

BUILD SOLUTIONS

BIO-TECH TRAINERS' WORKSHOP CONCLUSION REPORT

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1 – FOREWORD

Building Urban Intelligent Living Design Solutions

Cities currently host more than half of the world population, which is projected to increase up to 70% by 2050 (UN, 2014). Already, cities account for 70% of global CO₂ emissions (C40). With the expected population growth, cities would hence be the source of an estimated 85% of global GHG emissions.

There is a growing recognition and awareness that nature can help to provide viable solutions by using and deploying the properties of natural ecosystems and the services that they provide in a smart and 'engineered' way (EC). These living solutions provide sustainable, cost-effective, multi-purpose and flexible alternatives for various objectives. Working with nature, rather than against it, can further pave the way towards a more resource efficient, competitive and greener economy. It can also help to create new jobs and economic growth, through the manufacture and delivery of new products and services, which enhance the natural capital rather than deplete it (EC).

With that in mind, the big question is, why are nature-based solutions not used more to address the global urban challenges?

The main answer would be that there's a distinct skill and financing gap in the biotechnology sector. While we currently have great researchers in biotechnology, too often the commercialization and hence the implementation of their discoveries stumble due to a lack of personal experience in entrepreneurship and cooperation with industry leaders (Fritsch, 2010).

And even when most of those skills are present in a team attempting to commercialize a technology, another obstacle rears its head: the lack of short-term funding available to biotech start-ups and spinoffs (Swamidass, 2008). Recently, the High-Level Group for the European Innovation Council published their first recommendations which state that funding for disruptive, market-creating start-ups with deep-tech solutions (like biotech) is severely fragmented and doesn't meet the needs of the start-ups for developing the technology (http://ec.europa.eu/research/eic/pdf/eic_recommendations_set-1_2017.pdf). The lack of funding can be attributed to multiple factors, chief amongst them being the perceived risk and the huge capital expenditures necessary to develop sound biotechnology solutions.

Building Urban Intelligent Living Design Solutions (BUILD Solutions) project aims to set up transdisciplinary cooperation among universities and business, engaging students, teachers and researchers and providing them with the necessary entrepreneurial skills and connections to bring intelligent living solutions to the market, by investigating biological systems, creating smart design prototypes, business plans, plans for start-ups and working with accelerators.

The project's objective is to develop an experimental transdisciplinary educational system linking biology, intelligent design and business through several kinds of activities, such as courses for students and trainers, symposiums, development of educational resources, the set-up of an accelerator programme, launching an international call for ideas and creating new networks.

The project is co-funded by the Erasmus+ Programme of the European Union.



Living design solutions provide sustainable, cost-effective, multi-purpose and flexible alternatives for several urban challenges.

2 – BIO-TECH TRAINERS WORKSHOP, UL

2.1 Introduction

BUILD Solutions project is aimed at developing an experimental transdisciplinary educational system linking biology, intelligent design and business through several types of activities, including courses for students and trainers, symposiums, development of educational resources, the set-up of an accelerator programme, the launch of international calls for ideas, and the creation of new networks. Therefore, since one of the main objectives of the project is to introduce entrepreneurship education in the fields of biology, intelligent architecture and business, the project consortium is composed by both academic and industrial partners.

In this vein and in order to help structuring the transdisciplinary education programmes, BUILD Solutions have organized at the beginning of the project a set of 3 trainer workshops that aimed at sharing multidisciplinary knowledge among the three discipline trainers. In these sessions trainers from each discipline explained to the others basic technical concepts and educational methodologies that are commonly used in their respective fields so they can get familiarized with the content and terminology.

BUILDs develops an experimental transdisciplinary educational system linking the fields of biology, intelligent design and business.



The 3 Trainers workshops took place during the first months of the project, being the first at the University of Lorraine (M5, March 2019), the second at IAAC (M6, April 2019) and the third at the University of Vienna (M7, May 2019). Each Higher Education Institution ensured the participation of 2 staff members from each of their teaching and training teams, and each SME brought at least 1 staff representative. These Trainer Workshops were structured as a 3-days intensive programme where knowledge, concepts, and methods were shared in order to overcome the usual disciplinary barriers and to discuss the innovative modules and test them internally in peer learning sessions. As a result, experts were trained to be teachers at the Students Year Program and allowed them to get familiar with concepts belonging to the fields of biotechnology, design for urban resilience and business through a transdisciplinary lens.

