and User Board Members.

Regional level: the Amsterdam Metropolitan Area (AMA) was chosen as relevant regional entity to start the selection of the peri urban scale. Material Flow Analysis (MFA) and Life Cycle Assessments (LCA) will use this area, as well as the Focus Area.

The Amsterdam Metropolitan Area *(Metropoolregio Amsterdam*) is located in the North Wing of the larger polycentric Randstad region and spans across the boundaries of two provinces (North-Holland and Flevoland) and encompasses the city of Amsterdam and 32 municipalities. The total population is about 2.4 million. The region is responsible for a range of policies, including economic development, transport, and aspects of spatial planning related to urbanisation, landscape management, and sustainability.

Peri-urban area: we mapped the peri-urban areas on the basis of population density, land use and intermingling of built and unbuilt features. In summary, the spatial selection method can be described in the following four steps:

1. dividing the area into 500m x 500m grid cells;
2. selecting those grid cells with a population between 38 and 1,250 inhabitants per 500m x 500m;
3. adding grid cells, with a rural density of maximum population density that overlap with areas of the CORINE land cover classes industrial or commercial units, port areas, airports, mineral extraction sites, waste sites, port and leisure facilities, and all major roads and railway tracks and associated land;
4. subtracting all cells that are classified continuous urban fabric according to the CORINE land cover classification.

The resulting map for the AMA is presented in Figure 12.

Intra (peri-)urban system: Based on workshops with key stakeholders, as well as a preliminary spatial analysis, we selected the area starting from the analysis of the key challenges for developing a more circular economy in peri-urban areas in the region and the analysis of the key flows of resources. On that basis, we decided to delimit the intra peri-urban system on the basis of the three 'main ports' to the area: from the Amsterdam docklands towards North-West and IJmuiden (key areas with wasted landscapes and the port); South from there to include the Schiphol area (airport and the location of the Valley circular economy initiative); and finally South-East where the greenport is located (agricultural production in greenhouses and flower trading). Those areas are also relevant from the perspective of the flows that are key for the above-mentioned challenges, such as construction and demolition waste (e.g. housing challenges in Haarlemmermeer or regeneration of docklands in Amsterdam), biowaste (e.g. related to the airport and greenport challenges), municipal solid waste (e.g. while municipal solid waste is a challenge across the metropolitan region, in the airport area there is a specific challenge of waste from the catering for airplanes, etc.). While this delimitation is functional and spans across municipal boundaries, for data we have to rely on municipal data. Within this intra peri-urban systems, specific focus areas for proposed interventions will be determined at a later stage (in PULLs). Figure X presents the final selection of the intra-peri-urban scale used for the AMA.

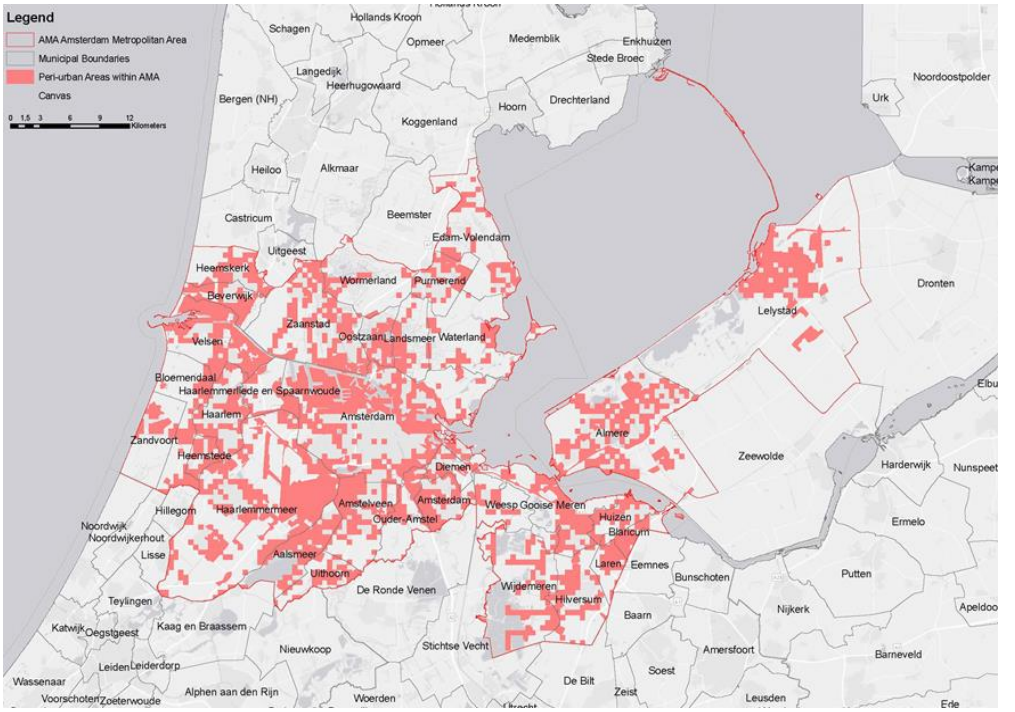


Figure 12: The peri-urban area within the AMA

Source: TU Delft Team

Figure 13 shows some of the pictures from the first field trip in the project area in the Amsterdam Metropolitan Area (AMA).

Figure 13: First field trip in the project area in the Amsterdam Metropolitan Area.

The field trip was in the wide area as indicated in the above map (Fig.12).

Source: photos by Libera Amenta

Focus area: In Amsterdam the choice of the focus area has also been driven by the presence of initiatives related to CE in the project area that are already ongoing. The list below show some of these initiatives, as the result of the first meeting with the Dutch Stakeholders on the 31st August 2016.

Amsterdam CE Initiatives:

- Park 2020
- STP
- AEB + partners, waternet
- Buiksloterham
- Waarderpolder
- Arena
- Zuidas
- Miskantus
- Pro Dock
- Schiphol
- Meerlanden
- Park 21
- Wildeman / Tuinen van West
- Composteren
- Almere, Floriade
- Flora Holland
- Greenport Aalsmeer
- Heineken Brewery
- Algae farming
- Regeneration Haarlemmermeer
- Cruqius
- ICL fertilizer
- Green Energy Hub
- Valley
- Temporary flax / hemp producer
- Tuin van Bret
- Stadshout
- Amstel kwartier hotel
- Wooden hotel (to come)
- ReGen

In depth analysis: see attached Spatial Analysis Glossary

How to choose case study areas: short tips

To choose the case study location, consider the following aspects:

- sample (Consortium level and local level);
- building on existing conditions (or groups);
- stakeholders involvement;
- for more info, as previously stated, see D3.1 Internal Guidelines (Handbook), Introduction to methodology for integrated spatial, material flow and social analyses.

3.2.5 How to engage with stakeholders: initial steps

Each PULL distinguishes a different mix of stakeholders involved in the LL Group. In the initial phase, the partner of REPAiR must identify the stakeholders who have an interest in the project issues.

As it is defined in the Work Package 6 (Task 6.1), the development of a list of stakeholders might start from the key stakeholders in the cases: who are the stakeholders involved in the waste and resource management, who are the stakeholders linked to the focus areas? Later in the project, other stakeholders can be added. The objective is to have an extensive stakeholder network in order to define the decision making and governance structure (See Deliverable D6.1).

It is recommended that groups include representatives from several fields and between public and private exponents. Nevertheless, the choice of stakeholders can be determined from the specific challenges defined in the focus area.

A possible, initial list of stakeholders, can include (where applicable):

- Regional or County Authority of the Metropolitan Area;
- local administrative entities within the Metropolitan Area;
- other public authorities, like universities and research centres, in particular, those including disciplines and specific trainings that can be used in the Lab;
- final beneficiaries, e.g. youth, the elderly, migrants, etc., end-users;
- public and private sector actors involved in Waste Treatment and Waste Disposal, in particular, those who represent the interests of groups specific or providing public services that can be used in the Lab;
- third Sector, Non-Governmental Organisations (NGOs), social enterprises, in particular, those who represent the interests of groups specific or providing public services, related to waste topics, that can be used in the Lab.

Overall, the group should represent the entire community of beneficiaries. It is essential to identify the stakeholders correctly, selecting them and inviting them to participate in the Open Group, in a flexible way, and adaptable during the duration of the project.

A shared Stakeholder Mapping Process (Stakeholder map, 'Stakeholder Mapping', url: https://www.stakeholdermap.com/ - last accessed: 25 September 2017; see paragraph 3.4.3) between the Consortium Members and the stakeholders themselves is a good way to determine who should be invited to participate and why, what contribution is expected from whom and how each stakeholder may contribute.

Maintaining and supporting the motivation of all stakeholders during the entire project requires good communication, concerning both the number of meetings, and their duration and frequency. Keeping open communication channels allows stakeholders to provide inputs on a formal and informal basis. While considering the huge potential offered by innovations for online and remote collaboration, direct bilateral contacts to help keep people informed should not be forgotten.

Here, we provide a non-exhaustive list of communication tools, from traditional to newer ones: teleconference, email, files sharing, website, newsletter, social media, phone calls, events.

It is important to adjust communication channels to the relevance and closeness of the stakeholder and, of course, to their technological capacity and means.

Example from Naples:

During the pre-Lab phase, UNINA has carried on individual meetings with a first small group of actors, involving some Consortium and User Board Members (Campania Region Authority, Municipality of Naples) and representatives from local administrative entities, with whom UNINA already had on-going collaborations on other European projects, in order to develop an initial stakeholders analysis.

This helps for the invitation of stakeholders to the PULL. Above all, it provided a first agreement on the definition of the area (see previous paragraph).

An actual exercise of Stakeholders Mapping will be repeated during the duration of the project, in order to define the other stakeholders and members that can add relevance and consistency to the structure of the group, adapting the group composition and the area definition.

Example from Amsterdam:

During the pre-lab phase, TU Delft organised a first Dutch Stakeholder Group meeting in the AMS Institute on the 31st August 2016. The Dutch Stakeholders that were recognised as important stakeholders at the meeting were, among others:

Governmental bodies:

- Rijksoverheid (National government)
- Waterboards
- Amsterdam economic board
- Amsterdam Metropolitan Area
- Amsterdam Smart City

Large companies with interests in the area:

- Transportation companies – specifically KLM
- Alliander
- Energy companies
- IBM
- Accenture

Front runners in developing the circular economy:

- Copper 8
- In Stock
- Metabolic

The reasons for choosing them were related to the expertise on the waste management topic of the experts selected and related to the high level of knowledge of the project area and of the knowledge and the involvement in the key initiatives related to CE in the AMA.

Figure 14: First Dutch Stakeholder meeting

Image Source: Photo by Hilde Remoy

3.2.6 How to engage with Stakeholders: short tips

To define the stakeholder to engage with, the following aspects should be considered:

- building on existing conditions (or groups);
- developing an initial key-stakeholders list based on developments in the area;
- making the stakeholders mapping exercise.

How to engage with Stakeholders: timeline tips

To get the Living Lab going, the following should be taken into consideration:

- organising stakeholders kick-off meeting;
- meeting on a regular basis;
- involving stakeholders in education activities (seminars, field trips, juries, etc.).

3.3 Cycles: Co-Design, Co-Production, Co-Decision

3.3.1 The Product of REPAiR: Eco-Innovative Strategies towards a more circular economy

The main aim of the PULLs is to develop strategies for a more circular economy by first generating input for the development of the six cases that build the GDSE as well as test the GDSE itself.

The PULLs are the main place and time of transdisciplinary integration within REPAiR. REPAiR integrates activities of ongoing teaching at the participating universities and AMS with research conducted in the WPs by consortium partners.

Eco-Innovation refers to all forms of innovation – technological and non-technological – that create business opportunities and benefit the environment by preventing or reducing the environmental impact, or by optimizing the use of resources.

Other than products, if we speak about services, they cannot be seen, tasted, touched, or smelled; a service can be an activity, a performance, or an object; it can be included in a product.

Eco-innovative strategies:

- provide customer and business value, as new services within old processes, significantly decrease environmental impacts;
- intend to produce three kinds of changes: technological, social and institutional, within the spatial dimension;
- should bring greater social and cultural acceptance, more confidence in the future;
- are closely linked to the way we use our natural resources, to how we produce and consume and to the concepts of eco-efficiency and eco-industries.

Eco-Innovative Solutions:

- are influenced by the site specificities
- depend on policies/resources (managerial, economic/financial, administrative capacity, etc.)
- depend on stakeholders: different people, queries, communities, economies are involved in eco-innovation process
- do not have a single scale, they cross multiple scales, different dimensions, grains and scales of the territories of innovation.

By combining eco-innovative solutions, integrated strategies can be developed.

Eco-innovative strategies are contextual, adaptive and flexible. They use several kinds of Eco-Innovative Solutions, depending on space and designed over time.

Instead of using a fixed catalogue of solutions, the purpose is to interpret the specificities of the case study and generate innovation in response to specific questions and potentials.

