



UrbanFarm2020

Bridging interdisciplinary knowledge for sustainable urban landscapes



UrbanFarm

UrbanFarm2020: Bridging interdisciplinary knowledge for sustainable urban landscapes.



Curators:

Francesco Orsini, Giuseppina Pennisi, Michele D'Ostuni, Mattia Paoletti, Gloria Steffan, Andrea D'Alessandro,
Gianmarco Sabbatini, Roberta D'Ercole, Andrea Tamburrini



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

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Text and editing: Francesco Orsini, Giuseppina Pennisi, Michele D'Ostuni, Mattia Paoletti, Roberta D'Ercole, Andrea Tamburrini
 Photos: Gloria Stefan, Andrea D' Alessandro, Francesco Orsini, Gianmarco Sabbatini
 Design: Michele D'Ostuni
 Editor: Alma Mater Studiorum - University of Bologna
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ISBN: 9788854970120
 Book Series: UrbanFarm
 ISSN: 2612-7660
 Volume: 3
 Curator: Orsini Francesco

We thank our partners and sponsors for their generous contributions.



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Giovanni Molari

*Director, Department of
Agricultural and Food Sciences
(DISTAL) - University of
Bologna - Alma Mater Studiorum*



OVER THE ROLE OF RESEARCH AND EDUCATION ON URBAN AGRICULTURE

Over the role of research and education on Urban Agriculture

While world cities are facing unstoppable urbanisation trends, the combined effects of arable land loss, resource scarcity and climate change put at risk our current food systems. Research into plant growing solutions adapted to urban environments such as building-integrated systems (rooftop greenhouses, indoor and vertical farms) or technologies for improved resource efficiency (following circularity in the use of resources or decreasing the urban energetic footprint) can allow for creating more sustainable cities.

The Department of Agricultural and Food Sciences (DISTAL) provides state-wide leadership in research, teaching and extension in the subjects of horticulture, crop production, sustainable agricultural systems and environment and applied plant ecology. Its general mission is to develop and deliver educational and research programmes enabling students to become highly skilled and creative graduates, and fostering the adoption of profitable, environmentally sound, and socially responsive agricultural systems. DISTAL hosts the Research Centre on Urban Environment for

Agriculture and Biodiversity (RESCUE-AB), which brings together skills and research expertise in the field of horticultural sciences, actively contributing to a number of interdisciplinary activities in the fields of urban horticulture and biodiversity, in Europe and in several countries of the World South.

UrbanFarm2020: students on the edge of urban renewal

Transferring agricultural technologies from the rural to the built environment cannot overlook the limits and opportunities provided by the urban infrastructures. On the other hand, the integration of plant cultivation into the urban landscape should not become a mere design exercise, but build on state-of-the-art solutions for plant cultivation instead, in order to turn competitive in the global food market. At the same time cities where food is produced, often see urban farming mainly as a strategy to address social exclusion. An urban garden can be used as a job training programme for youth that have dropped out from higher education, for refugees in their vulnerable stage of settling down in a new home country, or as an activity programme for people with disabilities. Accordingly, functional integration of agriculture



in cities cannot be exempted from bringing together expertise in agricultural sciences, engineering, landscape and urban planning, architecture and both environmental and social sciences.

In order to explore the opportunities provided by regenerating one of the three target locations of UrbanFarm2020, students from different disciplines needed to meet on a common ground. Accordingly, this student competition - that this year reach its second edition - was designed to allow fresh minds to join forces towards a common objective. Beside the specific design and innovation that was brought by each team, the strength of UrbanFarm2020 is upon its founding principle. It allowed for inspiration and reciprocal cross-fertilisation between concepts and skills. It also resulted in fostering collaborations and networking opportunities for the participants, that were engaged in an international environment where they had to apply the subject studied in their educational path, but also defend and substantiate their arguments and proposed solutions.

I wish therefore to express my sincere gratitude to all participating teams that were successful in bringing knowledge, enthusiasm and devotion into the design of the projects that are summarised in this publication. I also thank the professors, lecturers and experts that engaged in the scientific committee and international jury works and all the companies and institutions that supported the realization of this second edition of the UrbanFarm challenge.





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Enrico Sangiorgi

*Vice Rector for Teaching and
Education*

*University of Bologna - Alma Mater
Studiorum*



INTERDISCIPLINARY KNOWLEDGE FOR SHAPING FUTURE CITIES

Since its origins in 1088, the Alma Mater Studiorum - University of Bologna has been student-centered hosting prominent figures from science and the arts. Its teaching catalogue is diversified and tailored to the needs of present-day society and its degrees, with an offer of 221 degree programs and over 87.500 students enrolled, are widely and internationally recognized. All the degree programs offer the opportunity to spend some time studying abroad thanks to student exchange agreements with universities all over the world. The University of Bologna is based on five Campuses (Bologna, Cesena, Forlì, Ravenna and Rimini) located in the Emilia Romagna region. It offers also an over-seas branch in Buenos Aires that coordinates research, post-graduate training and academic liaison with Latin America. Beyond its well-established European links, Bologna enjoys multiple international connections with North America, Africa, Asia and Australia ensuring a multicultural environment and support services to international students and faculty. The University of Bologna is also one of the most active Universities leading and participating in European research and academic cooperation projects. It is active part of knowledge alliances

with industry and public/private organizations, and it is a hub of international networks.

The University is strongly committed to respond to the demands of a constantly evolving society, with continuously changing paradigms. Faithful to its mission, and thanks to a history that has consolidated over time, the Alma Mater Studiorum is fully aware that its activities can produce significant impact, both direct and indirect, on the community and on the region. Therefore, it continues to invest in the quality of training and in research related to the needs of society, as well as in a valuable organizational, institutional and multicampus structure, allowing their members to operate over a vast territory.

The University of Bologna is committed to the values of sustainability, aimed at the achievement of the 17 Sustainable Development Goals (SDGs) of the U.N. 2030 Agenda. such as enhancing and safeguarding the territory, improving community wellbeing, promoting a knowledge-based development economy, social equity, and the ability of those involved to work effectively together for the common good. As a concrete implementation of this commitment and following the success of the previous edition, the University

of Bologna is now presenting the results of the International Student Challenge “UrbanFarm2020”. We believe that this kind of activities are extremely valuable and fundamental in changing societies, since the Universities have to play a more and more active role in the achievement of a global and responsible citizenship. Global citizenship implies

the adoption of sustainable empathetic and supportive behaviours placing the one’s identity in a “global community” which is above the citizen identity of a particular nation or place.

School and universities are leading actors in this process because education should play a critical role in equipping learners with knowledge, skills, competencies, understanding and opportunities/tools to develop their mindset and behaviour, in order for them to become critical, confident, engaged, empathetic and active global citizens in the dynamic and interdependent world of the 21st century, able to foster a more just, peaceful and sustainable world.





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ResCUE-AB

Bridging interdisciplinary knowledge for sustainable urban landscapes: the international student competition UrbanFarm.

In a rapidly urbanizing world, urban agriculture (UA) represents an opportunity for improving food supply, health conditions, local economy, social integration, and environmental sustainability altogether. While a diversity of farming systems is encountered in the different global regions, it is estimated that about a third of urban dwellers is involved worldwide in the agro-food sector. In recent times, UA projects have sprouted across the world, both guided and promoted by governments and born by bottom-up community based initiatives. Accordingly, the concept of edible urban landscapes (edible cities, foodscapes) is today finding application all over the world. In order to facilitate a wider uptake of innovative policies and tools for the promotion of the sustainable goals associated with UA, it is crucial to create awareness on both institutional actors and the civil society through innovative and interdisciplinary approaches. The international student challenge UrbanFarm2020 (here at its second edition) aims at tackling the current need for cooperation between different disciplines by bringing together students from different fields of study into international teams addressing

the regeneration of three vacant urban spaces in the cities of Galliera (Italy), Lanuvio (Italy) and Longyearbyen (Norway). Target projects differ from their original purpose and include:

- An abandoned lot within the city of Lanuvio, in the rural countryside nearby Rome, surrounded by archaeological sites and natural parks, that until recently hosted an health emergency service.
- An abandoned factory of pesticides and phytochemicals, that largely contributed to the evolution of Galliera city from 1940, but was finally closed and abandoned in 1999.
- The periurban district of Nyben in the World northernmost city of Longyearbyen, in the Svalbard Islands (Norway), where agricultural production is constrained by the harsh environmental conditions and the local community relies ON fresh food shipped from the mainland.

What these locations share is that they all are vacant and constitute a cost and a missed opportunity for their cities. Within the UrbanFarm2020 challenge we aimed at showing that another use for these spaces is possible, overall contributing to creating

Francesco Orsini

University of Bologna - Alma Mater Studiorum, Coordinator, UrbanFarm International Student Challenge, Chair, Division on Landscape and Urban Horticulture, International Society for Horticultural Sciences, Coordinator, Food Systems in European Cities (FoodE), funded by EU-H2020



cities that are more attractive, more liveable, more inclusive and overall more sustainable. To reach this target, we engaged young minds and asked them to meet and work in international and interdisciplinary teams. UrbanFarm2020 became an opportunity to bridge viewpoints and approaches, while integrating state-of-the-art technologies and design for urban farming with functional urban planning.

Teamwork, interdisciplinary knowledge and intercultural dialogue: developing an educational framework that promotes active student involvement and targets societal needs.

Compared to traditional education models, Problem Based Learning (PBL) builds on the concept of active education, where the learner must elaborate new ideas inspired by everyday problems. Accordingly, UrbanFarm2020 represents an alternative and effective practice from the formal educational systems that are still based on frontal and unilateral teaching. In UrbanFarm2020, students have to apply their knowledge in real contexts, dealing with public administrations, private companies and legislative frameworks. Moreover, they gain a significant opportunity to exchange views and approaches with their peers from different origin and disciplines. They also have the chance to engage in a competitive call, dealing with meeting deadlines and having to present their concepts and ideas to an international audience, in most cases in a language (English) different from their mother tongue. Their dissemination and soft-skills are also improved, e.g. in how to prepare a promotional video, how to engage through advertising and social media or how to orally present their project in front of an audience. This competition can therefore be a teaching tool in the hands of educators to stimulate the individual and team skills of their students, and to raise a greater awareness over the applicability of theoretical concepts and their adaptability to the global ethics of sustainable development. Beyond the elevated project quality, the major achievement of the UrbanFarm2020 competition stands upon the geographical distribution and expertise covered by the participating teams. UrbanFarm2020 achieved to

engage a network of experts and UA practitioners from universities from all over the world in the evaluation of 25 projects prepared by teams involving more than 130 students. Looking at the projects it clearly appears how competences were successfully integrated and communicated in both project redaction and visual materials. This publication summarises the main ideas, visions and approaches that student teams brought together with enthusiasm and dedication. We trust that starting from these project ideas, inspired local administrators and urban planners will foster sustainability and liveability of their cities.



THE CHALLENGE

To boost urban renewal through urban agriculture, the University of Bologna Alma Mater Studiorum organized the Student Challenge, UrbanFarm2020.

25
Teams

22 Universities from all
over the World

139
Students

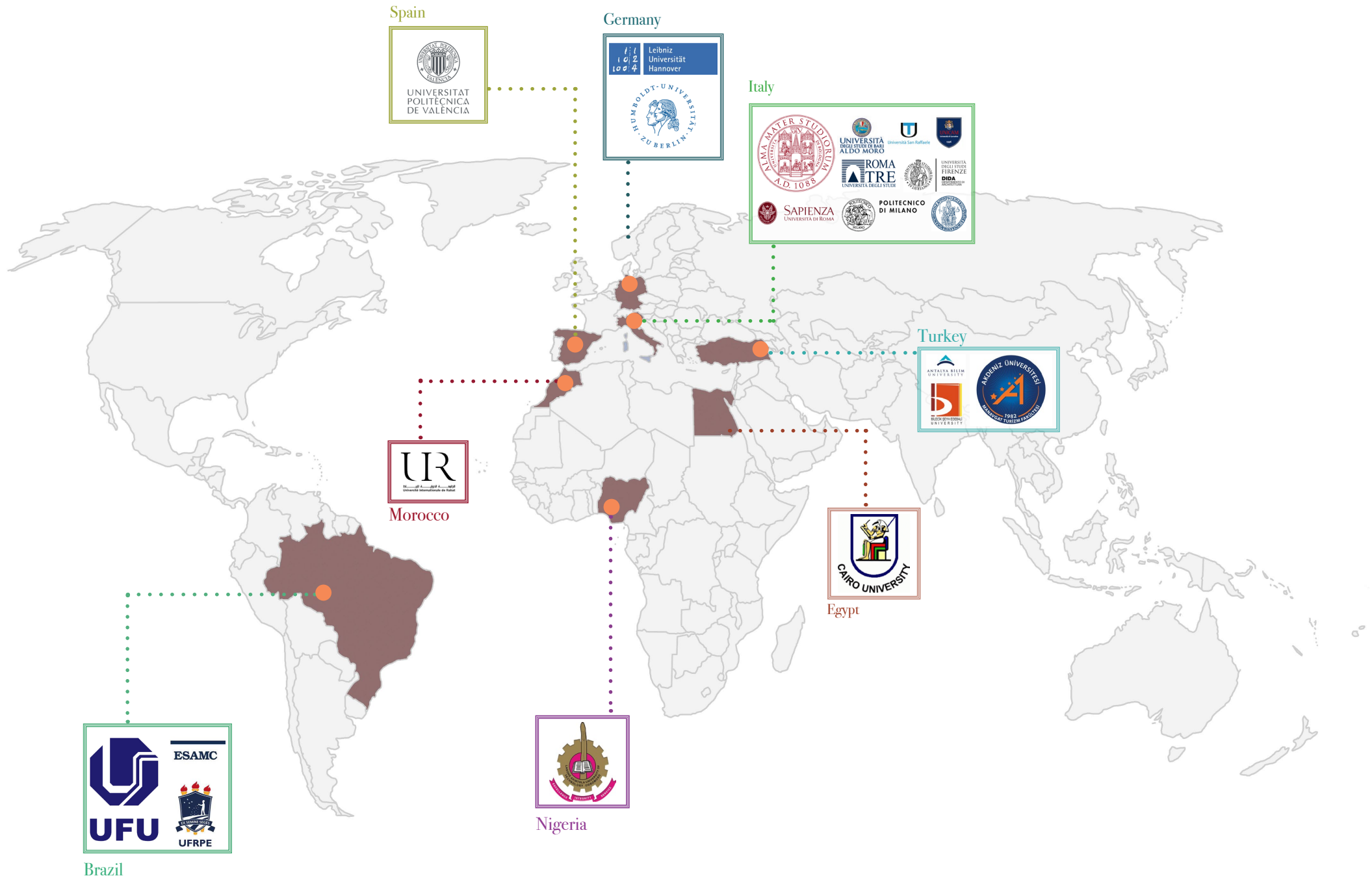
The Challenge

The competition, involving international teams of students from higher education in Agriculture, Biology, Architecture, Design, Economics, Engineering, Humanities and Social Sciences, aimed at designing innovative urban agriculture systems that integrate the best architectural and technological innovations to produce plants in urban environments. Three buildings, identified in the municipalities of Lanuvio (Roma), Galliera (Bologna) and Longyearbyen (Svalbard Islands, Norway) were studied and redesigned by the different student teams, in order to propose the best strategies in the three pillars of sustainability (economic, environmental and social). Teams were ranked based on their choices and building solutions related to the use of growing systems and climate management, as well as the strategies for water and mineral nutrition and integrated pest management. Interventions also had a strong social and business connotation, promoting the generation of new forms of employment for disadvantaged users. The competition involved students from all over the world,

evaluated by an interdisciplinary and international jury.

Background

The competition was organized by the Department of Agricultural and Food Sciences and Technologies (DISTAL) of the University of Bologna. The challenge is also supported by Alma Mater Foundation (FAM), MIPAAF (Ministry of Agricultural, Food and Forestry Policies - Italy) and International Society for Horticultural Sciences (ISHS). Activities were supported by the Municipalities of Galliera and Lanuvio, and Polar Permaculture. Media partners included SilvioFritegotto.it and Edagricole New Business Media. Main sponsors included Flytech srl, NovelFarm (Pordenone Fiere) and The United Bank Of Egypt. The initiative was also supported by WUXU, Aquaponic Design and Future Food Institute. The main aim of UrbanFarm2020 challenge is to design innovative urban agriculture systems that integrate the best architectural and technological innovations to produce food in urban environments. It also aims to promote multidisciplinary and international cooperation between universities all over the world.





“With cities being major source of resource consumption and responsible for 75% of the natural resources, urban agriculture can play an increasingly important role in global food security since it provides a solution for growing needs of cities to expand without harming the ecological balance and producing clean food. “

Jury Interview

by **Mohsen Aboulnaga**,
Professor of Sustainable Built
Environments, Cairo University
(CU), Egypt



Are cities across the globe ready for change to overcome the challenges facing them?

Urban farming is key answer to some of city challenges. Cities worldwide are facing enormous defies to cope with the rapid population increase, vast urbanisation, and climate change impacts. Half of the world's population live in cities, and it will reach 70% by 2050, according to the United Nations. Such huge increases cause tremendous pressure on cities' infrastructures, which are not resilient. On the other hand, cities consume around 70% of global total primary energy and emit around 65% of the world's total greenhouse gases, mainly CO₂. Thus, cities should adopt sustainable measures to attain SDGs; especially when cities are generating more than 80% of the global GDP.

Can urban farming reduce air pollution in cities?

Urban air pollution caused by transport and traffic, is a significant challenge in megacities. The World Health Organisation (WHO) stated that at least 96% of the populations in large cities are exposed to PM2.5 that exceeds the WHO air quality guidelines levels. Thus, improving air quality is an essential step to enhance liveability in

megacities. Here comes the role of rooftop urban farming to facilitate temperature moderation, mitigate urban heat islands, and lessen air pollution. Moreover, big data indicates massive potential of urban farming.

All these facts put enormous pressure on local governments to offer innovative solutions to cities' challenges in order to meet the Paris Climate Agreement targets.

Can Urban Agriculture play a key role in cities?

Urban farming can transform cities into green and sustainable ones. The awareness and involvement level in Urban Agriculture or Urban Farming is rising among officials and the public. UA has four dimensions: a) food security, b) social, c) environmental, and d) economic (Figure 1). UA in cities is an innovative solution to mitigate CO₂ emissions and climate change, reduce energy use in transporting vegetables and fruits, produce clean food, and enhance liveability. UA is part of the urban ecological systems, and it plays a vital role in the urban environmental management system. Many global examples show that urban farming can be implemented in households, public buildings, vertical and indoor farms as

well as in educational, leisure and social gardens. A research study estimated that UA could produce as much as 180 million metric tons of food a year.

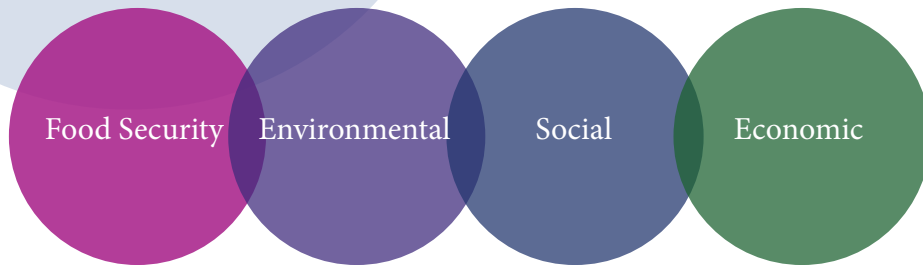


Fig. 1: The four dimensions of Urban Agriculture

Urban Agriculture for Future Cities: Strategies and Policies Needed

Policies can play a significant role in fostering urban farming in cities. UA agriculture policies can promote fresh and clean food to cities, but also offer a source of significant health, social and environmental benefits as well as economic development.

What is the role of policies in prompting urban agriculture?

The general policies that govern urban rooftop farms can be classified into four categories: a) incentives; b) best practice (examples); c) participation; and d) activation. One of the leading cities in Europe is Ghent – Belgium, where the City Council approved, in January 2015, a Climate Plan intending to bring about Ghent a climate-neutral city by 2050. The plan encompasses actions to foster urban farming by space for urban agriculture, guidance for schools to commence kitchen gardens and urban farming projects with social employment to offer healthy and affordable food. Recent policy by the French government set a law in March 2015 stating that all new buildings in commercial areas should be partially covered by either urban farms or green roofs. In August 2019, Paris has started building the largest urban rooftop farm ever in the world and in Europe, span approximately over 14,000 m²; to grow more than 30 different plant species and the site will produce around 1,000 kg of fruits and vegetables daily, yet will be tended to use entirely organic methods (Figure 2).

Are city governments seeing Innovation and Open Innovation as tools to drive cities towards innovation economy and innovation districts, yet key building blocks for long-term sustainable growth and developing smart and

green city?

We need a vibrant innovation ecosystem, deep talent pools within cities, and stakeholders' involvement as well as meta-governance to foster urban farming. An exemplary model was developed through an open innovation strategy in the city of Rotterdam, The Netherlands, where a rooftop urban farm, 'DakAkker' was created as the largest rooftop farm in the city on top of an abundant office building. The rooftop farm holds activities where residents can eat local clean food and enjoy life in fresh air. In this initiative, the municipality of Rotterdam managed, with Environmental Centre Rotterdam, the initiative that was funded by other stakeholders.

Fig.2: The largest urban farm in Paris and Europe



What are outcomes? It is simply:

- Climate-proof area,
- Food supply,
- Achieve liveability, and
- Make the city resilience.

Hence, municipalities should play a major role to address climate actions and transform cities to more sustainable energy resources to attain sustainable development goals (SDGs). There is urgent need for innovation strategies and robust policies to promote and enact urban agriculture policies in cities.

Where sustainable agriculture strategies exist?

Sustainable agriculture strategies have been witnessed in the early Egyptian civilisation, where they set environmental policies from before 3000 BC. The

first strategy for urban agriculture and farming was developed in the early Egyptian civilisation more than 4000 years across the River Nile. Such approach was centred on three pillars and seasons: 'Akhet' means flooding, 'Peret' stand for planting and 'Shemu' implies harvesting. Flax plants, uprooted before they started flowering, were grown for the fibres of their stems. These fibres were split along their length and spun into thread, which was used to weave sheets of linen and to make clothing. In addition, papyrus which grows on the Nile River banks was also used to make paper. The Ancient Egyptian also invented garden plots close to habitations and on higher ground, where vegetables and fruits were grown. Moreover, vegetables such as leeks, garlic, melons, squashes, pulses, lettuce, and other crops were produced; plus grapes that were made into wine. Figure 3 shows urban agriculture, farming and food production in Ancient Egypt.

Urban sustainability and resources efficiency: Over the role of Potentialities of building integrated agriculture.

Fig. 3: Urban agriculture, farming, and food in Ancient Egypt before 3000 BC



With cities being major source of resource consumption and responsible for 75% of the natural resources, urban agriculture can play an increasingly important role in global food security since it provides a solution for growing needs of cities to expand without harming the ecological balance and producing clean food. An EU study indicates that rooftop gardens in cities could possibly provide more than three quarters of the vegetables consumed in them. In the city of Bologna, for example, if rooftop gardens are exploited it can supply 12500 tonnes of vegetables 77% of the citizens needs based on consumption data. In China, 14 big cities produced more than 85% of fresh vegetables.

Can building-integrated agriculture be the prospective for urban sustainability and resources efficiency?

Integrating urban farms into the city fabric, mainly buildings and urban areas has many economic, social, and environmental benefits. Incorporating urban farms in cities can also turn wastes into productive resources, especially in growing cities that produce large amount of wastewater and organic wastes. Urban agriculture offers clean food while improving air quality resulting from carbon emissions and air pollution mitigation. It also helps in creating solutions to wastewater and organic waste in megacities.

Can architecture meet horticulture: bridging the vision for sustainable cities?

Horticulture was manifested more than 4000 years near Luxor, Upper Egypt, where gardens of Karnak Temple; were used for agriculture; and painting in the tomb of Nakh, the chief gardener, early 14th century B.C..

From this pioneering vision, architecture can be a catalyst platform for horticultural, which plays an increasingly vital role in the global food market. It provides a solution for the growing needs of cities to expand without harming the ecological balance and producing clean food. Integrating urban farms into abundant buildings can bring many added values, create jobs, and yet act as a self-sustained economy for healthy generative communities.



References

- Sustainable cities, Challenges and context, 2008 - available at: <https://unhabitat.org/wp-content/uploads/2010/07/GRHS.2009.1.pdf>, accessed: January 10, 2019.
- United Nation Habitat, UN-Habitat – Energy, [Online], available at: <https://unhabitat.org/urban-themes/energy/>, accessed: May 1, 2019.
- The World Bank, PART III 'Cities' Contribution to Climate Change', [Online], available at: <http://siteresources.worldbank.org/INTUWM/Resources/340232-1205330656272/4768406-1291309208465/PartIII.pdf>, p.14, accessed: May 1, 2019.
- Cities - United Nation Sustainable Development Action 2015, [Online], available at: <https://www.un.org/sustainabledevelopment/cities/>, accessed: May 1, 2019.
- Resource Efficiency and Green Economy, United Nations Environment Programme (UNEP), [Online], available at: <https://www.unenvironment.org/explore-topics/resource-efficiency/what-we-do/cities/resource-efficiency-green-economy>, accessed May 1, 2019)
- The World Bank Group, Urban Development, [online], available at <https://www.worldbank.org/en/topic/urbandevelopment/overview>
- Ambient (outdoor) air pollution, The World Health Organisation, May 2, 2018 [Online], available at: [https://www.who.int/news-room/fact-sheets/detail/ambient-\(outdoor\)-air-quality-and-health](https://www.who.int/news-room/fact-sheets/detail/ambient-(outdoor)-air-quality-and-health)
- Steve Hallett Lori, Hoagland Lori, and Emily Toner, 2017, Urban Agriculture: Environmental, Economic, and Social Perspectives, Horticultural Reviews, Volume 44, First Edition, Edited by Jules Janick 2017, Wiley-Blackwell, John Wiley & Sons, Inc, available at: https://www.researchgate.net/publication/308543504_Urban_Agriculture_Environmental_Economic_and_Social_Perspectivs accessed: May 1, 2019
- https://apolitical.co/soulution_article/urban-farming-has-arrived-heres-four-ways-to-make-a-success-of-it
- Carter, T. and Fowler, L. Establishing Green Roof Infrastructure through Environmental Policy Instruments, *Environ Manage*, 2008 Jul; 42(1)151-64, doi: 10.1007/s00267-008-9095-5, Epub 2008 Apr 4.
- Ghent Climate Plan 2014-2019. The Sustainable Energy Action Plan (SEAP) puts Ghent on course for climate neutrality in 2050, [online], available at: <https://stad.gent/en/city-structure/ghent-climate-plans/ghent-climate-plan-2014-2019>
- https://www.researchgate.net/publication/293196881_An_International_Review_of_Current_Practices_and_Future_TrendsGreen_Roof_Policies#downloadCitation
- <https://www.greenroofs.com/2019/08/28/worlds-largest-urban-farm-to-open-on-a-paris-rooftop/>
- <https://www.forbes.com/sites/alexledsom/2019/08/29/worlds-largest-urban-farm-to-openon-a-paris-rooftop/#7fd750d69305>
- Eva van Genuchten, Alicia Calderon Gonzalez and Ingrid Mulder, 2019. Open Innovation Strategies for Sustainable Urban Living, *Sustainability*, 2019 11, 3310; doi: 10.3390/su11123310 - Online, Available at: www.mdpi/journal/sustainability/, accessed: November 10, 2019.
- <https://www.crystalinks.com/egyptagriculture.html>
- Urban agriculture in Europe - Patterns, challenges and policies: Briefing European Parliamentary Research Service- In depth Analysis, December 2017 — PE 614.641, Members' Research Service, ISBN: 978-92-846-2506-2, doi:10.2861/413185, Available at: [http://www.europarl.europa.eu/RegData/etudes/IDAN/2017/614641/EPRS_IDA\(2017\)614641_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/IDAN/2017/614641/EPRS_IDA(2017)614641_EN.pdf)
- FoodMetres-Urban-Organic-Waste-Management-in-The-Hague.pdf. Wageningen University, Academic Consultancy Training, 2014-05-01 [Online], available at: <http://www.foodmetres.eu/wp-content/uploads/2014/06/FoodMetres-Urban-Organic-Waste-Management-in-The-Hague.pdf>.
- <https://www.bbc.com/news/science-environment-30182326>, accessed: March 3, 2019.



LONGYEARBYEN

In the small residential area of Nyben, in the suburbs of Longyearbyen (Svalbard Island, Norway), there is the Polar Garden, built in 2013 and now managed by the organization Polar Permaculture. In this area, the organization, founded by Chef Benjamin L. Vidmar, started to grow fresh vegetables inside a dome, which was set up in 2016, using it with passive solar energy from end of May until end of September. Polar Permaculture evolved out of the need to have the fresh, locally grown product in the World northernmost town of Longyearbyen. The local community loved the project and today want to grow more and reduce the import of fresh food that is shipped from mainland Norway.

