



UrbanFarm2019

Book Finale Challenge



URBANFARM2019

Curators:

Francesco Orsini, Giuseppina Pennisi, Michele D'Ostuni, Mattia Paoletti, Gloria Steffan, Denisa Kratochvilova, Andrea D'Alessandro



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA



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Photos: Gloria Steffan, Denisa Kratochvilova, Andrea D'Alessandro
Francesco Orsini, Andrea D'Alessandro, archive UrbanFarm2019
Design: Michele D'Ostuni
Printing: Edagricole
Editor: Alma Mater Studiorum University of Bologna
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ISBN: 9788898010936

We thank our partners and sponsors for their generous contributions.



Table of Contents

Introduction

Enrico Sangiorgi	4
Giovanni Molari	6
Francesco Orsini	8

About this challenge

The challenge	10
The 3 locations	14
Questions and answers	18

Concepts

<i>Belluno - Former Orzes Primary School</i>	21
FAMA_Architecture - Herbal Tea Farm	22
Future-A - DolomiNet Center	24
MiCRO - The green box	26
PineCube - Idro-Officinal Library	28
<i>Bologna - Fantoni Farm</i>	33
Archaea - Archaea Multifunctional Polo	34
Eco-Gazers - Towards a Sustainable, Productive and Energetic Farming	36
LANDERZ - Human and Urban Biotopes	38
ReGenius Loci - Aquaponic Social Garden	40
<i>Conegliano - Ex Zanussi Area</i>	45
Green Senses - Health Senses Path	46
Phoenix - L'Azienda Zanussi	48
Symbiosis - Zero +	50
The Wanderers - Gilgamesh	52
YS Design - The Green Hub	54
<i>Other Teams</i>	58

Interviews

Isabella Righini	12
Joan Rieradevall Pons	16
Runrid Fox-Kämper	30
Bernd Poelling	42
Augustin Rosenstiehl	56
Michele D'Ostuni and Antonella Trombadore	60

Main Partners	66
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Committees	60
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"The University of Bologna is committed to the values of sustainability, 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."

URBANFARM2019: Targeting global sustainability goals through an international student competition

by Prof. Enrico Sangiorgi, Vice-Rector for Teaching - University of Bologna



offered to over 86.500 students. All the degree programmes offer the opportunity to spend some time studying abroad thanks to student exchange agreements with universities all over the world.

Alma Mater Studiorum - Università di Bologna is based on five Campuses (Bologna, Cesena, Forlì, Ravenna and Rimini) located in the Emilia Romagna region. It offers also an overseas 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.

Bologna is one of the most active Universities leading and participating in European research and academic cooperation projects. It is active

Since its origins in 1088, the 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 are widely recognized thanks to its international reputation. 219 degree programmes are

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.

The University of Bologna proposes an innovative way to report on the contributions generated by its institutional activities, including training, research and social and public engagement, aimed at the achievement of the 17 Sustainable Development Goals (SDGs) of the U.N. 2030 Agenda.

The 2030 Agenda is an action plan for transforming the world, acting in favor of people, peace, the planet, prosperity and partnerships. This becomes realistically possible the more the values and the communicative and inspirational power of the SDGs enter into daily life, with real impact on the behaviors of teachers, administrators, executives and auditors within different institutes.

The University of Bologna is committed to the values of sustainability, 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.

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.

In this context, a group of our students, together with some students of architecture of the University of Florence, participated in the

international competition called "Could you design the ultimate Urban Greenhouse?" for the design of a building in the Bajer Kwartier district of Amsterdam. The competition has awarded the most sustainable solutions in the social, economic and environmental spheres, with particular attention to the recycling of materials and resources, from technological solutions for cultivation, to the definition of spaces and activities for social laboratories, to economic and environmental analysis of the impact of project.

Grounding on the experience of the previous competition, the University of Bologna launched in the last months the International Student Challenge "UrbanFarm2019", where students from all over the world were engaged in a competition for re-designing abandoned compounds in three Italian cities, namely Bologna, Belluno, and Conegliano. Students were asked to bring new life to urban vacant spaces, transforming them into places for urban renewal and social inclusion. The output of this competition are presented in this book

We believe that this kind of activities are extremely valuable and fundamental in changing societies, since the Universities has 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 mind-set 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.

"Beside the specific design and innovation that was brought by each team, the strength of UrbanFarm2019 is upon its founding principle. It allowed for inspiration and reciprocal cross-fertilisation between concepts and skills."

OVER THE ROLE OF RESEARCH AND EDUCATION ON URBAN AGRICULTURE

by Giovanni Molari, Director Department of Agricultural and Food Sciences (DISTAL) - University of Bologna



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.

UrbanFarm2019: 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 instead on state-of-the-art solutions for plant cultivation, 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 discern 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 UrbanFarm2019, students from different disciplines needed to meet on a common ground. Accordingly, this student competition was designed in order to allow fresh minds to join forces over a common objective. Beside the specific design and innovation that was brought by each team, the strength of UrbanFarm2019 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 bridging 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 first edition of the UrbanFarm challenge.





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ResCUE-AB

"From a social perspective, urban agriculture is often a mean for the promotion of intercultural dialogue, social inclusion and community building. "

INTERDISCIPLINARY KNOWLEDGE FOR SHAPING FUTURE CITIES.

by Francesco Orsini, Main organizer UrbanFarm2019 -Chair Division Landscape and Urban Horticulture (ISHS) - Research Centre on Urban Environment for Agriculture and Biodiversity (ResCUE-AB), Bologna University – Alma Mater Studiorum



Urban Agriculture in the 21th century

In a rapidly urbanizing world, urban agriculture represents an opportunity for improving food supply, health conditions, local economy, social integration, and environmental sustainability. While a diversity of farming systems is encountered in the different world regions, it is estimated that about a third of urban dwellers is involved worldwide in the agro-food sector. In recent times, urban agriculture projects have sprouted across the world, both guided and

promoted by governments than born by bottom-up community based initiatives. Accordingly, the concept of edible urban landscapes is today finding application all over the world.

As plant cultivation gets inside cities, a first limit is set by space availability. Hence, the implementation of innovative growing systems generally occurs through adaptation of state-of-the-art technologies developed in the rural contexts and/or by integration of growing solutions specifically designed for the urban concrete infrastructures. These are the cases of the building integrated rooftop greenhouses, the vertical cultivation of plants on greened building facades or even the conversion of abandoned buildings into plant factories through artificial lighting by use of LED technologies.

Once plant cultivation within the urban fabric becomes technically feasible, it is crucial to define its sustainability, addressing how its three spheres (social, economic and environmental) are affected by a single or a combination of technical solutions, management systems and business models.

From a social perspective, urban agriculture is often a mean for the promotion of intercultural

dialogue, social inclusion and community building. Urban gardens are also found in schools, where they offer optimal teaching tools for different disciplines, also through application of experiential learning methods.