The first BUILD Solutions Trainer Workshop, titled “BIO-TECH TRAINERS WORKSHOP” was led by UL and took place from 11 to 13 March 2019 at Université de Lorraine, Nancy, France. Having in mind the main project objective of developing an experimental transdisciplinary educational system where biology, intelligent design and business disciplines interrelate, the Bio-Tech Trainers Workshop aimed at providing partners coming from the fields of living-design and business with the basic learning tools about urban ecology, biodiversity in urban habitats, methodologies and tools for the assessment of the quality of ecosystems and courses set-up, in order to allow them to prepare their transdisciplinary students program.



2.2 About the Organisers

The Living Design Trainers Workshop was organized by Université de Lorraine (UL), with the support of Econick.

Université de Lorraine (UL) is a multidisciplinary, technological and entrepreneurial university. With more than 3,900 teaching and research faculty and more than 60,000 students, including nearly 18% international students from 145

countries, and about 12,000 students involved in entrepreneurship programs, UL is one of France's largest multidisciplinary universities. Its location in the heart of Europe, with borders on three European member states (Germany, Belgium and Luxembourg) offers to UL a privileged position for strong international partnerships. On a larger scale, UL is committed to numerous European and international collaborations and exchanges, including multi-partnership projects and initiatives that, in many cases, go beyond European borders. A dedicated European office, responsible for project support over the entire life cycle, supports this dynamic in European funding projects. From an educational point of view, UL is structured in 8 Collegiums, which include the various schools, faculties, and institutes. One Graduate School is ENSAIA (*Ecole Nationale Supérieure d'Agronomie et des Industries Alimentaires* of Nancy). It enrolls 170 Agronomy Engineers and Food Science Engineers each year, placing it second in all the French "*Grandes Ecoles*" in this sector. In 3 years, these future engineering graduates are qualified to fulfil high-level technical and economic functions in Agronomy and Agro-Industries, Food Industries and Biotechnology, in Environment, and all other related activities. The programs at ENSAIA are taught by 70 teacher-researchers who work closely with research units housed within the School. These certified research units guarantee a high-level scientific environment, reinforced by numerous, often unprecedented, resources.



ENSAIA is a Graduate School of the University of Lorraine that prepares engineering graduates in the fields of Agronomy and Agro-Industries, Food Industries, Biotechnology, and Environment.

The start-up ECONICK is based on the "agromining chain" aiming at the recovery by plants of strategic metals from secondary resources. The chain covers from cultivation of special plants on metal-bearing matrices, to harvest, and finally to process the biomass with the production of energy and recovery of metals by hydrometallurgy. Econick is the outcome of the research work conducted by 2 research institutes from UL, CNRS and INRAE, one specialized in agronomy and the other in chemical engineering.

2.3 Main Topics

The main topics addressed at the Bio-Tech Trainers Workshop were the following:

1. Basic Concepts of Urban Ecology
2. From natural to engineered ecosystems
3. Case studies of applications of Bio-Tech
4. Educational Programs on Bio-Tech and ecological engineering
5. Innovative educational programs development

Trainers from the living design and business disciplines were introduced by UL experts to the basic concepts, methodologies and tools in relation with (urban) ecology, including the interactions between compartments of the ecosystem (e.g., soil, water, air, living organisms), quality of those compartments (e.g., fertility, contamination of soils) and the development of the ecological engineering.



Trainers from the living design and business disciplines were introduced by UL experts to the basic concepts of urban ecology, ecosystem services and ecological engineering.

In addition, after accompanying partners through the analysis of a series of case studies in and around the city of Nancy, UL trainers shared with them the innovative educational programs developed at the Graduate School in order to provide information for the discussion on how to build the project's one-year transdisciplinary program.

2.4 Methodology

As previously mentioned, UL's Trainer Workshop was structured in a 3-days intensive program held in Nancy in March 2019, with the attendance of a total of 13 participants, consisting of 8 trainers and 5 SMEs partners.