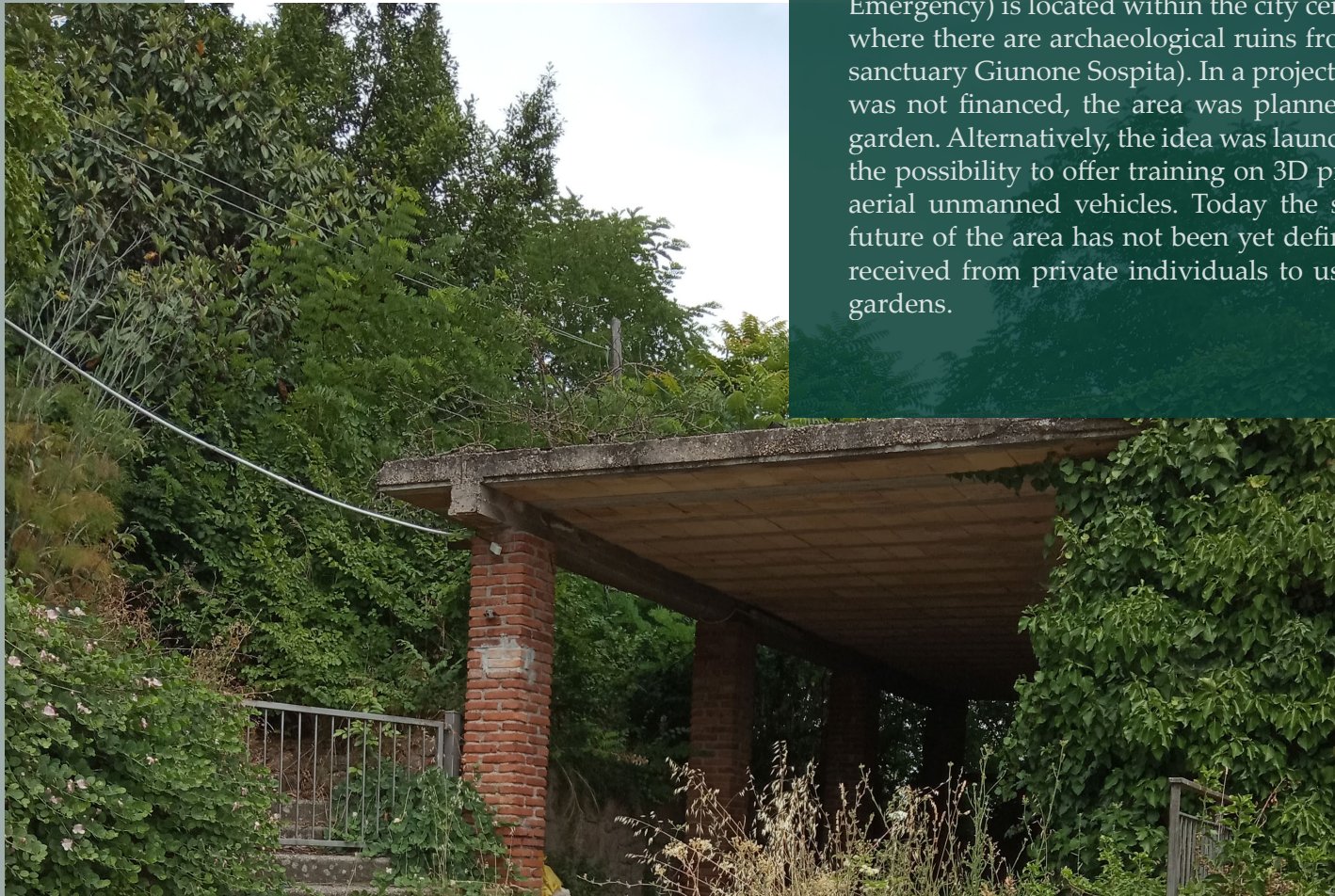






LANUVIO

The former station **ARES 118** (Regional Agency for Health Emergency) is located within the city center of Lanuvio (Rome), in an area where there are archaeological ruins from the Roman era (remains of the sanctuary Giunone Sospita). In a project presented a few years ago, which was not financed, the area was planned to be converted into an urban garden. Alternatively, the idea was launched to realize a youth center, with the possibility to offer training on 3D printing and photography through aerial unmanned vehicles. Today the space is completely unused. The future of the area has not been yet defined; however, requests have been received from private individuals to use it for the creation of vegetable gardens.

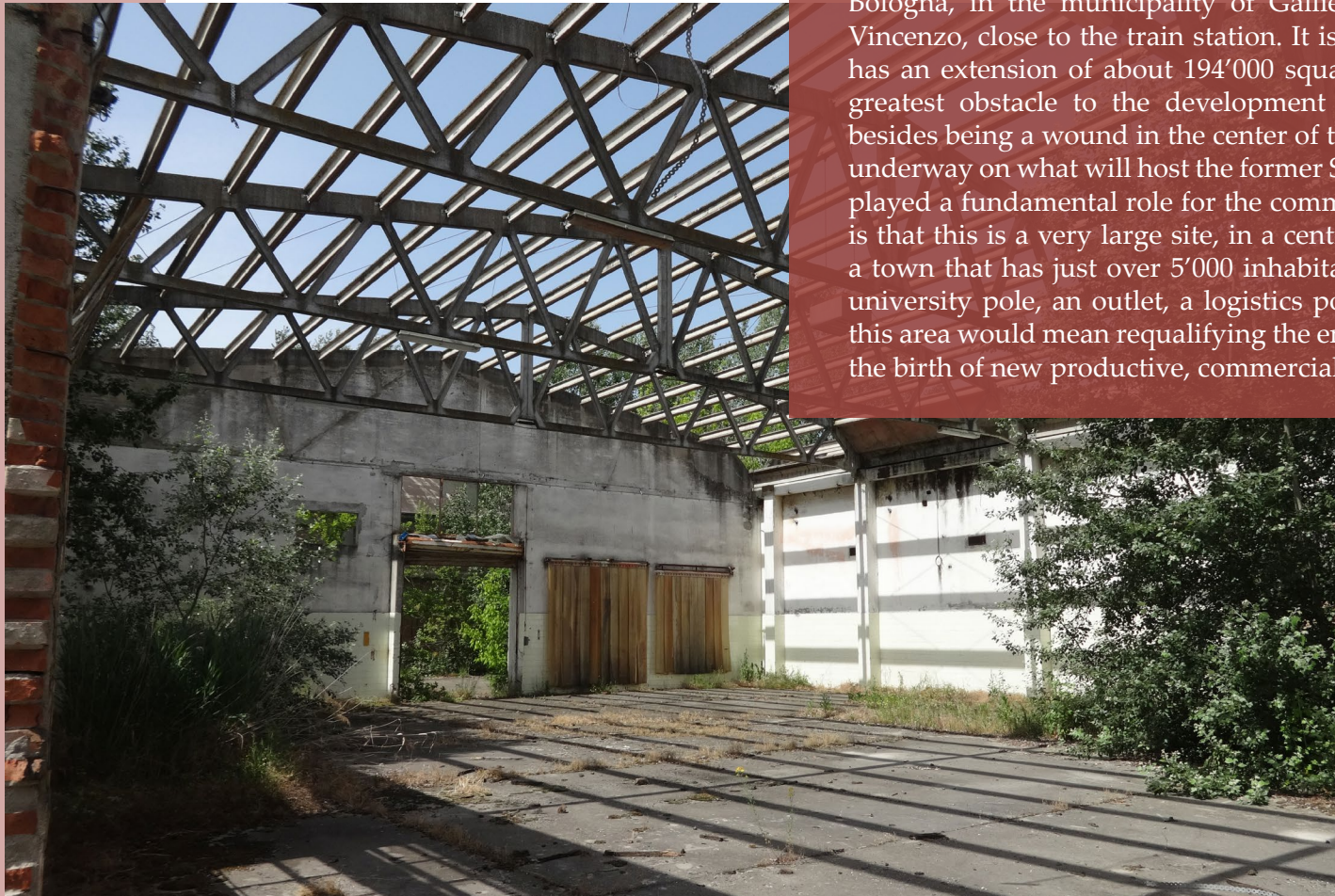






GALLIERA

The former SIAPA area (Società Italo Americana Prodotti Antiparassitari) is located in the territory of the Metropolitan City of Bologna, in the municipality of Galliera, in the neighborhood of San Vincenzo, close to the train station. It is an area of flat conformation and has an extension of about 194'000 square meters. Today, the area is the greatest obstacle to the development of the municipality of Galliera, besides being a wound in the center of the town. An intense debate is still underway on what will host the former SIAPA area, which for decades has played a fundamental role for the community of Galliera. What is certain is that this is a very large site, in a central position of the urban fabric of a town that has just over 5'000 inhabitants. The hypotheses are many: a university pole, an outlet, a logistics pole, an energy park. Requalifying this area would mean requalifying the entire town. It could be an input for the birth of new productive, commercial activities and not only.





“Urban agriculture was part of the city long before this term was coined, but with functions and meanings changing over time. In recent decades, food played only a minor role in urban development strategies.”

Jury Interview

by Runrid Fox-
Kämper, ILS – Research
Institute for Regional and
Urban Development gGmbH



Urban vacant lands and urban agriculture (UA)

In densely populated inner city area with deficits in urban green infrastructure community gardens often present a strategy for the re-use of urban brown fields. Especially in cities with declining population figures, where austerity resulted in areas earmarked for development that are left fallow, and open (public) spaces that are left unattended, UA is recognized as a tool for urban regeneration, place-making and identity; empowerment and social cohesion within the neighborhood.

Many urban agriculture projects such as community gardens have started as so called interim-uses on under-used public or private plots with short-term contracts. The uncertainty concerning long-term land use affects garden projects and has been identified as a major impeding factor for establishing UA projects within cities (Rosol 2005; Fox-Kämper et al. 2018; Wesener et al. 2020). In the context of urban land scarcity, inner-city urban gardens particularly compete with investors usually keen to implement real estate projects, e.g. for residential purposes. And even if vacant land is available in decayed neighbourhoods, market orientation in urban politics might lead to exploiting urban agriculture strategically for a ‘planned gentrification’ of a neighborhood. What is needed here is to find ways for institutionalize such forms of UA e.g.

by a recognition in urban coding plans or by embedding UA in urban food planning strategies.

The nexus between technology and social innovation in UA

Urban agriculture has a long tradition in Europe. Besides food growing, allotment gardens which date back to the beginning of the industrialisation in 18th century, and later community gardens that emerged after the 1970’s oil and financial crisis also aim at leisure activities, support personal encounter with other gardeners and social cohesion. Out of these gardens, more and more business models have developed that combine food growing with activities aiming at educational, integrative, therapeutical or other purposes, thus promoting social innovation. Lately, technology-driven and partly highly intensive food production forms of UA in and on buildings, such as rooftop, indoor and glasshouse production, are emerging. Some of these urban farms experiment with new food (such as algae) or closing life-cycle-loops (such as aquaponics). These are based on the motivation to advance business models of UA and on the cradle-to-cradle discourse aiming at producing food near to the consumers and at advancing the food production within cities.

Regularly, community gardens and indoor farms engage with the community around. Activities

range from educational visits by kindergartens or schools, cooking classes or harvest events. These activities bring community members together to learn, participate in activities, volunteer, and share the fresh vegetables grown and harvested by the farm. Many farm projects also engage in job trainings and skills teaching. These examples demonstrate that there is a close relationship of technical and social innovation in UA.

UA for future cities: strategies and policies needed

Urban agriculture was part of the city long before this term was coined, but with functions and meanings changing over time. In recent decades, food played only a minor role in urban development strategies. Apparently there was a longstanding consensus that the food system was largely a rural issue and therefore outside the scope of the urban planning agenda. This opinion seems to be subject of change with urban food planning becoming more and more part of urban, regional or supranational strategies, including UA in its diverse forms.

As the urban food system has a massive impact on many other sectors, such as public health, social justice, energy, water, land use, transport and economic development, there is a need for a return of food policy to cities. Many cities all over the world have already developed strategic concepts for this, e.g. the London food strategy aiming at providing for every Londoner access to healthy, affordable food dates back to 2006. In other cities food policy councils

are emerging serving as institutionalized platforms for local food policies. Integrated, cooperatively developed food strategies bring together the interests of the various sectors along the food chain, the urban administration and all relevant civil society groups. Urban food planning has to consider the different framework conditions and urban structures differ in each city - a one-size-fits-all strategy will not work.

Policies integrating UA into the urban food system are needed at different levels such as global, European, national, regional or local level, and should cover different sectors such as urban planning, environmental and health regulations or agrarian policies. E.g. within the Common Agricultural Policy (CAP), which is the main policy for farming and food production in the EU, funding criteria regularly do not apply on UA farms due to their (too small) size and their location within urban areas. Here a re-thinking process is needed that acknowledges the diversity of UA and their multi-functionality for manifold purposes.

At local level, some promising practices through which cities have started to put urban food production on the policy agendas and are changing institutional settings can be observed. Cities can build or join strategic networks aiming at raising the awareness for this issue in general and at exchange of practice, such as the Sustainable Food Cities network in the UK or the Milano Food Policy Pact.

References

Rosol, M. (2005). Community Gardens – A Potential for Stagnating and Shrinking Cities? Examples from Berlin. *Die Erde*, 136(2), 165-178.

Fox-Kämper, Runrid; Wesener, Andreas; Munderlein, Daniel; Sondermann, Martin; McWilliam, Wendy; Kirk, Nick (2018): Urban Community Gardens: An Evaluation of Governance Approaches and Related Enablers and Barriers at Different Development Stages. In: *Landscape and Urban Planning*, Vol. 170, pp. 59–68. doi:10.1016/j.landurbplan.2017.06.023.

Wesener, Andreas; Fox-Kämper, Runrid; Sondermann, Martin; Munderlein, Daniel (2020): Placemaking in Action: Factors that Support or Obstruct the Development of Urban Community Gardens; *Sustainability* 12(2):657; online first January 16, 2020; doi: 10.3390/su12020657





Q&A

We asked the participating teams to answer some of our questions regarding the challenge and their experience. In the next part of this book they will tell their stories and the relationships they built in their path to the Grand Finale

1. *Vision*

Imagine your concept has been realized. A person walks into your final project place. What does she / he see, hear, experience? What happens there? Give us a guided tour through your concept.

2. *Concept*

Name and shortly describe main elements of your concept/ Unique Selling Points, including your key innovation

3. *Sustainability*

Highlight the most important sustainability aspects of your design

4. *Lesson learnt*

Share three lessons learnt from participating in the Challenge

5. *Remarks*

Do you have any other remarks that you would like to share (related to the story of your team in the book?)

LONGYEARBYEN



TEAMS

AURORA

Bahar Sancar (Akdeniz University - Leading University in Education and Science in Akdeniz, Turkey) Berkant Yildiz (Akdeniz University - Leading University in Education and Science in Akdeniz, Turkey) Egemen Akinci (Akdeniz University - Leading University in Education and Science in Akdeniz, Turkey) Fatma Toran (Akdeniz University - Leading University in Education and Science in Akdeniz, Turkey) Ismail Hakkı Ogan (Akdeniz University - Leading University in Education and Science in Akdeniz, Turkey) Merve Akgun (Akdeniz University - Leading University in Education and Science in Akdeniz, Turkey) Seval Şencopur (Akdeniz University - Leading University in Education and Science in Akdeniz, Turkey)

THE POLAR FARMERS

Asmaa Mamdouh (Cairo University, Egypt) Federica Marandino (Federico II University of Naples, Italy) Guglielmo Maresca (Federico II University of Naples, Italy) Matilde Festi (Alma Mater Studiorum University of Bologna, Italy) Sergio Galano (Federico II University of Naples, Italy) Shorouk Ashraf Atef Ahmed Sayed (Cairo University, Egypt) Sarah Salem (Cairo University, Egypt) Ulisse Carlino (Alma Mater Studiorum University of Bologna, Italy)

SYMBIONT SOCIETY PROJECT

Ana Krstic (Alma Mater Studiorum University of Bologna, Italy) Andrea Frontani (Polytechnic of Milan, Italy) Babette Brands (Alma Mater Studiorum University of Bologna, Italy) Davide Libretti (Polytechnic of Milan, Italy) Federico Montefiori (Alma Mater Studiorum University of Bologna, Italy) Ferdinando simoncelli (Alma Mater Studiorum University of Bologna, Italy) Francesca Anastasio (Alma Mater Studiorum University of Bologna, Italy) Franco Abregu Guzman (Polytechnic of Milan, Italy) Martino Santoro (Alma Mater Studiorum University of Bologna, Italy) Matteo Landolfo (Alma Mater Studiorum University of Bologna, Italy)



AURORA

with:

Sustainable And Innovative Life At The Polar

Bahar Sancar, Berkant Yildiz, Egemen Akinci, Fatma Toran, İsmail Hakkı Ogan, Merve Akgun, Seval Şençöpur

Vision

The project, built on the island of Svalbard in Norway, combines with the social activity areas of 5 regions determined with environmentally friendly production facilities and provides active living space and tourism in the city center. The aim of production and socio-cultural life is aimed with the realization of current technological developments. In order to achieve high efficiency and quality values, we aim to highlight an important facility preferred in today's and regional conditions. In order to enable production in places where the soil is not suitable for vegetative production, micro greenery and soilless agriculture, which are relatively easy to grow and have low initial costs, will be supported and vegetative production will be made in this self-sufficient system of more than one variety. In our greenhouses where algae are produced; It is intended to be used in food, beverages, animal feed, organic fertilizers, cosmetics and health, industrial products and energy production. In addition to conventional animal husbandry, it is aimed to achieve maximum efficiency by using animal stable wastes in biogas production by using innovative barn architecture and heating technology. In this project, it is aimed to create a unique production structure supported by innovative production systems. The subject of "sustainable development", which means meeting the needs and expectations of the future generations without compromising the possibilities of meeting the needs and expectations, and "waste management", which forms the basis of sustainable development policies in this direction. While reaching these goals, environmentalist and creative systems were brought to the fore. In addition to meeting the needs of the region, it will be ensured to increase the level of welfare with economic efficiency, increase the quality of life, and the integrity of the domestic right and visitors in a social complex.

Concept

Generally, it is to meet the heat, electricity and water requirements of the planned social facility without creating a stress environment, to make self-sufficient vegetative and animal production, to produce algae, to provide local and tourist participants by creating a local identity and most importantly, to realize this process in the most economical way.

Geodesic dome: The architecture of newly built buildings is adapted to the model of the Geodesic dome. The Han Tent is designed in an area where the temperature is +35 in the summer and -35 in the winter. While the architectural buildings are being constructed, the buildings in the region are designed by examining.

Hydrogen gas: In addition to innovative energy demands, hydrogen gas will

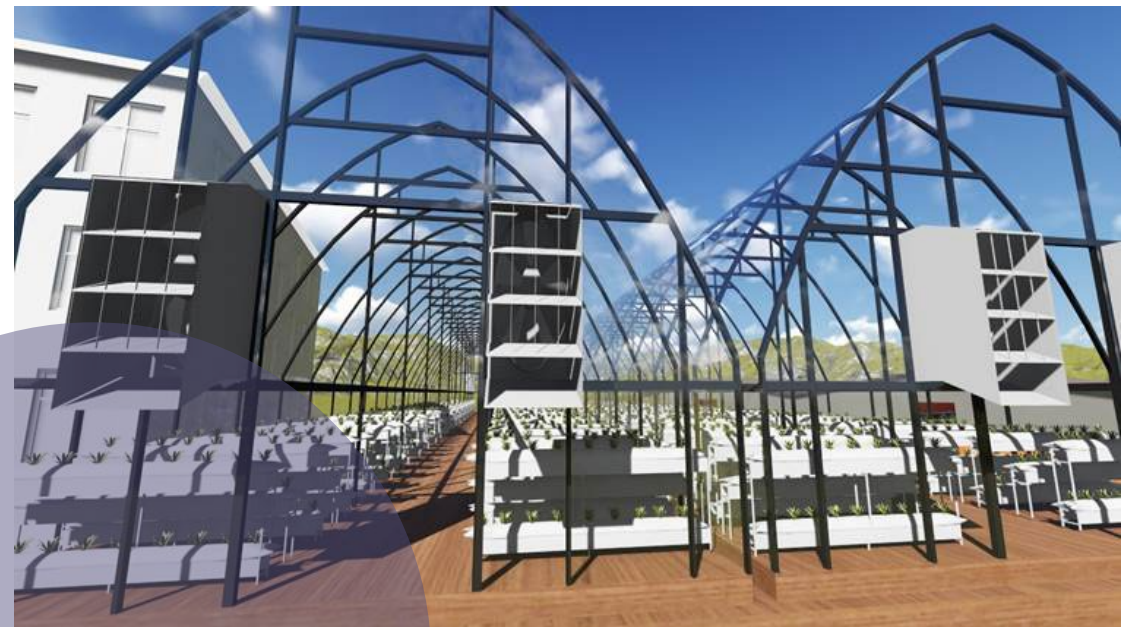
be used for heating and electricity generation. In this way, continuity will be provided in a green and sustainable manner where other systems fail. Seawater will be used as a source of hydrogen.

Algae production: By producing algae; It is intended to be used in nutrients, beverages, animal feed, organic fertilizers, cosmetics and health, industrial products and energy production. In the summer, macroalgae that need daylight can be produced, dried and consumed in the winter. In the winter months, it is planned to produce by using macroalgae that can breed in the dark. A laboratory environment has been created for use in areas such as cosmetics, healthcare and industrial products. Algae contain many vitamins for health, vitamin products will be provided. At the same time, heat and light source will be provided by choosing algae lamps for lighting purposes.

Biogas: In this proposed project, in addition to conventional animal husbandry, it is aimed to achieve maximum efficiency by using animal husbandry waste in biogas production by using innovative barn architecture and heating technology.

Sustainability

Water management: It provides many environmental and economic benefits such as increasing wastewater recycling and reuse, mitigating water scarcity, reducing pollution emissions, improving soil quality and reducing production costs. The treatment of the water used in our project will be provided and the



cycle will be continued in a cycle. Seawater will be purified from salt and will be obtained for drinking and use.

Waste management: The zero waste restaurant movement, which has basic principles such as the development of environmental awareness in the food and beverage industry, the re-evaluation of waste in the sector and the efficient use of natural resources, in this direction, reducing energy consumption, water consumption, waste management, chemical use, will set basic criteria for sustainable food issues.

Sustainability of existing buildings: Existing buildings have been preserved and restored. 4. The existing building in the area was converted into a hotel and glass igloos were built. Svalbard, one of the places where the northern lights are best watched, will wait for its guests. 3. The building has been restored in the existing building in the area, and the administrative building has been converted into sales places and cafes. 5. The existing structure in the field has been transformed into a laboratory for cosmetics, healthcare and industrial products from algae production.

Energy management: In addition to innovative energy demands, hydrogen gas will be used for heating and electricity generation. In this way, continuity will be provided in a green and sustainable manner where other systems fail. Seawater will be used as a source of hydrogen.

Algae production: intended for use in nutrients, beverages, animal feed, organic fertilizers, cosmetics and health, industrial products and energy production. At the same time, heat and light source will be provided by choosing algae lamps for lighting purposes.

Lesson learnt

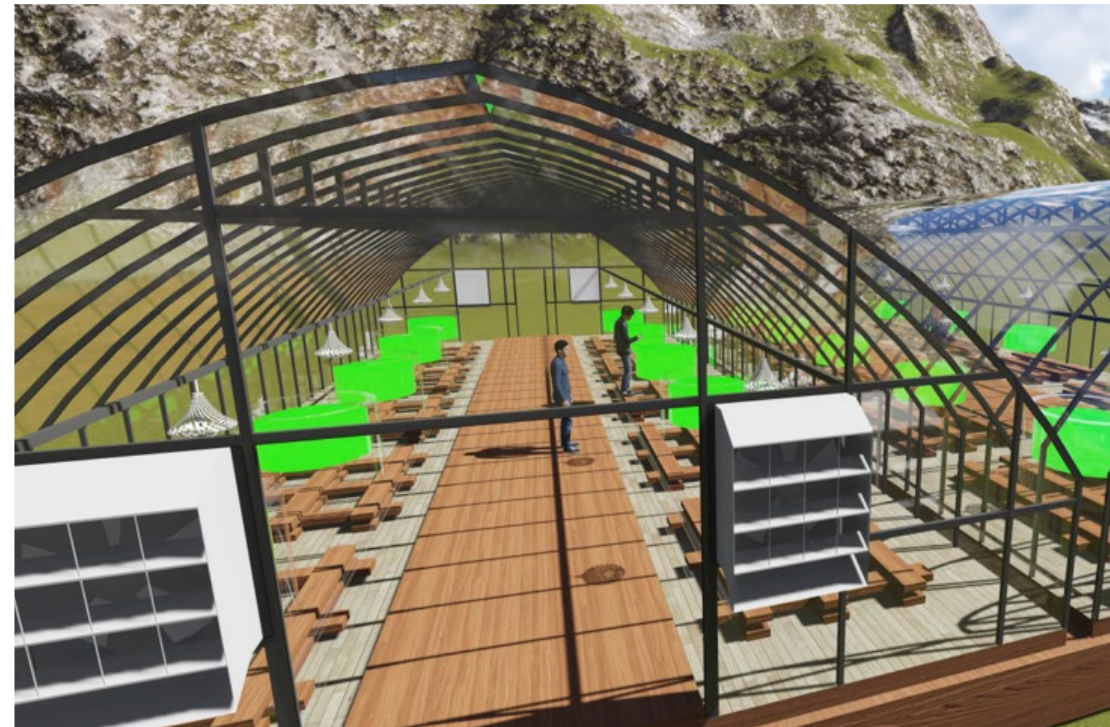
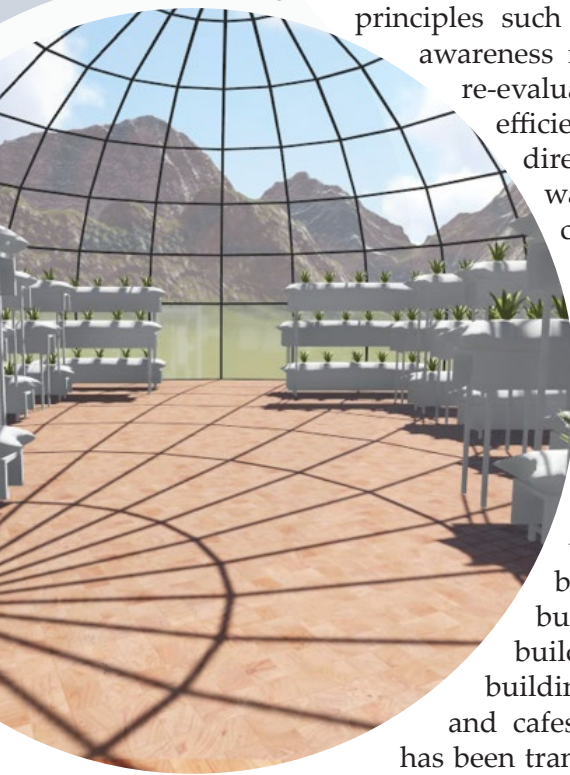
In this study, the ability of different professional disciplines to work integrated

with each other was developed. In this way, economical innovative approaches in energy, agricultural products and processed food production have been created in line with sustainable development principles. Plans have been produced to create green space awareness, which is one of the most important factors in determining the development levels of countries. In the realization of the ideas developed, the applications are planned to be environmentally friendly. A multidisciplinary environment has been created by improving the ability of information exchange and research between different professions, ensuring adequate communication in groups. We learned to produce fast and innovative ideas in the face of a problem that we may encounter in the social and business life process.

The ability to combine different ideas produced on an opinion and to bring them together at a common point and to manage this process has been developed.

Remarks

Our group members from different cultures and fields of study came together without knowing each other for innovative ideas in line with a common goal.



Bahar SANCAR, the team leader of our group, aimed to make the project effective by addressing the general planning, determining the renewable energy principles, and the benefits of algae production.

Berkant YILDIZ, who has been working in the field of animal biotechnology, has included the ideas created by considering the contribution of animal production and processing animal wastes to sustainability and energy.