On the other hand, assessing the economic sustainability of urban agriculture is often a quite complex and eventually controversial exercise. This since, beyond food production, the quantification and monetization of the associated benefits need to be appropriately addressed. Recent researches have shed some light onto the financial and economic evaluation of urban agriculture projects, particularly addressing the definition of viable business model typologies.

From an environmental perspective, urban agriculture can directly reduce the city footprint since it reduces the impact associated with food transport, but also by improving the resource efficiency of the urban ecosystem (e.g. when organic wastes are composted, or rainwater is collected), or mitigating the urban heat island effect through plant transpiration, overall resulting in a reduction of the city emissions of carbon dioxide.

In order to facilitate a wider uptake of innovative policies and tools for the promotion of the sustainable goals associated with urban agriculture, it is therefore crucial to create awareness on both institutional actors and the civil society as a whole through innovative and interdisciplinary approaches.

UrbanFarm2019: an international and interdisciplinary competition for turning urban vacant lands into sustainable urban regeneration spaces

The international student challenge “UrbanFarm2019” aims to tackle the current need for cross-pollination 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 Bologna, Belluno and Conegliano. Target projects differ from their original purpose and include:

- A former agricultural farm that was absorbed by the urban-sprawl in the second half of the 20th century and acquired by the city council in the late eighties.

- A factory of domestic appliances, that largely contributed to the evolution of Conegliano city in the last 70 years, but was finally closed in 2003 after the company moved away the production.
- A primary school that suffered from the progressive abandonment of Belluno city outskirts and was closed in 1992.

What these locations share is that they all are vacant and constitute a cost and a missed opportunity for their cities. Within the UrbanFarm2019 challenge we aimed at showing that another use for these spaces is possible, overall contributing to creating 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. UrbanFarm2019 became an opportunity to bridge viewpoints and approaches and integrate state-of-the-art technologies and design for urban farming with functional urban planning.

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 our cities.

Beyond UrbanFarm2019: the path forward

The major achievement of this competition stands upon the geographical distribution and expertise covered by the participating teams. The international student challenge URBANFARM2019 achieved to engage a network of experts and urban agriculture practitioners from universities from all over the world in the evaluation of 35 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. We see a future in close collaboration with the International Society for Horticultural Sciences (ISHS) and its Landscape and Urban Horticulture Division. Stay tuned and join the upcoming editions of UrbanFarm.

To boost urban renewal through urban agriculture, the University of Bologna Alma Mater Studiorum and the University of Florence jointly organized the Student Challenge, UrbanFarm2019.

3 months of time to redesign
3 locations, having a look at the
3 spheres of sustainability

THE CHALLENGE

Increasing of urban population is leading to re-design and re-place centres of food production in order to make cities more sustainable and to foster the creation of new economies.

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 Belluno, Bologna and Conegliano (Treviso), 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 entrepreneurial 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 jointly organized by the Department of Agricultural and Food Sciences and Technologies (DISTAL) of the University of Bologna and the Center of Bioecological Architecture and Technological Innovation for the Environment (ABITA) of the University of Florence.

The challenge is also supported by the Institute for Environmental Sciences and Technologies



(ICTA) of the Universitat Autònoma de Barcelona, the Agricultural Department of the University of Naples, the Universitat Politècnica de Cartagena, the Universidade Federal Rural do Pernambuco, the Ege University of Izmir and the Zvent Ivan University of Budapest.

Activities were supported by the International Society for Horticultural Sciences (ISHS), the Italian Society for Horticultural Sciences (SOIHS), Alma Mater Foundation (FAM), the FICO Foundation, the Pilastro Development Agency (Bologna) and the Municipalities of Bologna, Belluno and Conegliano. It also contributed to the innovation of educational tools in higher education toward entrepreneurial urban agriculture developed within the Erasmus+ project "Western Balkans Urban Agriculture Initiative (BUGI)", coordinated by the University of Sarajevo and partnered by the University of Bologna, the University of Mostar, the University

of Peja, the University of Pristina, the Nova Dorica University of Podgorica, the University of Ljubljana and the South Westphalia University of Applied Sciences. Media partners include SilvioFritegotto.it, AgroNotizie and Edagricole New Business Media.

Main sponsors included Flytech srl, NovelFarm, Coldiretti Treviso, Coldiretti Belluno and Daku. The initiative was also supported by Irritec, Fondazione Banca del Monte e Cassa di Risparmio di Faenza and the Contamination LAB.

The main aim of UrbanFarm2019 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 at promoting multidisciplinary and international cooperation between universities all over the world.

"The organization of events around the challenge allows social interactions and networking. This can, in turn, allow the environment for future collaborations and job opportunities."

Why an international student challenge?

by Isabella Righini, Wageningen University and Research - Jury Member



Organizing international competitions is becoming nowadays an interesting way to give attention to specific problems, future challenges, to come up with innovative solutions or explore something new in one or more combined fields. Climate-change related problems, optimization of fresh food production and solutions for urban agriculture are just some of the driven topics of recent competitions: the Climathon¹, a 24 hour-hackathon on climate challenges in cities promoted at European level, the Autonomous Greenhouse Challenge², to explore the potentialities of artificial intelligence in greenhouse vegetable production, Design the ultimate Urban greenhouse³, to stimulate resource efficient urban agricultural systems and UrbanFarm2019⁴, to integrate architectural and technological innovation for food production in cities.

An educational tool

In the first place, the whole competition can be considered as an effective educational tool. Participants are stimulated to apply their knowledge and skills to realistic cases, propose concrete solutions, defend and demonstrate the strength and validity of their approaches according to the challenge needs. Working in team is part of the learning process because it pushes the students to collaborate, to take decisions together and take the responsibility of their success and failure.

Development of diversified skills

The teams can go through one or more phases of selection and they are usually judged according to different rating criteria. Thus, the winning team is the one that successfully achieve the goals of the challenge but at the same time demonstrates to possess other skills like creativity and novelty, along the whole period.

Multidisciplinary and expert management

The organization and management of the entire challenge plays a big role in the success of the event and its outcomes. Organizers have the responsibility to provide structured guidelines and specifications which clearly state the background, the issue, the aims and the criteria. The strategies and the results are usually evaluated by a multidisciplinary commission

of experts. The judgements and comments of the specialists highlight the strength and weaknesses of each proposal and possible further improvements, making this moment a valuable lesson for everybody

Further outcomes

Besides the winner and the quantitative results, an international student challenge generates itself a net of positive outcomes. It brings young people together from all over the world to drive the attention on unsolved problem and to think about potential solutions. It creates knowledge and stimulates knowledge sharing within and between the teams, in a constructive and positive competitive environment where everybody can learn from the other ways of thinking. The organization of events around the challenge allows social interactions and networking. This can, in turn, allow the environment for future collaborations and job opportunities.

Why not?

Taking part in an international challenge is one of the greatest opportunity for motivated young people to express themselves and their creativity and give at the same time a valuable and concrete contribution to the entire community.