The following paragraphs define these solutions through the already mentioned Co-Creation process: a spiral in which it is possible to gradually adjust and evaluate the design of solutions (see paragraph 3.1).

From the Co-exploring, the Lab is gradually starting to address the Co-Design cycle and its specific sub-phases: Appreciate Opportunities, Design Concepts, Co-Evaluate Concepts.

3.3.2 Appreciating Opportunities

Each cycle has to start with an analytical moment, useful to assess existing knowledges and capabilities as well as decision needs. After the first cycle, analyses can be combined with the evaluation phase.

The proposed methodology will comprise focus-group, interviews and related activities of data collection. This set of different activities calls for the involvement of different stakeholders.

Some questions are central and can be reiterated at the start of each cycle:

- What is your general challenge and related objectives? What do you want to achieve in the process?
- Who are the target user-groups that need to be involved in this process? How should they be involved? What are the users expected to contribute with?
- Which needs, requirements and preferences do the users have or express related to the topic of the project?
- In which physical, social, technical and organizational context is the process going to be implemented?
- Which kind of bottlenecks or opportunities can you already foresee for the project, considering the existing conditions?

Both for Naples and Amsterdam, main challenges can be divided into four categories:

- Policies & regulations

- Cooperation
- Material Flows
- Wastescapes

Example from Naples

So far, in NAPLES PULLS the main challenges identified are:

Policies & regulations

Lack of capital to finance CE initiatives: public sector is overwhelmed with usual waste management costs, it cannot afford risky and innovative circular ventures.

Policy framework: Lack of clear regulations in terms of CE expectations. Recent Regional planning stimulates innovation, but regulations are still in a transitional phase

Lack of fiscal incentives for CE: At present there are no fiscal incentives for businesses implementing CE innovations, or even for businesses implementing recycling practices (see especially CDW flow).

Regulatory barrier: Public procurement rules (tendering) for CE initiatives is almost impossible at the moment due to lack of clear National/Regional regulations for assessing circularity.

Penalties procedures from UE to Campania Region: due to "eco-stocks" and landfill dumpings, Campania Region has been condemned to serious penalties. Campania Region is now performing actions to overcome the issue, but this is still a transitional phase

Bureaucratic times: even when public sector has made tenders and found fundings for recycling and CE activities, there are still slowness in implementing actions at municipal level due to Italian bureaucracy and under-sized technical offices.

Cooperation

Lack of Metropolitan leadership: the recently established ATO (Optimal operational area for waste management) is still in a transition phase, without clear power in waste management

Conflicting interests of stakeholders: political and power conflicts among small/big municipalities, among municipalities/big city of Naples within the recently established ATO (Optimal operational area for waste management). There are also big gaps in recycling collection percentage among portions of focus area (the big city of Naples has

the lowest rate in the ATO (Optimal operational area for waste management) and in the whole Campania Region).

Lack of intra-organisational cooperation: the recently established ATO (Optimal operational area for waste management) is still in a transition phase, without clear roles and functions in waste management

Material Flows

Biowaste: the metropolitan area of Naples has no composting plants. All the collected organic waste is sent out of Region. New compost big and small plants are planned, but there is the need for more, plus there is the need for systemic regeneration projects of those areas and it's still to understand ATO's (Optimal operational area for waste management) role in the management of the compost plants

Biowaste: compost made in Campania Region is not always "good quality" compost (impurities in the materials) because of lack in education among people - other ways to recycle (anaerobic digestion) cause fear among people because of lack of education

CDW: illegal dumping of small/medium fractions because of high costs for landfill delivery/little controls on the territories/lack in education among building enterprises/lack of recycling incentives for specific categories of waste

Wastescapes

High Speed Train development areas: over-sized infrastructures, illegal buildings and informal ROMA settlements, abandoned areas, former landfill with illegal dumping, polluted land, water and damaged ecosystems

Areas along regional highways/high speed corridors/urban streets: illegal dumping of waste, polluted land, water and damaged ecosystems

Confiscated assets (e.g. Masseria Antonio Esposito Ferraiuoli)

ROMA informal settlements (former ones and existing ones)

Arts Park in Casoria, approved project but waiting for a connection with big brownfields and recently built new URBACT park

Casoria/Casalnuovo abandoned former industries, waiting for new planning regulations and stakeholders

Each of the challenges refers to a multiple set of issues, characteristic of the condition of the Metropolitan Area of Naples, contemporarily involving environmental, social and economic vulnerabilities of the territories. That is why the overcome of the present condition implies a multi-sectoral approach, able to integrate dimensions and to involve institutions and communities.

Following the key principles of Living Lab theory, an integrated challenge call for integrated groups of public/private + people.

Example from Amsterdam

In AMSTERDAM the first foreseen key obstacle and hindrances towards the development of CE, which REPAiR could help to overcome, have been listed during the 1st meeting with the Dutch stakeholders (August 2016) and are the followings:

- Distrust/lack of trust
- Business Model/Finance > true cost
- CO2 pricing
- “Simplistic” Economic models
- Path dependency
- World open market
- Various definitions of CE
- Exchange of data
- Data: Availability, compatibility, integration, quality, amount,…
- Human nature
- Existing CAPEX (CAPital EXpenditure)
- Data for decision making
- Complexity
- Inadequate governance
- Established ways of working
- Greed
- Ignorance
- Political short term thinking
- Time (long/short term)
- Lack of collaboration (ego’s)
- Understanding Waste Geography
- Rules
- Different scales to work with
- Mismatch between learning (time) and speed up realizing houses
- Traditional working in spatial planning

Furthermore, within the PULL the following challenges have been identified so far:

Policies & regulations

Planning law: at present circularity is not promoted by spatial planning regulations

Funding gap - financing the time-consuming work on the development of CE business cases and engaging in collaboration. Commercial credit is available once a business case is set up

Policy framework: Lack of consistency of sustainability policies of municipalities, but also at the national level, make it harder for the key private sector stakeholders to respond to them and decide on long-term investment in CE

Taxation – lack of incentives for embracing CE by companies (linear production remains cheaper than circular); lack of fiscal incentives for change in waste behaviour among the citizens

Bouwbesluit (building law) – building regulations are too rigid, which hinders experimentation with circular products and processes, but also they do not consider circularity, which makes it difficult for municipalities to impose circularity as a criteria in granting building permits

Circular tendering - no criteria and experience in tendering for circular products and services, no shared practices and guidelines

Ownership of waste: When waste becomes a resource, there is automatically competition between the actors to capture its value. Big players are likely to dominate and compete for getting more waste. This could prevent innovations to utilise waste locally and it creates disincentives to reduce waste production

Cooperation

Lack of Regional Leadership: Given the relative lack of space in the AMA, what is crucially absent in the region at present is an actor with an authority to steer the deployment of circular economy activities spatially, from street scale to the regional scale

Gaps in cooperation within Value chain: actors in the value chain to take part in efforts to promote reuse or upcycling throughout the life cycle of a product

Conflicting interests of stakeholders: Lack of a shared understanding of CE and goals in this area. Interests of ‘old’ linear economy work against CE initiatives. Lack of examples of CE implementation is a challenge for further development and financing of CE initiatives

Lack of intra-organisational cooperation: Lack of knowledge to steer on CE, or knowledge available at parts of company but is ignored

Lack of data and knowledge on material flows for different organisations

Material Flows

Biowaste: Food waste – from households, restaurants, catering etc. Large fractions of food waste originate from residential and commercial activities that are not used at their highest utility (presently much of it ends up in the incinerator)

CDW: To stay on a par with the housing demand - both in quality and quantity - AMA has a huge renovation, transformation and construction challenge. These interventions imply large waste flows of CDW materials for which there are currently only low grade re-utilization routes. This is due to, for example: lack of lifecycle thinking in design stage, suboptimal separation processes, impurities in the materials, absence of market routes, vested interests, and obsolete regulatory frameworks. CDW relates to pressing challenges regarding local and global environmental impact, as well as supply security of raw materials

Plastic bottles: In the city of Amsterdam, plastic bottles are used and disposed in large quantities by tourists. The plastic bottles require high-quality food grade plastic, but they are only one time use items that make up large volumes in the street receptacles and in the waste transport trucks. Aside from being a visual blight, they also enter the environment (e.g. water ways). The anticipated growth in tourism might lead to an increase in plastic bottles. The high drinking water quality in the AMA does not necessitate the purchase of bottled water

Wastescapes

Construction restrictions around Schiphol: Many wastescapes need to be re-developed in a more circular way around the airport. In these areas developments are restricted due to noise and safety regulations, Residential use is not possible within the noise contours. Public health is in danger because of air and noise pollution. New uses should be found when housing is not possible

Derelict greenhouse areas:
Reuse of buildings as well as materials of the glasshouse is difficult because most of them are within the noise contour therefore residential use is not possible. Horticultural businesses lack ideas and knowledge on possible ways to reuse greenhouses for other means than provision of space for new housing developments, such as CE activities or other non-residential uses

Amsterdam Harbour: Underused areas seem to be less present in the harbour area, as most locations are already targeted and designated for the provision of housing for the city of Amsterdam. Polluted land, water and damaged ecosystems are present in the area, because of the presence of the operational infrastructure of waste

Underused business parks and office buildings: In some locations there is a high vacancy rate in office buildings, which calls for rethinking their use

3.3.3 Designing Concept

The aim of the second step is to co-develop concepts or rough prototypes of ideas, products, services, and policies, based on the constructed framework of needs, in each cycle coming from the previous phase. The concepts need to be detailed enough for the user to experience what they are co-producing.

A good methodology involves planning for real by temporary uses (see next chapter).

Some questions are central and can be reiterated at the start of each cycle:

- What is the overall purpose of the Eco-Innovative Solution (EIS) to be designed?
- Which are key user requirements that can be identified?
- Which hardware should the innovation be designed for? (e.g. mobile phone, PC, surf pads, touch-enabled surfaces, or other gadgets)

3.3.4 Co-Evaluating Concepts

The last phase will be based on the encouragement of sharing users thoughts and attitudes towards the concepts developed in the previous phases. After the first cycle, it can be combined with the aim to identify any unexplored needs or needs that are modified in some way during the duration of the cycles.

A good methodology is co-monitoring the change after temporary uses (see next chapter).

Some questions are central and can be reiterated at the start of each cycle:

- What are the main questions that still need to be answered by the proposed EIS, considering users needs and requirements?
- Who are the expected future users? How can they be enlarged?
- How can we encourage and stimulate users to use the EIS during the test period and get back to the Lab?

3.4 Co-producing and testing the service: techniques and methods

3.4.1 Collecting data methods

Data collection for appreciating opportunities phase might be accomplished through different methods, as the following ones:

- Data collection from city, regional or national statistical sources and archives;
- Surveys among (a relevant sample of) the users/stakeholders can provide data on critical points and needs;
- Interviews and focus groups with representatives of the users/stakeholders can help tracing experiences and perceptions; the groups have to be composed by people of different age, gender and ethnic profiles to find out needs and even to measure the EIS results.
- Storytelling, case studies and anecdotal evidence provide additional context information that can be used in evaluations phase too.

3.4.2 Tree of Problems (Challenges) and Objectives (Solutions)

The Tree of Problems (Challenges) and the Tree of Objectives (Solutions) is an established technique for work on problems in groups. It is a simple graphical representation of the problems, their causes and their effects, that can be easily made using with a blank template and sticky notes (post-its) (see Fig. 15).

These are the specific steps:

- List all the problems that come correlated to the main theme. Problems must be clearly identified; they must be current problems and not possible, imagined or future ones. The problem is a negative, existing situation, not the absence of a solution;
- Identify the “fundamental problem” in the tree. Some ‘’trial and error’ can be used to arrive to focusing on the right problem;
- Determine which problems are “Causes” (the roots of the tree) and which are “Effects” (the branches of the tree);
- Arrange in hierarchy both Causes and Effects, as the causes are linked to each other in cause / effect relationships.
- Once completed the Problem Tree, it is possible to use another blank template to move from problems to solutions and build the Objectives Tree. Following the same principle, rephrase all elements in positive affirmations, transforming the problems into solutions (the trunk of the tree), the effects

of changes into expected results (the branches of the tree), and the causes into actions (the roots of the tree).