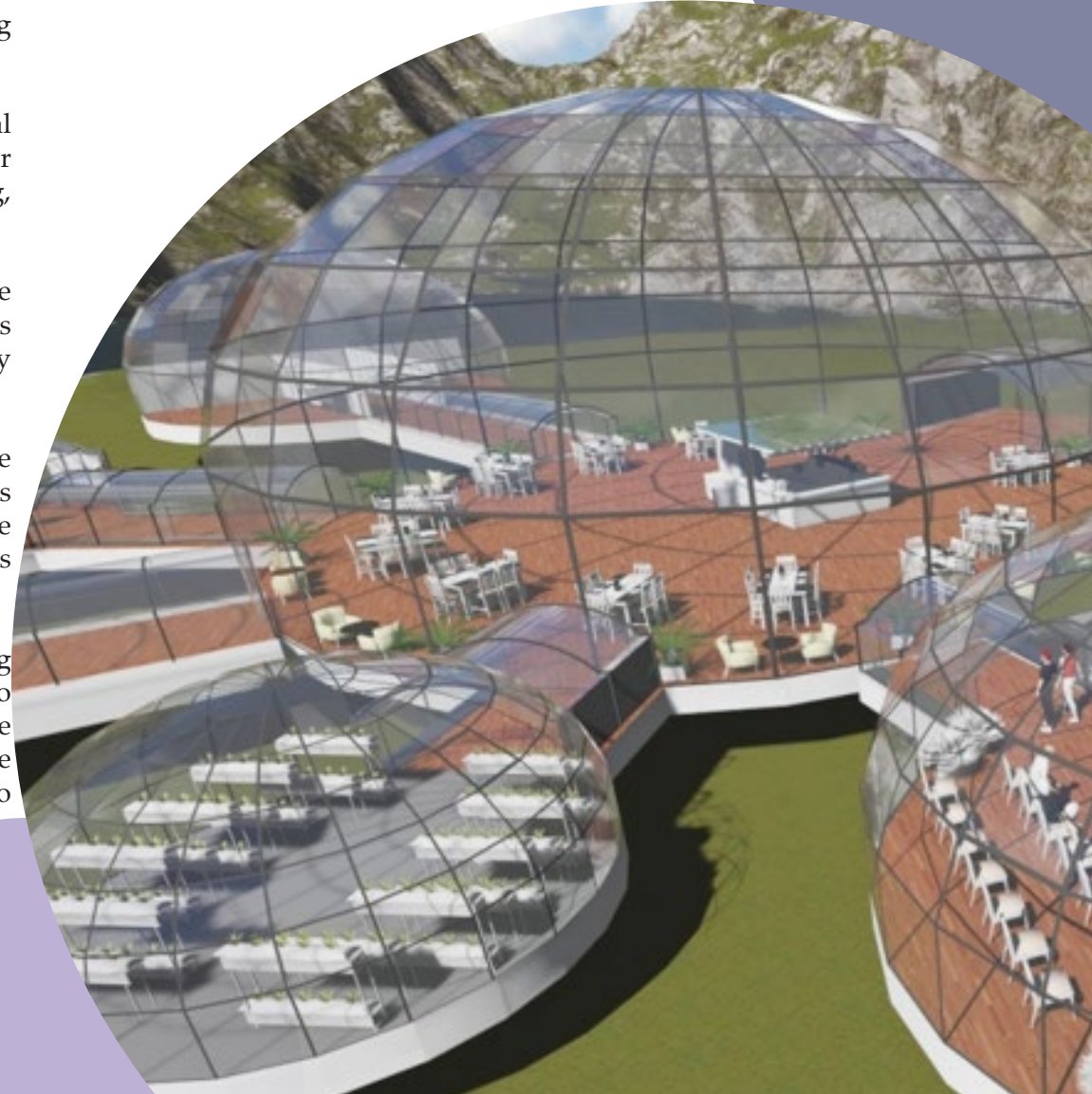
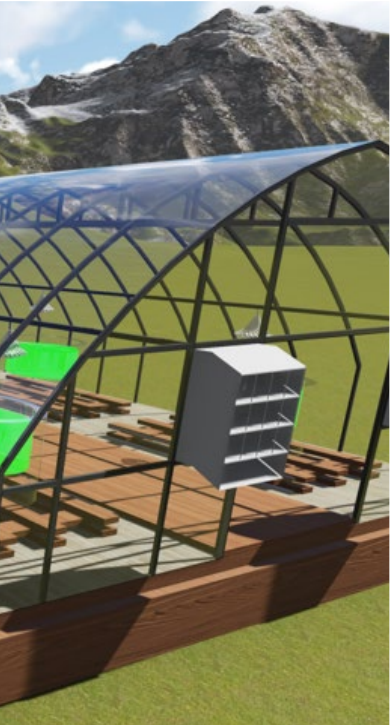
Working in the field of plant breeding and playing an active role in the private sector, Egemen AKINCI aimed to develop ideas with user needs by considering the principle of examining the economy and creating a local identity.

Fatma TORAN and İsmail Hakkı OGAN, who work in the fields of architectural decoration and building-inspection, have designed interior and exterior spaces with 2 and 3-dimensional drawings in architectural project drawing, considering the space structures,

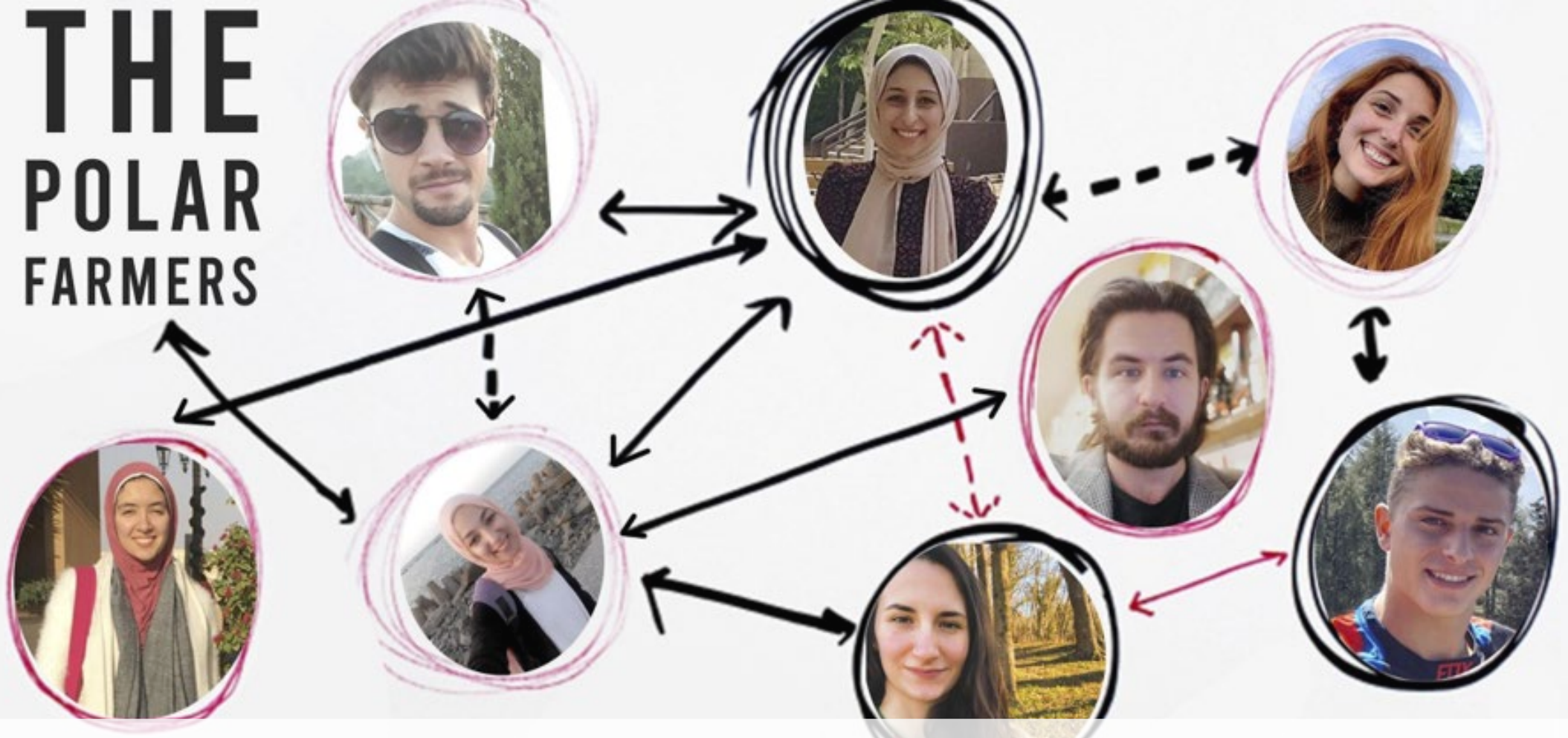
With her studies on landscape design and waste management, Merve AKGÜN has directed her works by targeting the visualization and sustainability principle in vegetable fields.

Seval ŞENÇOPUR, who stated the ideas of effective use of plant biotechnology in laboratory conditions and reducing the balanced and external dependence of plant production and bringing economic income as well, aimed to move the project forward.

Thus, different professions came together using multidisciplinary contexts. They have aimed to design projects using technological and sustainable techniques in order to make their use more advantageous in their currently used regions, due to their geographical factors.



THE POLAR FARMERS



THE POLAR FARMERS

with:
The Polardrasil

Asmaa Eldaly, Federica Marandino, Guglielmo Maresca, Matilde Festi, Sarah Salem, Sergio Galano, Shorouk Ashraf, Ulisse Carlino

Vision

Imagine yourself walking in a street between colourful timber houses and snow, while at once, you turn the corner and glimpse a place different from everything you have seen around; a group of glass domes, from which you hear music and see people who come and go continuously. You push the door. Someone greets you with joy while you can still feel the cold of the outdoors. Once you take a cup of hot chocolate, you can listen to a group of coalminers who play some music while sitting on comfortable sofas. Someone tells you that in the next dome you can enjoy a wonderful meal made by chef Benjamin L. Vidmar, founder of Polar Permaculture. You move to the bigger dome where the restaurant is placed, sit on a wooden table made of recycled materials and order today's meal. The waiter tells you that the ingredients have been harvested two hours earlier from the greenhouse. The meal is lettuce and microgreens salad with stir-fried mushrooms. Then you finish the meal and join the group visit to one of the two greenhouses where you can see where the food came from and learn about how it was grown and about making vermicompost, and think about proposing this method for more sustainable waste management in your neighbourhood. You notice the solar panels on the dome, and you understand that the same energy which was caressing your skin is now inside those small sprouts in the trays. Before leaving, you find a brochure where you find a picture of a dome furnished with a bed from where people look at the sky during the Northern Lights, and you understand that this place has other surprises for you.

Concept

The used systems have high efficiency with a high ratio between products and inputs and a performing supply chain that can provide high incomes. Each greenhouse can produce a wide range of crops especially lettuce, microgreens and mushrooms. Most of the organic biomass is recycled and vermicompost is produced from crop wastes to reduce pollution. The availability of fresh produce in Longyearbyen will enhance the quality of life of citizens and improve their health and welfare. Finally, the greenhouses act as a hosting place for educational tours to both citizens and tourists that help spread awareness on permaculture and waste management.

Economics

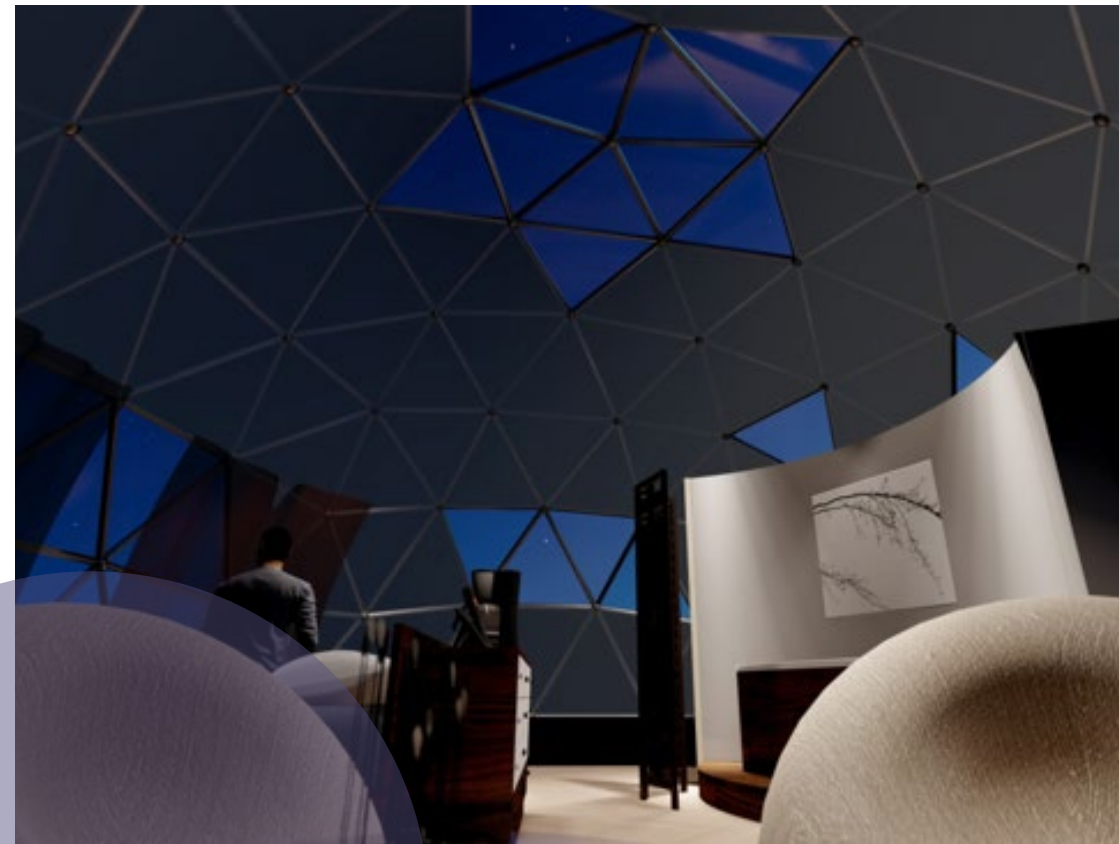
The use of modular domes makes it possible for future expansions for both the hotel rooms and the greenhouses to meet larger shares of the market over time. These domes support local activities and refresh the economy of Longyearbyen by producing veggies and selling them while promoting green energy sharing

to lower fossil fuel consumption and using recyclable materials for a green circular economy.

Geodesic Domes

The geodesic dome has excellent structural and environmental properties that can withstand strong winds and weight of snow while preserving and distributing heat inside it, making it the best highly energy-efficient building in such climate conditions. The project uses two sizes of domes for the greenhouses, restaurant and hotel rooms, with the same size of triangular panels for easier and more economic maintenance. The triangular panels are either transparent or opaque solar panels to generate clean energy.

The domes also have an inner openable film to control the amount of light getting in during the day and the amount of indoor light during the night which is an efficient and economical method to control light intensity.



Sustainability

Social sustainability

- 1- BELONGING: promoting social interaction to create a citizen identity
- 2- INTERACTION: facilitate the connection and cultural exchange between citizens and tourists by hosting public events for both the local community and tourists.
- 3- COOPERATION: encourage the development of common goals

Environmental sustainability

Each modelling level of the project included an environmental sustainability aspect:

- 1- THE BUILDING PROCESS, which includes recyclable and recycled materials
- 2- INNOVATION IN ENERGY by using renewable solar energy panels in the building's walls
- 3- WASTE MANAGEMENT by recycling leftovers from plants and organic urban waste, transforming them into a source for vermicomposting. This circular economy model is simple, feasible and thought for the safety of any form of life of this Environment

Economic sustainability

Finding a proper strategy to make the idea of multifunctional space in Longyearbyen be profitably required to analyse in detail the social and economic background. The place is worldwide known as a typical wintry touristic destination. For this reason, Polardadrasil must rely on commercial relationships with the local touristic facilities to expand the market share. Then, once that customers appreciate our healthy, tasty and colourful veggies, we are sure that they will ask to visit our urban farm to discover this wonderful place. In the end, Polardrasil will be able to guest as many holidaymakers possible in rooms built with the incomes of the vegetables sold. This strategy is thought not only to care about personal luck, but also to strengthen the wellness of the whole community.

Lesson learnt

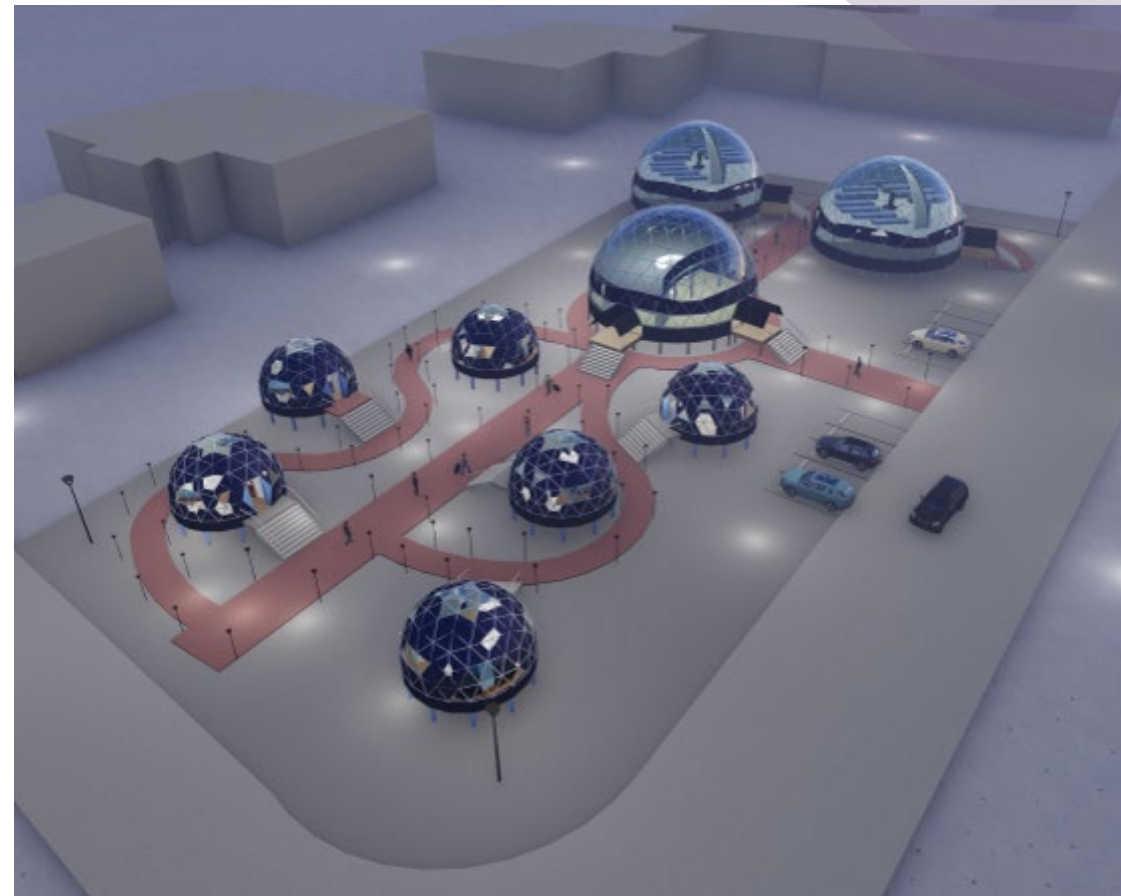
Working in a multidisciplinary team is like learning a new language, translating individuals' efforts in specific fields of work for a common goal: the creation of a collective masterpiece. We dealt with the difficulties of living far from each other and speaking different languages, but these distances have been filled

thanks to the stimuli that each of us was able to give to his teammates.
-The importance of working in synergy with each other makes clear how the prospect of one is closely linked and dependent on that of others, and how the definition of a good result is possible only with the multidisciplinary collaboration of all parts.

-For the first time, we have worked on a project that we are sure to be developed in the future, allowing to transform the hopes of a group of students into a concrete chance for an entire city to solve its problems.

Remarks

One of our teammates recently visited Longyearbyen. She witnessed about this using these words: "Visiting Longyearbyen helped me in reflecting on my



habits. Normal building rules, but my eating habits are completely different from daily routine over there. Besides, I enjoyed the beauty of a wild but also inhospitable nature, where mankind feels welcomed and in danger at the same time”.

Choosing the name of our project was the first task we had to deal with. A symbol of the cooperation that since the first moments of the competition joined us. And we found it. According to Norse mythology, Yggdrasil is the World Tree. Thanks to its roots, it connects the Nine Worlds with the Gods, the

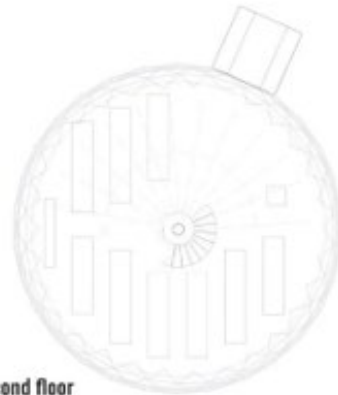
same as these fantastic 8 students of the team are linked to Longyearbyen and the whole planet. A perfect connection, clearly displayed in the shape of The Polardrasil project, whose activities are functionally and spiritually linked all together. We want to “plant” this tree in a land of ice, to give birth to a symbol for a city full of wonderful people, both young and old, students and workers.

DOME LAYOUT GREENHOUSE

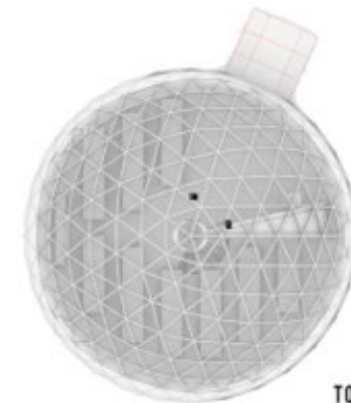
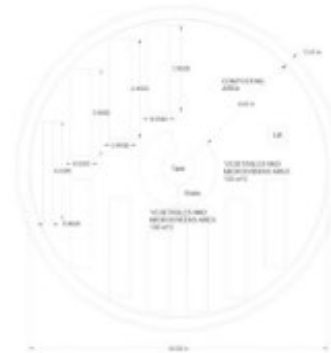
GREENHOUSE DISTRIBUTION



First floor



Second floor

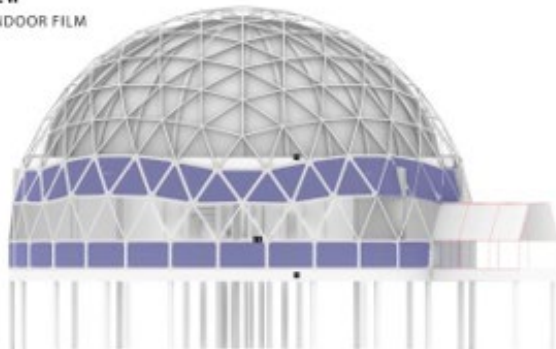


TOP VIEW

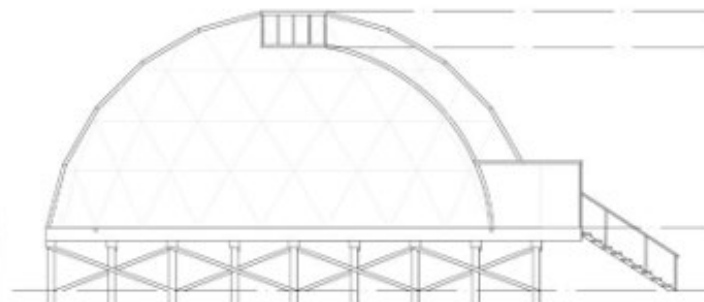


SIDE VIEW

CLOSED INDOOR FILM

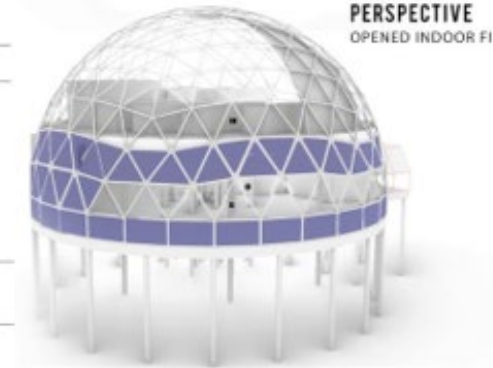


Section



PERSPECTIVE

OPENED INDOOR FILM





Symbiont Society project



SYMBIONT SOCIETY PROJECT

with:
Discovering green Revolution

Matteo Landolfo, Martino Santoro, Federico Montefiore, Ana Krstic, Babette Brands,
Davide Libretti, Andrea Frontani, Franco Abregu Guzman, Francesca Anastasio,
Ferdinando Simoncelli

Vision

The visitor arrives at the site and finds the northernmost plant production park in the world. The park is in line with the surrounding landscape, designed not to ruin the city skyline. From the large glass window of the greenhouse you can see the lush intensive cultivation (green carpets) of fresh and high-quality vegetables ready to be distributed in the country.

Not all of them. Part of the harvest will be at the disposal of the Bar/restaurant located next to the production centre (greenhouse + containers) which will allow a suggestive refreshment, but also the carrying out of culinary training courses, in this way the methods to safeguard the main nutritional values of the vegetables during their preparation will be taught.

In the same area the permaculture dome of Benjamin will be transported, an area of 100 square meters will be dedicated to it where it will be possible to manage it in the best way.

To supply the entire park with energy we will use a cogeneration plant with implementation of the local energy service.

With this plant we will be able to dispose of the biomass waste that is currently spilled into the sea obtaining the production of energy, heat and CO₂, useful for the cultivation itself.

In the Svalbard Islands there can be no plant life, but we made an exception, we brought it, and it is precisely this contrast that amazes the visitor at first sight.

Concept

The project set in lot 3 involves the installation of a production center with the creation of a hybrid structure. Hybrid because it is composed of two minimally modified containers (warehouse + cultivation of small plants) and a greenhouse (cultivation of more developed plants).

The greenhouse is designed with a double glass wall and openings in strategic positions for the flow and temperature of the air, having a large window facing south you can receive the greatest amount of sun rays and capture them inside it to heat the cultivation area (as a greenhouse effect). By creating a kind of passive heating.

Two types of plants will be installed for cultivation:

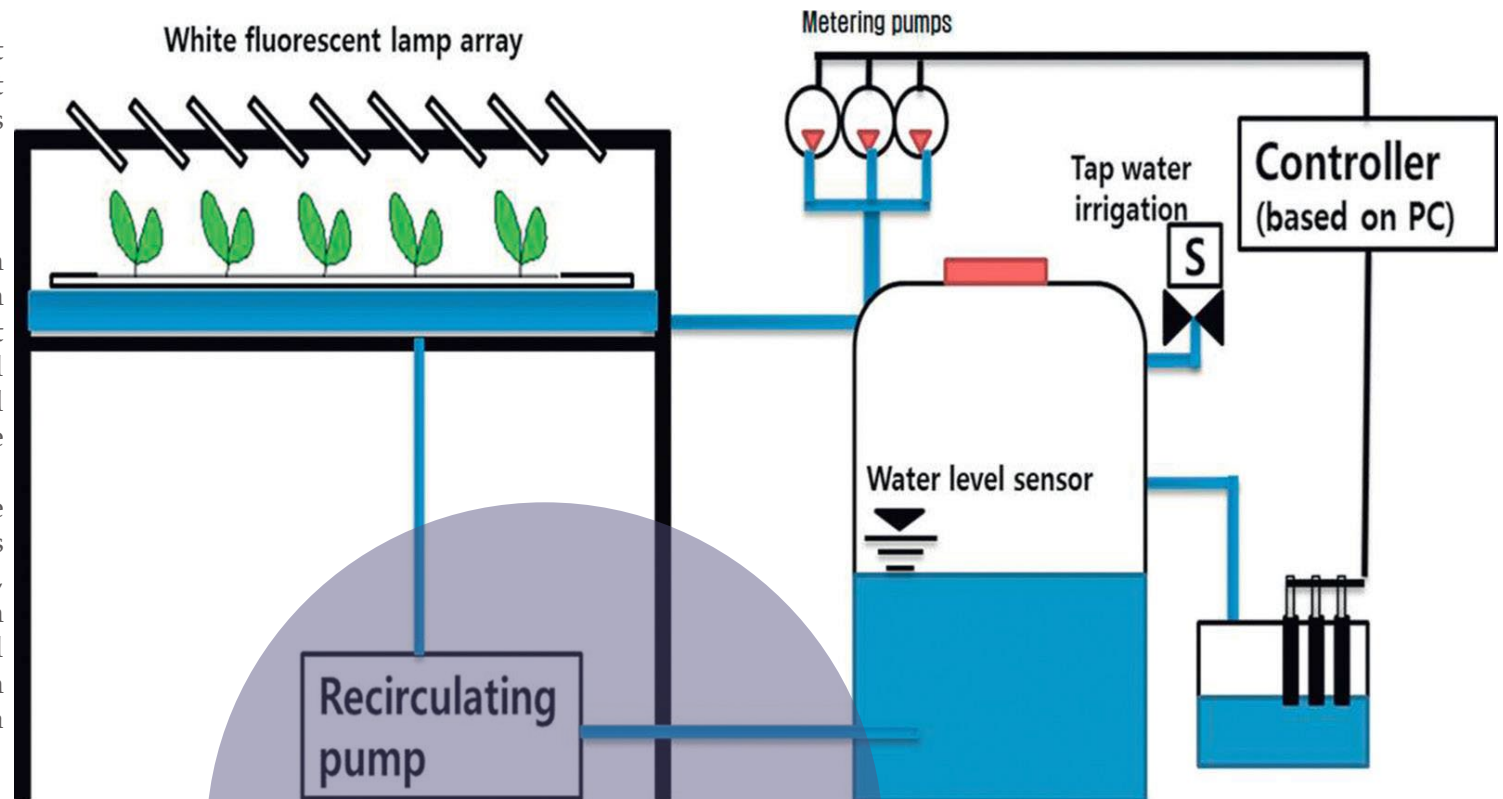
-Drip System, used in the greenhouse with mobile tables for a better organization of spaces

-NFT System, used in the container with 5-storey shelves to maximize space Both methods are designed for a minimal exploitation of the resources used in cultivation (electricity, water, nutrients etc. ..).

The warehouse will serve to maintain the cold chain to the product until the moment of delivery, the basic element for the preservation of a quality product. In addition to offering refreshment to citizens and visitors, the Bar / restaurant will also organize training courses on food education, having a very unbalanced diet due to the type of raw materials and their poor quality after import.

All biomass waste will be reused thanks to the installation of a cogeneration plant that will produce electricity, heat and CO₂ very useful for cultivation, eliminating the terrible environmental impact that waste at sea caused.

Finally, an area of 100 square meters will be set up to house Benjamin's permaculture dome, with which you can become a partner and collaborate on the exchange of information and services.



Sustainability

Every single detail of this project has been structured considering the three fundamental pillars of sustainability: economic, environmental and social.

Economic sustainability will be affirmed with the circular economy strategy trying to redirect waste in the cycle in any way.

Environmental sustainability will be safeguarded using new indoor cultivation systems which offers us to minimize the use of inputs by maximizing output. Furthermore, by maintaining cogeneration, we stop the pollution of the seas from organic biomass and update the exploitation of local energy sources.

Social sustainability is justified by the management of the entire site, as management by the cooperative by the citizens themselves is envisaged, and a constant and safe supply throughout the year is guaranteed, resulting in an increase in social well-being.