1 Promoted within the Climate-KIC by the European Institute of Innovation and Technology.

2 Wageningen University and Research, the Netherlands (2018).

3 Wageningen University and Research, the Netherlands

4 University of Bologna and Florence, Italy (2019).



THE 3 LOCATIONS

We have selected three different locations for the challenge: a former primary school in Orzes (city of Belluno), the Fantoni farm in Bologna and a st-industrial area in Conegliano. In the text below, you can find a short background story and our vision about each location.



Comune di Belluno

Belluno - former primary school of Orzes

In 1912 technical building authority of Orzes in Belluno designed a primary school, which was implemented in years 1920-1921. Between years 1981-1982, the city made a complete makeover of the school. Only supporting building elements were preserved, while new piping systems (for water and electricity), as well as roof, inner walls, floors, and windows, were replaced. Until 1992, the building hosted a primary school, but has been abandoned ever since. The UrbanFarm2019 vision is a project of vertical urban farm devoted to growing spices and herbs, possibly supplying the local cosmetics or pharmaceutical industry. A small laboratory could also be integrated, where participants could dry plants, prepare extracts and package the products.



Comune di Bologna

Bologna – Fantoni Farm

The building is part of a farm of about 6 hectares, owned by the municipality of Bologna since the late '80s. In 2016, the farmhouse and the surrounding land have been entrusted on loan for free to local Development Agency (Agenzia di Sviluppo Pilastro / Distetto Nord Est), an association of public and private entities, with the aim of improving the quality of life and encouraging the integration and economic development of the territory. Since 2017, part of the agricultural land of the farm hosts 108 urban gardens. The building is organized on two floors. Next to the house, there is a stable, which in the past hosted more than a dozen of cattles. Finally the former barn constitutes a third building on the left of the stable. Regeneration of Fantoni Farm in UrbanFarm2019 targets the promotion of job creation and social inclusion.



Città di Conegliano

Conegliano – Ex-Zanussi

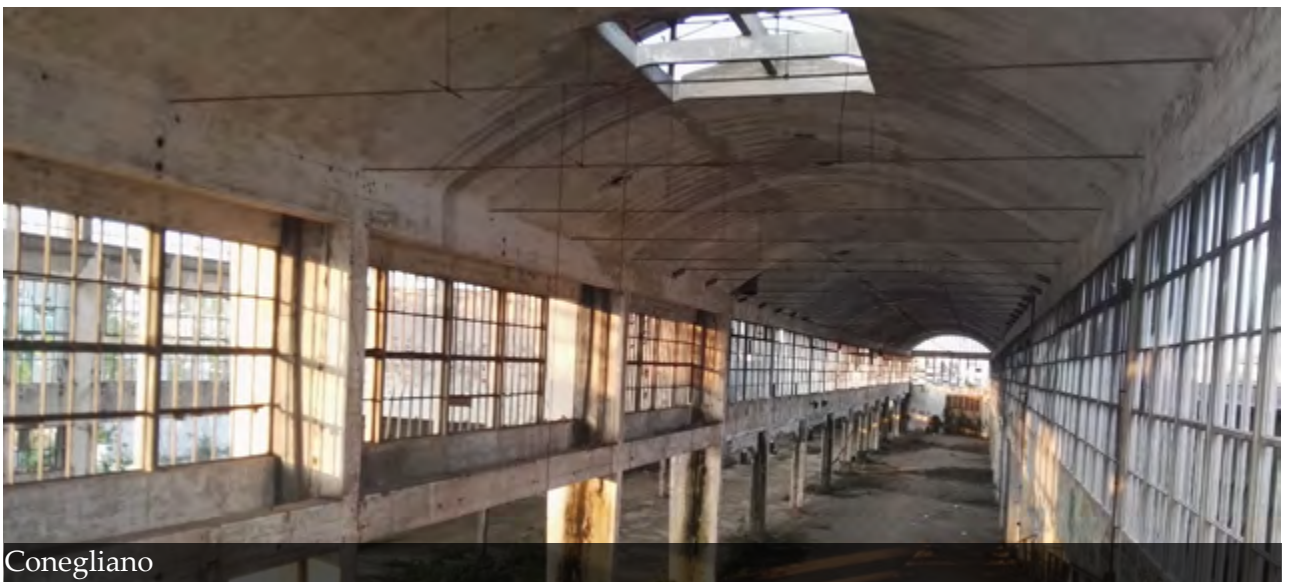
The former “Area Zanussi” is located in the city center of Conegliano (TV) between Pittoni street and Battisti street, covering an area of 165'000 m². This place was born as a foundry in 1948, over the Zoppas family's authority, making the industrial development of the city start. In the 1974 the industrial complex propriety was divided between Zoppas family and the new society, Zanussi. After ten years, with the evolution from Zoppas-Zanussi into the Electrolux group, the production centre was moved away and since 2003 building was left abandoned. Since then, the place is referred to as the “black hole” of Conegliano. Several strategies for urban regeneration were hypothesised since then, among which the possibility developed in UrbanFarm2019 to integrate urban green infrastructures in form of an urban agriculture project.



Belluno



Bologna



Conegliano

"The organization of events around the challenge allows social interactions and networking. This can, in turn, allow the environment for future collaborations and job opportunities."

Circular green economy and integrated production of food and the city. Rooftop Greenhouses to Improve Buildings and Cities Metabolism and Sustainability

by Dr. Joan Rieradevall Pons - Universitat Autònoma de Barcelona (UAB), Jury Member



At present, the majority of world's challenges regarding population, housing, education, employment, and tourism are experienced in cities and urbanized areas. More than half of the world population lives in urban settlements and this population is expected to grow in the future. Therefore, cities food security, energy and water supply, are crucial for daily activities of urban citizens. Recent studies have proven that urban settlements are more prone to the negative impact of natural disasters associated with climatic change. It is therefore needed to innovate urban food systems. To this end, the production of food in urban areas suggests environmental advantages by reducing transportation, packaging and loss among others.

Farming within the city fringes (e.g. Urban agriculture, UA) is being promoted by public administration and intergovernmental agencies as a tool to improve city sustainability. This practice, yet found in ancient cities, was largely disregarded in recent times, until it started

to flourish again in the last decades. Among available systems for plant cultivation in cities, Rooftop Greenhouses (RTGs) that use soilless growing systems are an interesting option because they take advantage of spaces that are available and often not used. There are however barriers to RTGs implementation in cities which include the consumer acceptance, management skills, investment costs, legal constraints, and building codes. For a sustainable city planning that includes RTGs, it will be necessary to develop new strategies and policies to overcome these barriers.

When RTGs are designed as fundamental, fully-integrated components of a building's metabolism, significant improvements in CO₂ emissions, water and energy use are possible, as illustrated in Figure 1.