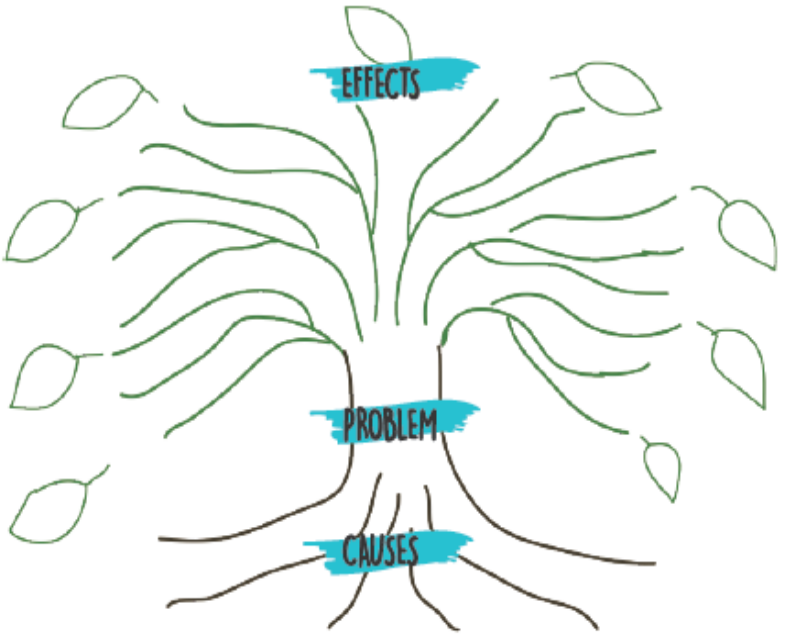


Figure 15: The Problem Tree

Source: Learning Kit – Urbact Summer University 2016

Example from Naples

During the third PULL meeting (September 2017, focused on Biowaste topic and related challenges), Naples organized a small workshop activity, called Tree of Decisions, established on the explained technique of the Problem Tree.

The objective of the exercise, from the point of view of evaluation, was to organize each one argumentations. The displayed chart showed the image of a tree. The roots represented the causes (e.g. not recycled waste), trunk represented the effects of previous causes (e.g. illegal dumpings), the foliage represented the Eco Innovative Solutions (e.g. eco-actions). These solutions could not only be physical actions or simply actions that work on behaviours, but they could have the ability to integrate different components in different ways.

Three post-its were distributed from a facilitator to the present stakeholders, where they could write, compared to their own competence / experience, a relevant /

priority cause, its negative / positive effects and what could be the possible eco-actions.

Eventually, the facilitator read causes, effects and solutions and there was a broad discussion around it, finalized to focus challenges and solutions for Biowaste topic, that experts can then analyze and implement.

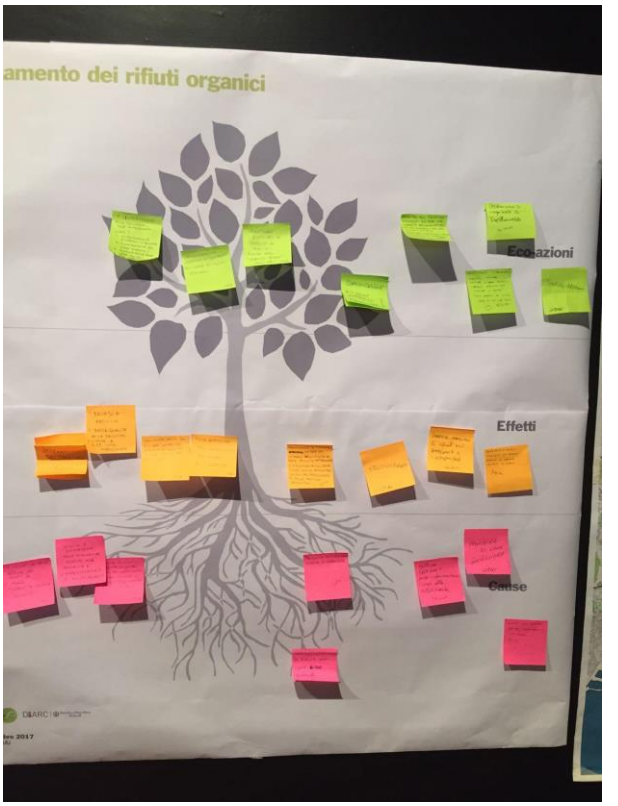


Figure 16: Picture of the exercise called "Naples Biowaste Decisions Tree"

Source: Pull Meeting 3 – September 2017

Example from Amsterdam

The first PULL workshop of the Amsterdam Metropolitan Area focused on sharpening four challenge trees, which represented namely the main challenges of Material Flows, Wastescapes, Cooperation, and Policies and Regulations, in the AMA. In the workshop, the stakeholders were asked to confirm, change and add to the challenge trees.

Each branch on a challenge tree represents one main challenge for the AMA, and each sub-branch represents specific challenges for a particular main challenge branch. Above each challenge tree there are two fringes, each containing a question

for the participants concerning each challenge, namely 'What if we? (who and where)' and 'What should be assessed?'. Participants were asked to provide feedback on each challenge tree by suggesting modifications and inserting sticky notes for each fringe (See Fig. 18 for an example).

Additionally, ideas of possible solutions to overcome challenges were collected, and the stakeholders were asked to indicate who should be involved to make solutions happen. A last step was to find out what needs to be assessed to make a solution valuable. The results from this workshop will be used as input for the next part of the PULL workshop series, which will focus on the development of eco-innovative solutions.

Figure 17: Example of a completed Challenge Tree "Wastescapes"

Source: AMA PULL Workshop 1 – September 2017

3.4.3 Stakeholder Management in REPAiR

The involvement of different stakeholders in the project process is crucial for the delivery of a successful result. A stakeholder is anyone that can be interested or influenced by the project or the strategy that you are developing.[1]

Stakeholder analysis, identification and categorisation is mainly a responsibility of WP6 (cfr. Deliverable 6.1, Chapter 2.2.1) in close collaboration with WP5.

In the perspective of WP5, the involvement of different stakeholders can be achieved following different steps:

1. IDENTIFY: Identifying and selecting;
2. ANALYSE: Analysing stakeholder impacts and interests in the project;
3. PLAN: identifying methods to effectively involve them;
4. ENGAGE: Stakeholder engagement[2].

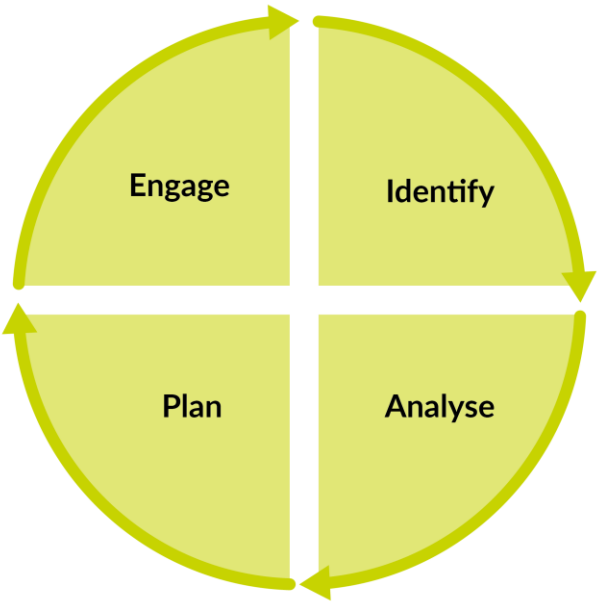


Figure 18: Stakeholder Mapping

Source: UNINA team re-elaboration of the graphic "Stakeholder Mapping" retrieved at: https://www.stakeholdermap.com, last access: 25 September 201.

Graphic by: Libera Amenta

[1] Stakeholder map, 'Stakeholder Mapping', url: https://www.stakeholdermap.com/last accessed: 25 September 2017

[2] Stakeholder map, 'Stakeholder Mapping', url: https://www.stakeholdermap.com/last accessed: 25 September 2017

An illustration of the steps listed above is given by the method applied within REPAiR research project, in the perspective of WP5, for the Stakeholder management and involvement. Specifically, the following actions are carried out:

1. Identify and selecting

Stakeholders are identified in REPAiR in different ways. First of all, they are listed within brainstorming sessions happening between the local project teams for each case study. Basically stakeholders are recognized thanks to the existing relation between the team members and other ongoing or previous projects. Moreover, during the first PULLs meetings the REPAiR team asks the selected stakeholders to point out other people who in their opinion should be involved in the Living Lab.

Specifically, TU Delft and UNINA, after the definition of the project areas, have identified key stakeholders that have direct interest on the sites (D.6.1, Chapter 2.2.1).

Consequently, it is possible to have several iterations in the Identifying and selecting phase (1).

2. Analysing stakeholder impacts and interests in the project

As already stated above, the analysis and categorisation of stakeholders is mainly part of WP6. This currently takes place for the pilots and will follow for the other follow-up cases cases (cfr. D6.3 Detailed Stakeholder and Goal Analysis Framework: Guiding Document). Taking into account WP6 approaches and results, within the perspective of WP5 PULL activities, relevant stakeholders for REPAiR are selected with the help of the Stakeholders Mapping Exercise, elaborated by Stakeholders Mapping approach (https://www.stakeholdermap.com/index.html).

It employs an analytical table (Table 4) useful to identify the interests and motivations of the stakeholders, and their role and influence in the decision-making process as well as possible actions consistent with the different interests expressed by the team of the different Peri-Urban Living Labs.

This table is composed of five columns (Table 4):

- The first column on the left lists all categories of actors who may have an interest and can be divided into two groups: Key Stakeholders (those directly interested in the topic discussed, positively or negatively); Secondary stakeholders (individuals with a role as an intermediary, including the distribution agencies and local political representatives and support agencies such as the social operators). They can be senior or junior, internal or external to the project.

- The following three columns describe the role and involvement of stakeholders: the first should sum up the current situation and how and why each stakeholder is affected by the problem to be addressed, the second is about the impacts he can have on the project itself, the third should note the potential role and the desire to change, while the fourth should focus on how the project can meet their needs.

This exercise can be useful during the whole project, in order to include missing stakeholders and co-monitor the relevance of the people involved. Therefore, different iterations in the Analysing phase (2) are needed.

STAKEHOLDER	INTERESTS	IMPACTS ON	ROLES AND MOTIVATIONS	POSSIBLE ACTIONS
Key Stakeholders	…	…	…	…
	…	…	…	…
Secondary stakeholders	…	…	…	…
	…	…	…	…

Table 4: Influence and importance level

Source: UNINA team simulation

3. Identifying methods to effectively involve them;

Engaging stakeholders requires different actions and efforts according to the importance and the influence that each of them has for the project. Starting from the stakeholders identified in WP6, it's possible to analyse their role in the decision-making process and the related influence and availability to be engaged. The identification of their priorities is relevant for understanding the possibility of activating a cooperation process.

An important exercise for the definition of the priorities among stakeholders, as well as for the identification of the right approach to engage each one of them, is the development of an Influence Matrix (Fig. 20).

This matrix can be created through a role-playing game as in a Triolectic Football Game (Jorn, 1964).

The stakeholders defined in the previous table (Table 4) are inserted in the matrix (Fig. 20), following the criteria of Influence and Importance:

A) High importance, Low influence: It consists of important stakeholders in relation

To the identified problems, but with low influence in the process. However, if they are upset, they can gain influence and try to resist to the proposed change.

B) High importance, High influence: These stakeholders may be impacted by the proposed change and can contribute, both supporting or opposing the proposed actions.

C) Low importance, Low influence: These stakeholders deserve a relative priority that may however require a limited monitoring or at least be kept informed during the process because their status could evolve over time.

D) Lower importance, High influence: These are the stakeholders with high influence, which may affect the outcome of the proposed actions, but whose interests are not in the target of the action.

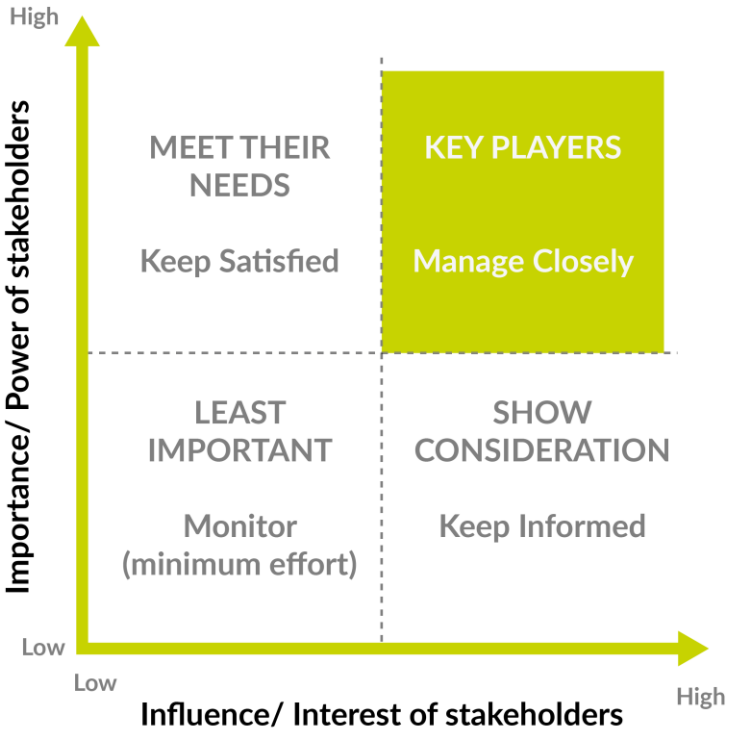


Figure 19: Stakeholder Influence and importance level

Source: UNINA team re-elaboration of the graphic "Stakeholder Analysis" retrieved at: www.stakeholdermap.com, last access: 25 September 2017, and of the graphic: "Power/Interest Grid for Stakeholder Prioritization", retrieved at: https://www.mindtools.com/pages/article/newPPM_07.htm, last access: 25 September 2017.