Day 1 was dedicated to introducing participants to the basic knowledge on Bio-Tech concepts, theories, and definitions, as well as to share with them how UL approaches its learning programs and the main educational outputs. The main topic was urban re-naturalization and resilience. The aim was to provide a better understanding of basic concepts of urban ecology: what is an urban ecosystem? Processes of ecological engineering were discussed around field experiments and case studies. The link between ecosystem services, functions and quality of urban ecosystems was described in order to develop tools for the development of sustainable cities.



Discovering the concepts and applications of urban ecology

On Day 2 UL organized a field trip dedicated to illustrating contrasted cases of implementation of nature-based solutions. The group of trainers and partners from SMEs have visited an Experimental Green Roof Platform presenting different types of green roofs having the function of water storage, made with different substrates with various constituents and being the support of a local vegetation. The visit allowed to focus on monitoring of water and thermal fluxes.

The second example was discovered following the route of an urban wandering in the city of Nancy, from mineral to vegetated sites. Along the course, the participants were able to discover and analyse contrasting development solutions involving more or less plants. The development strategy was commented on by a colleague from the green spaces department of the city of Nancy.

The group then went to visit a facility for education on reclamation of brownfields (GISFI experimental platform). This made it possible to illustrate for example the themes of natural attenuation, decontamination of polluted soils through physico-chemical and nature-based solutions, revegetation and agricultural production through pedological engineering on derelict lands and agromining of contaminated soils and industrial wastes to produce metal salts and energy.



On the top of a building: the experimental green roof platform (Cerema)

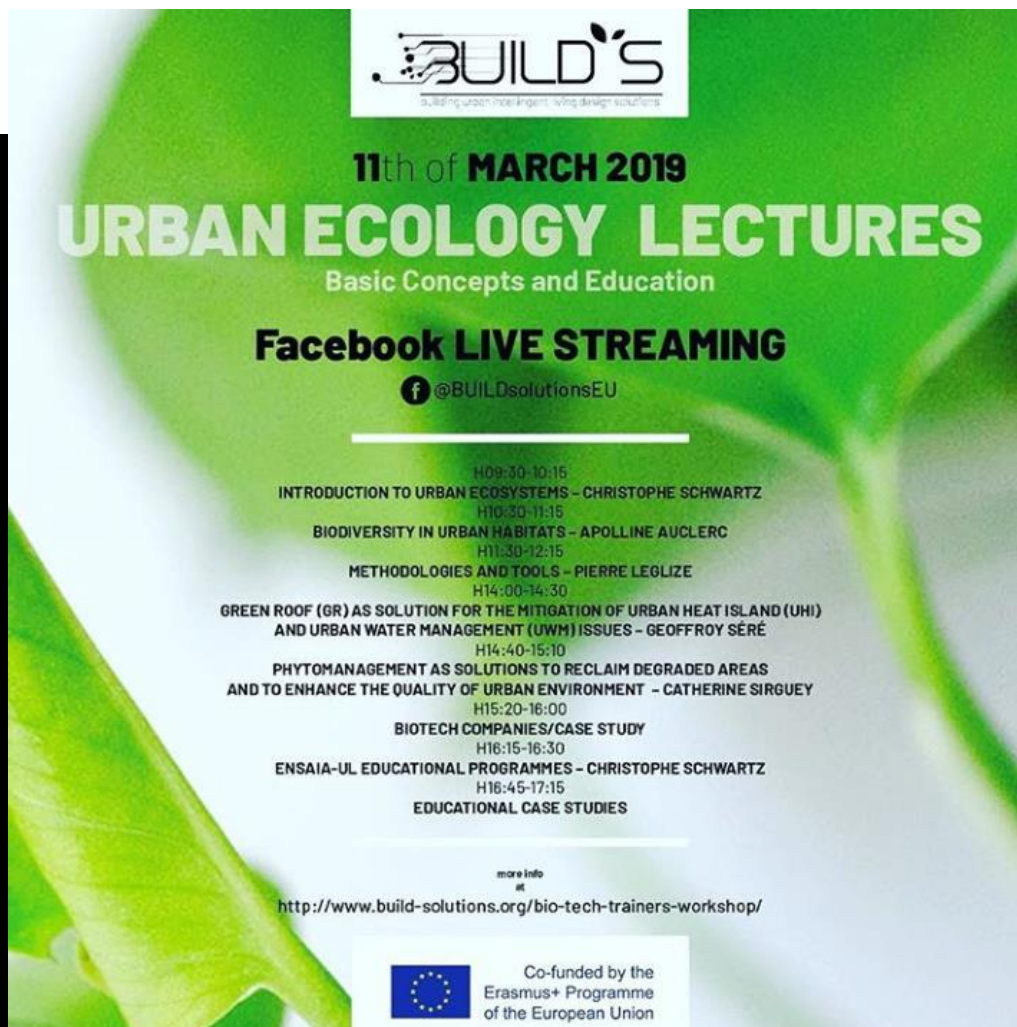
And lastly, Day 3 was devoted to the development of the year-transdisciplinary program by exploring different methodologies for collaboration.