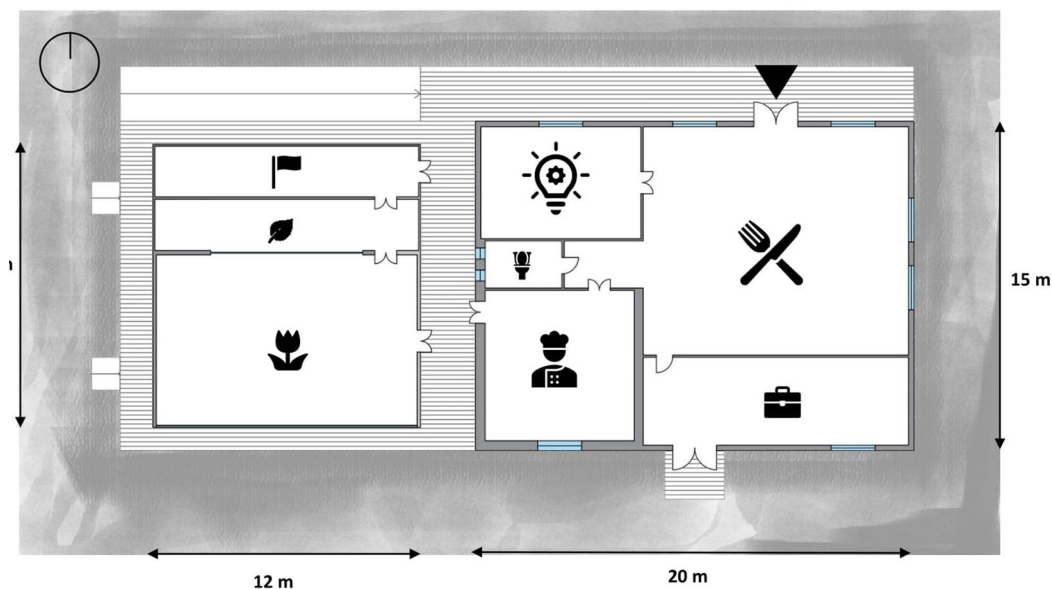
Lesson learnt

Our team, "Symbiont Society Project", is a big one because is made up of ten people. Normally you work with two or three people, but this is different. We need to keep in mind that every member has his school commitments and we live in different places. We have learned to divide the tasks in order to be faster and more efficient. We have also learned to put into practice the knowledge obtained at the university. Each of us has followed a different specialization so it has been crucial to share the information and confront each other. Collaboration is the winning strategy because some members know how to grow plants and which are their specific requirements while other member know how to build an efficient structure, furthermore other have to pay attention at the economic part and others knows which are the social goals. The last lesson learned concerns knowing a different territory like the one of Svalbard islands. The different and extreme climate is a great challenge, as a team we have to imagine different environmental factors and its consequences on the plants and on the structure of the buildings. Furthermore, we have to consider and adapt to a different culture trying to imagine new possible ways of relating by living in symbiosis with plants.

Remarks

Mainly during the early stages of our work, the Brainstorming technique was used in order to have a larger view of the topic and know other members' background, allowing a good work allocation within the group.

Communication problems related to the manners and the means were solved through a good coordination and helped the group creating internal coherence. This was essential in order to pursue a sustainable goal in a new context to the people involved in it. Having time limits and little knowledge about the location is inspiring because it improves your skillset in a working group, essential on the workplace of tomorrow. A constant learning will enhance the self-confidence, which resides in knowing the borders of the own knowledge and amplify them.





IS URBAN AGRICULTURE EVOLVING?

Jury Interview

by **Silvio Caputo**, *Kent School of Architecture and Planning Marlowe - Building Canterbury*



Past And Present

The history of urban agriculture has followed different paths, depending on the geopolitical area and country considered. In Europe, there are countries that have long-standing tradition of urban gardening (e.g. Germany and the UK) and others in which urban agriculture as we understand it today was introduced only recently (e.g. Greece). In all countries, however, the last three decades have been a period of rapid transformation. In a short lapse of time, urban agriculture has significantly widened and diversified its operational scope, moving from an individual practice (i.e. allotment leased by households or individual people) to a social one (e.g. community gardens); from an activity carried out for leisure to one perceived as beneficial to biodiversity; from one carried out on green spaces to one that can be implemented potentially everywhere, including rooftops and paved plots occupied on a temporary basis; and from one that is practiced with traditional horticultural techniques to one in which farmers experiment with permaculture techniques or even soil-less technologies. There are reasons to believe that this evolution reflects the way society is changing: concerns about the ecological health of our planet, the deteriorating socio-economic condition of society and people's wellbeing draw people towards fundamental issues of life such as

food and the environment, at the same time using food as a catalyst for social amelioration.

Merging buildings and food production

With urban agriculture evolving rapidly, experiments are made to test the possibility of integrating food growing within cities. Horticulture is generally not space efficient, at least not in the way space efficiency is understood in cities. Urban agriculture practice can therefore clash with the idea of urban sustainability which advocates a rational use of land in order to minimise expansion on green land for new urban development. With higher densities of the built environment and high land values, urban agriculture must compete for space and with the economic advantages that urban development can generate. One of the strategies that can circumvent such barriers is the integration of food growing spaces in buildings and the utilisation of interstitial or abandoned spaces. Rooftops are generally unused and they represent a great opportunity for urban food production. A study from Nadal et al. (2017), suggests that the suitable rooftops in Rubí, Barcelona, if equipped with greenhouses, can produce 50% of the city's expected demand for tomatoes. The possibility of utilising vertical farming can perhaps further increase productivity. But perhaps the bigger advantage can be generated by the exploitation of

urban resources that are currently largely wasted, such as rainwater, greywater, food waste and heat from buildings. Results from many experiments are encouraging. For example, the Roof Water Farm in Berlin is a greenhouse constructed on top of a residential building in Kreuzberg, Berlin, which is connected to the greywater system of the building, utilising this water in its aquaponic system (<http://www.roofwaterfarm.com/en/>). Tests on the plants have demonstrated that produce is safe to eat. The advantages of scaling up this approach can be significant, especially considering that agriculture consumes 70% of the total global freshwater withdrawn (FAO, 2011). Crops grown with waste water, food waste turned into compost and heat generated by buildings can reduce resource demand with great benefits for the environment.

Integrating food production in cities: a vision for a self-sufficient, sustainable city

A 'deep' integration of buildings and agriculture can accrue advantages that go far beyond food produced next to the place of consumption (e.g. zero miles); and the use of waste as a resource. If globally embraced, it can reduce demand for new agricultural land with immense benefits for the planet's ecosystems. This is an ambitious and necessary objective at a point in time in which demographic growth is predicted to reach 9 billion by 2050 (United Nations, 2004), with the consequent need to step up food production by 60% (FAO, 2011). Yet, new urban models that can support this integration are missing as well as evidence that such models can deliver what they promise. In fact, the ongoing experiments to integrate buildings and horticulture need to be supported by economic models and by planning policies that make the integration financially and practically viable. Some of these models have been proposed although at a rather theoretical level. For example, Despommier (2010) has been promoting the vertical farm as an approach to urban agriculture that can increase urban food production with minimal land use. Urban metabolism has been promoted as a conceptual approach to view cities in terms of input-output flows. By measuring these flows, we can appraise their impact on the environment while attempting to design a system of flows that is circular. The implementation of these visions is not without problems although they are important because they set the theoretical foundation and the ambitions for a sustainable city with a high degree of self-sufficiency and an absolute low impact on the environment.



References

- Despommier, D. (2010). *The vertical farm: Feeding the world in the 21st century*. Macmillan:London.
- FAO (Food and Agriculture Organization) (2011) *The state of the world's land and water resources for food and agriculture (SOLAW) – Managing systems at risk*. Rome: Food and Agriculture Organization of the United Nations and London, Earthscan.
- Nadal A., Alamús, R., Pipia, L., Ruiz, A., Corbera, J., Cuerva, E., Rieradevall, J and Josa, A. (2017) Urban planning and agriculture. Methodology for assessing rooftop greenhouse potential of non-residential areas using airborne sensors. *Science of the Total Environment* 601–602, pp. 493–507.
- United Nations. 2004. *World population to 2300*. New York: Department of Economic and Social Affairs, United Nations.

LANUVIO



TEAMS

FENICE

Andrea D'Aprile (Alma Mater Studiorum University of Bologna, Italy) Giuseppe Calore (Alma Mater Studiorum University of Bologna, Italy) Ibrahima Lo (Alma Mater Studiorum University of Bologna, Italy) Lorianne Ginot (Alma Mater Studiorum University of Bologna, Italy) Maia Correrella (Alma Mater Studiorum University of Bologna, Italy) Mariam Shehata (Cairo University, Egypt) Mariam Elina (Cairo University, Egypt) Nada Ali (Cairo University, Egypt) Olakunle Malik Sangodoyin (Ladoke Akintola University of Technology, in Ogbomoso, Oyo State, Nigeria) Salma Abou Ghanema (Cairo University, Egypt) Sohaila Ali (Cairo University, Egypt)

LANURBA

Cristiano Savini (Roma Tre University in Rome, Italy) Clara Berti (Alma Mater Studiorum University of Bologna, Italy) Giulio Seri ("La Sapienza" University of Rome, Italy) Lorenzo Trincone (Alma Mater Studiorum University of Bologna, Italy) William Bozzola (Polytechnic University of Milan, Italy) Andrea Campioli (Polytechnic University of Milan) Francesco Saverio Mazzi (Alma Mater Studiorum University of Bologna, Italy) Stefano Sasorossi (Roma Tre University in Rome, Italy) Teresa Bencic (Alma Mater Studiorum University of Bologna, Italy)

BTF

Arianna Scoglio (Polytechnic of Milan, Italy) Francesco Nizzi (Alma Mater Studiorum University of Bologna, Italy) Gaia Ricciardelli (Polytechnic of Milan, Italy) Lorenzo Samuil Mordos (Alma Mater Studiorum University of Bologna, Italy) Luca Rondanini (Polytechnic of Milan, Italy) Mattea Quaglia (Polytechnic of Milan, Italy)

FENICE



FENICE

with:

Green Symphony

Andrea D'Aprile, Giuseppe Calore, Lorianne Ginot, Maia Correrella, Mariam Elian, Mariam Shehata, Nada Yehia, Olakunle Malik Sangodoyin, Salma Abou Ghanema, Sohaila Tantawy

Vision

Arianna and Bruno are two friends living in Lanuvio who decided to visit the “Green Symphony” farm. When they cross the threshold, Arianna goes right: her yoga class will start soon! Meanwhile, Bruno continues forward walking by the pool of fish for aquaponics on his left to reach the permaculture garden where a class of children are listening to the explanation of a guide about the synergic garden. Little does he know that his steps are generating electricity through Pavegen tiles.

He admires the green wall that covers the main building and then he enters inside: it’s time to cook! Bruno is learning how to cook the fresh vegetables that the teacher picks by the aquaponics pipes inside the hall.

After the yoga class, Arianna passes near the fish pool and goes up the stairs to the greenhouse. She rented an aquaponic pipe and now it is time to pick up some of her vegetables. She learned so much about farming from this experience. Arianna will be using those freshly picked, red strawberries to make jam as she learned in the farm’s kitchen!

Arianna picks up the fruits, puts them inside her fabric bag, and goes down to the kitchen. Bruno finished his course and now it’s time to eat! They choose to eat in the semi-shaded area just outside the main building to interact with other visitors because it is a nice sunny day.

By evening, they noticed that the workshops’ building’s lights are on, there is an interesting conference about green energies! The two friends decide to remain. The friends say they had a beautiful and fruitful day at “Green Symphony” farm where they learned a lot and interacted and met new people. Every day is a beautiful day at Lauvao’s social hub: Green Symphony!

Concept

Green Symphony project aims to create social links between the community and to link the community to nature. It links music and agriculture using innovative techniques and technology with three main core values; innovation, sustainability and learning. The project raises the livability level of Lanuvio and provides the community with different services like workshops, a local kitchen lessons, an interactive green wall, yoga classes, festivals, and renting tubes for the community. It also accepts diversity by being part of a social cooperative called (“cooperativa sociale”). This implies that at least 30% of the employees are disadvantaged people.

As for the innovative agricultural techniques, the aquaponics system is used to save almost 90% of water and to produce no waste. The system acts as a closed

loop; the fish in the pool beside the main building produce nutrients for the plants and the plants clarify the water for the pool after absorbing the needed nutrients. The water of the pool passes through vertical green columns which can be rented to the local community. Harvested rainwater will be stored in an underground tank and used in the farm to decrease the waste of water. Permaculture technique is also used to manage the soil in a sustainably and avoid using pesticides. The organic wastes of the kitchen will be composted and used as fertilizer. For producing clean energy, 25 PV cells will be installed to produce 320 kWh annually and Pavegen® tiles will be added which produce 5 watts per footstep at 12-48 volts DC.



Sustainability

“Green Symphony” highlights sustainability in all of its activities. The region, Lazio, is situated in the Mediterranean area, where the average solar radiation is good enough for the vegetables to grow (up to 190 MJ/m²) and precipitation (827 mm/m² annual average) allow harvesting of rainwater in the underground water-tank from the rooftop of the buildings and a channel system outside in the garden.

To reduce water loss in permaculture, different techniques have been applied: shrubberies to reduce water evaporation from the soil and to maintain constant levels of humidity;

drip irrigation focused on the vegetable roots;

humidity sensors linked with a computer that activates the irrigation plant only when it is necessary.

The aquaponic system consists of a closed-cycle system: water used for fish (enriched of nutrients by excrement and urine), is pumped into the columns in which vegetables grow. Then, the remaining water returns to the pond. Only small and scarce additions of water are required to balance the loss from evaporation and transpiration of vegetables.

Local native seeds are used for the production of food, maintaining biodiversity and reducing genetic erosion. Due to the membership with “Civiltà Contadina”, we exchange native seeds and knowledge with other farmers, members of this non-profit association.

The food produced is a great avoidance of impact, in terms of carbon footprint: the food is produced without pesticides and fertilizers, it is not transported and packaged as conventional food. Food residues from the kitchen will be transformed into compost creating, together with aquaponics, an agriculture system based on the circular economy.

Besides, the farm engages the community in tremendous social events like workshops, yoga classes and festivals. Therefore, our project covers the 3 pillars of sustainability: environmental, economic and social.

Lesson learnt

Before applying for the URBAN FARM 2020 competition, we all shared the same need of facing a challenge from which we could learn new things. As a team, we believe we have learnt the following our three lessons:

UNITY IN DIVERSITY: Despite being in different countries, we managed to work together to get our final output as one team and make it significant

and unique. We also study different fields such as architecture, agriculture, economics ...etc. We worked together utilizing skills from our past experiences to get a project that addresses all the fields we study with various solutions.

COOPERATION: Cooperation is fundamental to solve all the problems we faced and looking for optimum solutions with our different knowledge. Brainstorming together was a fun part behind our achievements and ideas in the project. Cooperation between all the team members was the key to our outcomes.

HARDWORK: It may seem obvious, but the competition required work, time, concentration, and research, from all of us. We had to put in the time and plan our time between studies, our social lives and working on the competition. It was the highlight of our united and coherent team: everyone showed care, responsibility and passion by putting the maximum effort to reach our common aim.



Remarks

Being a multidisciplinary international team, our team faced many challenges while working on the project. The team members come from 5 different departments, 4 different countries and 4 different universities. Therefore, communication and decision making were a big challenge.

Aiming to present the best project, all team members were open to all suggestions. We divided the team into subgroups and each group had a member responsible for it. Any modifications meant to be instant and reached all the members. Then the person responsible for the part shared his/her

opinion about what should be done and then the cycle starts again once the members have evaluated the solution and made decisions.

We were motivated from day one to work on the challenge and together we were able to get the most out of our skills as each member has a special skill that the other members did not. We are glad we were introduced to each other and were able to cooperate to present a project like Green Symphony.

LEGEND

-  Greenhouse Rooftop
-  Storage Area
-  Kitchen



Aquaponics

Soilless agricultural technique using 90% less water.



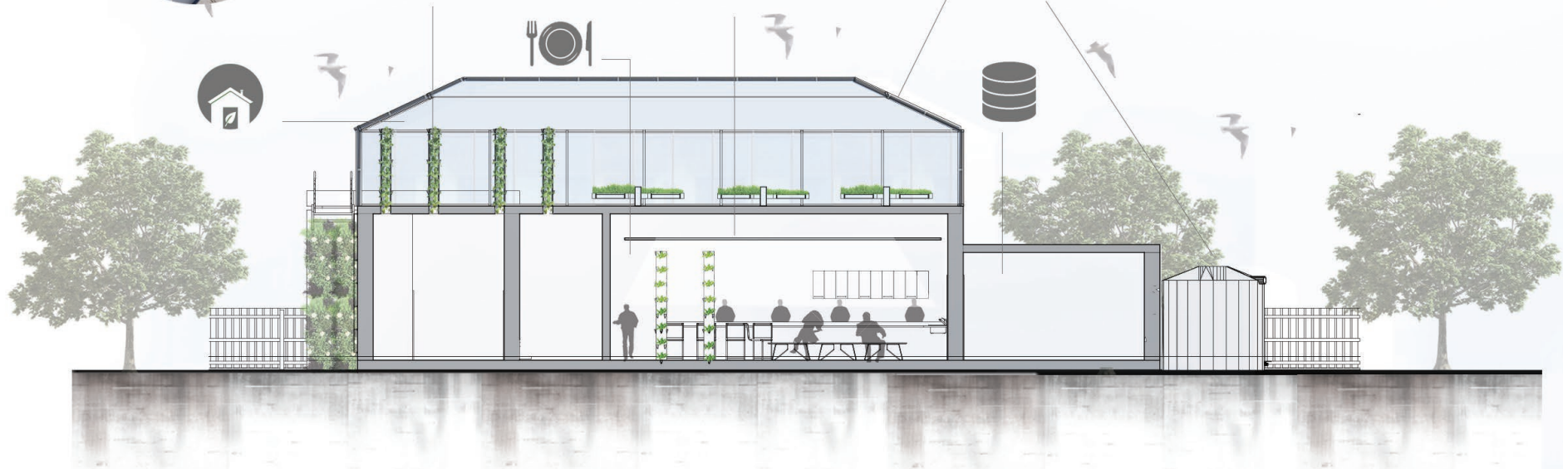
One Space Luminous Smart Technology

Smart technology used in the kitchen and large spaces for saving energy



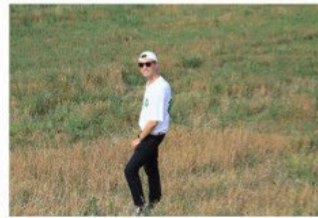
Rainwater Harvesting

Rain water collected in water tanks for irrigation need





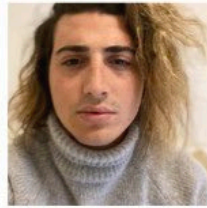
Lorenzo Trincone



Francesco Saverio Mazzi



Giulio Seri



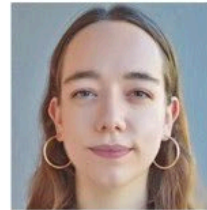
William Bozzola



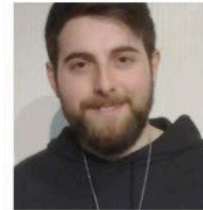
Teresa Bencic



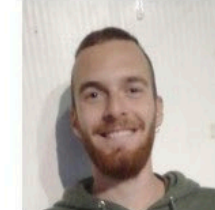
Andrea Campioli



Clara Berti



Cristiano Savini



Stefano Sassarossi

LANURBA

with:

Healty colors... a dream about Lanuvio

Lorenzo Trincone, Francesco Saverio Mazzi, Cristiano Savini, Stefano Sassarossi, Clara Berti, Andrea Campioli, William Bozzola

Vision

We are in Lanuvio, in the heart of an archaeological wonder featuring, the ancient temple of Giunone Sospita. It is morning, we immediately see many people

coming out of an iron gate with a wooden box full of brightly coloured vegetables.

The signpost says: "Lanurba: Local agrifood exposition and restaurant". We are intrigued and we enter through the gate. We can see a multifunctional and innovative space characterized by the presence of a park and social vegetable gardens. For the

occasion, a small food exposition is organized. Local producers and young urban farmers exhibit their products collected the same morning. They look very fresh! The signpost says: "Greenhouse and mushroom farm". We go inside the greenhouse and we can admire bright and coloured plants. Each plant seems to be a pixel of a big picture. There are people of all ages collecting beautiful swiss chard leaves. They pack and weigh them. On the floor, some arrows indicate the path between the plants. A display explains that the path follows the biological cycle of the plant and that we are inside an automatic greenhouse. Through a corridor, we reach the mushroom production zone, and interactive totems and panels illustrate the technology used to produce the mushrooms and their biological cycle.

We see people of all ages looking through small windows at the end of the corridor.

Person of mature years seems very serious. We have a look. There are bags full of growing mushrooms hanged on a rail system installed on the ceiling. This system is

very similar to those used in slaughterhouses. A display explains why mushrooms could be a real alternative to reduce the environmental impact generated by intensive

livestock farming. After learning more about the topic, we could not resist the temptation to buy freshly picked mushrooms

Concept

Lanurba will present itself as a space where a modest agricultural production will take place in the context of an urban environment. Our innovation will consist of renting our space twice a week for open-air markets where local producers can sell their products and have a satisfactory economic return. We will propose our products as niche ones, and they will be high content anthocyanins vegetables, mushrooms and spirulina algae. We will do it mainly through our restaurant and during "pick your own" initiatives. Thanks to our

cultivation system we will guarantee a daily harvest during each season of the year. In this way, we will be focused on the quality and freshness of our products.

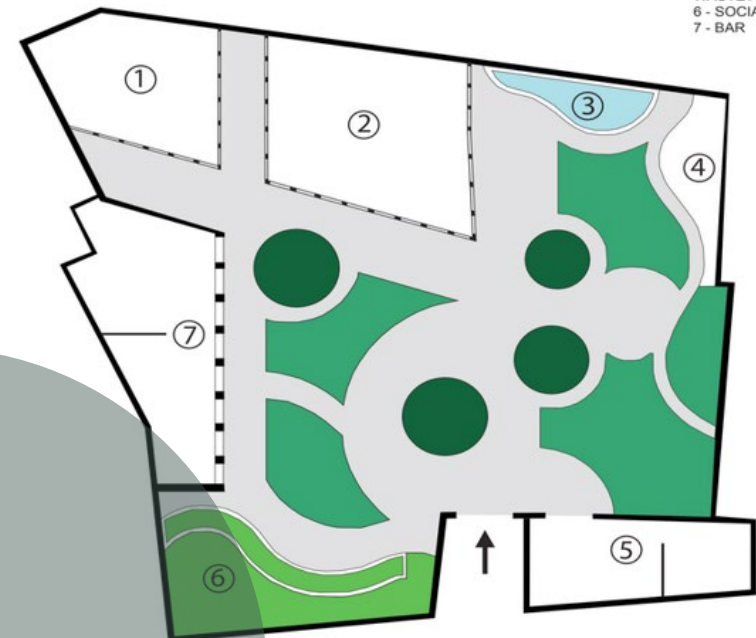
The presence of a small reconstruction of a Roman amphitheatre will allow us to organize evening events overlooking the islands of Ponza and Ventotene.

This place will be actively frequented during the days, in particular, thanks to the presence of social vegetable gardens managed by the Pink Community of Lanurba. This community will be composed of women united by the experience of breast cancer disease. In Lanurba they will experience integrated cancer therapies related to agriculture and a healthy and balanced lifestyle. Moreover, we would sponsor multiculturalism. During our agri-food exposition, everyone could come and use the oven to prepare food (e.g. bread, pizza etc). The use of the oven will be free, but it would be possible to donate. Just one challenge will be fixed: "Are you able to bake a cake or bread typical of a country different from your provenance one? Let's try by using our oven!". Last but not least, we would like to inspire people to a sustainable diet, making them interact with a cutting-edge environment, where learning about the culture and innovations in the food sector is easier and it brings an educational surplus.

MASTERPLAN LANURBA PROJECT

LEGEND:

- 1 - MUSHROOM FARM
- 2 - GREEN HOUSE
- 3 - FOUNTAIN
- 4 - OPEN AIR THEATRE
- 5 - COMPOST AND WASTE AREA
- 6 - SOCIAL FARM
- 7 - BAR



Sustainability

Obviously, at the heart of all of this, there is sustainability. Our challenge is to make a self-organized cyclical production system developed to reduce the environmental impact to the minimum while maximizing the output. All our productions are connected by nutrients flow, water flow, gas exchange, and managed by an electronic microcontroller called Arduino. Moreover, a vermicomposting area allows us to compost all the organic waste inside the structure.

Greenhouse

We choose a floating hydroponic system because is the most efficient way for any beginner to enter the field of hydroponics. It can be made on raised waterproofed culture tanks. Recycled plastic rafts float on top of the water, and plants on the raft, dangle their roots into the solution below. We choose an unconventional tank shape for a logistic and didactic purpose. It will be "u-shaped". Thanks to this "trick", will be possible to have a walk through the biological cycle of the crops. Water flushings are rare but necessary: during this process part of the nutrient solution used for crops cultivation will be spread into a culture tank to produce the spirulina algae. We want to do that to recycle nutrients and water.

Energy

We decided to use solar energy by exploiting solar cells, to provide the right temperature inside the greenhouse and in the production area of mushrooms. By calculating, we have discovered that the energy consumption per day will be approximately 70 kWh for the greenhouse and 38 kWh for the UTA batteries in the mushrooms rooms during winter.

We choose photovoltaic energy production to supply the restaurant loads. We have an estimated average electric consumption of 40 kWh/day and a power of 5kW. We have tried to combine the diverse thermal and electrical requirements of the considered places, paying attention to not have a serious environmental impact.

Restaurant and buildings

To ensure economic sustainability for this investment, we have accepted a trade-off between style and cost for the investment.

Lesson learnt

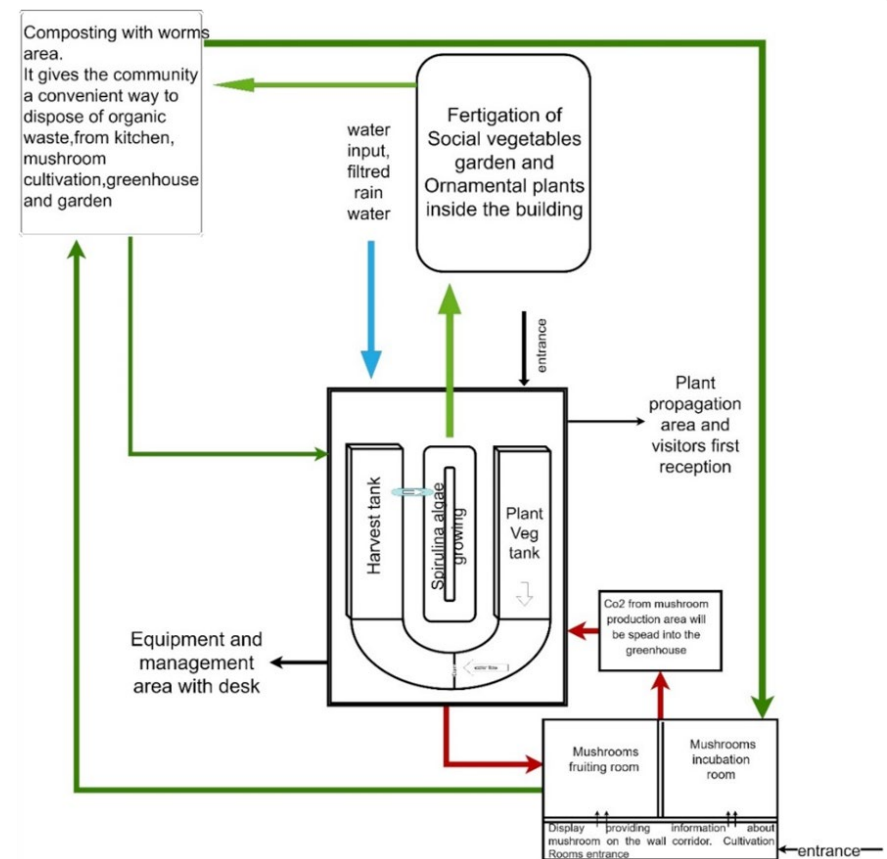
Collaboration

We have been in contact every week to develop our project. Urbanfarm has allowed us to put in practice our academic knowledge and to interface with different multidisciplinary subjects. Moreover, we have increased our command of technical English. For Lanuvio we have tried to combine the traditional model of the farm with a more integrated and social agriculture.

The difference between each member's ecologic-environmental vision: Our different backgrounds made us understand that environmental sustainability has many facets.

Timing and comprehension

We have followed a "script" in the growth of our idea. Each team member has written his/her part of the challenge, using creativity and we have understood



that collaboration is essential to have a complete and global vision. To realize our project was fundamental to be organized since not everyone knew each other. But this experience has enabled us to get to know one other, and maybe we will collaborate on future projects. It was instructive and amusing to engage in the creation of our video presentation, which was a whole new experience for us.

Remarks

For many of us was the first time to join a multidisciplinary competition, and though physically far, we went towards one direction that is the productive,

architectural and social requalification of an abandoned area. Three team members have visited Lanuvio and have talked to locals for gathering information concerning the area and the archaeological site. This research was fundamental to figure out which were the needs of Lanuvio's inhabitant (older and young people, workers etc.). Moreover, from the interviews and the on-site visit, it emerged that Lanuvio, and in particular its archaeological site, is also frequented by international tourists. Finally, an artist, who was inspired by the project, has realized a sculptural work, by using a graphics program, which unites modern art and agricultural production.