Figure 1. Integrated rooftop greenhouse bidirectional connection

Within the framework of the project FertileCity (www.fertilecity.com), the ICTA-UAB has developed technological and sustainability assessment of a number of UA growing systems. Main topics addressed included architectural and engineering requirements, city integration, CO₂ emissions management, energy consumption, food production, social integration, and potential associated with rainwater harvesting. The analyses used several different methods such as Life Cycle Assessment, Life Cycle Costing, Social Life Cycle Analysis, and the Integrated Value Model for Sustainable Assessment (MIVES). Research activities allowed for improve energy, CO₂ and water flows. By considering environmental, economic, and social life cycles it was possible to foster global sustainability in implementing building integrated Rooftop

Greenhouses (i-RTGs) (Figure 2).

WATER 80% of the water used for the crops was rainwater. 1.1m ³ /m ² -year of tap water saved	ENERGY Avoided 100 kg CO ₂ eq./m ² -year	ENERGY Ideal temperature conditions for grow in over 76% of annual hours	ENERGY savings of 887 kWh/m ² -yr compared to a conventional greenhouse
WATER Recirculation Irrigated, 30% of all nutrients were recovered	EMISSIONS CO ₂ concentration of the residual air building is lower for the plants carbon enrichment (<800 ppm)	FOOD 20 kg/m ² of tomato were produced each year on average	WASTE CO ₂ in tomato biomass fixed through creation of thermal insulation materials
AIR POLLUTION Amount of heavy metal (Pb, H, As, Cd and Pb) detected in sampling of vegetables below concentration levels established by UE legislation	URBAN PLANNING Basic guidelines by airborne sensors detected: roof materials with a low bearing capacity	WASTE SUBSTRATE Use vegetable compost improved plants resilience to water stress compared to perlite	WASTE Tomato plant residue shows great potential for valorize through the production biochar

Figure 2. Fertilecity Project contribution

The acquired knowledge also served to design and improve the Rooftop Greenhouse Lab (RTG-LAB) at the Institute of Environmental Science and Technology (ICTA) of the Universitat Autònoma de Barcelona, and allows for the creation of scenarios on future research needs (Figure 3).

WATER RECYCLATION Resources and water efficiency	ENERGY and SUSTAINABLE ARCHITECTURE Bidirectional energy performance	ENERGY ECOINNOVATION Phase change materials application, Smart Fusion of heat storage technologies of materials according to their phase change	ENERGY EFFICIENCY Leds
WATER 100% RAINWATER Potential water self-sufficiency Water harvesting Potential/low water agriculture consumption	EMISSIONS Crops' carbon enrichment with residual air from household and offices (> 1.000 CO ₂ ppm)	FOOD SYMBIOSIS Fish & hydroponic	RESIDUAL BIOMASS INDUSTRIAL ECOLOGY Reused phosphorus waste water treatment plants
ENVIRONMENT NEXUS WATER-FOOD-ENERGY Roof mosaic	ENVIRONMENT URBAN PLANING AIRBORNE SENSORS Rainwater harvesting, vertical agriculture and solar energy use in buildings, Rooftops characterization using remote sensing	RESIDUAL BIOMASS CARBON FIXATION	RESIDUAL BIOMASS NEW MATERIALS AND BY-PRODUCTS Phycocyanin non-toxic Chemical treatment, bio-plastics, hydrocomposites, organic resins

Figure 3. Building integrated agriculture: Future Research Urban Sustainability and Resource Efficiency



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

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

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

3

Highlight the most important sustainability aspects of your design

4

Share three lessons learnt from participating in the Challenge

5

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

BELLUNO - FORMER ORZES PRIMARY SCHOOL

FAMA_Architecture

Future_A

MiCRO

PineCube



Herbal Tea Farm

Immersed in the green, in the background the Dolomites, around us few houses. We are in Orzes. We enter the Herbal Tea Farm and immediately we are struck by an aphrodisiac fragrance of herbs, flowers. A staff member welcomes us and offers us a guided tour of the structure. We immediately notice a thick network of pipes that cross the building from the bottom to the top, from right to left, we are intrigued. Here we are in the first point of our tour. Here we remain fascinated by this chain of plants, they look like large shelves where they grow and grow six different types of plants, they explain. They are plants that can grow thanks to water and air, without using land. In this space some employees of the structure are busy picking up grown plants, putting them inside capsules by inserting them in these tubes and are automatically transported to the upper floor. The space is all open space or divided by glass walls, you can see the whole production process in a single glance. The second step of the tour is on the upper floor: the drying of the product. Here there are other employees who take the capsules and place them in the oven. Once ready, the capsules pass into a new network of tubes and arrive in another room. The capsules open in glass containers filled with boiling water: the herbal tea is ready to taste. Here there are sofas and tables. From the windows you can see the mountains. We sit down and enjoy this new product with pleasure. After the tour we have the opportunity to check the different types of herbal teas, in different formats. It's a fun and

welcoming place, perfect for a healthy relaxation with family or friends.

The innovative idea that Herbal Tea Farm proposes, it is a new way of producing herbal teas, from the plant to grow plants (hydroponic and areoponic) to the way of preparing the product. "Tea Pump" is a tube path made of stainless steel. When the plant is ready to be taken from its container where it is planted, it is removed from it and inserted into a capsule. It is made of steel and glass and its size is adjustable, allowing the inclusion of different types of plants. Once inserted, the capsule is hooked to the "Tea Pump" system. The "Tea Pump" is a path of pipes that start from the rooms where hydroponic and aeroponic culture is positioned, passing from the rooms used for drying (essential phase for the production of herbal teas) and finally to the tasting space open to the public. The "Tea Pump" is like a binary for the capsules. Through this system, the whole process is semiautomated. The work of the specialized employees is mainly that of control of the growth of the plants, the first transport in the capsules and hooking in the tracks, cleaning and transport in the drying ovens. Here, the plant is taken out of the capsules, cleaned, inserted in the oven. Once dried it is stored in the capsule, hooked to the track. The capsule, thus, arrives in the tasting room. The capsule automatically opens and the contents are poured into a glass container filled with boiling water. The water is transformed into herbal tea. The glass container is divided into six segments

inside, as the number of types of plants. The goal is to generate products different from those proposed by the market, with a taste, a fragrance qualitatively higher.

The goal is to categorize the Farm as nZEB (nearly Zero Energy Building) using alternative sources: the sun, the wind, biomass (renewable sources) and high performance systems capable of supplying bioenergy to the building for ventilation, heating and cooling of environments and crops, hot water production, water reuse and lighting. Combining the performance of our technologies (passive and active systems) we aim to completely fulfil the energy needs of our building.

PHOTOBIOREACTOR PANEL (PBRs) are used for precise phototrophic cultivation of algae and cyanobacteria. The panels have been placed on the south-facing facade, occupying an area of 60 m², the single panel measures 280x80x8 cm.

BIOGAS CHP PLANT allows the simultaneous production of electricity with 35% efficiency and heat with 50%. The electricity can be used to power the surrounding equipment. Herbal waste is transformed into biogas through a process called anaerobic digestion and then it is used to produce heat and electricity in the CHP unit.