3 – OUTPUTS

3.1 Programme

The Bio-Tech Trainers Workshop organized by UL and Econick succeeded in providing partners coming from the fields of design and business with basic and key tools to understand the Ecology and Bio-Tech disciplines and how its courses are set up, with the main objective of informing the development of the transdisciplinary students programs.

Detailed workshop programme (download it [here](#)):



BUILD'S
Building urban more intelligent living design solutions


11th of MARCH 2019

URBAN ECOLOGY LECTURES
Basic Concepts and Education

Facebook LIVE STREAMING
f @BUILDSolutionsEU

H09:30-10:15
INTRODUCTION TO URBAN ECOSYSTEMS – CHRISTOPHE SCHWARTZ
H10:30-11:15
BIODIVERSITY IN URBAN HABITATS – APOLLINE AUCLERC
H11:30-12:15
METHODOLOGIES AND TOOLS – PIERRE LEGLIZE
H14:00-14:30
GREEN ROOF (GR) AS SOLUTION FOR THE MITIGATION OF URBAN HEAT ISLAND (UHI)
AND URBAN WATER MANAGEMENT (UWM) ISSUES – GEOFFROY SÉRÉ
H14:40-15:10
PHYTOMANAGEMENT AS SOLUTIONS TO RECLAIM DEGRADED AREAS
AND TO ENHANCE THE QUALITY OF URBAN ENVIRONMENT – CATHERINE SIRGUEY
H15:20-16:00
BIOTECH COMPANIES/CASE STUDY
H16:15-16:30
ENSAIA-UL EDUCATIONAL PROGRAMMES – CHRISTOPHE SCHWARTZ
H16:45-17:15
EDUCATIONAL CASE STUDIES

more info
at
<http://www.build-solutions.org/bio-tech-trainers-workshop/>

 Co-funded by the
Erasmus+ Programme
of the European Union

Day 1 – Knowledge sharing on “Urban Renaturalisation and Resilience” and
Educational courses

Understanding basic Concepts of Urban Ecology: What is an urban ecosystem /
Ecological engineering / Case studies; link between services, functions and
quality of urban ecosystems for sustainable cities

H09:30-10:15 - Lesson 1: Introduction to Urban Ecosystems - Christophe Schwartz

- Global to specific definition of an urban ecosystem
(biocenosis, biotope, compartments, flows)
- Gradient of anthropisation
(factors, functioning and quality/health of the ecosystem)
- Ecosystem services provided by urban ecosystems

H10:30-11:15 - Lesson 2: Biodiversity in urban habitats - Apolline Auclerc

- Urban habitats: complementary physical, chemical and biological approaches
- The living organisms
- Functional approaches
- Green technologies need functional ecosystems

H11:30-12:15 - Lesson 3: Methodologies and Tools - Pierre Leglize

- Observation of urban ecosystems
- Sampling/characterisation
- Quality assesement
- Decision Support Systems

From natural to engineered ecosystems

H14:00-14:30 - Lesson 3: Green roof (GR) as Solution for the mitigation of Urban Heat
Island (UHI) and Urban Water Management (UWM) Issues – Geoffroy Séré

- Specific issues of urban areas: UHI and UWM
- What is a GR
- Contribution of GR to the mitigation of UHI and UWM

H14:40-15:10 - Lesson 4: Phytomanagement as Solutions to reclaim degraded Areas and
to enhance the Quality of urban Environment – Catherine Sirguez