Graphic by: Libera Amenta

4. Stakeholder engagement

According with the different type of stakeholders analysed following the previous step (3), REPAiR identifies different methods for stakeholder engagement[3]:

- Establishing a partnership with the relevant stakeholder identified;
- Involving stakeholders in the PULLs meetings as part of the research team, asking them to accomplish a specified goal (or task);
- Consulting stakeholders through (online) questionnaires;
- Sharing the findings of the project and the ongoing initiatives of REPAiR through the REPAiR project website and through other social network channels (e.g. Twitter, Facebook, etc.).

3.4.4 Temporary uses: take actions!

Participating in research activities can become a fundamental shift for the construction of a sharing strategy, between institutions, community and associations, operating in the area

It is possible to create a continuous path for the project, where temporary uses are moments of co-design stimulation and co-evaluation.

Starting points can be:

- Planning for real: Method of involvement of the local community in which small groups make plans for the future, using maps or flexible cardboard models.
- Interactive visualizations: Visual Presentations that allow people to participate with contributions and / or changes.

These activities are at the core of GDSE interface with people and stakeholders. Looking at Deliverable D2.1: “stakeholders are asked to work together on a common interface using computer-based geodesign tools linked to a touch-enabled interface [...] The main rationale within a PULL workshop is that specific tools fulfilling specific roles, can be used jointly by the stakeholders using a common information platform linked to an interactive touch-enabled hardware instrument. Major roles include communication and visualisation of information, discussion support, and design and assessment of alternative waste management solutions and eco-innovative approaches”.

[3] Stakeholder Map, ‘Stakeholder Engagement approaches’, retrieved at: https://www.stakeholdermap.com/stakeholder-engagement.html, last access: 25 September 2017).

Building on these accomplishments, it is possible to build actual events, carefully structured as collaborative moments, in which all stakeholders work closely with specialists from different disciplines to create actions for the future of the community or treat certain aspects of it.

What is crucial is not to alter the existing condition through uses not connected to an overall strategy: temporaneity is a catalyst for the project, a pilot case within the long-term implementation.

3.4.5 Co-Monitoring the change

Monitoring is the regular, systematic collection of data about the implementation of the project. Co-monitoring means using the monitoring as a tool to change the roadmap, while the drive is still on, to adjust solutions in a collaborative way.

This will typically include information about the progress of activities and the delivery of outputs, in order to share ownership of success, obstacles and amendments to the project, as well as learning for all.

The frequency of monitoring and reporting will depend on the duration and nature of the Eco Innovative Solutions. During the REPAiR project we will be able to monitoring the evolution of some tests of selected Eco Innovative Solutions .

3.4.6 Testing and implementing Eco-Innovative Solutions in a GDSE - Geodesign Decision Support Environment

In REPAiR project, the GeoDesign Spatial Environment (GDSE) can be considered as the digital enabling context, where the different research results converge in reiterative phases of co-design and co-evaluation, according to the methodological steps implemented by the PULLs, useful to test and implement Eco-Innovative Solutions. GDSE is considered the central approach, and the platform where hard and soft data converge and interplay, elaborating the results of the interaction with the real-life context deriving from the PULLs and where knowledge is shared and co-design process becomes effective using GDSE platform. GDSE is relevant to develop and comparatively assess alternative Eco-Innovative Solutions, and one of the aims of the REPAiR project is to develop, test and apply the GDSE, conceived as an open source product designed for a use within workshop session of the Peri-Urban Living Labs (PULLs), where small groups of participants cooperatively develop strategies consistent with the CE model and with a special focus on waste and resource management.

REPAiR adapts Steinitz's (2012) GeoDesign framework, comprising six questions that are asked at, at least three points in a GeoDesign project to understand the

study area, to specify the methods and to perform the study: 1. How should the study area be described? 2. How does the study area operate? 3. Is the current study area working well? 4. How might the study area be altered? 5. What differences might the changes cause? 6. How should the study area be changed?

Starting from these main issues REPAiR project selected some relevant steps between the WP2 and WP5 and the related deliverables, that identify the relationships among GeoDesign and PULL approach.

From Deliverable D2.1 and D2.2:

• Step 1: A starting set of maps and visualised data is displayed to the stakeholders on the touch-enabled interface including at least: a brief description of the business-as-usual-state in terms of flows, stacks and impacts; a starting set of solutions to specific problems arisen from the analysis of the business-as-usual-state.

• Step 2: The stakeholders assess the displayed data.

• Step 3: The stakeholders discuss the currently displayed setting and: give further information on the business-as-usual-state; describe requirements for solutions and strategies; discuss and further develop the suggested solutions; combine solutions to their preferred strategy.

• Step 4: The solutions and strategies modified by the stakeholder's co-design process are sent to the GDSE column I model version through the touch-enabled interface. Input from stakeholders can be expressed in the form of parameter setting and modification, multiple choice, drawing of simple shapes (i.e., points, lines or polygons). These tools are interactive and intended for workshop-settings, which means that tool users are allowed to provide input and generate output in real time through easy-to-use multiuser interfaces.

• Step 5: The GDSE column I model version recalculates flows, stocks and impacts caused by the modified "design" (= solutions and strategies").

• Step 6: The recalculated maps and charts are displayed on the touch-enabled interface.

• Step 7: The stakeholders reassess the displayed data and flows, stocks and impacts caused by their "design" (= solutions and strategies") using their local expertise.

• Step 8: The stakeholders continue their discussion and optimization (thus, loop back to Step 2).

• Step "X": Within the visualisation component, final solutions and strategies (combination of solutions) and impact assessments are communicated to all stakeholders as maps, flow diagrams and bar charts showing quantitative assessments and rankings."

4 Making the most of transnational exchanges

4.1 International meetings as tools for Living Labs

The exchange within the REPAiR Consortium equals a bridge that facilitates the interaction between local and transnational levels. Each LL provides relevant input and quality for transnational events. In return, they will acquire the knowledge produced during the transnational meetings, which enrich the discussion at the local level, by improving capabilities of the stakeholders.

Most of the partner cities will have the opportunity to host a transnational event. Such an event could have the form of a field trip, seminar, a conference, a bilateral visit, etc.

Hosting colleagues and experts from partner cities allows the Consortium to share local experiences and the progress made on the topic addressed by the project. Members of the local Living Lab have the opportunity to present themselves to their counterparts in other cities to show the solutions and the results achieved.

The members of the local Living Lab also have the option to participate in events organized by other partner cities, to see how they are addressing similar problems, in order to find specific solutions, adapting the experiences of others to their own local context.

Example from Naples:

Within the 1st Consortium Meeting, REPAiR Kick-off Meeting in Amsterdam/Delft, Naples has organized a Market Place activity around the topic of Eco-Innovative Solutions. This experience has produced vibrant ideas and initial designs, core of the first Book of Ideas produced by the Consortium.

The 2nd Consortium Meeting has been organised by UNINA research group in the location of the University of Naples Federico II in June 2017.

Example from Amsterdam:

So far, TU Delft organised the 1st Consortium Meeting, REPAiR Kick-off Meeting in Amsterdam/Delft that took place in November 2016 in the Netherlands.

It was a wonderful opportunity to share knowledge and experience methods of mutual understanding. This type of event helped members feel part of a dynamic group, allowing them to make a useful exchange of ideas and opinions.

In-depth analysis: for more on the 1st Consortium meeting and/or Market Place, see the attached Book of Ideas.

4.2 University education and Teaching activities

4.2.1 How to carry out the mapping exercise with the students

For the students involved in the LL, participation brings the advantage of working in multidisciplinary teams on real-life projects on the interface of research and design, and therefore learn skills that will be crucial for their future employability and professional success (and entrepreneurial skills).

The initial exercise for students coincides with the actual mapping to define borders and cases, following waste and Wasted Landscapes (better defined in the attached Spatial Analysis Glossary as “Wastescapes”) life cycles.

In the research project, institutional boundaries cannot be considered as the only relevant boundaries for spatial or flows analysis: therefore, the research needs to define case study areas going beyond the city boundaries, crossing provincial boundaries and going beyond any predefined definition of functional urban area (FUA).

Case studies should be defined following a multi-sectoral approach, able to integrate dimensions and to involve institutions and communities expectations.

National and local policies regulate the legal management of waste by shaping peri-urban areas through “operational landscapes of waste” (see the definition in the attached Spatial Analysis Glossary) which are made of incinerators, landfills, waste-recycling plants, waste-water processing plants and even former industrial areas waiting for reclamation by the State. At the same time, for analysing the overall waste metabolism, we have also to consider the Wastescapes, including: stretches of agricultural land housing; illegal constructions; portions of abandoned historical heritage; housing or productive facilities confiscated by the state; abandoned or soon to be abandoned factories and shopping malls; surfaces, areas and infrastructures designed to host marginal lives.

In-depth analysis: for more on Wastescapes, see attached Spatial Analysis Glossary.

Example from Naples:

In the pre-lab phase , the UNINA team has carried out an initial Mapping Exercise with two courses of students, to define the case study areas at the various scales. The courses are:

- Third year Urban Planning Course (Urban and Spatial Planning Bachelor Degree) – 25 students;
- Fifth year Urban Planning Course (Architecture Master Degree) – 50 students;
- Thesis dissertation (Architecture Master Degree) – 2 students;
- PhD 1st and 2nd year (Urban and Spatial Planning) – 2 students.

In particular, there is a proposition of a 2.5x2.5 Square Kms grid, crossing sectorial, administrative borders within the Metropolitan Area of Naples. Within the grid, the exercise has seen the research of peculiar conditions, contemporarily involving environmental, social and economic vulnerabilities of the peri-urban territories, declined through the interpretative lens of waste and Wastescapes.

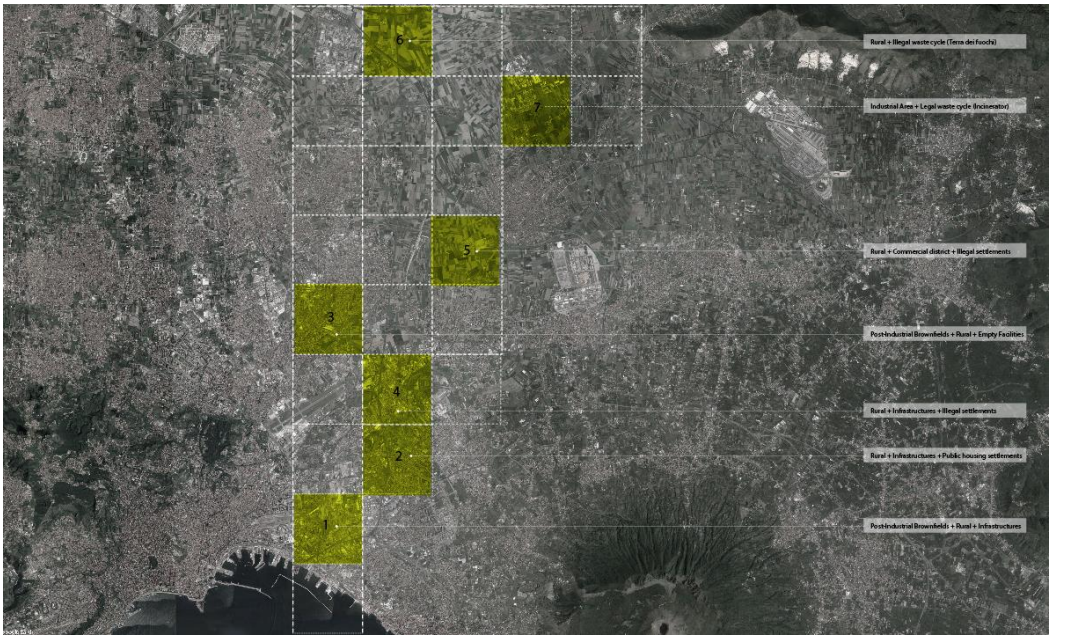
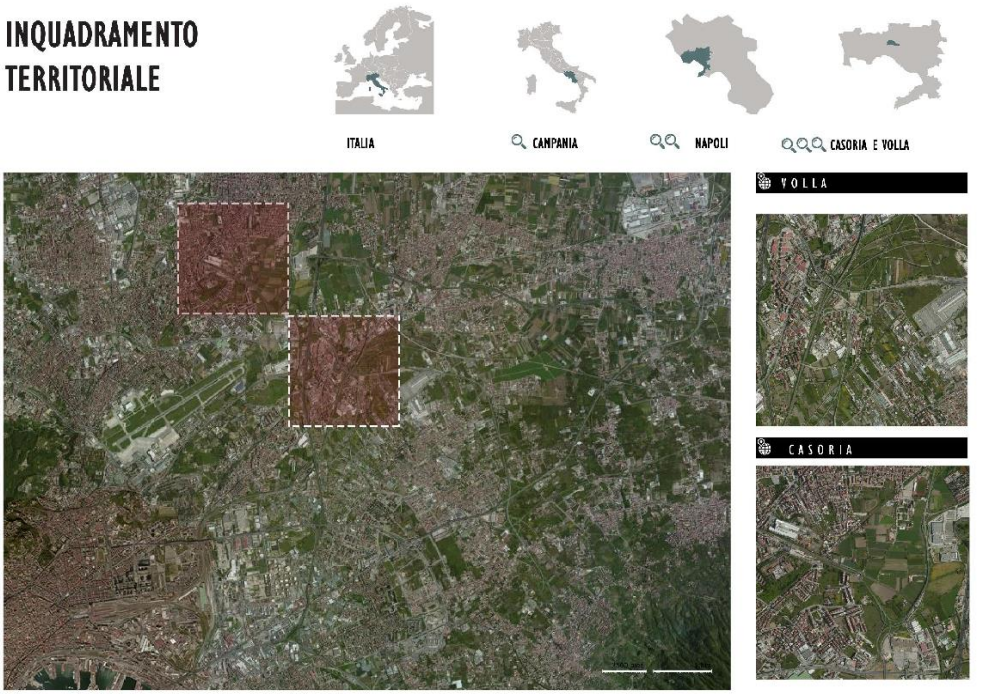