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BTF

with:

Iuno's Temple Farm

Arianna Scoglio, Francesco Nizzi, Gaia Ricciardelli, Lorenzo Samuil Mordos, Luca Rondanini,
Mattea Quaglia

Vision

Iuno's Temple Farm is a real educational farm whose idea revolves around two fundamental concepts: innovation and tradition. Located near the archaeological area of Lanuvio, which houses the temple of Juno Sospita, the farm blends well with the surrounding context. The tourist going to Iuno's Temple Farm is in front of two buildings. Entering the main one the customer can live a unique experience of food, tasting innovative dishes and cocktails made with products coming directly from the farm and with the addition of spirulina seaweed grown on-site. The customer, however, can not only taste it but can also see how it is cultivated in the educational laboratory located inside the greenhouse, which houses several tanks for processing this new "BIO food of the future". Passing through an open equipped area you reach a second small building, an arcade that houses several beehives. In this place, the tourist can live a complete experience, immersed in nature, innovation and history, thanks to the strong connection with the temple of Juno Sospita.

Concept

Beekeeping has a triple function. First, it is a useful activity for balance sheet as it provides good profits from the sale of products (honey, propolis, royal jelly and pollen) and the provision of the educational apiary service. Secondly, it provides a pollination service useful to the horticultural crops we are going to develop. Finally, the educational area under the canopy will provide a training path for customers, will be an unforgettable experience.

Spirulina seaweed, our key innovation. Thanks to the production system we have developed, it'll be possible to produce a quantity of seaweed that meets the needs of the shop and restaurant we have set up. It'll represent the basis of the menu proposed as pasta, bread and other foods to be discovered. Furthermore, seaweed is a superfood for its beneficial properties, as it contains a lot of protein, vitamin A, B and D and minerals, such as iron and fatty acids. Beekeeping and spirulina seaweed work in synergy with the didactic area. Part of the structure has been designed specifically for this function: the area for educational beekeeping will be under the porch, while the spirulina seaweed will be located on the ground floor of the building. Both will, therefore, be available to all customers of the structure even in adverse weather conditions. It should not be forgotten that this activity will make an important contribution to profit in the income statement.

The zero-kilometer gardens now represent for many well-known realities, but we have however proposed this activity because in our country there're still too few working examples of this type of activity. Anyway, in our case, it presents itself as a fundamental activity for the development upstream of the project, as

the shop and the restaurant.

Sustainability

The sustainable aspects of the project are various. Above the two buildings, there are photovoltaic systems; it is a safe, low maintenance system able to provide green energy without polluting. Thanks to the presence of a bioreactor, all crop waste materials will be composted. The residue can be used as a soil improver or composted before use or sale. Finally, all locally grown products will be sold locally or reused in the restaurant kitchen. This results in many advantages for the customer, for the instance: less plastic waste, less fossil fuel emissions for transport, fresh produce and more nutraceutical product quality.

Lesson learnt

- Learning to work in teams, made up of people from different fields. It is not always easy to collaborate with other disciplines. Urban Farm taught us that cooperation is the best key to a project. Different looks are necessary for a good project.
- We have learned to know the territory in which you design, taking care of its history and tradition even when you want to bring elements of innovation.
- Respecting the times of competitions is not always easy. Splitting the project into phases simplifies the work and allows you to respect deliveries and commissions.



AN EXAMPLE OF INNOVATIVE UA PROJECT

Jury Interview

by **Xavier Gabarrell**
Durany Department of
Chemical, Biological and
Environmental Engineering
(ICTA) Universitat Autònoma
de Barcelona



Urban agriculture is a new economic-social sector that overarch a large number of products, services, systems and motivations. One of our last experiences is the new open air urban farming system in the rooftop of a small restaurant. This restaurant is promoted by Joan Escribà (that also owns other restaurants, e.g., in Barcelona city), and will be in Empúries (Costa Brava, Catalunya). Its cuisine is celebrated for the quality and everyday innovation. From the garden to the dish in only 6 meters: local products, for local food and diet. We were involved, thanks to our previous experience in other buildings and rooftop of restaurants in Barcelona, in this new project, which has the wind from the sea as one of the main challenges. The most enthusiastic with the project has been the restaurant's chef, a good way to start and the warranty for a successful initiative. Today urban agriculture needs also to explore this kind of projects, successful examples inside specific sectors or communities. A warm welcome to the new cuisine into urban farming.

UA for future cities: strategies and policies needed

Every day urban agriculture is growing around the World, a slow but unstoppable process. This is here. But the new green revolution has not arrived yet. Current policies and planning strategies were not thought for the urban agriculture paradigm

and clearly, until today it has not been a priority for local governments. While different motivations have promoted this new challenge, the persisting old visions have stopped its progress. Until now, e-mobility is an example of a main priority in cities. Why local mobility is more a priority than the local food? Both, mobility and food, as well as water and energy, are needed every day. But until now, little concerns have aroused around food. This is changing. We need to introduce urban agriculture in the local agendas, and this will happen in the coming years.

We can discuss about how, about strategies and policies, but the answer is not only there. We must act. The best strategy is the example. European cities are old, and need fresh air. Urban agriculture is also a way to rethink and feel young again. As in other revolutions, policies will change after the actions. It is time to change.

Urban sustainability and resource efficiency: over the role and potentialities of building integrated agriculture

Soiless agriculture can help cities to cope with their scarcity of natural resource such as land, water and nutrient, which are the base of food. Without them, we cannot sustain our population. I see the urban agriculture that reuses the local resources as a disruptive technology that can change our minds. Our water from rainwater, our

nutrients from wastewater, our land from our buildings. From the linear system to a circular system where food is produced locally with our resources. Easily, soilless agriculture is the most effective, which use more efficiently the resources. Rooftops and façades are providing extra land; water can be reclaimed from rainfall and regenerated wastewater sources. So then, we should do an extra effort for the main nutrients, like nitrogen and phosphorus, that can also be obtained from our waste. If it's needed we can have renewable energy for artificial radiation and more intensive production. Technology is available, it is time to act.



GALLIERA

TEAMS

MASTERS OF GREEN

Deniz subasi (Akdeniz University - Leading University in Education and Science in Antalya,Turkey) Emre Biçer (Akdeniz University - Leading University in Education and Science in Antalya,Turkey) Parla Özkul (Akdeniz University - Leading University in Education and Science in Antalya,Turkey) Ramazan Zing (Bilecik Şeyh Edebali University in Bilecik, Turkey) Suleyman Veysel Terzioglu (Akdeniz University - Leading University in Education and Science in Antalya,Turkey)

ABABA GREEN

Alice Lucchi (Alma Mater Studiorum University of Bologna, Italy) Alessandra Squarzoni (Alma Mater Studiorum University of Bologna, Italy) Ashkan Tayebi Gholamzadeh (Alma Mater Studiorum University of Bologna, Italy) Beatrice Meluzzi (Alma Mater Studiorum University of Bologna, Italy) Bahar Piryaee (Alma Mater Studiorum University of Bologna, Italy)

GREEN LAND

Carmela Carbone (Federico II University of Naples, Italy) Federica Carbone (Alma Mater Studiorum University of Bologna, Italy) Ludovica Maffettone (University of Salerno, Italy) Martina Cepparulo (Alma Mater Studiorum University of Bologna, Italy) Marco Cepparulo (Federico II University of Naples, Italy) Michela Rega (University of Salerno, Italy)

FGS

Essadek Benchekroun (Université Internationale de Rabat, Marocco) Fabrizio Vadacca ("La Sapienza" University of Rome, Italy) Gaia Vadacca (San Raffaele Telematic Studies University of Rome, Italy) Stefano Casanova ("La Sapienza" University of Rome, Italy)

AMY INNOVATIONS

Abdelrahman Mohammed Mohie (Cairo University, Egypt) Moataz Sherif Mohsen Mahmoud (Cairo University, Egypt) Youstina Youssef William Youssef (Cairo University, Egypt)

GREEN ID

Aline Soares Cortes (Universidade Federal De Uberlandia, Brazil) Alan Henrique Santos Silva (Universidade Federal Rural de Pernambuco, Brazil) Karen Carrer Ruman de Bortoli (Universidade Federal De Uberlandia, Brazil) Ricardo Felipe Lima de Souza (Universitat Politècnica de València, Spain) Samara Ferreira Crispim (University of Camerino, Italy) Sarah Rodrigues Martins (Universidade Federal De Uberlandia, Brazil)

3MA

Agata Morelli (Alma Mater Studiorum University of Bologna, Italy) Emma Varotto (Polytechnic of Milan, Italy) Marco Tira (Polytechnic of Milan, Italy) Mariaclaudia Tricarico (Polytechnic of Milan, Italy)

HOPE

Abdelrahman Mohamed Alaa Abdelhalim (Cairo University, Egypt) Ahmed Fargaly (Cairo University, Egypt) Filippo Frisoni (Alma Mater Studiorum University of Bologna, Italy) Gabriela Mazzarello (Alma Mater Studiorum University of Bologna, Italy) Olafur Arni Hall (Alma Mater Studiorum University of Bologna, Italy) Sara Nicosia (Alma Mater Studiorum University of Bologna, Italy)

HOP-E

Brando Di Giovanni (Alma Mater Studiorum University of Bologna, Italy) Emanuele Durante (Alma Mater Studiorum University of Bologna, Italy) Laura Gabrielli (Alma Mater Studiorum University of Bologna, Italy) Luca Gialli (Alma Mater Studiorum University of Bologna, Italy) Michele Lapomarda (Alma Mater Studiorum University of Bologna, Italy) Mohamed Shahwan (Cairo University, Egypt) Patricia Gonzalez Mariscal (Humboldt University of Berlin, Germany) Sherifa El-Haggan (Cairo University, Egypt) Yasmina Abdelrazek (Cairo University, Egypt)



MASTERS OF GREEN
with:
Beginning of an era, Galliera

Deniz Subaşı, Parla Özkul, Suleyman Veysel Terzioglu, Ramazan Zing, Emre Biçer

Vision

When our visitors first step into the area, we want them to feel like they are in sustainable wonderland. They will feel almost in another world with lots of green space around them and different ornamental plants, trees and bushes. When they come to the greenhouse areas, they will be intertwined with agriculture either from high viewing areas or by visiting them. We designed greenhouses with 8 different themes: ornamental and succulent plants greenhouse, gardening greenhouse, tropical greenhouse, berry fruit greenhouse, vegetables greenhouse, basic flowers greenhouse, edible flowers greenhouse, soy and vetch greenhouse (for organic fertilizer production). By coming here, visitors will learn about every branch of agriculture: in Ecobar they will be able to produce themselves the vegetables they want from the greenhouse, they will be able to buy grown products from organic markets as feeders, they will be able to buy not only edible products that we grow in greenhouses, but also processed products such as vegetable oil, wine, spices, soap in the sales office. Thanks to the congress centre, congresses will be scheduled in the future for meetings, they will get out of the business atmosphere and at the same time relieve their stress with agriculture. Since we know that it is important to raise awareness to people at a young age, young visitors will meet agriculture in our mini agriculture training park which we designed specifically for children. Visitors can search for their arrangements by choosing the flowers they want from the greenhouse of ornamental plants.

Since we want to raise awareness of autism, the fact that the majority of our employees are individuals with autism and disabilities will increase the sensitivity of our visitors.

Concept

We can describe our main concept by the words of beneficial, multifunctional agriculture and socializing. While we design this project, not only socializing but also agriculture and raising awareness about agriculture was our concern. We wanted to design a facility that can fulfil its own needs. It is very significant for us to have a facility that can reuse its sources. This is why everything we design in the facility, both outside and inside areas are designed with reused materials. Also, the water, energy is produced in facility own. Besides, using architectural design, we wanted to have an area that gives a natural life, we designed our exterior spaces in harmony with interior spaces. Therefore, having an open plan was our main idea for planning. In our project, we give importance to show the beauty of nature and not to close it, in our interior areas we allowed daylight to enlighten. By the help of our Ecobar, and Organic Market, the organic nutrition and significance of nature will be remarked. We

focused on sustainable solutions and reusing sources with innovations for both agriculture and energy-producing.

Sustainability

Our urban farm will be a green zero energy buildings, powered from different active systems; a geothermal heat pump, and a photovoltaic panels system. Recyclable materials will be used for all architectural parts. For the differences and sustainability of agriculture, the aquaponic system will be used. Greenhouses will be used more effectively with vertical systems. In our greenhouses, CO2 fertilization will be used to ensure optimum growth for plants. Since we are against the use of chemicals for the fertilization, the soybean and vetch that we grow in the greenhouse will be mixed with soil after we begin to green, and organic fertilizer will be obtained in our greenhouses. The bicycles we use for the spinning room in the gym will be special bicycles that produce energy. We will supply some of our electricity, albeit small, from here. Here, a glass of smoothie will be given to our guests who use bicycles for a certain time and produce energy. We will also use the green roof solution



resulting from the reduction of agricultural areas due to the problems brought by urbanization. Rain tanks will be installed for water use, and we will use UV Water Purifier system.

Lesson learnt

We started this business as 5 people who did not meet before the competition. Thanks to the contest, 5 people belonging to different professions became close friends that can cooperate. We have an idea about each other's professions and learned the difficulties and conveniences. We increased our culture by brainstorming to create environmentalist, sustainable approaches. We have always thought about evaluating a good chance for our world, not with a

sense of competition. As a result of all these stages, we understood that there is always a better, more environmentally friendly and more sustainable option.

Remarks

This is a project that we want to make actual. We are very pleased with every step. We are delighted that we can use the best options at every stage and turn an environmentally and sustainable agricultural area into a social environment. Another point that excites us is that employees will be composed of autism and disabled individuals which will give them work opportunities. We want our Project to be the beginning of a new era, to be hope and light for everyone





ECOLOGICAL COVER
Maintains hot and cold balance
Prevents evaporation





ABABA GREEN

with:

Strawberry Fields

Beatrice Meluzzi, Alessandra Squarzoni, Alice Lucchi, Bahar Piryaee

Vision

The area of the ex-Siapa can be reached with “sustainable” means of transport such as bicycle, bus, trains or car. Once you’re there you go inside walking or by bike. Once inside, the visitor will no longer find himself in front of urban gardens and several buildings renovated using photovoltaic glass and air handling unit (AHU). One of the first buildings visible on the right, will constitute a meeting point for the citizens, thanks to the presence of a bar, but also of a restaurant, where people from Galliera and surroundings can eat something that comes from their land. Besides, the structure will feature a supermarket with narrow local range products, all without the usage of plastic in packaging. Once you exit the building, moving towards the canal, you will be able to see the production plants, where our super fruits (strawberry, blueberry and raspberry) will be produced following some of the most innovative soilless production techniques. The large concrete space, on which the water tower stands, is an expanse of urban gardens where citizens, by paying a small contribution, can grow their products. The area adjacent to the canal will be completely reclaimed using a phytoremediation process exploiting the ability of various plant essences to extract the polluting metals present in the area.

Concept

The most characteristic and innovative aspects of the project are mainly focused on environmentally and socially sustainable details. Creating the former Siapa Area a social pole, of encounter and sharing, will be without doubts one of the most interesting challenges: Urban garden plots will represent the most practical and active part of sociality, will serve to exchange knowledge and to make everyone (adults and children) more involved and sensitive to issues concerning the problems of the agro-system food. The plots will be regulated by a participatory planning to which all can adhere and propose their ideas for the cultivation methods, the pre-selected varieties and so on. In addition, a second key innovation will be a 0-km (where only local products will be sold) and zero-waste (as they will all be products without packaging, sold within reusable containers) supermarket. It would be very interesting, to create a great social and environmental pole that attracts the energies of the Galicians of the periphery.

Sustainability

Sustainability is a key force in our project. Starting from the economic sphere, we immediately set out to enter a niche of the market still to be discovered. The hydroponic cultivation and transformation of strawberries and red fruits will try to sustain the functioning of the area, together with the presence of a

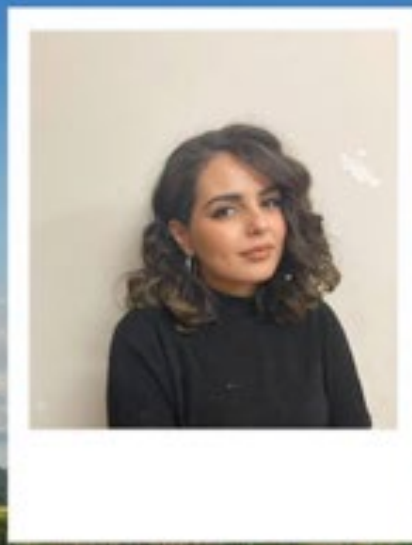
bar and a restaurant. Environmental and social sustainability is the important part: the structures are coming from recycled materials and a use of resources that aims to zero waste and maximum efficiency of use. Also, the presence of a zero-waste supermarket is set as a goal to follow again the few in Italy to try to eliminate the plastic from our conventional shelves. Finally, social sustainability will be the protagonist. A building will be reserved, which together with the urban gardens will aim solely at union, to conviviality, exchange of knowledge and skills. The projects for schools and children will not miss making them re-discover their deeper bond with the land, with food and with nature.

Lesson learnt

1) Working in a group is very exciting, especially if with people from other countries, because you share not only different knowledge and even with life experiences that enrich you deeply. However the ideas between the components in the group may be different, together with the leader, it is necessary to find the best thing for the group itself. 2) A lot of works is required to do a project: the idea is not feasible if factors such as economic sustainability but also the participation of the population and local and regional authorities are lacking. Furthermore, being able to know more details and see the place can be useful to better understand the best result of the project. 3) You must always get involved and use your knowledge to create something concrete. We are happy and satisfied to have been able to participate in the challenge. We believe that these types of challenges with international partners are useful not only for students but also for all the entities that are part of the organization of these challenges.

Remarks

Our team have different backgrounds and passions: one Master Degree environmental engineer student from Theran, Iran, and three Masters Degree horticulture students at the University of Bologna. We are all in life enthusiastic, interested in nature, and we are sensitive to environmental issues. We tried to put together our academic knowledge with the research we carried out specifically for this competition. Doing a project with other people is a very complete experience for a student. You learn to listen up to everyone, to mix ideas and to overcome problems and we learned a lot from it. This new knowledge will help us to better enter in the future in the projects’ world with more awareness of the complexities linked to it. We think that this experience allowed us to realize how sharing is important. Sharing ideas, knowledge, time and work is a pillar to achieve any type of goal. There is a better way to requalify Galliera and a possible solution could be an urban farm project.



GREEN LAND

with:

Circular Central Farm

Martina Cepparulo, Marco Cepparulo, Carmela Carbone, Federica Carbone, Michela Rega,
Ludovica Maffettone

Vision

The visitor arrives at the Urban farm by train. From the window he sees industrial buildings, surrounded by green; intrigued by this combination, he approaches the entrance. Here he is guided by exhibited panels that illustrate the different areas and activities of the complex: he can decide to go to the main building to buy something or attend a lecture or admire the installations in the exhibition hall, or he can choose to visit the rest of the farm on his own to see what happens there.

The visitor immediately senses a path to follow because highlighted by a wooden walkway that recreates the main axis underlined by wooden shelters and benches where he can rest.

Walking, the visitor sees vegetable gardens and an educational farm. Continuing the path, he notes that the gardens are cut by secondary paths that allow him to fully immerse himself in cultivation. So, he can see that the whole community actively participates, including people with disabilities, thanks to special wooden structures. At the end of this path, the visitor can rest and refresh inside the restaurant. Inside the building, the visitor doesn't feel separated from the context since the windows and terraces that allow a constant connection with the outside and to enjoy the view of a park with a lake where you can relax.

The sensory gardens, with their colours and scents, attract the users. His senses are stimulated ensuring him a psychological relaxation. On the other side, he will find an orchard, which can also be visited.

Continuing his visit, he finds ancient buildings which he understands that currently house innovative cultivation techniques or workshops.

After a day spent inside the farm, the visitor feels satisfied and relaxed by this experience which has increased his knowledge in a creative and fun way.

Concept

Several aspects characterize our project. First of all, we want to give new life to the ex-SIAPA and transform it into an attractive and interactive centre to attract a growing number of visitors and provide the community of Galliera not only with a social but also an ecological and economic space where it is possible to learn how to take care of plants but above all to work in groups and meet new people. The structure welcomes everyone thanks to a wide range of activities both educational and workshop activities from children to adults, from disabled people to people on the margins of society. Social integration is, in fact, one of the focal points of our project. In addition, providing the opportunity to learn both traditional and modern cultivation techniques such as closed-loop hydroponic and aeroponic systems becomes for us an

instrument of social redemption and therefore of integration into the working fabric. The presence of a restaurant made of wood and draining eco-sustainable concrete where you can eat our products, surrounded by flexible and adaptable furnishing elements, transports guests into a green dimension attentive to the needs of those who live it. One of the main innovation points of our project is to transform our competitors into allies with whom it is possible to support each other, exchange products and in this way benefit from mutual collaboration.

Sustainability

The theme of a recovery project, associated with that of building sustainability, is particularly urgent today. The affinities between compatible conservation and sustainability derive from the common field of interest for limited and degradable resources: on the one hand historical and architectural, on the other, social, environmental and economic. The urban farm project envisages a rational and efficient use of resources with economic growth by decreasing the use of non-renewable resources with a view to the cost-benefit ratio. Some of the existing buildings have not been demolished, also recognizing an economic as well as historical-architectural aspect. Conditions of well-being are guaranteed in terms of collective life (safety, health and education) equally distributed through various teaching and laboratory activities, social gardens and common spaces. The intention is to distribute high quality and sustainable local products, reducing CO2 emissions for production; several existing buildings have been recovered and then used as innovative greenhouses that house soilless cultivation systems and are efficient from energy saving, through roofs in transparent photovoltaic panels, water and fertilizers; this particular type of farming also guarantees the minimum use of pesticides. A km0 sales network will be created, reducing transport and greenhouse gas emissions as much as possible. The land is irrigated by reusing rainwater which is collected and updated also thus limiting the use of additional resources. The waste deriving from cultivation and various processes are used in part as a fertilizing material for the cultivated area and in part transferred to a biodigester to produce methane gas.

Lesson learnt

This experience has enriched us deeply in many ways.

First, we worked as a real team for the first time, each of us putting his specific skills to work, to create a well-structured project, cohesive in its parts and coherent with the aims of the competition.

We worked on our theoretical knowledge and put it into practice for the first

time. The obstacles encountered during the conception and design phases put us in contact with the concrete problems of the working realities to which each of us is oriented after university, and solving them was stimulating, as it taught us that there is a solution to every problem and we should never give up.

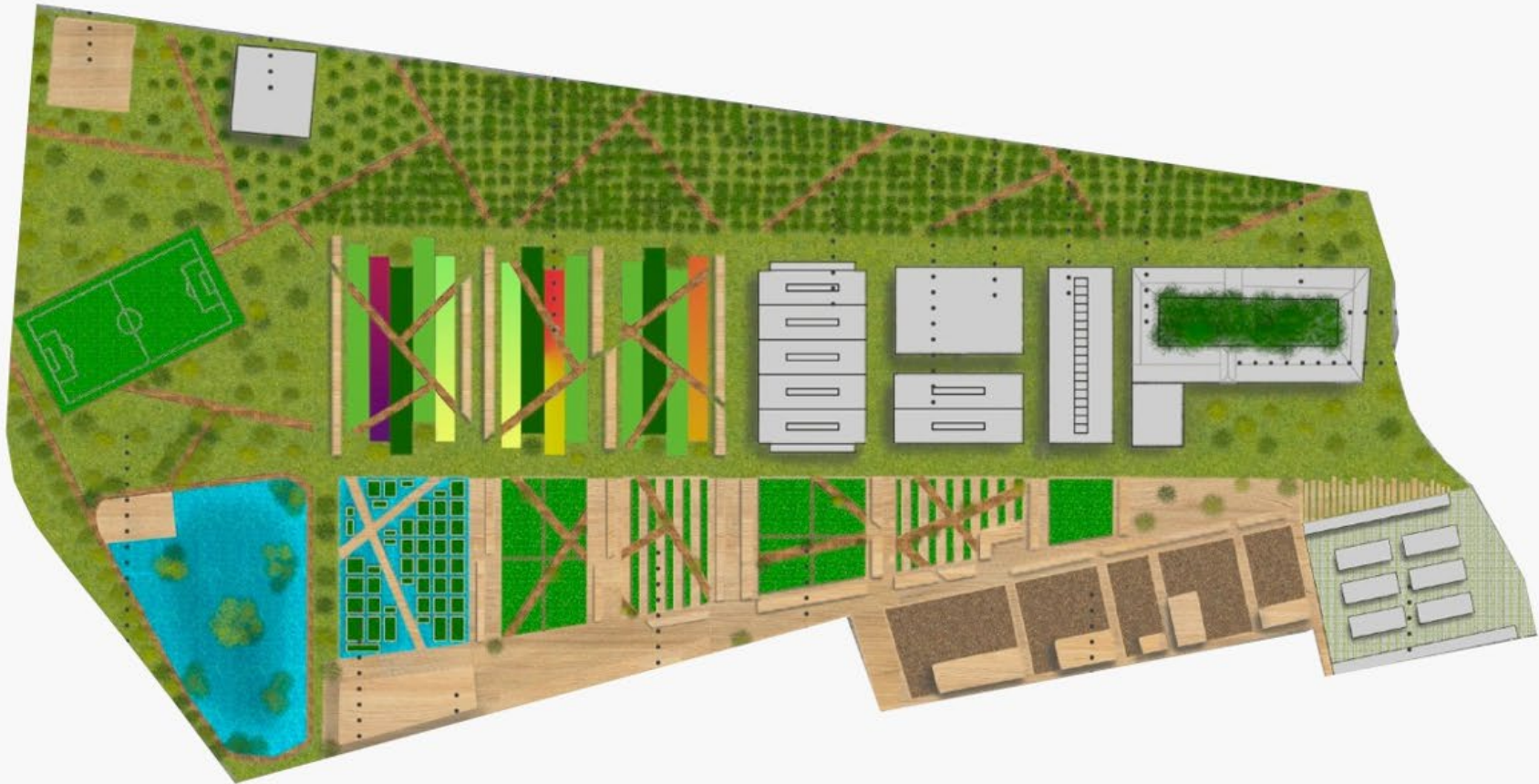
Secondly, we had the opportunity to compare ourselves with other teams and their ideas. Working in parallel with people from all over the world is certainly a source of inspiration and personal growth.

What we have learned from the other teams is that one goal (the redevelopment of degraded sites) can be achieved through multiple avenues, all different but

all equally creative and interesting. We are sure that this experience has opened our minds and will lead us to think even bigger for a possible next project!

Finally, the redevelopment of decaying areas is an issue that we feel particularly strongly about in such a dramatic historical moment in terms of environmental pollution as the one we live in. For this reason, working on this project is a source of great pride for us and makes us feel part of a small system that (we hope) will change our future and that of our beloved planet for the better.

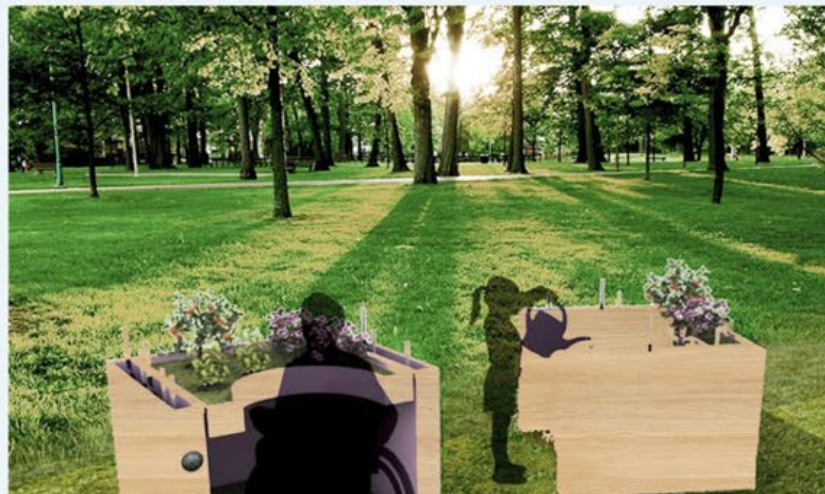
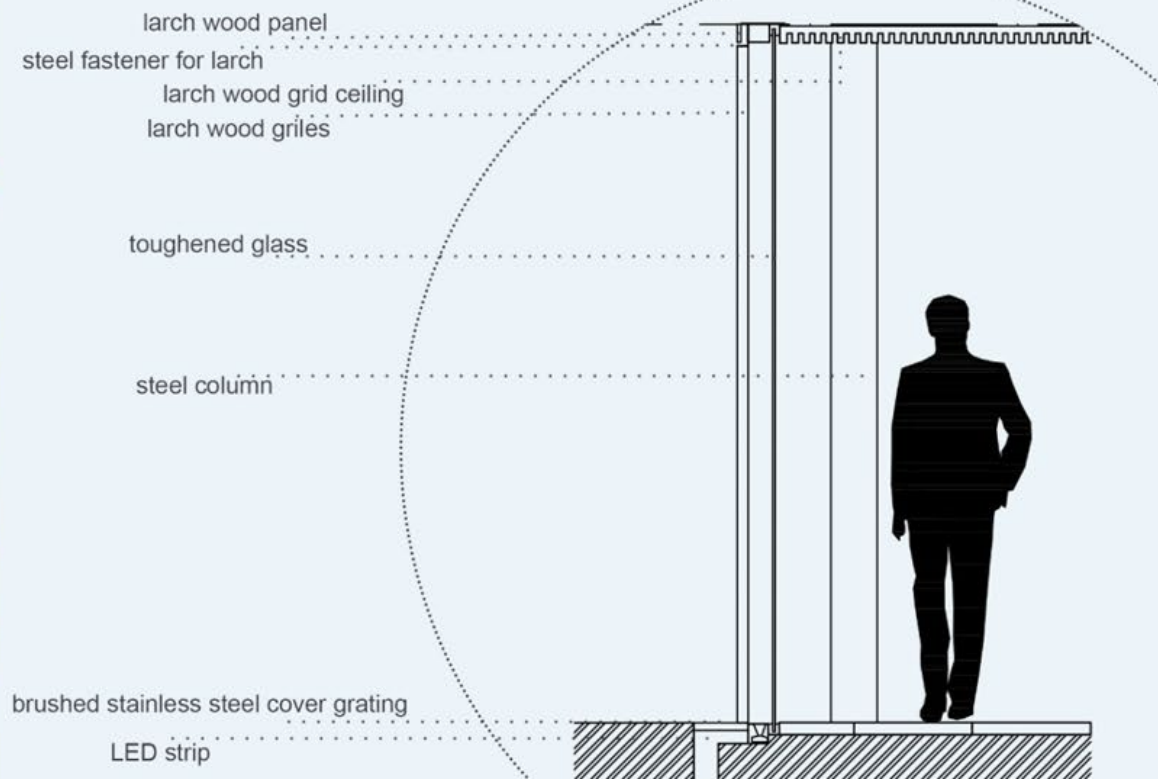
We have learned that all of us, in our small way, can contribute to change.