- Degradation and contamination of urban ecosystems
- Organisms as reclamation tools
- Optimisation of the processes involved in phytomanagement
- Toward new economic developments

H15:20-16:00 - Lesson 5: Bio-Tech Companies/Case Study

Bio-tech Education

H16:15-16:30 - Lesson 6: ENSAIA-UL educational programs - Christophe Schwartz

H16:45-17:15 - Lesson 7: Educational Case Studies:

- Circular Economy adapted to urban greening - Geoffroy Séré
- Urban farming - Apolline Auclerc
- Innovation in urban trees planting - Geoffroy Séré
- Urban de-icing: impact and solutions - Pierre Leglize
- Agro-urbanism - Christophe Schwartz

H18:00 – Ecology and design: Visit of Musée de l'Ecole de Nancy - École de Nancy, or the Nancy School, was a group of Art Nouveau artisans and designers working in Nancy, France between 1890 and 1914. Major figures included the furniture designer Louis Majorelle, ebenist and glass artist Jacques Grüber, the glass and furniture designer Émile Gallé, and the crystal manufactory of Daum. Their work was largely inspired by floral and vegetal forms found in the region. The goal of the group was to produce in series ordinary objects, such as furniture, glassware, and pottery, with fine craftsmanship and in original forms, making art objects available for people's homes. (Wikipédia).

Day 2 - Case studies in Nancy

Applications of Bio-tech

H08:30-10:00 - Case Study 1: Visit of the Experimental Green Roof Platform - Geoffroy Séré, Cerema

- Different types of green roofs: water storage, substrates with various constituents, local vegetation
- Monitoring of water and thermal fluxes

H10:30-12:00 - Case Study 2: Urban wandering from mineral to vegetated sites - Christophe Schwartz, Ville de Nancy

Urban wandering in the city of
Nancy, from mineral to
vegetated sites



Facility for education on reclamation of brownfields:
GISFI experimental platform in Homécourt

H14:00-18:00 - Case Study 3: GISFI experimental Platform - all

- Natural attenuation
- Decontamination of Polluted Soils through Chemical and Nature Based Solutions
- Revegetation and Agricultural Production through Pedological Engineering on Derelict Lands
- BioTech Company/Econick/Case Study (Jean Louis Morel, Ramez Saad)
- Agromining of Contaminated Soils and Industrial Wastes to Produce Metal Salts and Energy
- Field work

Enter into the ecosystem and discover
interactions between soils and
vegetation (GISFI)



Day 3 - Workshops

Innovative educational programs development

H10:00-11:30 - Workshop 1: Yearly transdisciplinary programs development – BIO-TECH Semester

- Presentation of draft programme for BIO-TECH Semester
- Development of methodologies / Inputs from Partners

H12:00-13:30 - Workshop 2: Intensive transdisciplinary programs development – BIO-TECH Intensive Course

- Presentation of draft program for BIO-TECH Intensive Course
- Development of methodologies / Inputs from Partners

H14:30-16:30 - Steering Committee meeting

- Mini accelerator
- Section dedicated to students
- Collaborations beyond the project (internships, ...)
- Symposium in Nancy (end of October 2019)
- Mini accelerator business

3.2. Partners presentations

UL, Apolline Auclerc

Biodiversity in Urban Habitats

Download it [here](#)

UL, Christophe Schwartz

Understanding basic concepts of Urban Ecology

Download it [here](#)

UL, Geoffroy Séré

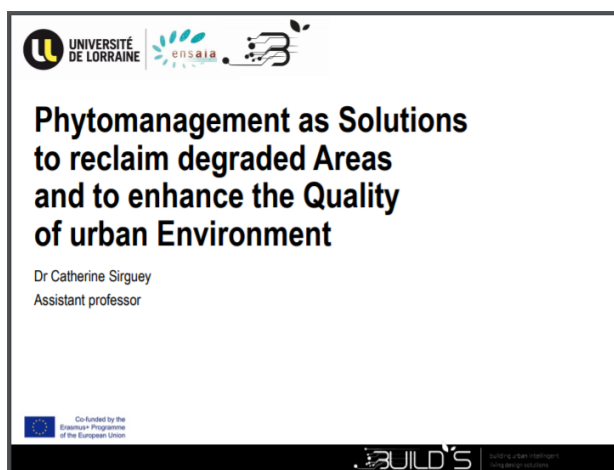
Green Roof as solution for
the mitigation of Urban Heat
Island and Urban Water
Management Issues