Figure 20: Metropolitan Area of Naples example grid: peri-urban territories into the metropolitan area. We focus on this sub-region because of the relevant presence of several topics related to REPAiR topics: the presence of a lot of wasted landscapes but also the importance of big waste treatment and disposal plants.
Source: Enrico Formato elaboration



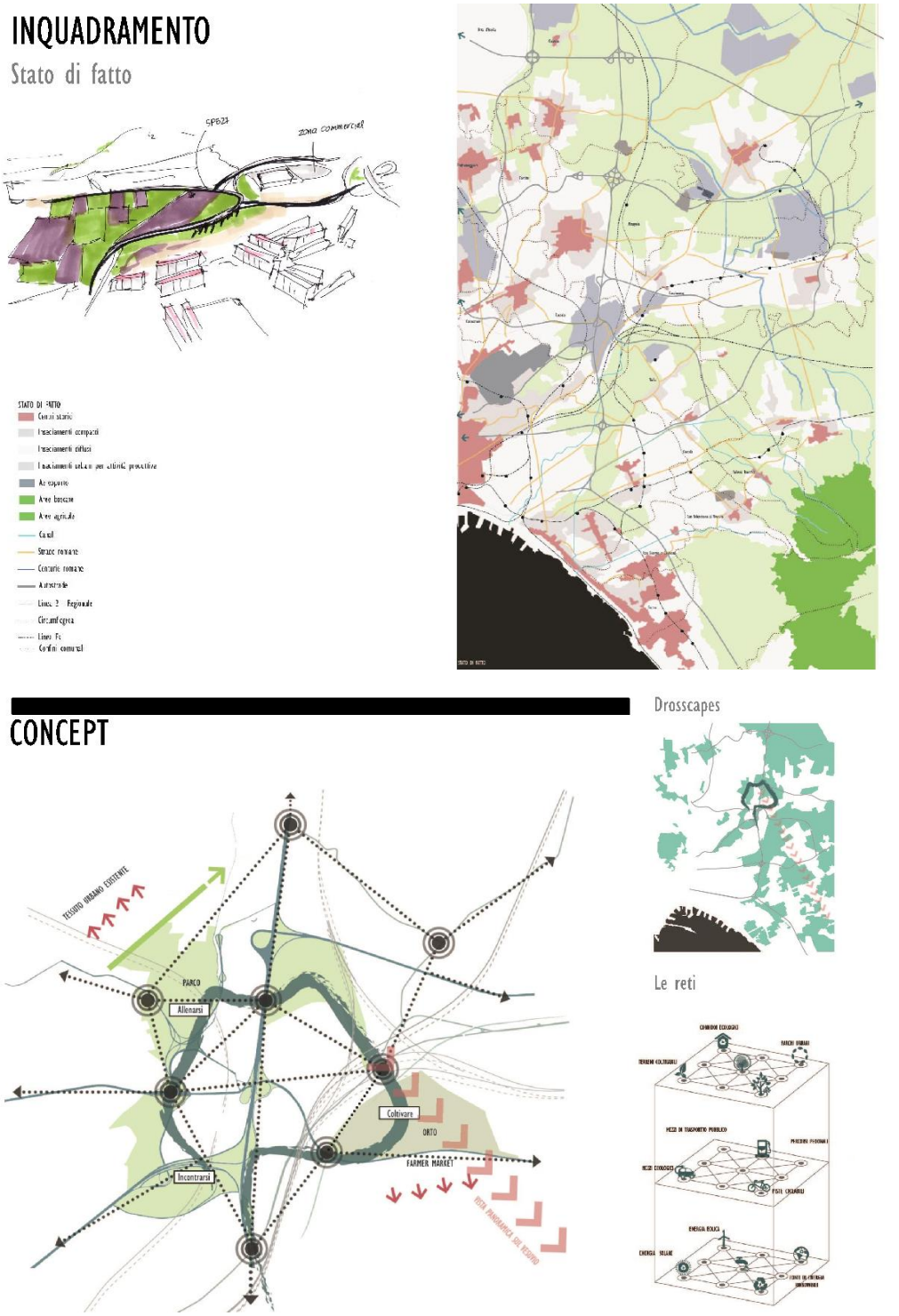


Figure 21: First examples of students' exercise on the project area at UNINA

Source: UNINA students

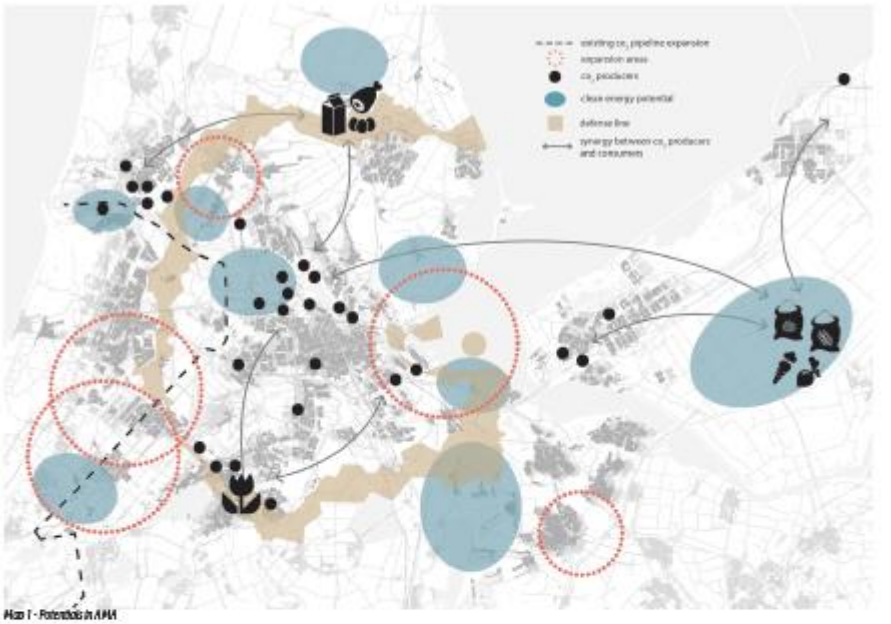
Examples from Amsterdam

In the pre-lab phase, the TUD team has carried out a Research and Design Studio-Spatial strategies for the Global Metropolis - with 80 international urbanism Master students. Aim of the Studio was to develop integrative spatial development Visions and Strategies for the Amsterdam Metropolitan Area that should spur the transition towards a circular economy. This integration meant that members of the REPAiR team were part of the studio mentor teams and provided additional methodological input for material flow analyses and systemic design.

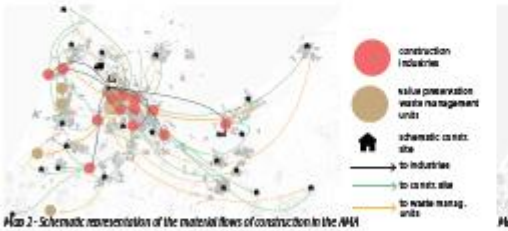
- Fifth year Urban Planning Course (Architecture Master Degree) – 50 students;
- Thesis dissertation (Architecture Master Degree) – 2 students;
- PhD 1st and 2nd year (Urban and Spatial Planning) – 2 students.

Course description and a Book of results can be found (after November 2017) on the REPAiR webpage. The following figures show some examples.

Additionally, in order to test transdisciplinary geo-design methods the course Geo-design for a Circular Economy in Urban Regions was developed and given for the first time. Students from Urbanism, Architecture and Industrial economy were working jointly on eco-innovative solutions for a more circular Amsterdam Metropolitan area. Also their results will be made available via the REPAiR webpage.



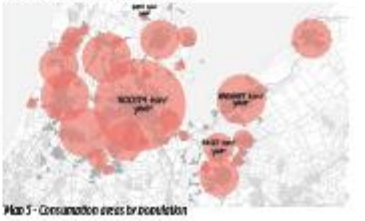
Map 1 - Potentials in AMA



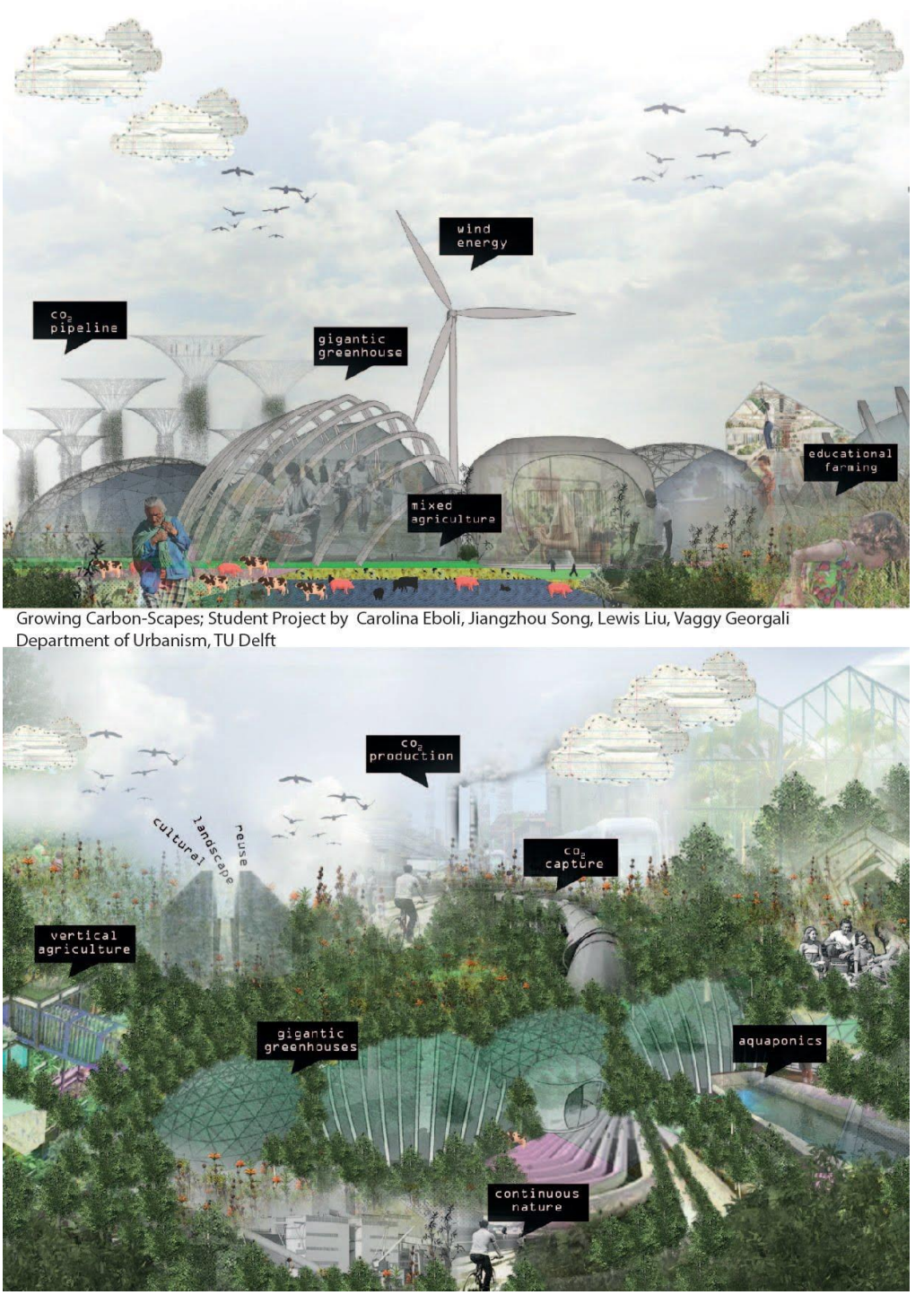
Map 2 - Schematic representation of the material flows of construction in the AMA