VERTICAL SUBSTRATE FITODEPURATION PLANT consists of a waterproofed basin filled with the filter substrate in which the waste

water is directed to be treated, and in which the semi-macrophyte aquatic plants grow. The combined action of substrate filtration, chemical degradation by the bacterial flora and root absorption is capable of removing the main pollutants present in water.

VENTILATED ROOF AND EXTERIOR INSULATION: we decided to make changes to the casing of the building in order to optimize the well-being for any user and to improve both the appearance and the maintenance of the structure. [Uw] 0,28 W/m²k

Our team consists of four architects, it was interesting to try their hand at disciplines that we had never met. We have discovered the world of hydroponics and aeroponics that we did not know before. We had the chance to explain our ideas differently. Through the videos, the abstracts, the business model. It has been a new experience for all four and we are happy to have been part of it.

Until before we had not thought so thoroughly about our project, coming to decide the part of marketing behind it. We put ourselves to the test and we are satisfied with the result. Although all four architects, we have 4 different variations. Francesco is more tied to the compositional part of the project, while Martina to the sustainable and innovative part, Adriana Isabella to the post production and finally Alessandra to the concept.



Alessandra Bernabei, Francesco Calabretti, Martina Cappellini, Adriana Isabella
Ceravolo



Future - A

DolomiNet Center

Imagine. You are driving through a wonderful green landscape and suddenly it appears in front of your eyes: DolomiNet Center, a futuristic structure covered in photovoltaic glass and wood.

Giving a better look, you realize it reminds you something familiar that you already saw many times passing through Dolomites landscape. Now you remember. It reminds you a *tabià*, a traditional agricultural building of Veneto Mountains.

You decide to get closer to this structure and a green wall catches your curiosity. It is not just a *tabià* is also a greenhouse. Through the glass, you can see a vertical garden full of officinal flowers and herbs. You are ready to enter the structure, but on your right side you see a wonderful garden. It leads you through an educational and sensorial path full of colors and fragrances, where you discover Dolomites traditional herbs. Finally you enter the building, having since the first time the sensation of a very relaxed atmosphere and modern environment, where employees, trainees, researches and visitors collaborate and interact each other to share and learn knowledge about officinal plants and mushrooms production and processing. Through glass partitions and windows you can see offices, laboratories, a classroom and unique productive areas for plants and mushrooms cultivation.

After an intern visit, you lastly enter the greenhouse. Humidity, fragrances, colors and heat invest you. You walk through the two-leveled structure and watching through overtures

for observation you see in the distance the wonderful skyline of Alps.

Belluno district is currently facing a strong depopulation process especially determined by a decrease of job opportunities, which left behind an elderly population and high amount of abandoned buildings. Starting from this problems analysis, we decided to do not limit our project to Orzes School reconversion, but look over competition request and create a new economic identity that will benefit entire territory.

“DolomiNet” is the solution that we propose for Belluno district. It is a network of indoor farms specialized on medicinal mushrooms and herbs production and processing, obtained by the reconversion of abandoned buildings. In order to achieve this long-term project, Orzes School will become “DolomiNet” administrative reference, as well as a productive training and research center where to educate future network members and investigate on new pharmaceutical products and lighting technologies.

The Green Exoskeleton

The “Green Exoskeleton” is a bioclimatic greenhouse applied on Orzes School outside as a double skin façade and therefore reproducible on other productive existing buildings. It owe its name to the dual function of productive outdoor extension and structure thermal insulator for energy savings and emissions reduction.

The Forest Biosystem

We designed an innovative production system inspired by forest natural connections and therefore named “The Forest Biosystem”. It is a closed system based on mutualistic cultivation of medicinal plants and mushrooms, which will respectively benefit from CO₂-enriched and CO₂-reduced air environments. We will also reuse local waste woodchips as a zero-kilometer growing substrate for mushrooms and seedlings support.

Coofarming

The application “CooFarming” has been conceived as a tool to facilitate network communication between farmers and administrative center. Use of sensors for growing parameters within cultivation areas, will assist network agronomist for immediate advices to farmers, while a technological integration will also allow fertirrigation remote control.

In order to achieve environmental sustainability of Orzes structure and decrease production carbon footprint, we design a closed productive system based on use of local wastes and renewable energies, which will also include innovative technologies for energy saving and growing inputs optimization.

We will use waste woodchips from local wood processing as a zero-kilometer growing substrate for mushrooms and seedlings cultivation. Once exhausted, woodchips and other farm organic wastes will be composted and reintroduced within the production or used to produce heat and energy by a gasification system. After network formation, large-scale mushrooms remains and organic farming wastes will be recycled for the production of a biodegradable plastic based on chitin presence. Waste CO₂ from both gasification system and mushrooms respiration will be also recycled, channeling the gas within plants cultivation area in order to increase productive capacity.

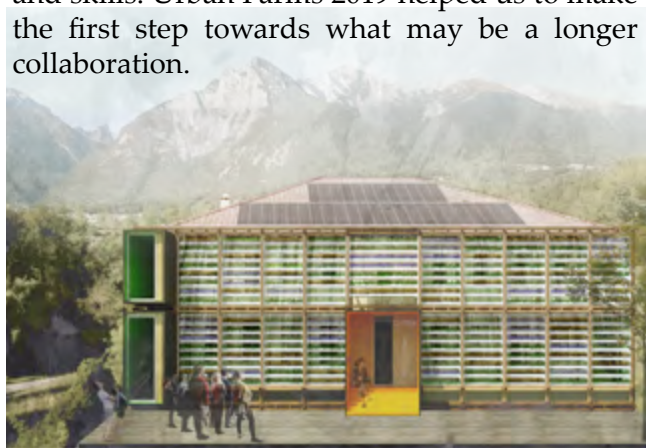
Participating in the challenge, we learnt three main lessons that especially concerned teamwork, creativity improvement and problem-solution analysis.

When we started to work on the project, we did not know what working in a multidisciplinary team meant. Despite the different backgrounds, we became able to share our skills and opinions, therefore learning not only new things from other studies fields, but also something more about our personal communication capacity.

Creativity is another aspect that we improved participating to the challenge. We had to connect our previous knowledge, deepen topics, think in a different prospective and imagine new scenarios, with the final purpose to create a unique and innovative project.

Problems and solutions analysis was also a fundamental aspect that we had to face working on the project. It helped us to improve our critic and problem-solving capacity, concerning not only issues derived from project development, but also team communication and organization.”

“We are a group of friend from the same town that university career spread all over Italy. We have different backgrounds in agriculture, architecture and business, but the same interest in sustainable development. Since a long time, our dream was to collaborate in the field of sustainable agritechture, sharing our knowledge and skills. Urban Farms 2019 helped us to make the first step towards what may be a longer collaboration.