Remarks

Being part of this team has taught us to face the challenges positively by learning to collaborate and listen to the requests and ideas of the other members. As despite being physically distant, we managed to organize and coordinate most adequately, completing an important job.

The strength on which our cohesion is founded is certainly the importance we attribute to the surrounding environment and the desire to limit what are the harmful effects of man on the environment and to be able to re-evaluate a huge abandoned area through agriculture and sustainability.





FGS

with:

Urban Farm and new horizon of
education

Fabrizio Vadacca, Stefano Casanova, Gaia Vadacca, Benchekroun Med Essadek

Vision

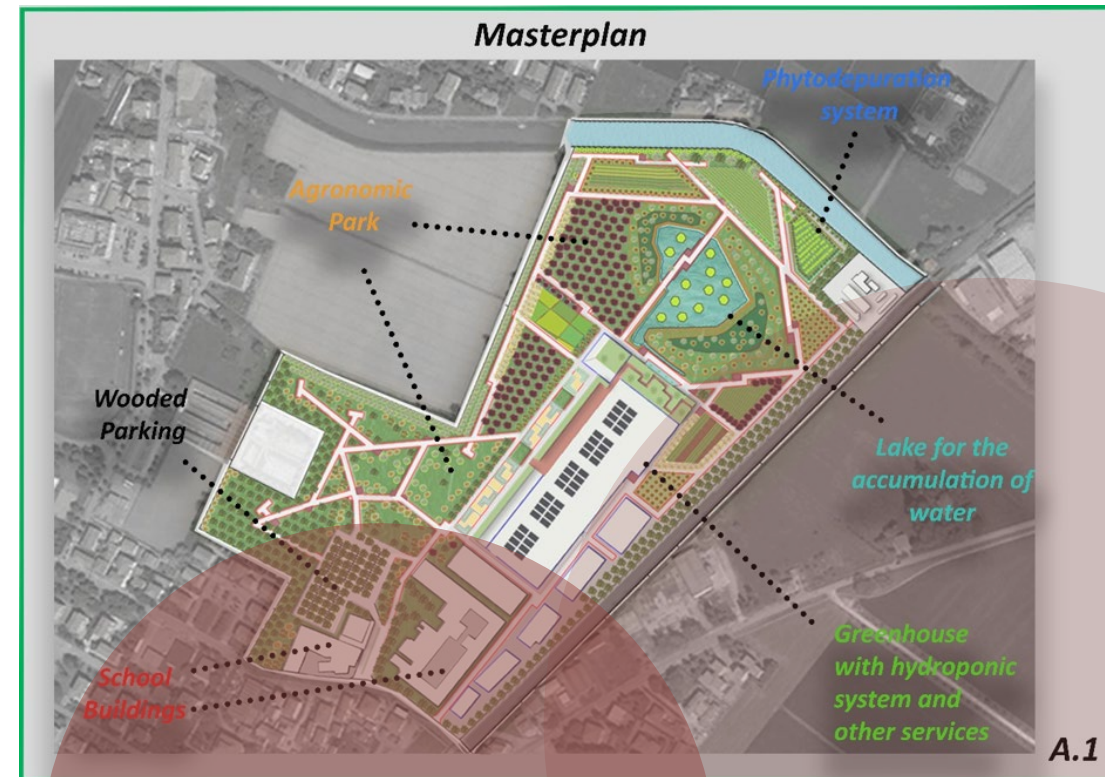
Our thought was to create a place where both the local employees and the students, but also the citizens of Galliera themselves, could live a complete experience and also spend a pleasant day, or simply go for a run or take a walk in safety, enjoying the pleasure and benefits of the Italian agricultural landscape. The project is a proposal that can increase the quality of services that the area offers, focusing more on professional training, but also ensuring that the training experience does not become too heavy or monotonous and can be integrated, also on-site, with some of those activities that are normally practised during the day, such as a dinner with friends, a workout in the gym or a run in the green and the multitude of agricultural and ornamental species that the park offers. All this can improve the quality of life and the perception of the citizens of the area itself, thus being able to restore that luster symbol that was lost with the closure of the factory by replacing the perception of a degraded and ruined environment, with that of a multifunctional park surrounded by greenery that changes perceptions of space and colors with the passage of time and seasons.

Concept

Our project speaks of a semi-public urban park of agronomic species that contains a professional institute or a production company that provides training services and work experiences for young professionals or students of agronomic and hotel complexes. The park is planned and structured in such a way as to allow circulation on foot, by bicycle and/or small electric vehicles that can be rented within the park itself. It is not allowed to move inside with private vehicles as the circulation is open only to the means of service, but parking is provided inside a walnut wood to give the possibility to the people of the structure, but also to those who want to reach from afar, to park inside and move by foot or using small electric vehicles you can rent there or bring yourself, including bicycles. Some of the structures, the newest, will be adapted to the needs of teaching, others created from scratch as a greenhouse building focused on the system of hydroponic cultivation and still others, the smaller ones, will be arranged in small greenhouses and for a breeding of hens for the production of mushrooms and berries on the farm. However, the newly built structure will include services such as a restaurant, gym, reading room, a bar, a shop for small ecological vehicles and a library with a reading room to provide a service for both employees and students and citizens, but also a tower building which maintains the same purposes as the greenhouse from which it is possible to have a better perception of the surrounding agricultural and urban landscape.

Sustainability

To make a complicated project sustainable many efforts have to be done, first of all we structured it in such a way that it can be carried out in several steps, allowing the investors to have an economic return on different fields, trying as much as possible to make interventions on already existing structures and reduce the construction of new buildings. To meet energy needs, we decided to integrate public energy services with a system of photovoltaic panels, identifying a room that already exists in the area and is well served by public roads for the accumulation of the energy produced to cope with any extraordinary requests or problems. The new roofs of the premises, mostly in glass or plastic materials, have been designed facing south as much as possible with an adequate inclination, to allow good exposure to the sun. Instead, as regards the management of the water needed for irrigation, we have planned the presence of a basin that is a natural lake, for the supply of irrigation water and the replacement of the water of the fish breeding tanks, in the hydroponic systems inside the production building. This lake will be fed mainly by the canal adjacent to the area however we have provided rainwater recovery



systems to its aid and above all an integrated system with an additional basin for water treatment by phyto-purification, connected to a pre-treatment within pits. As for the fertilization of the soil, it is carried out through the hydroponic system, inside the greenhouse, but we have foreseen the presence of a small farm on the ground of hens in one of the lateral buildings to whose excrements are an excellent fertilizer for the soil.

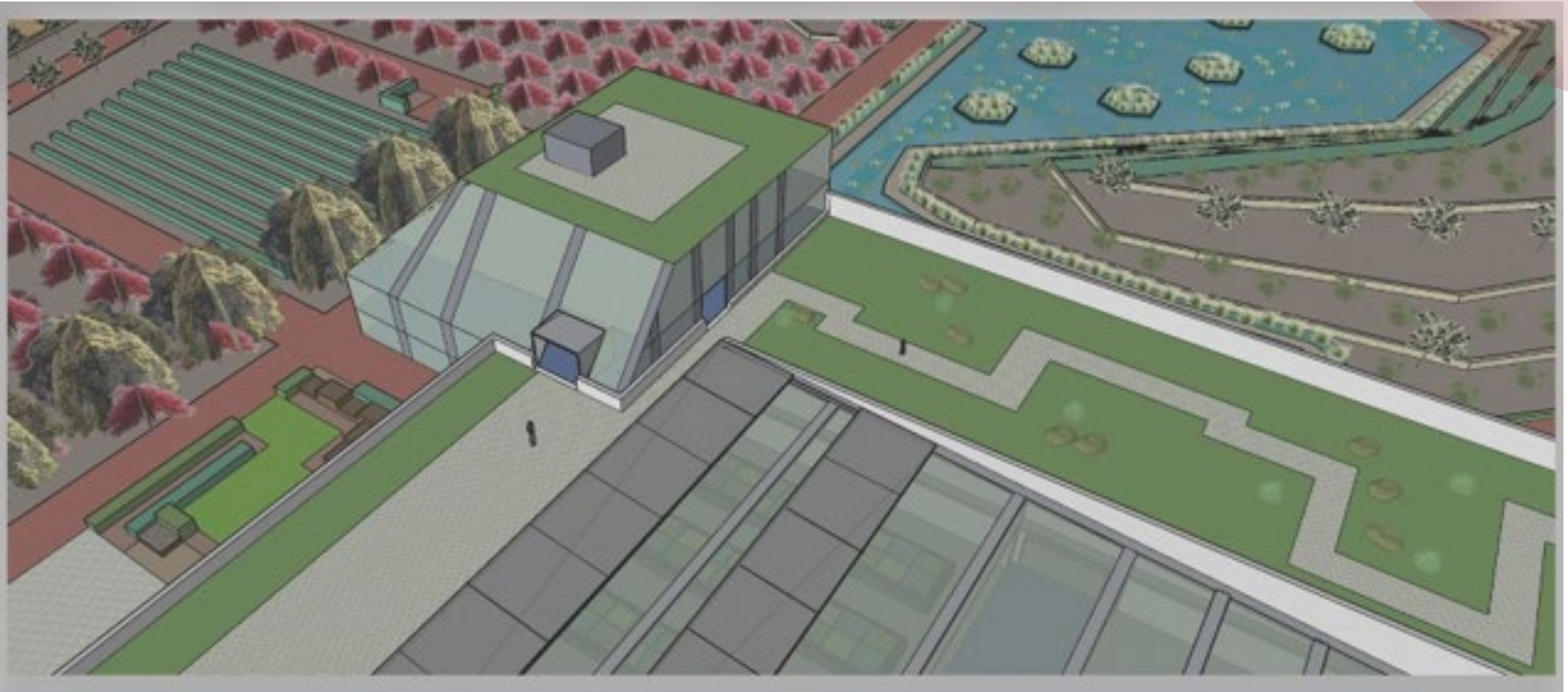
Lesson learnt

Participating in the competition was very interesting in the first place due to the type of topics covered with which we enriched our knowledge at a multidisciplinary level, but above all, it has given us a strong interest in

deepening our preparation on the subject of Urban farm and why not, perhaps, to propose again in the future to work in this area.

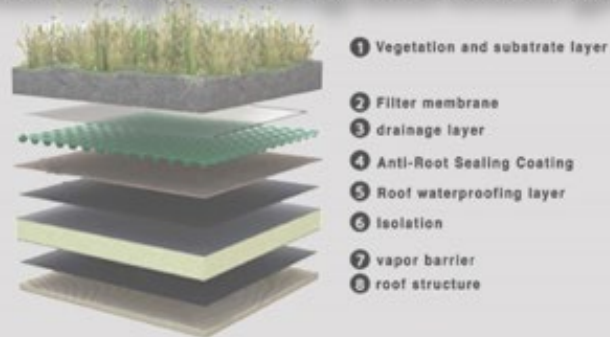
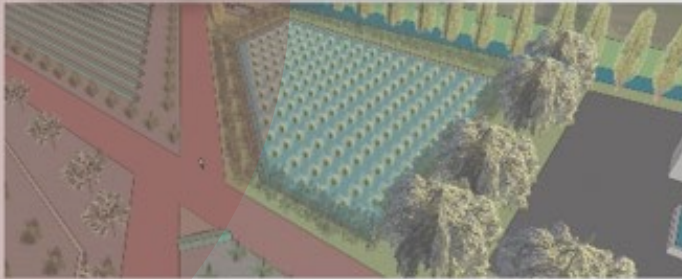
Secondly, we can say that it was a training experience because it pushed us to relate and collaborate, even if at a distance, to improve our ability to manage workloads to respect what the delivery terms of a public competition, helping us to become familiar with the world of work.

Finally, the competition made us aware of the importance of the theme of the regeneration of degraded areas or areas that present urban problems and how urban agriculture can increasingly be one of the possible solutions for our future.



Phytodepuration sistem green roof and water gesture

Phytodepuraton sistem



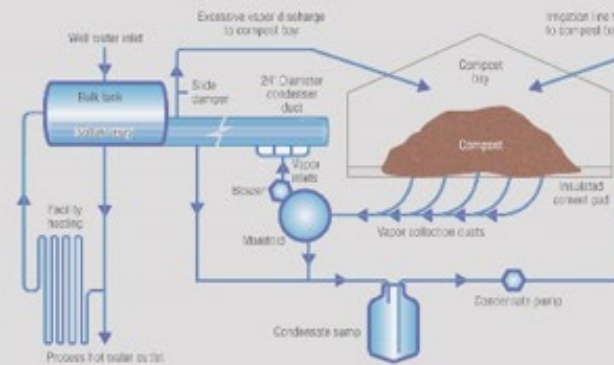
Green rooftops

The vegetal roof with vegetable garden makes it possible to block the UV, fight against the islands of heat. It is a good acoustic and thermal insulation. The thickness of the soil allows a good absorption of rainwater



Artificial basin against heat island

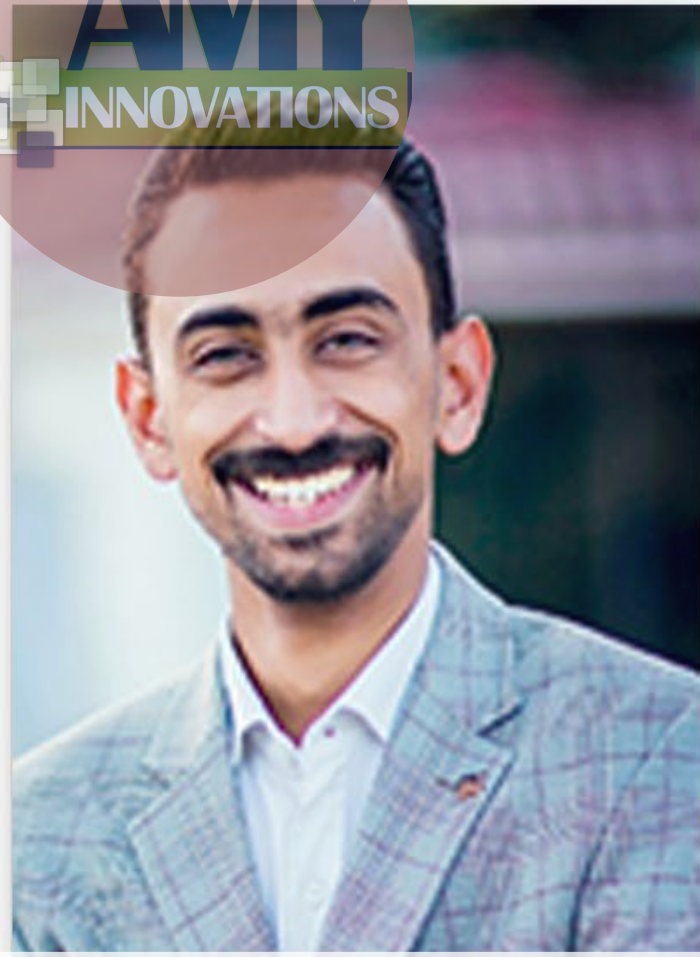
UNH heat recovery system



Recovery heat system



fertilize with the chicken manure



AMY INNOVATIONS
with:
Galliera Kitchen Park (GKP)

Abdelrahman Mohammed Mohie, Moataz Sherif Mohsen Mahmoud, Youstina Youssef William Youssef

Vision

Let's go to the GKP festival. I'm going to have a healthy breakfast at GKP, do you want to join? - Did you see master chef Italy final? Yes, it was amazing! I had attended the Grand finale at GKP studio - Where did you buy these fresh groceries?

You are going to listen all these words once Galliera kitchen is opened and ready to serve Bologna and Galliera residents. If you are walking 1 km away from the park, you would see the lights come out from GKP landmark – The historical water tank –. Once you entered the park you will find two entrances: one heads direct to the markets and shops street where you can buy either daily fresh groceries (tomatoes, lettuce, pepper, rosemary, different herbs, etc.) or local goods. The other entrance heads to the Community center that hosts workshops, research labs, and classes for all age groups. Conference Center inside it host the international summits and conferences, Research center deals with the majors of urban farming, food resources, production, and environmental technologies. It includes many facilities (like labs, libraries, etc.) for researchers, theoretical and practical projects. In the Community garden you can rent hydroponics units and benefit from their crops by eating or selling in GKP's markets and restaurants. This garden is designed as a neighborhood garden; visitors can work together and know better their neighbors. In the Hall of narrations, visitors can trace the historical background of their city and its public figures, they can also watch documentary movies about GKP and the source of their daily kitchen food as well as recent technologies of urban farming.

These two main spines pass through the main park's buildings and integrate the park with the external community, starting from the main gate and ending up with the Floating garden. It is the main attractive and connecting point of GKP especially with the community of the other side of the canal. It's a public space with several ponds for fish, ducks, growing plants and also for entertainment by boats as an example. Here you can smell the delicious fresh plates of the Restaurants located inside the garden. These restaurants use the fresh kitchen crops growth inside GKP's farms. Because GKP is a car-free park, visitors can cycle in the park street's bike lanes, running, enjoying and interacting with the open spaces and urban farms. The design of this spine allows the users to socially interact with each other's and attending GKP events in its community spaces and seats. To reach our Vision "CONNECTING A LOYAL COMMUNITY OF BOLOGNA INHABITANTS USING SHARED URBAN FARMS"

Concept

Starting from our vision, our main goal is to involve Galliera residents and GKP visitors in all activities inside the park. So, we worked on creating public spaces with leisure and edible landscapes like Community garden and the floating one. The floating garden, as mentioned before, is a space with several ponds, these ponds are involved in our key innovation system which is the "Greyponic" system. Greyponic system combines both greywater recycling system and aquaponics system, so the recycled greywater after passing through many filtration processes (sedimentation storage, grow beds of Greed plants) is mixed with pumped fresh water and go through the last step of filtration through algae and filtration ponds which control the chemical parameters to be safe for fish and edible plants. Now, this water is ready to enter the aquaponics system passing through ducks' ponds to increase the nutrients value, then it goes through the fish ponds, by feeding fish their wastes and uneaten food turns into ammonia. The water filled with ammonia now is pumped in the floating fields' ponds, the bacteria of soil and roots turn ammonia into nitrates, then nitrates are absorbed by the plants with other nutrients. At the same time,



these floating fields return oxygen to the water and return water to the cycle without ammonia, until it reaches the fish ponds again.

Regarding the indoor elements, GKP has a cluster of 4 buildings in a moderate condition, these buildings were warehouses and now they contain urban farms of Zipgrow vertical farming, growing organic kitchen crops. The ZipFarm is a vertical hydroponic system consisting of a Light Rack to hold LumiGrow LED lights, and three individual ZipRacks outfitted with ZipGrow Towers. The “Galliera ZipFarm” saves time and labor, high-efficiency LED lights maximize efficiency and crop production, while our water recirculation design saves 90-95% more water than other growing practices.

One of the warehouses’ buildings is renovated to be media studios for hosting cooking shows like Master Chef and cooking media programs in general, to brand our park and be an economic source for GKP. These shows will use kitchen crops to grow in GKP urban farms. These studios will be used also for cooking competition events between the park visitors.

People now are playing mobile games as part of their daily lives and sharing them with their friends. GKP mobile application is working on making the

park part of every user daily life through “gamification”. Gaming now can make a better world and can solve problems. In the application, you have your own avatar, the application will record all your activities related to the park and rewarded you by points which give you different privileges to buy local products, book your seat in your favorite GKP restaurant, etc. To increase the interaction between GKP people, you can invite your friends, compete with them, passing levels together inside the game and this will encourage users to do the activities inside the park in communal groups.

Sustainability

One of our main goals in the Galliera kitchen park project is to link the SDGs trying to achieve some of them through our sustainable project strategy. So, we decided to make our project with smart, sustainable, affordable, and environmental materials and systems to make Galliera Kitchen Park a prototype for innovative green zero-waste urban farming parks. Most of the systems used in our project are circulated systems to reach zero waste. We used materials that are environmentally and economically sustainable. Socially inclusive zero-waste restaurants in GKP manage their waste resource to reuse all kinds of wastes, so they decrease the energy consumption and the bad impact on



the external environment. Solar cells are used to produce energy and “urban batteries” zinc-air batteries to save energy.

Sustainable innovations in GKP to achieve “Less water, land, energy and resources usage”:

Modular sustainable units:

- Innovation studios:
These units are built with reused shipping containers, more than 70% of the facade is built with glass to have a panoramic view on the whole garden. These units relate to greywater treatment system. The architecture design of the unit consists of two overlapping floors to achieve the maximum solar gain (for roof PV cells) and light for the studios. This overlapping helps in making a skylight for the ground floor to reduce the use of energy in lighting. Solar shades over the glass openings are designed to reduce glaring and direct sunrays in order not to disturb users.

- Market units:
Market units are built by using the recycled concrete of demolished buildings inside GKP. The roof is inclined with a specific slope to have maximum exposure to the sun. Cross ventilation will be done through upper back windows, to have good airflow and refreshment during the crowd of the market. Solar shades with galvanized glass are used to reduce glaring. Flexibility in design is done to join two or more units together for bigger retailers, with different colors to enhance the visitors’ experience.

- Zero waste Restaurants:
Restaurant units inside the floating garden are also built from the recycled concrete. The roofs are designed with projected shades to maximize the area of its green roofs.

- Reversometer (sustainable greywater management system):
Reversometer is a smart intervention system, which aims to save the water resource and then treats the greywater by using greywater treatment systems to reuse it again in washing and farming. This system can be applied in GKP restaurants, markets, innovation studios, etc. The system works by calculating the amount of greywater produced by the restaurant (as an example); the amount reused by the restaurant and returned to the GKP water main pipes. By applying this system, the restaurant can pay less for water, and the kitchen crops which are bought from the park farms.

Lesson learnt

First, our team’s background regard mainly sustainable urban design and architecture, but everyone is specialized in a specific topic, according to his master thesis topic. Abdelrahman’s major is related to the economic aspect,

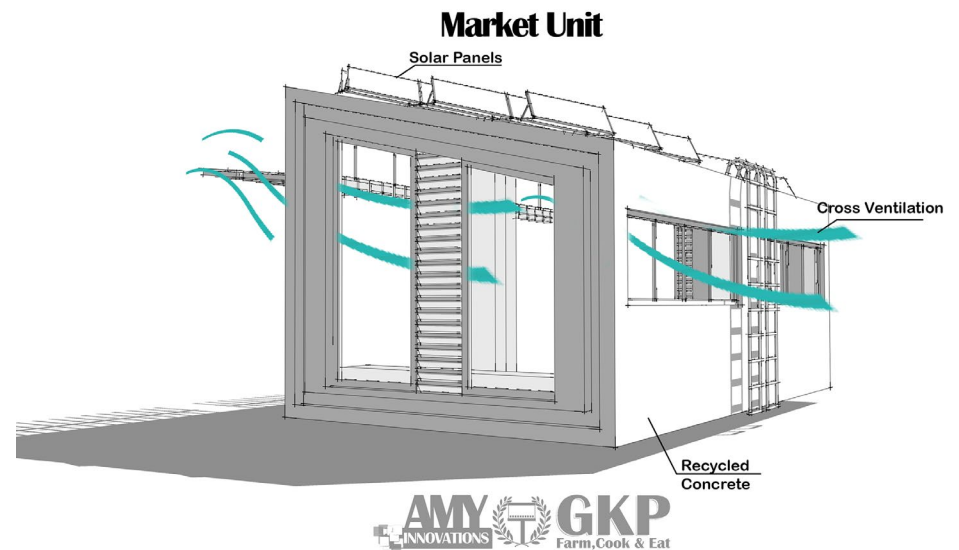
while Moataz’s topic is in the social aspect, whereas the environmental specialization belongs to Youstina. So, we share our knowledge, experience, and opinions together with different approaches; UrbanFarm 2020 challenge was a chance to integrate between the team members’ backgrounds.

Second, we also learned how to deal, as urban designers, with different disciplines that we weren’t exposed to it before, like Business model plan (marketing, financial plan, etc.), Agricultural new technologies (aquaponics, greyponics, hydroponics, zipgrow, etc.). Also making videos and searching in related sciences was a new experience that enriched our knowledge.

Finally, Brainstorming, consideration of different ideas and usage of them to make different prototypes was one of the main benefits of this challenge.

Remarks

AMY-Innovations is formed by three architects and urban designers. Each one takes that field from a different point of view but our target was the same: using our educational background and skills to help people have a better life through research based on their real needs. And we found UrbanFarm 2020 is the real opportunity to achieve our goal. Through UrbanFarm 2020, we learned a lot of new technologies, new fields, and new cultures.





GREEN ID

with:

Green Cycle Urban Farm

Aline Côrtes, Karen Bortoli, Alan Silva, Ricardo Souza, Samara Crispim, Sarah Rodrigues

Vision

We've conceived the idea of Green Cycle Urban Farm as an environment of multiple exchanges among people, the natural environment and the built environment. By entering the farm through the Via Vittorio Veneto, visitors will be able to choose to access, on the left, a Unibo campus dedicated to the agronomic sciences, or, on the right, to experience the ambience provided by the Local Market, which brings together the peculiar attributes of a historical and requalified building. In the market, products produced in the city and, especially, within the site itself, will be commercialized with emphasis on essential oils and the balsamic vinegar, which are so valued in this region.

Visitors will also be able to choose to access the farm through one of the several cycle paths created to connect the north and northwest portions of the city of Galliera to the core of the project, where the composting and cogeneration systems (heat + fertilizer) are located - which feed all the other buildings. The gym and the restaurant are also at the centre of the site, inviting students, employees and visitors to access and stay in a kind of pact for health that places conscious food preparation and consumption and body care running together. The restaurant building is covered in the southwest orientation by photovoltaic panels, and the annexe where the gym is located has responsive facades in the same orientation, which, in addition to providing significant aesthetic expressiveness, adds environmental comfort and energy efficiency to the area.

Greenhouses for hydroponics, aquaponics and vertical farms are located sequentially to the north on the land, close to the Riolo Canal, taking advantage of pre-existing, revitalized infrastructure. In this region, there is also an arena theatre and a mandala garden for outdoor cultivation of species destined for the manufacture of essential oils and balsamic vinegar, providing a stunning view and special aromas during much of the year. Finally, in the lowest part of the land, as well as in its northeastern end, there is a retention basin, fed with rainwater from drainage canals and distributed on the area, still constituting a visual landmark for the entire complex.

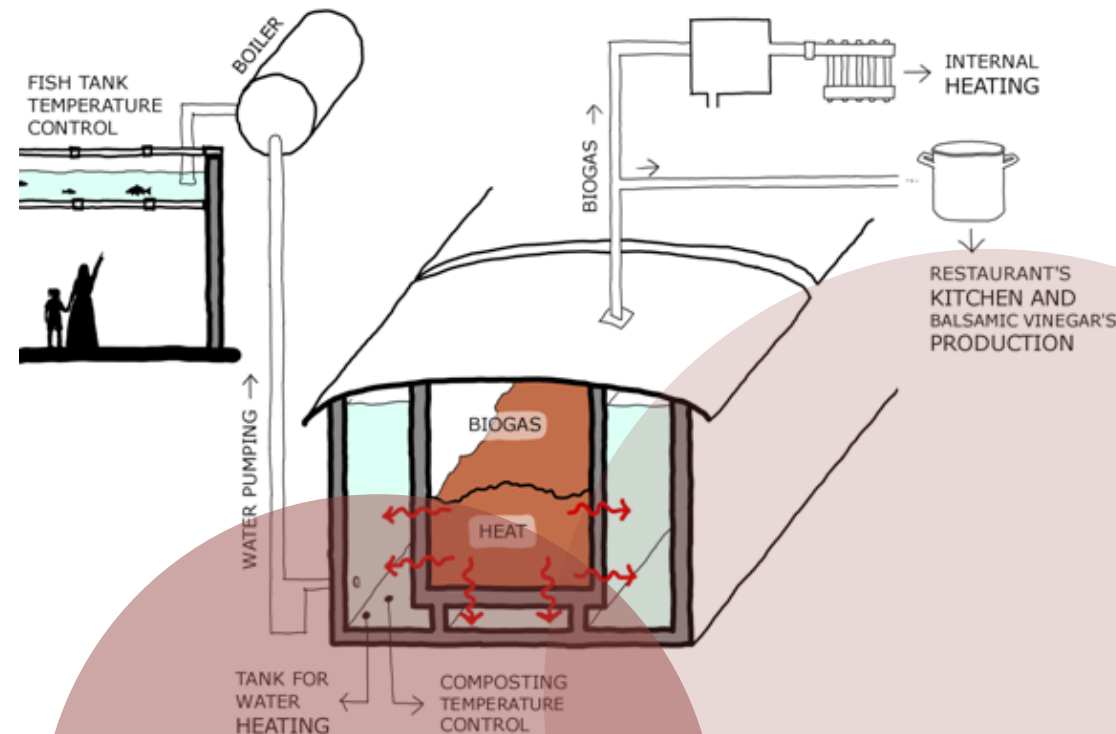
Concept

The main innovative elements of our concept are:

- o Composting system;
- o Aquaponics;
- o Climate responsive facades;
- o A factory for recycled paper and seeds;
- o Mobile App.