Map 3 - Types of landscape: low biodiversity

Map 4 - Energy roadmap in Amsterdam metropolitan area



Map 5 - Consumption areas by population



Growing Carbon-Scapes; Student Project by Carolina Eboli, Jiangzhou Song, Lewis Liu, Vaggy Georgali
Department of Urbanism, TU Delft

Figure 22: Student Project - Growing Carbon-Scapes - Carolina Eboli, Jiangzhou Song, Lewis Liu, Vaggy Georgali - Department of Urbanism, TU Delft

Impressions of a post fuel landscape. Student Project by Wang Yi, Hu Ye, Karishma Asarpota, Oukje van Merle
Department of Urbanism, TU Delft

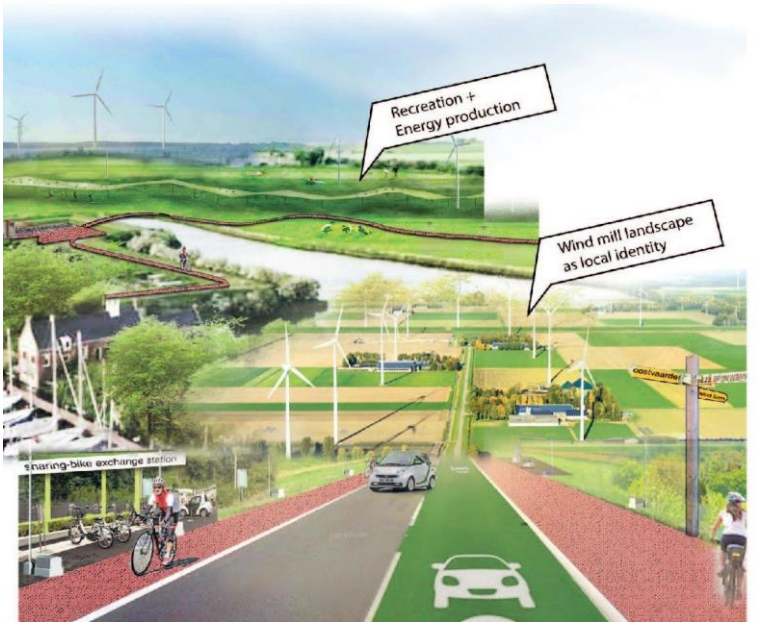


Figure 23: Student Project – Impressions of a post fuel landscape - Wang Yi, Hu Ye, Karishma Asarpota, Oukje van Merle - Department of Urbanism, TU Delft

4.2.2 Testing Eco-Innovative Solutions in Architecture and Urban Planning Courses

Groups of students working on the study areas over several years (four in the case of REPAiR), not only help to conduct the basic research activities, but moreover they can help in testing actual sets of Eco-Innovative Solutions.

Following the Market Place technique, used in the first Consortium Meeting, students are divided in groups, aimed at Eco-Innovative Solutions design.

The groups can be made within one singular teaching course or, in a workshop, mixing students from various disciplines (architecture and planning, as concerns TU Delft and UNINA). The mixing of competences and abilities, even from students of different ages, can be fruitful in developing EIS.

But the real element of opportunity stands in the EIS testing: since users requirements can change as the problem develops into possible solutions, it is important to re-examine initial needs, making sure they correlate to updated requirements, eventually coming up with new solutions.

Therefore, the EIS testing with students has to be iterative, following the idea that the implementation of solutions goes through iterative interactions between students competences and perspectives.

In -depth analysis: for more on Market Place, see attached Book Of Ideas

4.2.3 International workshops and international exchanges

Naples and Amsterdam students activities take place simultaneously. Below there is a scheme from REPAiR proposal presenting a preliminary structure of the pilot PULLs, where results of student work and research activities are integrated.

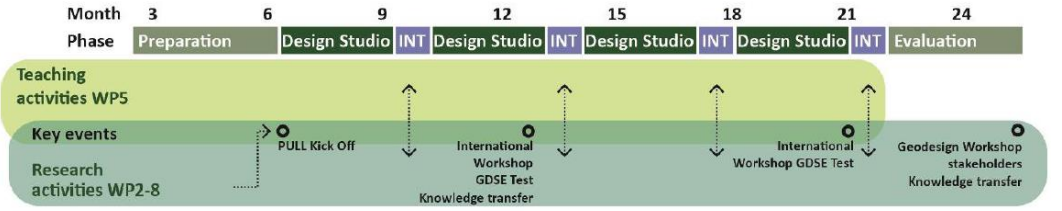


Figure 24: Living Labs and teaching activities

Source: REPAiR project proposal, elaboration Libera Amenta

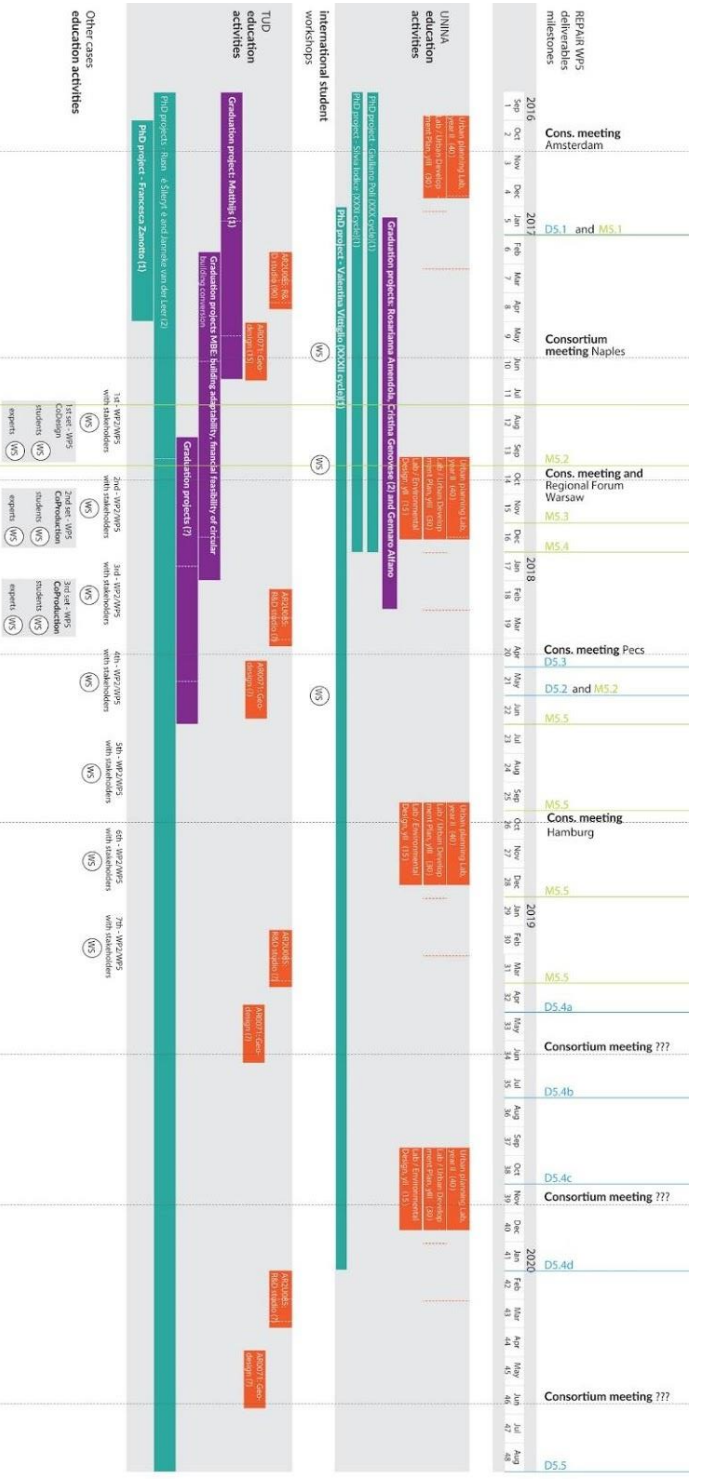


Figure 25: Preliminary timeline for all PULLs - 4 years
Source: Elaboration Janneke van der Leer

Education activities:
BSc and MSc courses/studios/labs: (expected) number of students involved in brackets
MSc graduation/thesis: (expected) number of students involved in brackets
PhD projects: (expected) number of students involved in brackets

Deliverables and milestones:
D5.1 - Methodological guidelines (Handbook) for the PULLs
M5.1 - Definitive location, organizational settings and educational outline for two pilot PULLs. Amsterdam and Naples ready
M5.2 - International student workshop bringing together the multidisciplinary teams from both pilot cases
M5.3 - First set of solutions for a selection of challenges in pilot cases ready to be integrated into the GDSE ready
M5.4 - Definitive location and organizational settings of PULLs for follow-up studies ready
D5.3 - Handbook: How to run a PULLs
D5.2 - Catalogue of solutions and strategies for AMS and MAN
M5.5 - Final presentation and evaluation of student work of the follow-up PULLs
D5.4a to d - Catalogue of solutions and strategies for follow up cases
D5.5 - Updated handbook: how to run a PULLs for dissemination purposes

In addition to the already planned International Workshop GDSE Test and Knowledge Transfer (due in June 2017), the aim of the project is to enhance exchanges among university students within the consortium.

In the initial phase, exchanges will happen between TU Delft and UNINA students and they will consist in one-week long trip to the other university, aimed at field trips and seminars. The specific education details will be decided on an actual basis, but the overall idea is to get the opportunity for the students to visit foreign schools of Architecture and Planning and work on comparable case studies.

5 The role of knowledge transfer in PULLs

5.1 Knowledge transfer in REPAiR

Transfer of knowledge or transfer, exchange of good/best practices is a widely used phenomenon in European and international development policies at all levels (local, regional or national), between individuals and organisations across boundaries. Knowledge transfer is especially frequent between the economically "leading" and "lagging" territories. There are substantial differences among EU member states in governance, in administrative cultures, in knowledge in use in everyday life, in technology in use, in composition of stakeholders, in objectives and focus, in motivation, in behavioural and socio-cultural aspects etc. (Duan et al. 2010, Stead 2012), making such transfer an exercise riddled with complexity and uncertainty about the 'transferability' of practices across different territorial settings. In fact, the research on policy transfer and transfer of best practice in planning (see e.g. Dolowitz & Marsh, 2000; Stead, 2012) stresses the pitfalls of transfer of practices and solutions without considering their applicability to the local context, which tends to produce disappointing, if not downright damaging results. The challenge lies in the appropriately prepared list of conditions to make a successful transfer and a distinction between the practices that are widely transferable across different contexts and practices which are context-dependent and thus with limited scope for applying elsewhere.

One crucial aspect of knowledge transfer in collaborative modelling-based geodesign research is the capability of the models to include, (next to the evidence-based knowledge) as much knowledge from key stakeholders (private, academic, institutional) as possible that participate in the LLs. The GDSE to be developed for and by REPAiR will be strongly based on modelling, which will in turn require knowledge (in the form of data, parameters, layers, models, etc.) to be fed from the the internal research of the REPAiR team.

Peri-urban Living Labs – including teaching and workshop activities – constitute a tool that enables the relevant industries and stakeholders to present, test and assess newly developed technologies in a "real-world" environment and in "real time". (The feedback loops that will occur when the GDSE is implemented (via "what-if" tools) in the workshops of the PULLs will also act as knowledge transfer tools: iteratively, from users to the models and into the designs of the solutions.) The eco-innovative waste management solutions and strategies generated in PULLs will be selectively and strategically transferred to other case study areas. Hence,

from the viewpoint of knowledge transfer. LL is not only a tool to be transferred but it is a tool for learning and knowledge transfer itself.

5.2 Knowledge transfer events as part of the Living Lab workshops

The plan is to organise six knowledge transfer events (workshops) bringing together the relevant stakeholders as part of the living labs in six case study areas. Local REPAiR (project) partners (organisers of the specific workshops) will be asked to invite the relevant local stakeholders (from the peri-urban area) to participate in the workshops. The purpose of these events is to demonstrate transferable solutions, discuss the scope for their adoption elsewhere, as well as to gather feedback from the participants that will be used to refine the methodology of knowledge transfer (T 7.4) and to elaborate the online handbook of knowledge transfer (T 7.5).

5.3 Guidelines for the contribution and participation of WP7 to PULLs

The “knowledge transfer events” as part of the LLs in the six peri-urban areas would entail the following.

Key non-academic partners – related to the relevant LLs (where the event takes place) – will be asked to give short presentations on how relevant is learning from other areas for them and how this learning takes places in practice. (At the kick-off meeting, from each peri-urban areas, a representative was asked to present a challenge and its solution, based on a given guideline). Using the updated guidelines, we aim to ask other key stakeholders to give short presentation about their challenges and solutions, their learning processes.