Giorgia Minelli, Alessandro Cleri, Elisabetta Cleri, Elena Petricciuolo, Leonardo Minni, Elisa Appolloni - Universities: Perugia, Bologna, Ferrara, Milan, La Sapienza Roma



The green box

A guided tour

Inside MiCRO urban farm people could live a sensorial, didactic and recreational experience. We need to describe what a potential user could enjoy as soon as he would arrive in the farm. We imagine that people will come in the structure by car. So, they will drive through Dolomites landscape and breath clean air, smell its perfumes and hear its sounds. Initially, users will see the innovative façade that is wonderful for its look, variable through the seasons. There are a vertical garden and a modular wood panels on the façade, along with seaweed panels, that will be differently populated depending on the current season.

So, in summer the façade will be green like the vertical garden and the wonderful surrounding landscape. Instead, during the winter there will be the green of the vertical garden and the transparency of the seaweeds panels. So, during this season the wood panels color, that is traditional of the alpine landscape, will prevail over the others. After the entrance in the building, visitors will be received from the receptionist, that will show them all the tour possibilities satisfy users' needs. The guided visit will start from the hall and then people will go in the video room where they can watch videos about the farm works. Then they might go to the café and enjoy a tea or a coffee with the background sounds and the colored outdoor façade pattern. On the outside people will walk through the hortus conclusus, where there will mix medical herbs colors and smells. So, people will arrive

in the nursery, where they can see all the little plants available for adoption. Guided tour will end in the MiCRO store and here will be shown all the natural products created with our plants.

Key innovations

Our building offers many innovative services to users, in fact it is a smart urban farm. The main innovative element we realized is a mobile app that will allow users to buy MiCRO products, watch the interactive map, read our recipes and adopt a plant.

Through the interactive map people can see from phone display the following data:

Chilometers covered, calories consumed, time spent.

Activities description about what it's possible to do inside the MiCRO urban farm.

First aid kits and fire extinguishers map.

Guided tour description and a map of each visited room.

Moreover, inside the building there will be technological elements that will send useful data (like CO₂ in the air or temperature) to mobile app through wifi. There will also be a MiCRO store where people can buy products like creams or face masks, and each packaging will be created with recyclable materials.

Anyway, the most technological innovation of our urban farm will be on the outdoor façade. In fact, in addition to the vertical garden there will also be wood and seaweeds panels with cultivated seaweeds inside that will be used for MiCRO

products. Thanks to seaweeds seasonality, the façade will be coloured in different ways during summer and winter.

The café is another building peculiarity: it's totally glazed, so the natural light could penetrate in the rooms and shade them through shielding cover systems. The glazed system will let users look inside the café from inside the buffer space.

Sustainability

Our urban farm will be a green zero energy building, powered from different active systems: a geothermal heat pump (30%), a photovoltaic panels system (30%) and an aeolic turbines system (20%). Moreover, many passive systems contribute to bioclimatic wellness, like the insulated windows, the buffer space and the thermal insulation coat on north, east and west façade.

So, MiCRO urban farm will be autonomous in order to maximize the building sustainability and reduce the consumptions. Moreover, the external façade, made of a vertical garden, will allow CO2 reduction and provide clean air not only inside the building but also in the bordering areas.

Then, the technological elements located inside the farm will allow to precisely monitor air quality parameters like CO2 index, temperature and oxygen, both inside and outside the farm.

Another way to control the cultivations is through hydroponic systems, that allow a bigger plants growth with respect to the land. This way, monitoring of nourishing quantity and environment condition is better, so this guarantees high productivity.

Lessons learned

The first thing we learned participating to the challenge is the importance of team working. We could share ideas and accept criticisms in order to improve our knowledge. From criticisms, in particular, we learned many things and we were always ready and enthusiastic to modify and optimise our work without bringing us down.

So, we deeply considered each advice people gave us.

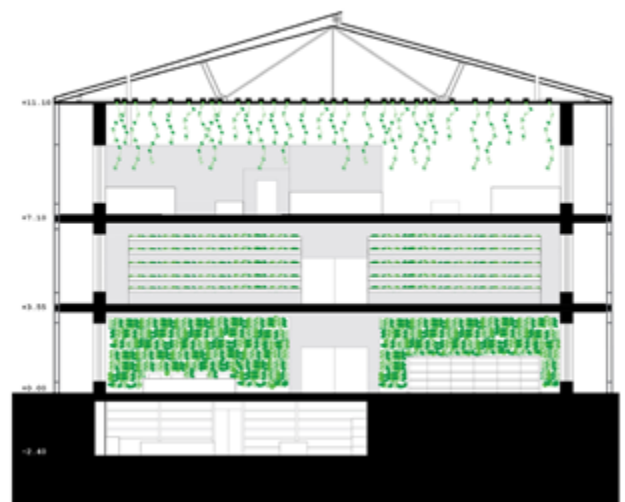
Moreover, we deepened our technical knowledge both about the urban farm planning and the business plan design, and this things will be useful for our working future.

Finally we learned what it means to participate to an international competition about a very fascinating theme. We really appreciated the challenge topic and so we worked hard in order to follow every deadline and show our work at best. We managed to improve our english vocabulary and we practiced in order to show our project in public in the most impressive way.

Other

Our team is made up of Landscape Architecture Master's Degree at La Sapienza students. We have different backgrounds and approaches to the project (project management, architecture, urban planning, environmental planning).

Through this challenge we could mix all our knowledges in order to project a good work. Moreover, we improved our english and our experience in architecture setting, that isn't actually our area of expertise. Despite of this, we worked hard and we tried to do our the best. So, we hope that we made it.





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Once this project is finished, it will be possible to observe an intensive green roof, made up of innovative elements such as anti-root system and polyethylene drainage elements and bags of expanded perlite where to grow medicinal plants of different kinds.

This structure will be thermally and acoustically insulated from electromagnetic fields and will also be connected with ecological corridors fostering floral and fauna biodiversity.

Along one of the perimeter sides of the green roof, Top Bar hives will be installed, to produce honey derived essentially from the nectar of medicinal plants placed on the roof and those found in the surrounding meadows.

Bee hives will host *Apis Ligustica*. Who will visit this new reality will have the opportunity to follow all the processes that will concern the production of honey and those related to the hypogeum and the green roof: from planting to harvesting.

This green roof is nothing more than the coverage of the hypogeum located in the centre of the garden. The main feature of this project is to be able to follow the process from the beginning up to the final product and then from the harvesting of honey and plants.

From the entrance of the structure you can immediately see through a glazed wall the hydroponic cultivation inside the hypogeum that thanks to the particular lighting techniques offers an evocative scenery. Same in the shop, where the consumer will be able to see the honey production processes through a glass wall.

Our vision, is to revamp Orzes School: our mission, is to create a hybrid and innovative environment.

We are young but we think big. We created a team from zero, and decided to set up a hybrid business idea based on hi-tech agriculture for indoor cultivation of exotic plants (Hydroponic closed loop system, with NFT Technology) and traditional cultivation techniques for outdoor cultivation of alpine herbs: something new in Belluno Province.