The composting system helps to decompose organic waste and to generate fertilizers in a clean, safe and chemical-free way. Among its products, there are methane gas and heat. The heat will be used to warm up water which, through temperature sensors, will provide adequate conditions for the life cycle of the fish, in the aquaponics cultivation. The fish produced, in turn, are capable of supplying substances responsible for plant nutrition. Another product of the decomposition made by composting is methane gas, which will be captured by a biodigester and used to warm rooms through many devices.

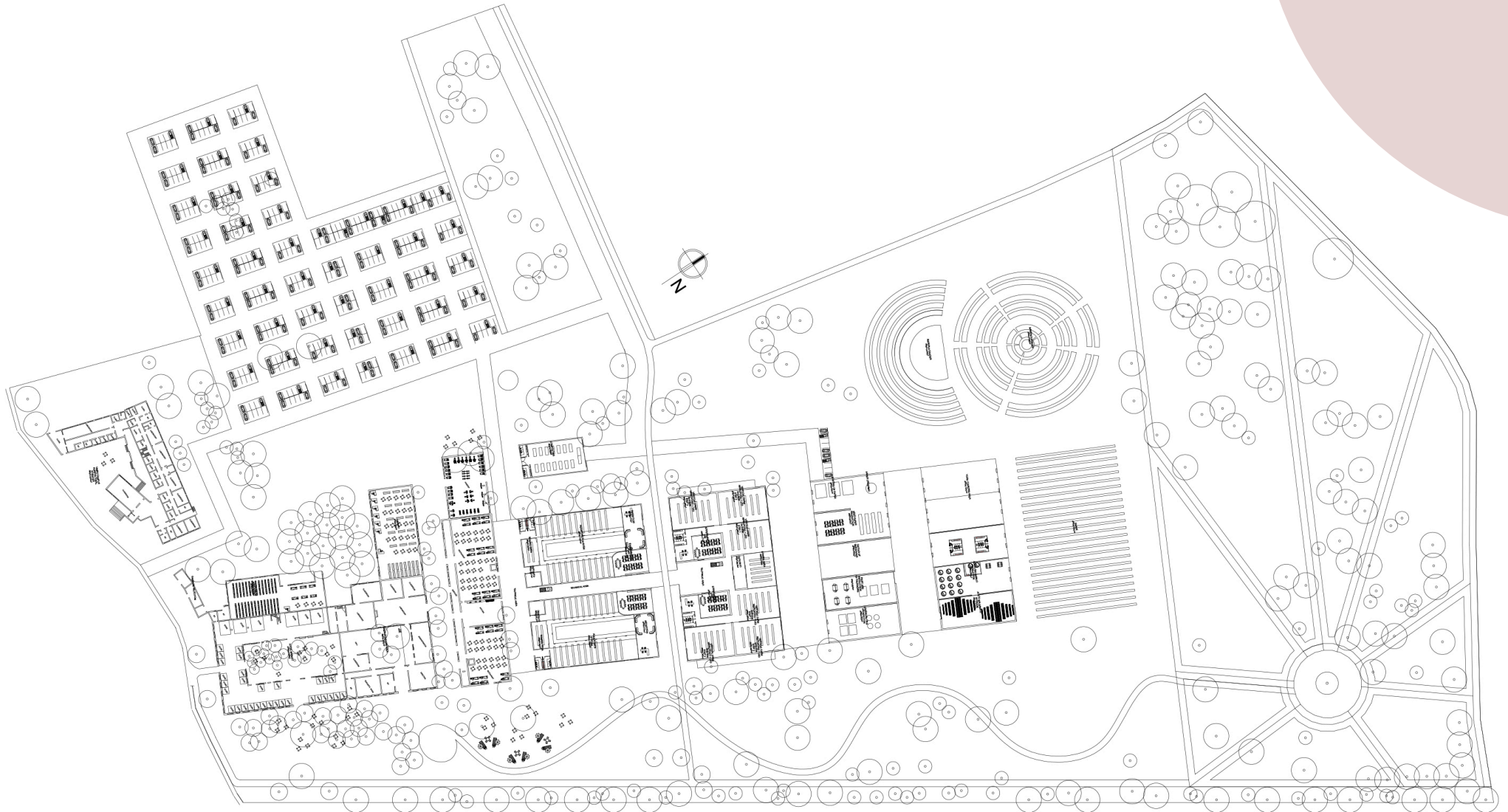
Facades capable of modifying their shape, porosity and transparency according to climatic conditions will simultaneously provide environmental comfort and energy efficiency to indoor environments, while also being able to generate energy for building maintenance when equipped with solar collector systems. To ensure the reduction of solid wastes, all the packages used in the market, restaurant or the garden will be produced in the complex, which will be made from paper-seed (a type of recycled paper made from flower or spice seeds), considerably reducing the use of petroleum-based raw materials and ensuring the rapid decomposition of the materials.



The local community will be responsible for maintaining the project. And in order, to facilitate this endeavour, we suggest the development of a mobile app that, in addition to assisting in the promotion and dissemination of workshops and events, will also bring a scoring program to reward citizens according to their level of engagement. Personal contact within the institution and through social media will promote the connection between university and community, which allows the sharing of knowledge and collective growth.

Sustainability

The main purpose of our project is to connect people with each other and with their natural and built environment, generating local and economic growth, social inclusion and a sense of environmental responsibility. Considering the economic, social and environmental pillars of Sustainability, one of the most important aspects of our project is the search for income generation through the production and valuation of local goods, respecting the ability to regenerate the environment and culture and habits of the local community.



In this sense, the decision for the production of balsamic vinegar and cultivation of aromatic species in the mandala garden stands out, both based on cooperative and solidary business models. The recycled paper and seed paper factories also stand out, aligning the practice of technology transfer to the community (which will participate in workshops and professional courses at the facilities of this factory), which also empowers itself when becoming able to perform an environmental recognized profession.

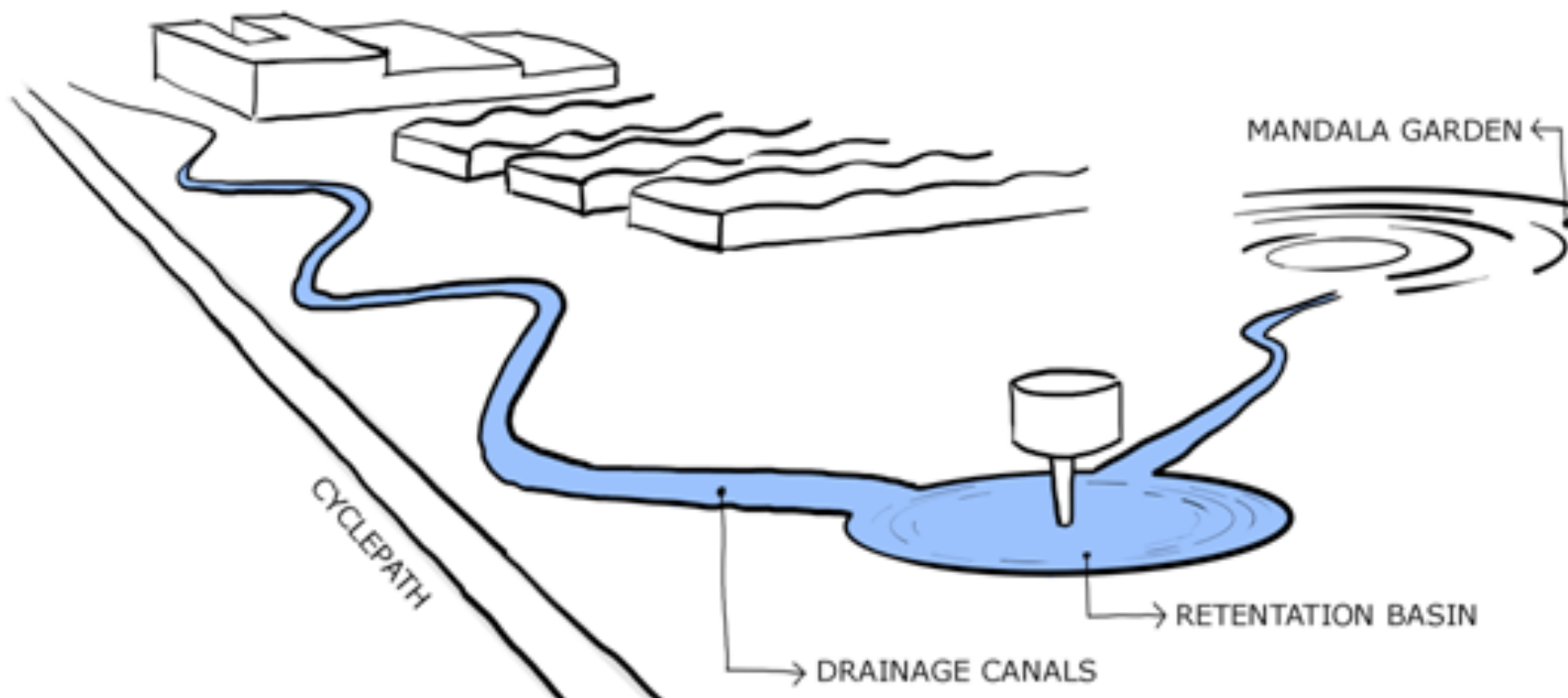
The indication of technologies capable of making the buildings' facades responsive to the climate contributes to reducing their energy consumption for air conditioning, either for heating or cooling. Along with it, the use of the heat produced in the composting process for space heating leads the buildings closer to self-sufficiency. Both strategies have the potential to reduce environmental impacts derived from the production of electricity by public companies.

After all, the option for keeping most of the original buildings of Ex SIAPA, through retrofit and readapting, demonstrates a concern when it comes to the preservation of the original landscape, the preservation of the past and the creation of connections with the future. It gives a modern and reverent

aspect to the project and makes it also able to place itself in the urban scene in coherence with economic, social and environmental demands and, at the same time, provide quality of life for the local community.

Lesson learnt

- o The importance of seeing the multiplicity of possibilities in places where there are apparently only problems;
- o The need to develop integrative projects constantly negotiating the consequences of our decision-making. When defining the program of needs and determining uses and their respective situations in a large area, such as the Ex SIAPA in Galliera, the observation of the consequences on the social, economic and environmental spheres was very useful and played a determinant role.
- o The importance of direct and clear communication between members of a project team, as well as the determination of symbolic hierarchies for coordinated work conduction, important aspects of the final quality of the material produced.



3MA



Agata Morelli



Mariaclaudia
Tricarico



Marco Tira



Emma Varotto

3MA

with:

**Waste Converters: Enlivening Galleria by
bridging the gap with agroecology.**

Agata Morelli, Emma Varotto, Marco Tira, Mariaclaudia Tricarico

Vision

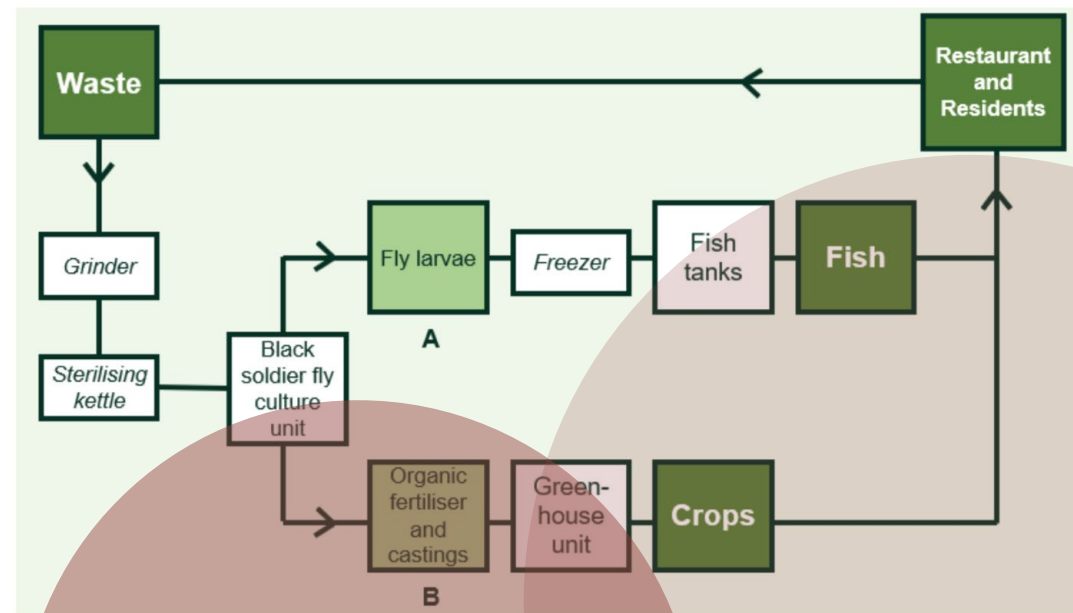
Our project involves a farm in the city. This means that the average audience member coming to visit our project will not be a scientist, agronomist or part of the agricultural sector, making some of the processes they witness alien to them. Most people may be surprised and intrigued by the way common foods that they consume daily are produced. This is the exact aim of this farm; not only will it be contributing to the sustainable production of food and produce, but it will be reconnecting the public to the agricultural industry- a gap that must be closed if sustainability is the goal. The first thing people would see is the fly larvae farm (converting the organic waste into proteinaceous larvae and fertiliser) and the aquaponics section (incorporating the hydroponics system growing vegetables and the aquaculture technology producing trout). When living in a city, you tend to lose the sense of organic processes as they are masked by a cloud of chemical pollution. Our urban farm will provide a refuge for this toxicity by providing a bit of green and blue amongst the grey of the city. Furthermore, another element the guests visiting the project will see is the social cooperative. Familiar facilities and activities such as a movie theatre and restaurant will also be available for visitors to take part in. In this manner, the public can contribute to the initiative, without needing to be fully invested in the agricultural basis of the project.

Concept

The main elements of the project include the urban farm, consisting of an organic waste plant and an aquaponics system, and the social cooperative. Firstly, organic waste will be collected around the city and deposited into our plant, where black soldier fly larvae degrade this waste into an organic fertiliser. The fly larvae themselves also become a calorie-dense food source for livestock. These two yields (the fertiliser and larvae) will then be used in the aquaponics system- the second selling point of the farm. The aquaponic system consists of a hydroponic system growing vegetables using the fertiliser and an aquaculture technology consisting of fish tanks whereby trout fish are grown, and the fly larvae are used as fish feed. What is nifty about this system is that the water from the fish tanks is used to water the vegetables, and the excess water is then filtered back to the fish tanks; minimising wastewater and generating a closed-loop system. The second element of the project involves the social cooperative; consisting of various activities and facilities made available to the public. These include facilities such as a movie theatre and restaurant. This creates a platform whereby the produce yielded by the farm is circulated back to the public through facilities such as the restaurant. Again, emphasising the notion of a closed-loop system.

Sustainability

The entirety of the project has been designed to be as sustainable as possible. When considering the farm, all the main processes are founded on principles of sustainability. The fact that organic waste around the city will be collected and converted to a biologically friendly, economically useful form, will already be minimising the use of landfills which are notorious for their environmental impact. Furthermore, organic waste is not a finite resource from a city perspective, meaning that a constant supply of organic waste will result in a constant supply of organic fertiliser and livestock feed. The United Nations has regarded aquaponics as one of the best modern technologies for sustainable development. This is because aquaponics relies on the premise that waste must be kept to a minimum, and that nutrients and resources should be constantly cycled through the system fundamentally because it is a closed-loop system. In the aquaponics system, the water from the fish tanks (the aquaculture unit) which is high in nutrients, will be used to irrigate the vegetables growing in the greenhouse. Subsequently, as the water runs through the plants and potting substrates, it is filtered back to the fish tanks. Rainwater capture tanks will also be implemented, thus, during dry periods, the water stored in the tanks can be cycled within this system. When considering the hydroponics system, we will use recycled plastic containers as potting media.



Lesson learnt

The main lesson that we learnt is that not all sustainable development plans need to be big and grand. This project acts as a perfect example of this. By renovating an old, dilapidated building that has lost its value in the industry and economy, one can create a small, unique environment contributing to sustainable development. Cities are wounded by processes that can mostly be considered as noxious to the environment, but this is one small step to rectifying and alleviating some stress that urban settings inflict on the environment. The second lesson we learnt was how to integrate inherently scientific and agronomic processes to economic and social imperatives. This is an extremely important part of the project because one can have a fantastic agricultural

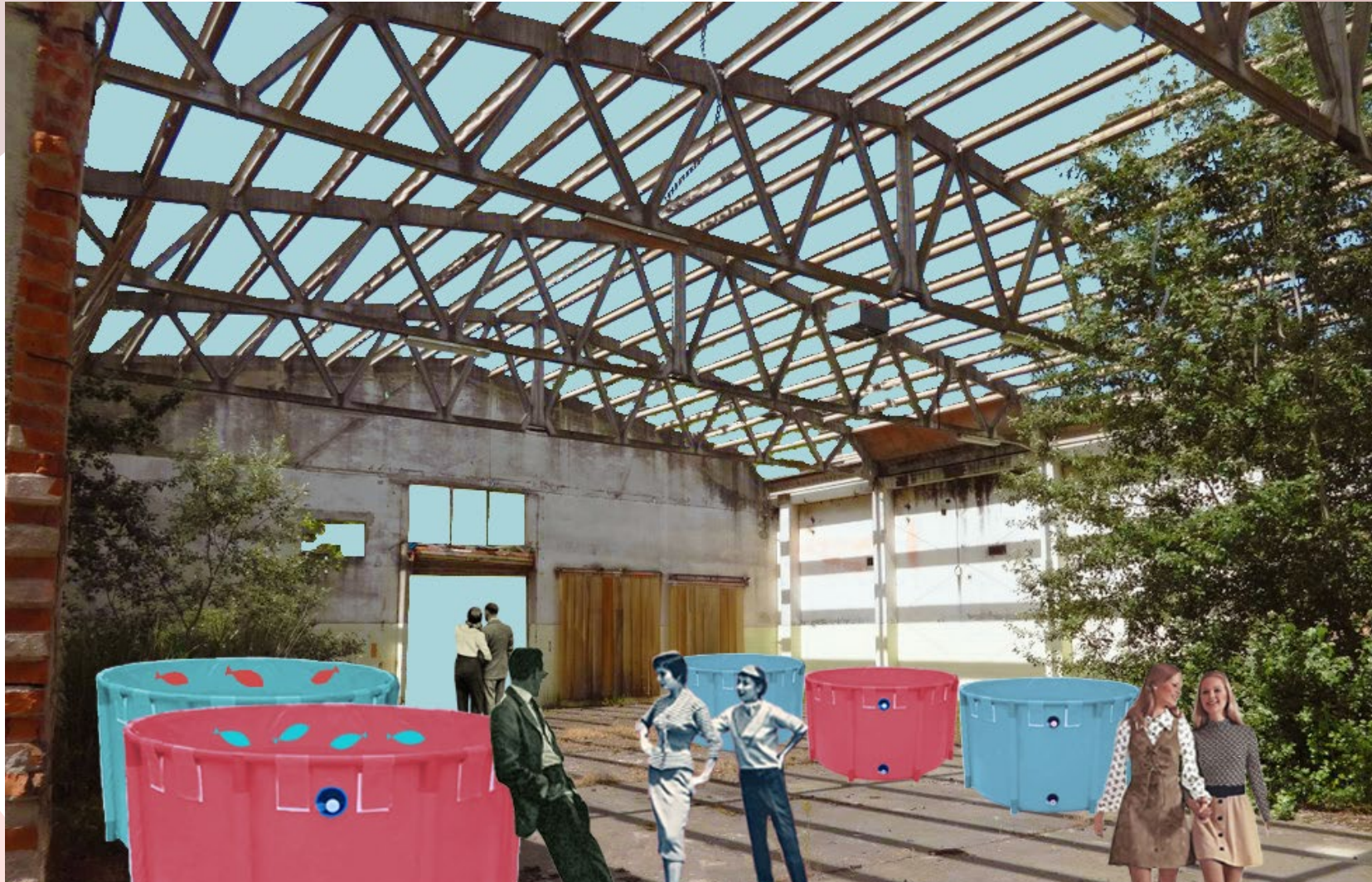
idea, but if it does not add social and economic worth, it may not necessarily be feasible. This also ties into a major aspect of the project; the residents and general public. For the initiative to work, it needs to spike the interest of a general audience; bridging the gap between our food production processes and the city. Lastly, a less apparent lesson we learnt was how to communicate and connect amongst group members who, (1) are living in different areas and/or countries, (2) may not all speak the same language, and (3) are from different industries and fields of study. Although we are sure this is a lesson most other groups have learned from, it was a very important one because such a situation can be extrapolated to a work context; as many projects in the future may need to be dealt with in a similar manner.



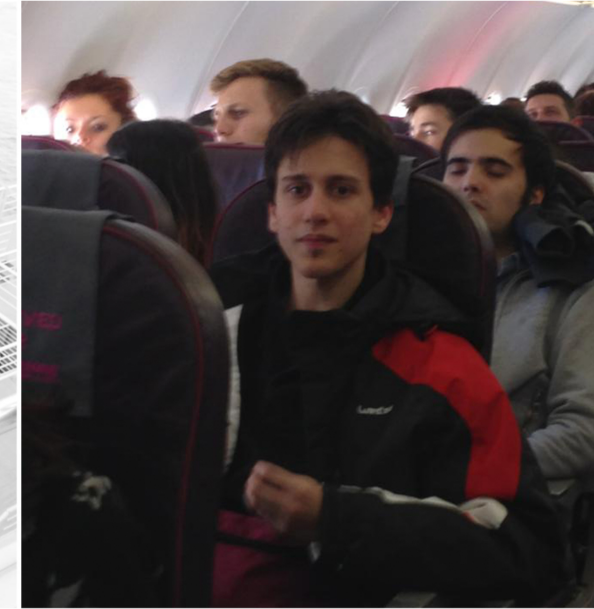
Remarks

The main story we would like to share is to reiterate the concept of communication and collaboration within a team consisting of different experts and professions. A project like this involves a variety of different skills and knowledge and requires an integrated approach tackling many different disciplines; such as economics, architecture and agriculture. This is important to consider on an industry level, like many initiatives, firms and projects are

no longer founded on one discipline but involve a cooperative consisting of multiple specialists from different fields and branches of studies. Thus, rendering a project of this calibre as trans-multidisciplinary. We would also like to emphasise the idea as to how a project like this can reconnect the public to food production systems. There is a misconception that food production is for the tertiary sector in rural areas. However, this is a perfect example as to how we can integrate such processes in an urban environment.



WE ARE HOPE



HOPE

with:

Exhibition Park for Sustainable Horticultural and Environmental
Technologies: Soilless Agriculture and Renewable Energies

Gabriela Mazzarello, Abdelrahman Mohamed , Filippo Frisoni, Ahmed Yasser

Vision

If you are looking for a place to have fun while learning something new, a place to work, to buy something, to perform or exhibit your art, or a place where you can just walk-in in serenity with a lover, a friend or by yourself: We designed the site that provides all those experiences.

As soon as you walk in you will feel familiar with the place, you will have many hands-on experiences with very creative ideas. You will feel very inspired and motivated to have fun while learning about sustainability. You will be able to play sustainability games, listen to a concert or visit an art exhibition. More importantly you will feel like you belong, because your visit is both relaxing and stimulating.

- Green-business experience: You will have an adventurous and profitable visit because at our expo areas, you can showcase your products and directly talk to potential new clients. You can also comfortably work at our corporate hospitality area and stay at our hotel, in a place that uses clean energy (such as photovoltaic energy from the sun, and the wood energy (biomass) of poplar wood chips)

- Agricultural experience: You will be able to learn more with our workshops with the most advanced soilless agricultural technologies and see how it works. In the west flower square, you can see the cultivation of the most interesting ornamental flowers and to take advantage of a small park with a life path. The horticultural center is in fact designed to ensure a good amount of greenery, between the buildings and the climbing plants in the overhangs of the canopies.

- Services: You can take advantage of a whole range of services: restaurant service (with a portion of our home-grown vegetables), physical (life path), training courses (off-soil agriculture courses / exhibitions: in the center of environmental education) to more technical ones such as the gardening workshop. The multifunctionality of agriculture and the environment is enhanced. You will breathe sustainability and you will love it so much you will come back again.

Concept

Our sustainability park is unique. We are highly integrated with nature, turning a symbol of negativity into a symbol of hope. We use advanced and sustainable technologies for soilless agriculture, from the most inspiring ones such as hydroponics with plastic bottles to the more innovative ones such as aeroflo120. The high variety of technologies used (cultivation in planters with soil for flowers, aeroponic tower and also in aeroflo120, vertical farming) allows the student, the hydroponic, the farmer, the visitor, the researcher and

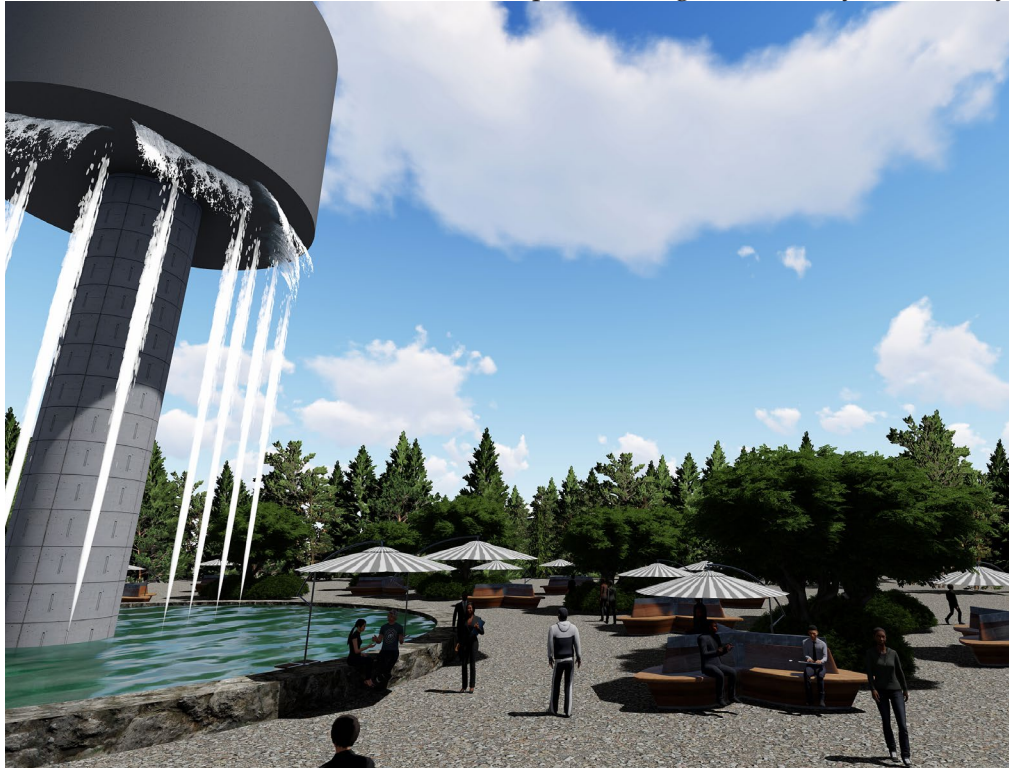
the user of the horticultural center an excellent education and training. Another aspect that makes us special and attractive is the overall range of services: the integration of all ages, levels and distribution of knowledge and leisure within one park. Artistical, cultural, gastronomical, agricultural, business, fitness and even tourist spheres coming all together in one place. And the cherry on the cake? We have international and local artists showing creative art pieces done through the theme of sustainability, as well as the best chefs working with only fresh ingredients.



Sustainability

We embrace the theme of sustainability in all areas of our project. But did you know we are also economically sustainable? With our wide range of diverse sources of revenues and costs backing us up in almost all possible scenarios such as an industry/ market failing we always have something different to rely on. Take into consideration that our caring committees will be in charge of the administration of the site through the short- and long-term goals while prioritizing the needs of locals. We highly focus on prevention by having our own prevention fund (plus insurance). We placed careful attention into keeping our workers happy by being paid fairly and never having to “over-work” because their individual valuable input is always considered by our committee. We designed the site to be social friendly, productive and have a good impact on the environment. The site itself is a way to raise awareness about sustainability.

The Aeroponic system allows a huge saving of resources. The aeroponic system allows water savings of 95%, this is a fundamental element in a world where 70% of water consumption is due to agriculture, and where within 30 years there is a risk of a water shortage for 5 billion people the tower aeroponics also allows the use of less LEDs with a consequent saving of electricity and money.



This system therefore allows a better management of the water resource. Hydroponics mostly uses coconut fiber, a biodegradable material, allowing for zero disposal.