In LLs workshops for knowledge transfer will be organised. Workshops will contain group work on knowledge transfer in order to reveal facilitators and barriers and key channels for learning. We are planning mixed groups with different stakeholders from different countries. Practices identified in the different areas will be discussed from the point of view of their suitability to other contexts. (A test workshop was planned at the kick-off meeting.)

The events will also be an opportunity to present first ideas on knowledge transfer, getting feedback on the draft transfer methodology (T 7.4.) by the WP leaders of knowledge transfer.

After the workshop day, a report listing good examples and (positive and negative) factors affecting learning/knowledge will be prepared and fed into T 7.4.

Participants will also be asked to fill out a very short questionnaire about learning.

Focus group interviews will be carried out as part of the LLs with a group of students participating in LLs. The aim is to reveal the potential and the role of LLs as a knowledge transfer tool.

In order to understand better the LLs as a knowledge transfer channel, a separate survey will be carried out at the beginning and at the end of the PULLs in the six peri-urban areas (PUAs). The main goal of these surveys is to detect the expectations (at the beginning of the LLs) and the perceptions of participants in different PUAs (with different social-cultural background) and to compare these expectations and perceptions from the viewpoint of knowledge transfer.

A detailed description on the structure and method of knowledge transfer can be found at the sharepoint.

5.4 Public network exchange outputs: Book of Ideas

During the Session on Workpackage 5 in the First REPAiR Consortium Meeting in Delft (november 2016), no minutes were taken, but the results were reported within the attached Book of Ideas, capturing all important thoughts as a memory aid. It is an example of a publishing tool, useful as a network exchange and a creative communication output, aimed at delivering a message to a specific target group. The Book of Ideas is then ment for the participants of the First Consortium Meeting, for their colleagues, who are following the project, and for the interested REPAiR User Board community, giving everyone the opportunity to stay involved; reacting, correcting or supplementing the ideas in their own partner organization. It is an interpretation of the very first results of the discussions of the team members, giving account to the specificities of the Session on WP5, and in general of the Meeting crucial points, capturing the energy and atmosphere of the meeting (e.g. with regards to catering and drinking bottles meanings, to significant pictures, etc.). This way it is intended to inspire, but also to encourage the partners to reflect on the meeting, on the state of art and on the very fundamentals of the consortium activities.
This tool could grow and be used in the future by other host cities of the consortium. It is a quite challenging exercise, because it forces to reflect on the time spent together in the meeting and on the exchanged ideas. It is not the closing chapter of a meeting, but more a starting point to talk, experiment and exchange what partners have learned.

In sum, the motivation to have such book of ideas lies in the fact that contains the results of the meeting where the very first brainstorming of the REPAiR research team took place; through it we put together different approach for developing Eco-Innovative Solutions for waste and wastescapes; it was a way to reinforce cohesion and a spirit of mutual collaboration in the team group too.

This tool was used also in other contexts4 because it allows to create a logbook of the different issues that are explored.

The ideas reported in the Book of Ideas have been the foundation of the current Eco-Innovative Solutions developed for the pilot cases of Naples and Amsterdam, developed in co-creation with local stakeholders. It will be possible to briefly mention this work in an ongoing publication we are working on, and specifically the paper for a special issue of the journal Urban Planning.

Therefore, the solutions of the book of ideas represented a kind of common ground among different stakeholders (members of the consortium, citizens, students, etc.) to proceed with the next stages of the PULL methodology. This book was developed in a preliminary phase of the project, so the ideas have been seen as a base to start the further discussion.

[4] For more examples of Book of Ideas, see Urbact III network Sub>urban Re-inventing the fringe: https://urbact.eu/sub.urban.

6 Next steps

The present deliverable D 5.1 is the first of WP5, and it has been updated during the development of the first PULL meetings.

A timeline of the first two years of Pilot PULLs is presented below. As the two cases had very different starting point, considering key knowledge on CE, it is apparent that the PULLs will differ reflecting this differences.

That's why Amsterdam had the chance to start since the beginning of the process working directly on CE Initiatives (see Month #0), while Naples chose to start creating interest around stakeholders to REPAiR consortium (see Month #8).

However, within the process, the two Pilot Pulls started aligning their process among themselves and with the GDSE, starting from challenges, then going on solutions and eventually to co-design strategies.

The first year has seen the focus on challenges on each case study (see Months #11, #13, #14), even if the same activity in Naples has been divided in several meetings, in order to "enhance" stakeholders knowledges there were not used to talk in terms of CE, while in Amsterdam the same goals have been achieved quickly because stakeholders were more used to CE topics and perspectives.

Consortium Meetings are also understood as occasions in which organizing Design Workshops for the development of Eco-Innovative Solutions, as you can see in the table below (e.g. in the case of Warsaw Third Consortium Meeting).

#	Month	AMSTERDAM	Topic	NAPLES	Topic
0	August	Preliminary PULL Workshop	Circular Economy initiatives in AMA		
1	September				
2	October				
3	November				
4	December				
5	January				
6	February				
7	March				
8	April			Preliminary PULL Workshop	REPAiR Intro - Meeting the stakeholders
9	May	Students **Design Workshop**		Students **Design Workshop**	
10	June	Students **Design Workshop**		Students **Design Workshop**	
11	July			PULL workshop 1	Challenges
12	August				
13	September	PULL workshop 1	Challenges	PULL workshop 2	Organic Waste (Topic and challenges)
13	October	Consortium Meeting **Design Workshop**	From Challenges to solutions	Consortium Meeting **Design Workshop**	From Challenges to solutions

		In Warsaw		In Warsaw	
14	November			PULL Workshop 3	CDW (Topic and challenges)
14	November	**Milestone 20**	First set of solutions for Amsterdam	**Milestone 20**	First set of solutions for Naples
15	December	PULL workshop 2	Solutions	PULL workshop 4	Solutions
16	January				
17	February	**Design Workshop**		**Design Workshop**	
18	March	PULL workshop 3	Solutions	PULL workshop 5	Solutions
19	April	Consortium Meeting **Design Workshop** In Pecs	Refine solutions and test in the GDSE	Consortium Meeting **Design Workshop** In Pecs	Refine solutions and test in the GDSE
20	May				
21	June	PULL workshop 4	Co-design strategies	PULL workshop 6	Co-design strategies

Table 5: Pilot Pulls Timeline

Source. TU Delft and Unina team

The next steps on its way to implementation within the project have to involve the follow-up cases and therefore enlarge the discussion towards the PULL leaders of all the cases. With respect to this context, Table 5 lists the key actions during the next months of the project that will define and concretise the Living Labs in more detail.

Deliverable /Milestone	Key Tasks in relation to WP 5	Key Responsible Partners	Due Month
MS20 First set of solutions for pilot cases	T5.2	UNINA	15
MS21 Organizational settings of Pulls for follow up	T5.3	UNINA	15
D5.2 Eco-innovative solutions Amsterdam	T5.2	TUD	21
D5.3 Eco-innovative solutions Naples	T5.2	UNINA	21
MS19 International students workshop	T5.2	TUD	13-21
D5.4 Handbook: How to run a PULL	T5.3	UNINA	21
MS22 Student presentation follow up Pulls	T5.4	UNINA	22-25-28-31
D5.5 Eco-innovative solutions Ghent	T5.4	UGENT	32
D5.6 Eco-innovative solutions Lodz	T5.4	IGiPZ	35
D5.7 Eco-innovative solutions Hamburg	T5.4	HCU	38
D5.8 Eco-innovative solutions Pecs	T5.4	RKI	41
D5.9 Final Updated Handbook: How to run a PULL for dissemination purposes	T5.5	UNINA	48

Table 6: Next milestones and deliverables, which further define and concretise the Living Labs

Here follows a hypothesis of Roadmap for the WP5 tasks related activities, with the involvement of the partners that have a small involvement in the WP5.

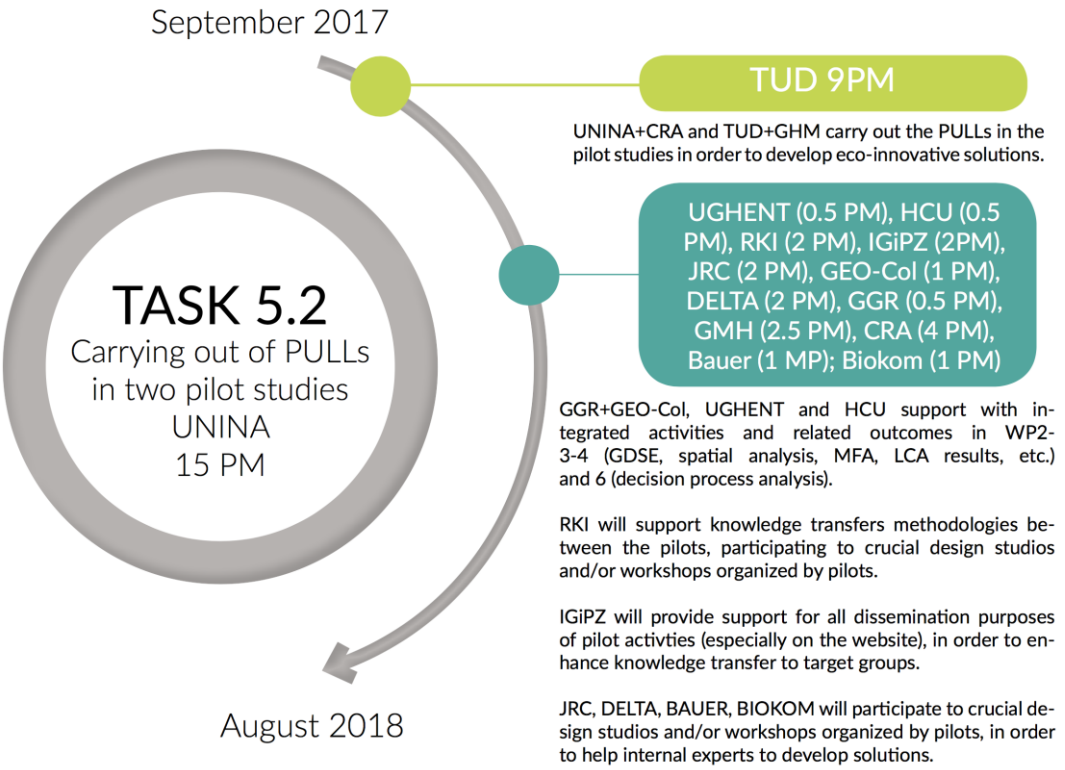


Figure 26: Roadmap for the WP5 tasks related activities
Source: Elaboration Libera Amenta and Anna Attademo

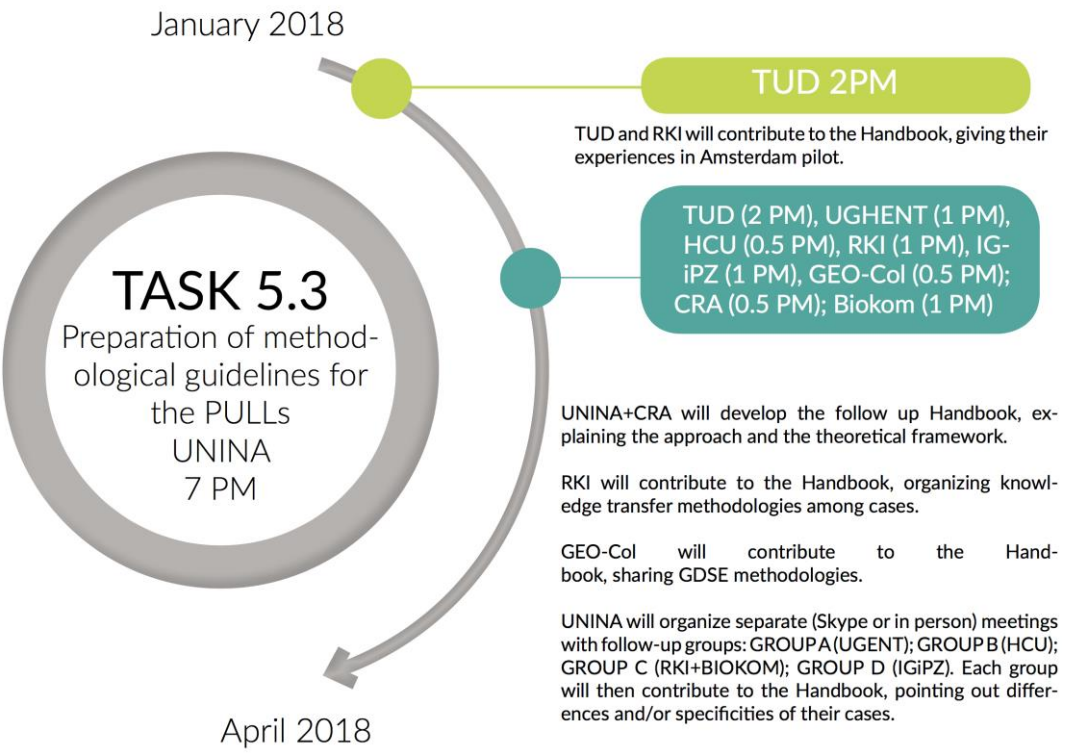


Figure 27: Roadmap for the WP5 tasks related activities
Source: Elaboration Libera Amenta and Anna Attademo

References

Abowd, G. D. (1999). Classroom 2000: An Experiment with the Instrumentation of a Living Educational Environment, *IBM Systems Journal*, vol. 38, n. 4, 508–530.