We call it IMAGINATION. We believe in the creation of new businesses, but only if green-based. We aim to re-design Orzes School which is nearby the Dolomites Mountains, UNESCO Heritage site, and we consider that environment as holy. We call it SUSTAINABILITY. New businesses must be social well-being providers. We do not want just to create a production plant, but an inclusive and creative environment for the communities in Belluno Province.

First of all, for us it is vital to provide more employment to the population: we aim to create more jobs hiring specialized personnel, but also disadvantaged users and interns from the educational field.

Giving hopes, is what we call HUMANITY. We aim to realize something completely new that did not even exist yet in Belluno Province.

We want to go counter-tendency, and investing in a new business in Belluno Province when the area is facing a process of land abandonment and decrease on businesses creation. We call it BRAVERY.

Our ambition is to enhance the already existing culture of well-being and appreciation natural and high- quality products that are accessible in Belluno Province, consolidating that trend even more. We call it BACK TO BASICS.

As for the attention paid to the environment, we decided to re-design the structure to operate as independently as possible, using renewable energy sources, a water recycling system, a beekeeping activity which will helps us to avoid damages to the environment.

It is commonly accepted that beekeeping helps the environment and produces a positive impact. We planned also to install an omnivorous biomass energy plant.

The choice of a biomass energy plant comes from the need to dispose part of our production waste from the plants: in this way, we can reduce the costs for the supply of fuel, and further wood fuel will be purchased exclusively from the local wood industry.

The combustion process generates Carbon Dioxide (CO₂), and, on the other hands, plants needs CO₂ to grow in optimal conditions. This is why we designed a system of air-ducts for carbonic manuring of our plants.

The idea is to filter the emissions and re-using them in our hydroponic system, reducing the emissions in the air and avoiding pollution. We have also decide to install some photovoltaic panels to provide further green energy.

DIFFERENT UNIVERSITIES, DIFFERENT BACKGROUND

The main lesson learnt from URBANFARM 2019 regards a new set of “how-to” about team working. We formed a group of people through a huge activity of networking: Facebook Groups, personal contacts and “word-of-mouth”, and we had to start dealing with each other through WhatsApp and skype calls every single day. We had to learn how to understand each point of view and ideas, understanding the importance of the different fields of study involved in the group.

SIX SMALL IDEAS ARE BETTER THAN A HUGE ONE

Another key aspect of these past hard-working weeks, was the process of ideas generation. From a rough work, we continuously provided our personal contribution and knowledge, giving birth to a creative cycle that allowed us to implement an unique project which blends multiple ideas from economic, agricultural and architectural derivation.

GAINING NEW SOFT SKILLS

Team Working involves a lot of variables that affect the decision-making process and the project itself. This experience taught us how to manage time and tasks, but especially how to solve clashes due to stress management: it is part of the process itself, and understanding how to let it release, is vital to let the work go on.



Elisabetta Tonet, Isabella Dagostin, Niccolò Tagliaferri, Nicola Colucci, Nicola Dall'Agnol, Pamela De Biasi - Universities: Ca Foscari, Milan, Trento, Bologna, Pisa, Padova

"In growing cities, conflicts about ways to use the remaining land are pre-programmed, as major problems may arise from a market orientation in urban politics and diverging interests in using vacant sites."

Urban vacant lands and urban agriculture (UA)

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



European regions and cities are affected by contrasting developments: with growing metropolitan areas on the one hand and shrinking cities at the peripheries with a declining demand on the other.

Urban vacant lands and urban agriculture (UA) in growing cities, conflicts about ways to use the remaining land are pre-programmed, as major problems may arise from a market orientation in urban politics and diverging interests in using vacant sites. In contrast, in shrinking cities, and this has been demonstrated after the latest economic crisis in 2008 in many cities around the Mediterranean Sea, urban agriculture has more opportunities to develop as urban planners recognize urban agriculture projects as tools for urban regeneration, place-making and identity, as austerity results in areas earmarked for development that are left fallow, and open (public) spaces that are left unattended.

Many urban agriculture projects such as community gardens have started as so called

interim-uses on under-used public or private plots with leasing contracts over a rather short period of time. The uncertainty concerning a long-term sustainment of the gardens has been identified as a major impeding factor for establishing UA projects within cities (Rosol 2005; Fox-Kämper et al. 2018). And even if vacant land is available in decayed neighbourhood or under decline, market orientation in urban politics tends to use urban agriculture strategically for either a 'planned gentrification' of a neighborhood or for reducing maintenance costs for public spaces.

UA for future cities: strategies and policies needed

Policies influencing UA are needed at different levels such as global, European, national, regional or local level, and should cover different sectors such as urban planning, environmental 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 where cities have started to put urban food production on the policy agendas can be observed to overcome obstacles. 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 Pact.

They can change the institutional settings for advancing the urban food production through e.g. found councils or the creation of "one-stop-agencies" to overcome unclear responsibilities and bureaucratic hurdles and in general consider food in planning decisions.

From allotment gardens to rooftop greenhouses: how urban agriculture is evolving

Urban agriculture has a long tradition in Europe. The establishment of first allotment gardens date back to the beginning of the industrialisation in 18th century, most of them developed to feed the rural population pouring into the cities. Today, round 3 Millions. allotment plots are reported to exist all over Europe, many of them being used for leisure activities besides food growing. In many European countries, allotment gardens are widely acknowledged in legislation and encoded in construction plans and protected by building laws.

Based on models first emerging after the 1970's oil and finance crisis in New York, in early 1980s also in Europe community gardens popped up, often on vacant plots waiting for construction, nourished by the right-to-the-city movement, aiming often more at community building than on growing food.

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. Due to their organisation informal structures and their character as interim use of urban land dedicated for other types of land-use, community gardens and their diverse sub-forms in contrast to allotments are not regulated by law.

This also applies to the latest development of urban agriculture in form of **technology-driven and partly highly intensive food production** in and on buildings, such as rooftop, indoor and glasshouse production, also called zero-acreage farming. 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.