- The use of renewable energy costs but gives great satisfaction. With the photovoltaic in 3 years it is completely included in the costs, the energy can be conserved to be then self-consumed. Poplar allows the soil to be purified by polluting substances and at the same time to produce wood energy that can be sold at a good price and used as green energy.

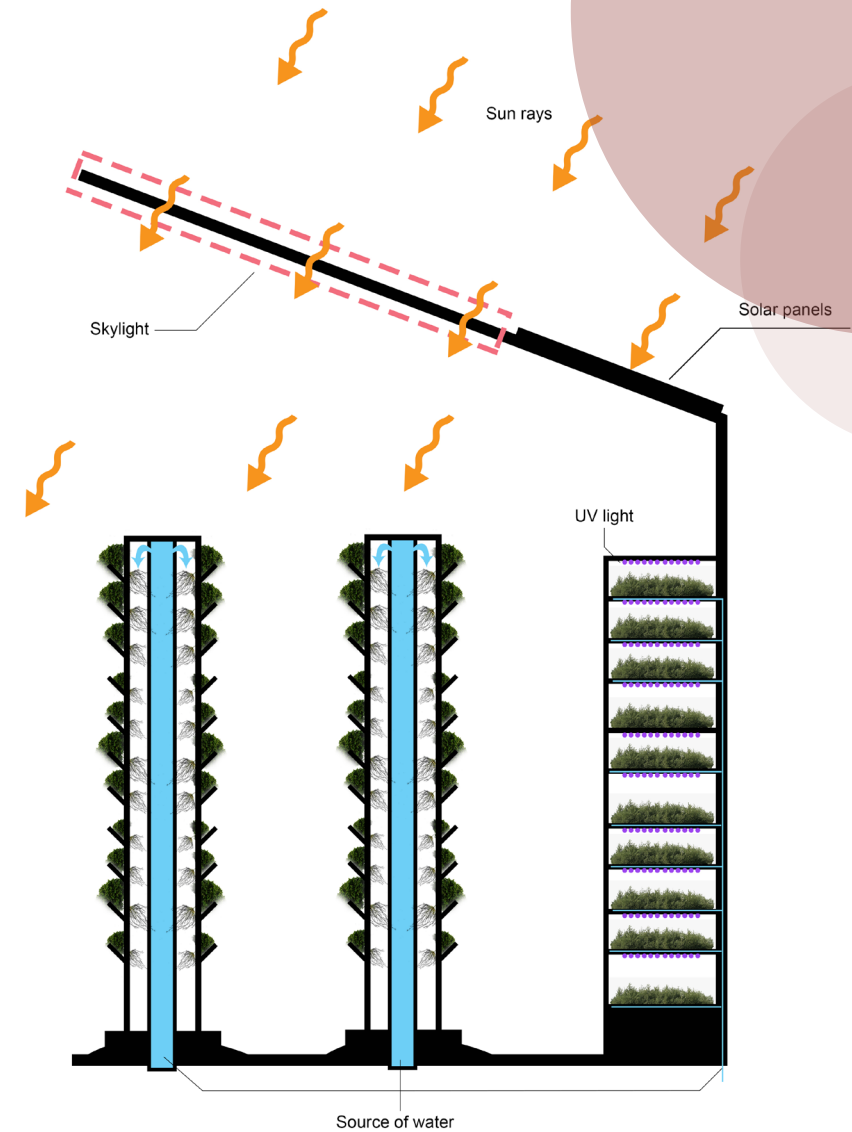
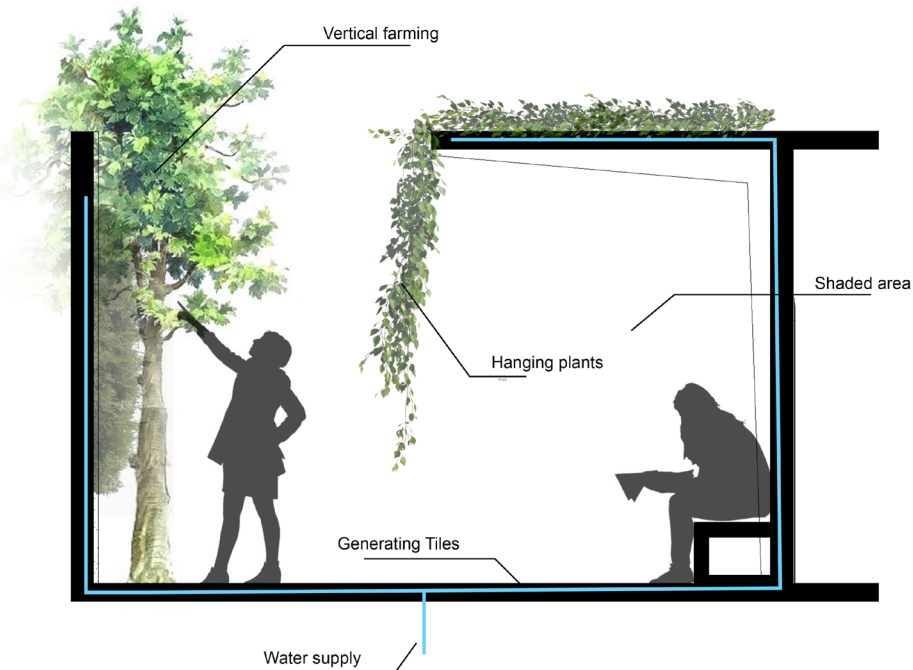
- The hydroponic system with plastic bottles not only collects plastic bottles for reuse in a greenhouse, but also supplies them to farmers and hydroponics interested in trying this way of growing, who also have the opportunity to learn how to do it right.

Lesson learnt

Working on this project has been very challenging, however very fun. Our team members have been extremely supportive. Each one of us is a hardworking individual. We were able to look beyond our differences and come to a common ground of producing quality work. Each one of us trusted each other, and solved problems by appreciating ideas from different angles and



understanding from different points of view. A very important lesson for us was (1) Organizing. We believe it is of great importance to foster and increase organizational and practical experiences in universities (such as Urban Farm) to increase awareness on relevant topics within society and stimulate student skills. (2) Turning theory into action: from the economical perspective we learned that calculating revenues for a very innovative project is as hard as asking Steve Jobs to calculate how much profit he would have made with the invention of the iPhone, before finishing his project for the first iPhone. and from an agricultural perspective: The new soilless methods are very innovative methods that allow huge savings in resources for the benefit of the ecosystem and man. Our third and biggest take away besides all the academic factors is that (3) Team members will become your friends. When your specific team goes through a lot of hardships, you learn to put a very special value on human beings that offer you help and stay hopeful and positive through the darkest hours.



HOP-E



HOP - E

with:

SIEPE (Sustainability Inclusion Energy Production Environment)

Brando Di Giovanni, Emanuele Durante, Luca Gialli, Laura Gabrielli, Michele Lapomarda, Mohamed Shahwan, Patricia Gonzalez Mariscal, Sherifa El-Haggan, Yasmina Ragab

Vision

Greener and more alive are the first things one will notice in SIEPE. The journey starts with the educational hub that begins with a students' dorm, and a research center that will remind us of the old site as it still has got the historical elevation. Next, lies a small outstanding museum that plays the role of the table of content in a book, as it showcases the aim of the project, along with prototypes for the produced beer and cultivated hops, and a video hall where animated videos will explain briefly the process of the environmental and agricultural aspects applied in the project. Arts and crafts, made from organic waste by the kids, will also be exhibited, and finally, a small souvenirs shop acts as the epilogue of that book. After this introduction, people will get a chance to walk through our huge market that sells our organic products. Our communal zone lies in the center of the project, starting with our special international spices garden with the built-in nature fusion cells used for working quietly. Followed by our recreational piazza for the community, which includes a restaurant, co-working lounges and an amphitheater. Sports facilities lie on the other side of the spine where the students can play football, volleyball, basketball, tennis, and billiard games, along with workshops, where people learn about urban farming and the practical agriculture techniques. The greenhouse and the brewery stand afterwards, acting as the main cores of the project, as they sustain it with their regular productions. The educational hub finally ends with a library and seminars' halls utilized by the students. The nexus of quattro lakes and the poplar forest for wild birds are the perfect end linking our functional and recreational aspirations with the harbor of the canal.

Concept

Communal approach: it starts from the territory's needs. We identified core communities: Locals, disadvantaged people, students as well as companies, research and education entities. Our activities aim to involve them on different levels - in the best case as an integral part in the creation of positive impact. The concrete outcome is a community hub, a shelter, a gastronomic experience, a vanguard farming and production approach, a meeting center, education and pleasure, where sustainable, innovative solutions are generated, experimented and realized. All is combined with a social process to integrate and empower people left beside by our society. This would surely be a propeller for the economic growth of Galliera and lifeblood for the ex SIAPA site, thanks to the consequent increasing demand of services and facilities.

Circular agriculture: can be found in the way we produce hop and other crops. We placed the production in greenhouses to have a controlled environment,

drastically reducing the environmental impact comparing it to the traditional farming techniques, therefore avoiding the use of pesticides. A circular loop is created by recovering the CO₂ coming from the biogas plant and sending it to the greenhouses to satisfy the demand and avoiding its release into the atmosphere.

Contaminated site remediation: by choosing green alternatives that are less expensive and very easy to manage in comparison with previous methods that needed constant intensive maintenance. These solutions have a triple benefit of having good efficiency for the type of contamination of the site, enriching the ecosystem of the area and again, giving access to EU funds for the development of green areas.

Hop-E mobile app: used to market all events on site and allow for their online subscription including lectures, conferences, seminars, workshops as well as dorms and lodge's rent.



Sustainability

The renovation of the ex SIAPA area embraces sustainability in all its aspects. Concerning the environmental aspects in specific, we applied the circular economy concept, however, we avoided excessive interdependency between units which could lead to hardly manageable systems. Starting from the importance of preserving the water resource in an intensively agriculture exploited piece of land, we applied the principles of sustainable urban drainage in our design, which accounts for green rooftops, permeable paving and xeriscape. We reduced polluted runoff by harvesting rainwater from every rooftop and sending it to three underground tanks. Rainwater is then reused for on-site applications, from machine washing to aquaculture and garden irrigation. Of course, our aquaponic and hydroponic systems are at the centre of the water saving design, having a closed system that implements water reuse. We reduced waste production from the very start, by renovating most of the existing buildings, therefore minimizing demolition waste. Obviously, tackling Climate Change by reducing our CO2 footprint was a priority. Energy is generated by a gas turbine fed by the biogas from the anaerobic digester, which takes food and agronomic waste as input. Buildings are expected to

be well insulated and energy autonomous, also thanks to the integration of green rooftops that reduce evapotranspiration, and solar panels. Concerning the soil contamination in the area, we designed two solutions. An in-situ phytoremediation with poplars, well suited for the two shallow contaminated plumes in the green area, and a pump and treat system for the deep plume in the constructed area, ending with a facultative pond in the green area. These two treatments also create a buffer zone between the site and 'Riolo' channel and a green corridor for wild birds. Finally, the green area hosts our 'Quattro Lake' project for pikes' reintroduction in the local ecosystem.

Lesson learnt

1. Acquisition of new knowledge and transversal point of view: Working on this project added to our knowledge and broadened our views towards other fields, as we tried to be architecturally, environmentally, agriculturally and economically as realistic as possible, and compromise a few parts for the sake of the whole project. We have gained deeper insights on what "Urban Farm" is, and how it can be applied in other sustainable projects. This project also encourages making urban areas more sustainable and productive.



Moreover, it inspired us to promote this environmental-friendly approach in our diverse domains, to achieve cleaner, more energy efficient buildings with good thermal comfort, and practice more self-sufficiency regarding agriculture production.

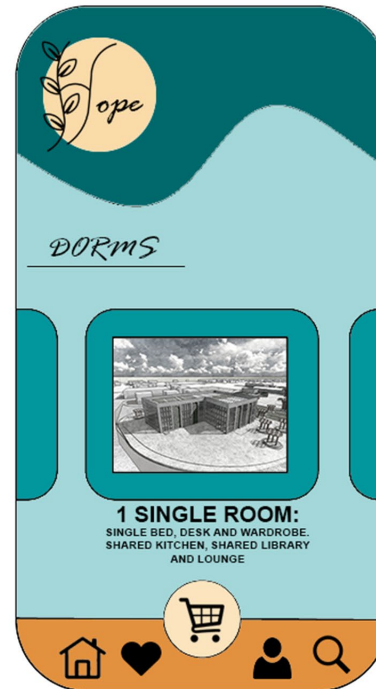
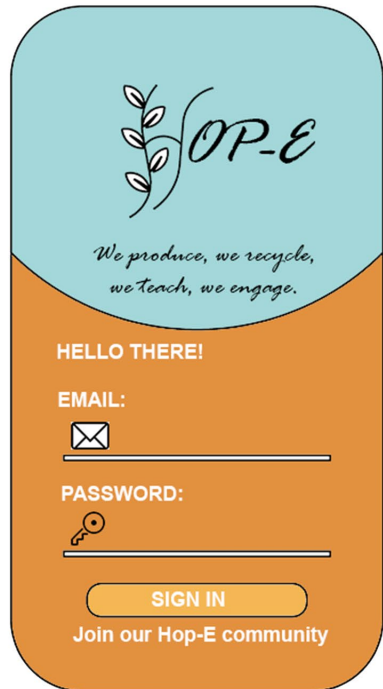
2. Social skills: We experienced the challenges of working in an international team with different point of view, specializations and geographical positions. We learnt that constant communication, coordination, active modifications and clear objectives are the core to the success of such a project.

3. Real life experience on a revitalization project: Moreover, working on a real area gave us the chance to exert and to question our academical knowledge. Since it is a revitalization project we had to work on existing buildings and data. This was related to several constraints such as; the contaminated soil, the closeness of the existing buildings, the access to the site limited to the short side of the land, the water canal being the edge of the land plot, and the location of the existing tanks. Dealing with the site was a response to those constraints, and our aim was to optimize the functions' locations and their relation with each other, reuse most of the existing buildings, demolish the least number of buildings, try to stay as cost effective as possible, and finally create a more interesting and alive journey than the former experience in the site.

Remarks

Hop-E is a very diverse team, in terms of nationality, skills and background of study and we believe it englobes the true spirit of Urban Farm. The team gradually built itself around the growing awareness that in order to develop the initial idea of renovation of the ex SIAPA site we needed a strong and motivated group of people that could bring a relevant contribution on every aspect of sustainability. We consider ourselves lucky to have found team members that were deeply invested into the realization of this project proposal, as most of us didn't know each other before the competition. It surely was a "shot in the dark", and we all had to face an initial phase of adapting to each other and trying to identify and valorize everyone's skills and place in the team. Overall, it was a great learning process, fascinating to observe. It challenged the idea of ourselves as in such a diverse team your role can be very different from what you expected and it can bring out part of your personality that might be worth discovering and some others that are better to be tamed.

We also have understand that the word resilience is just abused, and today we have the proof that on certain occasions, the word phytoremediation if whispered and said sweetly can also sound sexy.



The International Master's Degree in Horticultural Science (IMAHs): opportunities and perspectives for our students

Luca Dondini

*University of Bologna - Alma Mater Studiorum
Coordinator, International Master in Horticultural Sciences (IMAHs)*



The International Master's Degree in Horticultural Science is a 2-year post-graduate Program offered by the Department of Agricultural and Food Sciences - DISTAL of the University of Bologna, and the Faculty of Science and Technology of the Free University of Bozen-Bolzano. The International Program is addressed to graduates in Agriculture, Forestry, Environmental Science and Biotechnologies, and other subjects related to the study of Life Sciences. It is entirely taught and assessed in English. The Degree Program seeks to create future Agriculture technicians possessing high skills and capable of working in the horticultural sector in an international context. Students will experience multidisciplinary training and research-led teaching in subjects covering the main aspects of horticultural production and the supply chain with particular attention to environmental sustainability as well as social and economic protection (People-Planet Profit).

The Program is structured in four semesters (each worth 30 ECTS). The entire first year (1st and 2nd semester) is held at the University of Bologna and focuses on methodological aspects, on the efficient use of resources in the production process and on the quality of horticultural produce. In addition, during the first year (usually in the 1st semester) all the students enrolled take part in an Academic Basecamp. The Academic Basecamp

will introduce the students to the main areas related to horticulture and to their challenges. The students will be put in contact, from the very beginning, with the needs and challenges related to their future field of employment. The 3rd semester is offered exclusively at the Free University of Bozen-Bolzano and covers sustainable management of fruit trees, grapevines and the supply chain management of horticultural produces. During the 4th semester, an internship and the preparation of the Master's thesis are foreseen.

From an international perspective, the Master's Degree in Horticultural Science is part of the Hortalliance Network with other leading European institutions in this sector. In particular, it has implemented various types of cooperation agreements with the following universities:

- Szent Istvan University of Budapest (Erasmus+ and Double Degree agreement)
- Technical University of Munich (Erasmus+ agreement)
- University of Applied Sciences at BOKU – Wien (Erasmus+ agreement)
- Humboldt University of Berlin (Erasmus+ agreement)

Thanks to the above-mentioned agreements, students enrolled will have the opportunity to

spend up to two semesters (2nd, 3rd or 4th) in one of the European partner universities as exchange students Erasmus+ (with financial assistance) and be entitled to earn a Double Degree in some cases.

The international degree programme IMAHS has been designed for highly motivated students and aims to form international-level professionals that will be qualified for designing, managing and assuring the quality of agricultural business along the whole production chain. Graduates may apply for positions in the management of the food production or transformation chain, in the organization of control systems and quality certification (traceability, system-, process- and product quality, hygienic assessment) of horticultural produce, in the organization of activities and projects linked to public intervention in horticulture, and in research and development for the improvement of technology and production.

From its first edition, the international student challenge UrbanFarm was proposed as a supplementary and integrative activity to IMAHS students, allowing them to translate into practice in a real project design their acquired competences. The intent of providing the opportunity to meet and

exchange with peers from other background and cultures, altogether with the exploration of soft skills associated with videomaking and web-promotion, public speaking and team-working were successfully met, as evidenced by the elevate quality of the proposals that are summarized in this book. Further information on the master course may be found on the dedicated website (<https://corsi.unibo.it/2cycle/InternationalHorticulturalScience>), or may be requested at the course e-mail address: cdl.imahs@unibo.it



The International Master's Degree in Horticultural Science (IMAHs): opportunities and perspectives for our students

Jury Interview

by **Stefania De Pascale**,
Professors of Horticulture,
University of Napoli Federico
II, Italy with **Chiara Cirillo**
and **Youssef Rouphael**,

Application of permaculture for brownfield regeneration

Permaculture is not the landscape, or even the skills of organic gardening, sustainable farming, energy efficient building or eco-village development as such, but can be used to design, establish, manage and improve these and all other efforts made by individuals, households and communities towards a sustainable future.

David Holmgren

Under the designation of “brownfield sites”, are generally merged entirely abandoned areas, that have been affected by the former operations of the site and surrounding land; that are derelict and underused and may have real or perceived contamination problems, that are mainly in developed urban areas and require intervention to bring them back to beneficial use (Franz et al., 2006; Oliver et al., 2005). In the 70s and 80s of the last century, the abandoned areas were considered almost “urban wounds” to be saturated, but local urban policies and planning proposals appeared

very inadequate. Nowadays, it is well known that even abandoned areas retain some values and capabilities.

“Sustainable Brownfield Regeneration is the management, rehabilitation and benefiting of the brownfields in such a manner as to ensure the attainment and continued satisfaction of human needs for present and future generations in environmentally sensitive, economically viable, institutionally robust and socially acceptable ways within the particular regional context” (RESCUE, 2003). This is a very broad and general definition, which was further refined into major fields of work within brownfields regeneration, and led to the definition of sustainable objectives and indicators



for the planning processes and methods for citizens participation; (i) a sustainable land use and urban design on brownfield sites, (ii) the management and reuse of existing buildings and infrastructures, (iii) the reuse of soil and debris and management of contaminants risk, and (iv) the management of brownfield regeneration projects.

Urban agriculture can create beneficial changes in the cities, by turning brownfields into productive green areas, thus generating an urban environmental and qualitative improvement. Cultivated areas may contribute to air pollution reduction and occupation of abandoned and disused areas, which prevent the illegal disposal of waste and crime diffusion. The “edible” urban landscapes can be spread as a redevelopment tool in the suburbs, for the improvement of the landscape quality of urban places and social life in the cities. Natural ecosystems can also be very productive without the use of fossil fuels or other chemicals that support the agricultural and industrial activities in these days, by cutting the production of any kind of pollution. The main goal of permaculture is to create systems having similar characteristics of a natural ecosystem, and to meet the needs of citizens. The key to doing it is to build a network of beneficial relationships among the different elements that will contribute to constitute a garden.

A brownfield regeneration project: the former Railway Warehouses in the Metropolitan City of Napoli

The present project falls within the urban

regeneration of a large specialized fenced site completely abandoned: the area of the former Railway Warehouses located within the Metropolitan City of Napoli, formerly used by the National Railways for train maintenance, which is currently fallen in disuse. The project ensures that the effects of this area restoration go far beyond the limit of its borders: through the reconnection with parts of the adjacent districts that are historically separated, but also through a strategy of re-stitching the city by natural patches, that affects the city planning at different scales. The potentialities of a deep regeneration arise when a project does not affect only physical dimensions and space distribution, but may also have a marked social impact. The transformation may bring “roominess” in marginal lands (neglected and decayed areas), through a new sensibility able to interpret some phenomena in place and to redesign the latent form of a landscape that historically marked the urban design of the city.

The suggested redevelopment of green areas (Fig. 1) envisages designing a food forest, that is intended for this brownfield site to generate:

- i) a model for a proper healthy human nutrition to affirm sustainable lifestyles, and create new perspectives regarding food safety in urban agriculture;
- ii) a social experiment that promotes the engagement of local community in agricultural knowledge and public space sharing;
- iii) a valuable environment for urban biodiversity;



iv) an innovative model of design and utilization of new public spaces.

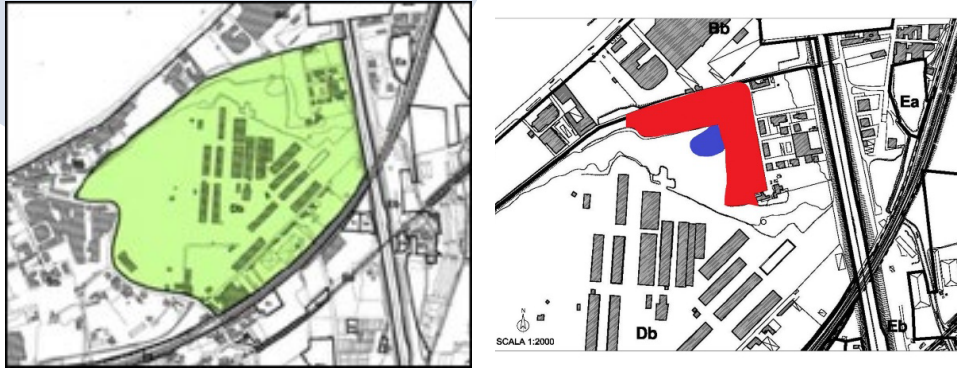


Figure 1. The brownfield area of former National Railways Warehouses located within the Metropolitan City of Napoli (a) and a detail of the green areas with the proposed destinations (b)

Methodology of analysis and development of a step-by-step project

The first phase of the project is characterized by a large-scale spatial analysis to understand the dynamics -at natural and anthropic levels- involving the existence of the field to be designed. A second phase analysis defines the specificities and characteristics of the adopted design strategies offering insights and specific evaluations to emerging issues. The third phase is the project proposal with detailed examples of green arrangement. The basic idea is founded on the ecological and biological principles of permaculture that aims to design and create sustainable and resilient human settlements. Permaculture may represent a tool of innovative ethic design, based on a sustainable agriculture that revitalizes soil, conserves water and redirects waste flows. These techniques are put into practice in different ways, aiming to arrange sort of multi-specific populations, intercropping trees and shrubs depending on the characteristic slopes and peculiarities of the soil surface of the plant site. The plantings have been carried out in accordance with the seven layers of vegetation that can be easily identified in a forest and with the need to create such intercropping between fruit trees and the other layers of the surrounding vegetation (guilds) that are mutually beneficial. The facility layout is made of sinusoidal and curvilinear files, which are usually found in lowland forests to mask the artificial afforestation structure and increase its irregularities, increasing thus the nature of the topsoil connotation. Mulching, which is a technique for soil coverage with organic or mineral material, has

a soil protection purpose. In absence of an irrigation system, the creation of specific swales become crucial in order to allow the runoff of water and its collection. A swale is a little deep ditch perfectly collimating with soil level lines. For the synergic vegetable garden, flowerbeds follow rounded shapes to create different micro-climatic conditions, allowing a simultaneous cultivation of different vegetables (intercropping), and complex interactions between plants. Even in this case, the mulching constitutes one of the fundamental elements to protect the soil.

The project concerns a portion of the North-East side area, characterized by a quite irregular elevation and separated from the remaining flat part. The general project is oriented to increase the area of positive externalities for the city and for the citizens, related to an increase of the common values that can be measured in terms of quality and overall improvement of the habitability of the urban structure.

Finally, the industrial void turns into an open place, pleasant, rich and attractive, able to polarize the flows coming from the city toward the ideal focal point of the plan, that maximizes the function of edible forest as a context to develop the neighbourhood: a public system designed with the landscape and ecological materials. A green space, which everybody willing to enjoy a recreational and simultaneously functional area, can benefit of: fruit harvested in the orchard and the garden will in fact be available to the whole community. The edible forest is made of many layers, from the bottom to the grassy tops of the tallest trees, through shrubs and small trees, thus the various levels provide a variety of habitats, many products and great visual perspective (Fig. 2). Free spaces between neighbouring trees and shrubs, nested in the crevices under the branches, edible herbs that encourage insectivorous birds to explore the trees searching of larvae and eggs, whereas leafy plants that provide mulching, when cut and left to compost on site. Being the subject of fairly large project area, combining nitrogen-fixing species, bee-attractive plants and other multifunctional plants guilds to create dynamic, interconnecting shafts with different uses to create a "superguild". All project activities are carried out with the intention of seeing fruits and orchards as an important resource for the community, and also emphasize the ecological and landscape value in urban areas, to disseminate and preserve the biodiversity of our territory, retrieve fruits and flavours, creating new green areas, requiring low-maintenance, but with an important role in the urban ecosystem. The concept of forest food is conceived as an opportunity for inhabitants own use and for creating a low-maintenance multifunction reality based on the mimesis of a forest ecosystem (Witthfield, 2002). So it is natural, it respects the time of the forest growth and seeks to protect and emulate as close as possible the natural and semi-natural

environments of the province of Naples. Finally, the project aims to be one of the many elements necessary to a cultural change to which human kind is called to develop a new social model not only fairer, sober and respectful of the natural system of which we are part, but also characterized by an increased quality of life and greater moral and physical welfare.

Figure 2. Project plan of Food forest and Synergic vegetable garden



References

Franz M., Pahlen G., Nathanail P., Okuniek N., Koj A. (2006) Sustainable development and brownfield regeneration. What defines the quality of derelict land recycling? *Environmental Sciences*, 3:2, 135-151,

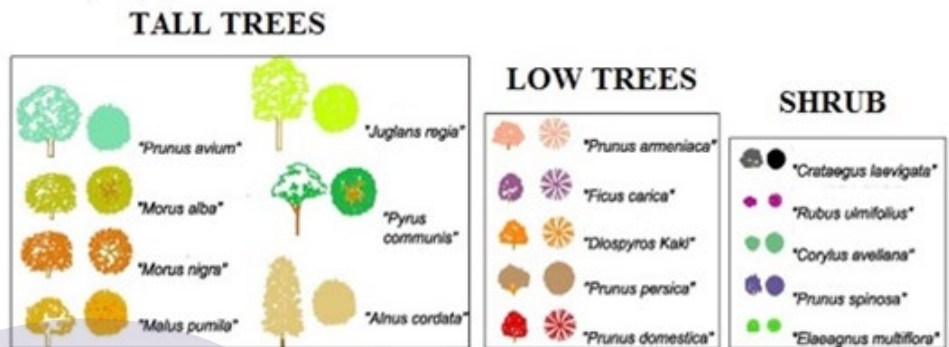
Jacke D., Toensmeier E., 2005. *Edible Forest Gardens. Volume 2. Ecological Design and Practice for Temperate-Climate Permaculture.* Vermont: Chelsea Green Publishing Company,

Oliver L, Ferber U, Grimski D, Millar K, Nathanail P. 2005. The Scale and Nature of European Brownfields. In: Oliver L, Millar K, Grimski D, Ferber U, Nathanail P. *CABERNET. Proceedings of CABERNET2005: The International Conference on Managing Urban Land.* Land Quality Press: Nottingham, pp 274 –281.

RESCUE 2003. *Development of an Analytical Sustainability Framework for the Context of Brownfield Regeneration in France, Germany, Poland and the United Kingdom.* Final Report of Work Package 1. Available: http://www.rescue-europe.com/download/reports/1_Analytical%20sustainability%20framework.pdf.

Whitefield, P., 2002 *How to Make a Forest Garden, England: Permanent Publications*

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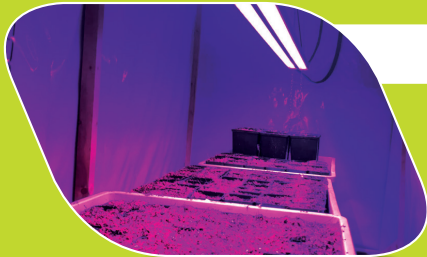
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A special acknowledgment to all those that made this challenge possible and successful



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