Allen, A., Broto, V.C. & Rapoport, E. (2012). Interdisciplinary Perspectives on Urban Metabolism. A review of the literature, *Journal of Industrial Ecology*, 16(6), 851–861.

Azzopardi, L., & Balog, L. (2011). Towards a Living Lab for Information Retrieval Research and Development: A Proposal for a Living Lab for Product Search Tasks, in *Proceedings of CLEF 2011: Conference on Multilingual and Multimodal Information Access Evaluation*, LNCS 6941, September 2011: 26–37.

Bajgier, S., M., Maragah, H. D., Saccucci, M. S., Verzilli, A., & Prybutok, V. R. (1991). Introducing Students to Community Operations Research by Using a City Neighborhood as a Living Laboratory, *Operations Research*, vol. 39, n. 5, 701–709.

Ballon, P., Pierson, J., & Deleare, S. (2005). Test and Experimentation Platforms for Broadband Innovation: Examining European Practice, *Proceedings of the 16th European Regional Conference*, *International Telecommunications Society*, Portugal, 4-6 September 2005, 1-22.

Ballon, P., Glidden, J., Kranas, P., Menychtas, A., Ruston, S., & Van der Graaf, S. (2011), Is there a Need for a Cloud Platform for European Smart Cities?, in P. Cunningham & M. Cunningham (Eds), *Proceedings of the eChallenges e-2011 Conference*, Dublin, International Information Management Corporation (IIMC).

Bergvall-Kåreborn, B., Ihlström Eriksson, C., Ståhlbröst, A., & Svensson, J. (2009). A Milieu for Innovation: Defining Living Labs, in K. R. E. Huizingh, S. Conn, M. Torkkeli, & I. Bitran (Eds.), *Proceedings of the 2nd ISPIM Innovation Symposium: Simulating Recovery – The Role of Innovation Management*, New York City, USA 6–9 December, 2009.

Cerreta, M., & Fusco Girard, L. (2017). *Smart landscapes. Hybrid decision-making processes for the spatial innovation*, Clean, Naples, Italy.

Cerreta, M., & Panaro, S. (2017). *Cilento Labscape: a Living Lab approach for local innovation networks*. Proceedings of Living Cities, Liveable Spaces: Placemaking and Identity, 22-24 November 2017, La Valletta, Malta.

Concilio, G., & Rizzo, F. (2016). *Human Smart Cities. Rethinking the Interplay between Design and Planning*, Springer, Heidelberg, The Netherland.

Concilio, G. (2016). Urban Living Labs: Opportunities in and for Planning. In

Concilio, G., Rizzo, F. (eds), *Human Smart Cities. Rethinking the Interplay between Design and Planning*, Springer, Heidelberg, The Netherland, 21-40.

Concilio, G., & De Bonis, L. (2012), Smart Cities and planning in a Living Lab perspective, in Campagna, M., De Montis, A., Isola, F., Lai, S., Pira, C., Zoppi, C. (eds.), Planning Support Tools: Policy Analysis, Implementation and Evaluation, *Proceedings of the VII Int.l Conf. on Informatics and Urban and Regional Planning INPUT 2012*, FrancoAngeli, Milano.

Concilio, G., De Bonis, L., Leanza, E., Marsh, J., & Trapani, F. (2014). Co-Creative, Re-Generative Smart Cities. Smart Cities and Planning in a Living Lab Perspective 2, *TEMA. Journal of Land Use, Mobility and Environment*, 260-270.

CoreLabs (2008). CoreLabs from AMI@Work communities wiki. http://www.ami-communities.net/wiki/CORELABS.

Dolowitz, D. & Marsh, D. (2000). Learning from Abroad: The role of Policy Transfer in Contemporary Policy Making, *Governance: An International Journal of Policy and Administration*, vol. 13, n. 1, 5-23.

Duan, Y., Xu, M, & Feng, W. (2010). Transnational knowledge transfer, in Schwartz, D. (ed.), *Encyclopedia of Knowledge Management*, IGI Publishing, 1512-1524.

Dutilleul, B., Birrer, F. A. J., & Mensink, W. (2010). Unpacking European Living Labs: Analysing Innovation's Social Dimensions, *Central European Journal of Public Policy*, vol. 4, n. 1, 60–85.

EC (2009). *Living Labs for user-driven open innovation. European Commission*, Office for Official Publications of the European Communities, Luxembourg.

ENoLL (2016). Open Living Labs. The First step towards a new Innovation System, retrieved from http://www.openlivinglabs.eu/

Eskelinen, J., Garcia Robles, A., Lindy, I., Marsh, J., & Muente-Kunigami, A. (2015). *Citizen-Driven Innovation. A guidebook for city mayors and public administrators*, The World Bank, Washington, DC.

Eriksson, M., Niitamo, V. P., & Kulkki, S. (2005). *State-of-the-art in utilizing Living Labs approach to user-centric ICT innovation-a European approach*, Center for Distance-spanning Technology, Lulea University of Technology Lulea, Sweden.

Feurstein, K., Hesmer, K. A., Hribernik, K.D., & Schumacher, J. (2008). Living Labs: A New Development Strategy, in J. Schumacher & V.-P. Niitamo (Eds), *European Living Labs. A New Approach for Human Centric Regional Innovation*, Berlin, Wissenschaftlicher Verlag, Berlin, 1-14.

Gemeente Rotterdam, IABR, FABRIC, JCFO, & TNO. (2014), *URBAN METABOLISM*

Sustainable development of Rotterdam, Rotterdam.

Girardet, H. (2004). *Cities, People, Planet. Urban Development and Climate Change*, John Wiley and Sons, Hoboken (NJ).

Higgins A., Klein S. (2011). Introduction to the Living Lab Approach, in: Tan YH., Björn-Andersen N., Klein S., Rukanova B. (eds), *Accelerating Global Supply Chains with IT-Innovation*, Springer, Berlin, Heidelberg.

Innovation Alcotra (2013). *La creazione di Living Lab transfrontalieri*, Torino.

Intille, S. S., Larson, K., Beaudin, J. S., Nawyn, J., Munguia Tapia, E., & Kaushik, P. (2005). A Living Laboratory for the Design and Evaluation of Ubiquitous Computing Interfaces, in Extended Abstracts of the 2005 Conference on Human Factors in Computing Systems: 1941–1944, ACM Press, New York, NY.

Intille, S. S., Larson, K., Munguia Tapia, E., Beaudin, J., Kaushik, P., Nawyn, J., & R. Rockinson, R. (2006). Using a Live-In Laboratory for Ubiquitous Computing Research, in K. P. Fishkin, B. Schiele, P. Nixon, & A. Quigley (Eds.), *Proceedings of PERVASIVE 2006*, LNCS 3968, Springer-Verlag, Berlin Heidelberg, 349-365.

Jie, Q. (2016). *Circular Buildings the Urban Living Lab Way. A Practical Facilitation Tool as Guidance for a Circular Building Process as Collaborative Ecosystem*, MSc Thesis Industrial Ecology, Delft University of Technology, Delft.

Jorn, A. (1964). *De la méthode triolectique, dans ses applications en situlogie générale*, Institut Scandinave de Vandalisme Comparé.

Juujärvi, S., & Pesso, K. (2013). Actor Roles in an Urban Living Lab: What Can We Learn from Suurpelto, Finland?, *Technology Innovation Management Review*, November, 22–27.

Kviselius, N. Z., Andersson, P., Ozan, H., & Edenius, M. (2009). Living Labs as Tools for Open Innovation, *Communications and Strategies*, vol. 74, n. 2, 490–504.

Leminen, S., & Westerlund, M. (2011). Managing the Challenges of Becoming an Open Innovation Company: Experiences from Living Labs, T*echnology Innovation Management Review*, vol. 1, n. 1, 9–25.

Leminen, S., & Westerlund, M. (2012). Towards Innovation in Living Labs Network, *International Journal of Product Development*, vol. 17, n. 1/2, 43–59.

Leminen, S. (2015). Q&A What are living labs?, T*echnology Innovation Management Review*, vol. 5, n. 9, 29–35.

Liedtke, C., Welfens, J., Rohn, H., & Nordmann, J. (2012). Living Lab: User-Driven Innovation for Sustainability, *International Journal of Sustainability in Higher*

Education, vol. 13, n. 2, 106–118.

Mavridis, A., Molinari, F., Vontas, A., & Crehan, P. (2009). A Practical Model for the Study of Living Labs Complex Environment, in *Proceedings of the 3rd IEEE International Conference on Digital Ecosystems and Technologies* (DEST '09), 1–3 June, 2009.

Mulder, I., Velthuas, D., & Kriesn, M. (2008). The Living Labs Harmonization Cube: Communicating Living Lab Essentials, *The Electronic Journal for Virtual Organizations and Networks*, n. 10, 1–14.

Mulder, I., & Stappers, P. J. (2009). Co-Creating in Practice: Results and Challenges. Paper presented at the 15th International Conference on Concurrent Engineering (ICE 2009), Leiden, The Netherlands, 22–24 June, 2009.

Mutanga, M. B., Dlamini, I., Chani, T., Ndelela, N., & Adigun, M. (2011). Living Lab: A Potential Change Catalyst for Development in Nongoma, in P. Cunningham & M. Cunningham (Eds.), IST-Africa 2011 Conference Proceedings: 1–8. International Information Management Corporation (IIMC).

Niitamo, V.-P., Westerlund, M., & Leminen, S. (2012). A Small-Firm Perspective on the Benefits of Living Labs, *Technology Innovation Management Review*, vol. 2, n. 9, 44–49.

Panaro, S. (2015). *Landscape Co-Evaluation. Approcci valutativi adattivi per la co-creatività territoriale e l'innovazione locale*, PhD Thesis in "Metodi di valutazione per la Conservazione Integrata, Recupero, Manutenzione e Gestione del Patrimonio Architettonico, Urbano ed Ambientale", XXVII cycle, University of Naples, tutors proff. Luigi Fusco Girard, Maria Cerreta.

Pollitt, C., Bouckaert, G., & Loeffler, E. (2006). *Making Quality Sustainable: Co-design, Co-decide, Co- produce, Co-evaluate*, 4QC Conference for Public Administration in the EU, Finland.

Schaffers, H., & Kulkki, S. (2007). Living Labs: An Open Innovation Concept Fostering Rural Development, *Tech Monitor*, (Sep-Oct), 30–38.

Schaffers, H., Sällström, A., Pallot, M., Hernández-Muñoz, J. M., Santoro, R.. & Trousse, B. (2011). Integrating Living Labs with Future Internet Experimental Platforms for Co-creating Services within Smart Cities, in K.-D. Thoben, Volker Stich, and Ali Imtiaz (Eds.), *Proceedings of the 2011 17th International Conference on Concurrent Enterprising* (ICE 2011), 1–11.

Schuurman, D., & De Marez, L. (2009). User-Centred Innovation: Towards a Conceptual Integration of Lead Users and Living Labs, in *Proceedings of COST298: The Good, the Bad and the Challenging*, 13–15 May 2009,

Copenhagen, Denmark.

Ståhlbröst, A., & Holst, M. (2012). *The Living Lab Methodology Handbook*, Center for Distance-spanning Technology, Lulea University of Technology Lulea, Sweden.

Stead, D. (2012). Best Practices and Policy Transfer in Spatial Planning, *Planning Practice and Research*, vol. 27, n. 1, 103–116.

Steinitz, C. (2012). *A Framework for Geodesign. Changing Geography by Design*, E. Press, ed., New York.

Van Rensburg, J. R., Smit, D., & Veldsman, A. (2007). Marrying the "System of Innovation" and Micro-Enterprises, in *Real world Rural SADC: An Overview of Collaborative SMME Incubation in the Rural Living Lab of Sekhukhune*, Paper presented at IST-Africa 2007 Conference, Maputo, Mozambique, 9-11 May, 2007.

Webliography

Harvard University Living Lab, url: https://green.harvard.edu/series/living-lab

Portland State University Living Lab, url: https://www.pdx.edu/sustainability/living-lab

Stakeholder map, 'Stakeholder Mapping', url: https://www.stakeholdermap.com

MindTools, "Power/Interest Grid for Stakeholder Prioritization", retrieved at: https://www.mindtools.com/pages/article/newPPM_07.htm

WEEN Models Project, url: www.weeenmodels.eu/EN/objectives.html

Last access for all websites: October 2017.

Attachments

A Book of Ideas

Spatial Analysis Glossary