Download it [here](#)

UL, Catherine Sirguez

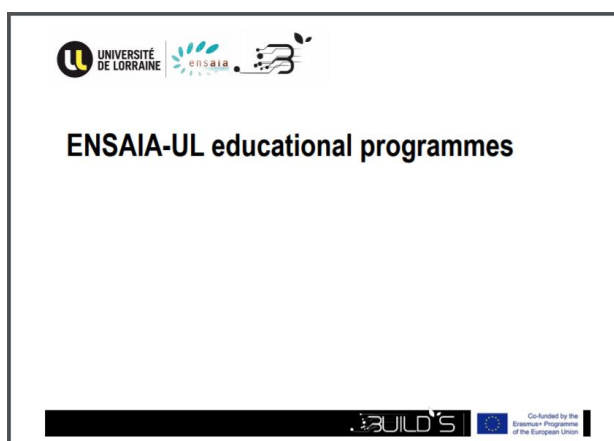
Phytomanagement as
Solutions to reclaim
degraded Areas and to
enhance the Quality of
urban Environment



Download it [here](#)

UL

ENSAIA-UL Educational
Programmes



Download it [here](#)

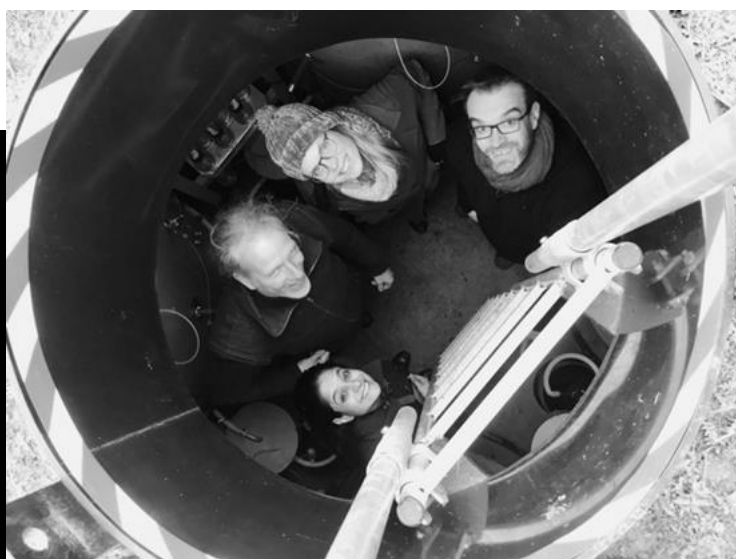
3.3. Event pictures



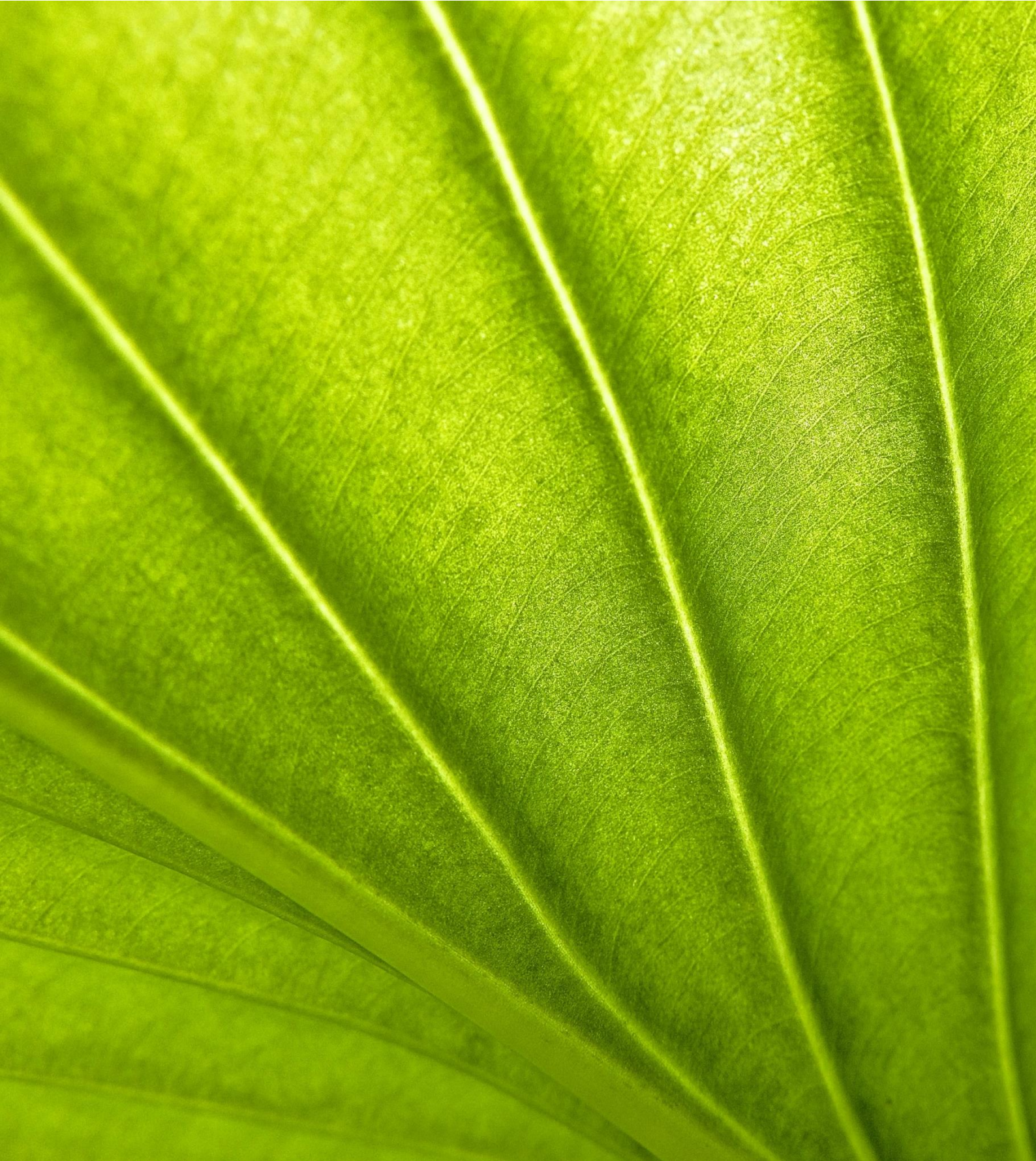
4 - CONCLUSIONS AND RECOMMENDATIONS

The 3 days of the first trainers workshop dedicated to Bio-Tech allowed all the partners to test how to cross disciplines and how to be open to a discipline other than one's own. Experts in ecology, agronomy and biotechnology from UL did the exercise of preparing a series of conferences intended to introduce colleagues from distant disciplines (living design, business, entrepreneurship) to the main concepts of fundamental and applied ecology. The essential point will have been to become aware of the functioning of living systems in the field. The transition from theory to practice took place in very contrasting contexts, along of a gradient of anthropization of ecosystems going from the city to derelict lands. Illustrating the concepts of ecology through different case studies allowed the partners to discover the complexity of living systems and to discuss ways of optimizing NBS. The field approach makes it possible to confront the reality of the functioning of urban ecosystems and to jointly imagine ways of optimization, taking into account the compartments of ecosystems in urban planning strategies.

In addition to raise awareness of the constraints of biological systems and to train colleagues from the project, the workshop also helped to better understand and discuss the pedagogical approaches proposed at UL. The way of training agricultural engineers or ecologists is based on a particular pedagogical engineering associating the acquisition of fundamental scientific concepts, the confrontation in the field applying process from the ecological engineering and the realisation of team projects. These main methods were proposed to the multidisciplinary group of BUILD trainers and colleagues from SMEs, opening the door to the experiences of the following disciplinary workshops. Acculturation is underway.



Explore the hidden face of urban ecosystems: soils.
Have a new perspective on urban ecosystems!



Building Urban Intelligent Living Design Solutions, 2018-2021