URBAN FARM 2019

BOLOGNA - THE FANTONI FARM

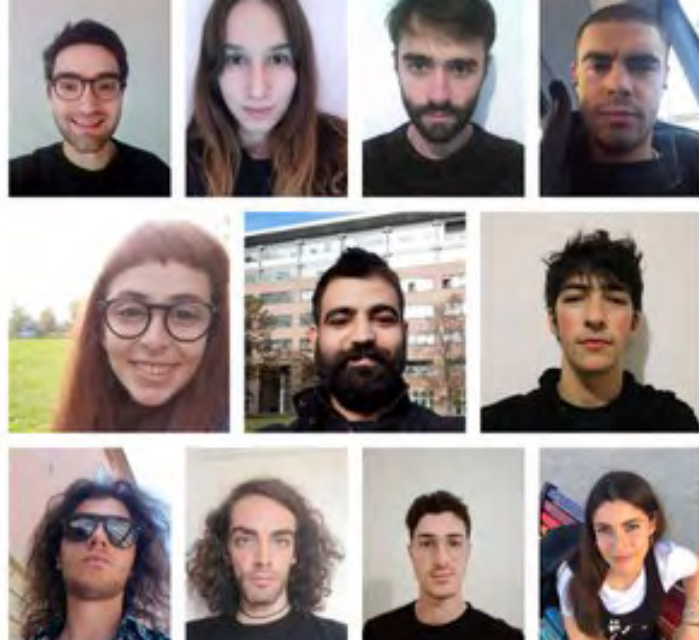


Archaea

Eco-Gazers

Landerz

ReGenius Loci



Archaea Multifunctional Polo

Entering the Archaea multifunctional center is a new and unique experience for the visitor. Going through the ground that leads from one building to another and interacting with the different spaces that make it up means being part of a structured whole, of an organization that responds to various needs and is able to accommodate any type of person. The six hectares of Fattoria Fantoni will be transformed into a green area full of trees, aromatic plants and synergistic crops. In them the inhabitants of the Pilastro neighborhood (in the city of Bologna) will find an oasis of well-being and tranquility where they can spend moments of relationship with nature. To make this possible, our group has decided to design a place able to enclose infrastructures with different functions. The two entrances will enable to make the visitor interact with two different areas of the complex: one next to the agri-kindergarden and the other to the laboratories and the auditorium, allowing a logical diversification of the spaces necessary to ensure privacy and a better exploitability of the whole. The synergistic crops, the ancient grains, the large orchard and the greenhouse are the production points and, therefore, those that respond to the need to re-establish an active relationship between the families and the products of the earth. The sustainability and feasibility of the project lie in its simplicity, in the will to combine nature and life of man. Archaea will be able to entertain and educate both children and adults, will offer a wide range of activities, will produce food at zero km and will

host events in its auditorium, all respecting and protecting the environment with its innovative technologies.

Agri-kindergarden

The agri-kindergarden is located next to the synergistic garden and the greenhouse, the building is built in an eco-sustainable way, designed to limit waste, exploit solar energy and integrate with the surrounding environment. Like all buildings in Archaea, the structure has a green roof, photovoltaic panels and kinetic energy recovery tiles.

The area of the agri-kindergarden represents an alternative way to educate through nature, an opportunity for families of Pilastro neighborhood to be able to choose, in addition to conventional facilities, a school that proposes a different educational plan. Starting from the children means connecting directly to them that mission of renewal, of alternatively and eco-sustainability that the project aims to convey.

The crops

The productive part of Archaea protects the biodiversity and the autochthony of the crops. The plant species cultivated in the synergic gardens, in the orchard and in the greenhouse have been selected to guarantee an excellent annual and seasonal yield. The half hectare of land will be cultivated with ancient grains, which require a reduced quantity of herbicides and are able to guarantee excellent nutritional values of the production.

The Archaea greenhouse will be equipped with innovative systems such as aquaponics and hydroponics. Among the advantages of their use there is an increase in productivity (from two to ten times greater than traditional cultivation systems). The use of such systems represents the possibility of thinking of an Urban Farm and the desire to increase the levels of indoor production. Aquaponics and hydroponics will also be the subject of study for members of the agricultural university who can directly use the greenhouse environment for didactic internships, extracurricular hours and interactive lessons on site.

Photovoltaic and green roofs

The Archaea photovoltaic systems are permanently connected to the electricity grid, absorbing energy from it during the hours when the photovoltaic generator is not able to produce the energy necessary to satisfy the need of the user system. At first glance, solar panels and vegetation do not seem to be made for each other, but the solar industry has recently been targeting new green roofing infrastructures that integrate with photovoltaic modules. This combination could be a quick and easy way to increase the efficiency of photovoltaics, making it more convenient for homeowners. In fact, excess heat prevents photovoltaic cells from operating at maximum efficiency and while solar industry researchers are developing new technologies to get around this problem, green roofs have already proven that they can cool the surface temperature.

The various components that make up Archaea are entirely designed paying attention to both environmental and economic sustainability. The project is able to maintain itself, internally produce the amount of electricity required, dispose of its waste and obtain, from the sale of products, from the service of the agri-

kindergarden, from the tickets for workshops and shows in the auditorium, the necessary profits.

The technologies of Archaea project have been chosen to create an eco-sustainable reality that can perfectly integrate itself with the surrounding environment, actually all structures (except the auditorium) will have a green roof thanks to which they will disappear in the adjacent countryside. Archaea wants to make a deep connection with nature, wants to be an integral part of its processes and its strength, trying, thanks to the photovoltaic panels, to draw from it (without deteriorating it) all the energy necessary for the maintenance of the whole. The kinetic recovery flooring represents the desire to make the structure alive through the transit of its users. Archaea is animated by a concept of nature that includes the man, who walking through its paths is transformed into a source of energy. In the agricultural processes aquaponics and hydroponics are used in order to maximize the available space and intensify the various productions.

Participating in UrbanFarm2019 has tested the specific skills of the group, the project idea and the purpose is the cost of participation of all the members of Archaea, commitment and perseverance.

The competition and the look towards an eco-sustainable future that has been able to promote have made our idea of a multifunctional center conceivable and feasible. Thanks to UrbanFarm2019, we have understood the importance of work, coordination and division of tasks, and to think in practical terms about the creation of an eco-sustainable, productive place capable of changing the relationship between man and nature. The project we propose is the fulfillment of what the participation in the competition has taught us, it is the fruit to be collected.

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Towards a Sustainable, Productive and Energetic Farming: Fantoni Farm

Visitors will see an energy farm that is alive, sustainable and productive. By designing the farm, we have avoided any problems that could ruin the healthy and natural vision. By providing for the presence of an electric shuttle, we reduced the carbon footprint and avoided noise. By reducing negative problems we will help visitors to clearly recognize nature and themselves.

Visitors will reach the production area overcoming the green axis formed by trees. In addition to the visual guidelines, the sound of the environment will illuminate visitors on the farm and attract them to nature. Visitors will have the opportunity to meet the animals when they reach the main axis and experience organic production and natural life. Sowing, irrigation and harvesting processes in outdoor production areas can be observed and visitors can be directly involved. There are also workshops on organic production held with farm and greenhouse products. Organic food is available at the restaurant and supermarket - to continue with the organic experience.

Finally, visitors can experience the biogas production that is our most important innovation and learn about the process. After finishing the visit to the farm, the restaurant, in the middle of fields, trees and surrounded by the sounds of nature, offers the opportunity to taste wines, olive oil and dried grapes.

Livestock management – Designing the shelters, we calculated the proper areas for both chickens and cows keeping according to standards. We searched for the comfort zone of cows and chickens for producing milk and eggs.

Biogas production – We use manures of chickens and cows to produce energy. According to our calculations, the biogas system produces the sufficient energy for electric shuttle that is used for people transportation between city centre and farm.

Cycle management – We arranged the inputs and outputs of the active farm as they also can be used in other inputs and outputs cycles'. The output of a cycle can be the input of another cycle or can affect another cycle's output in a positive way.

Transportation – While deciding on a transportation system, we consider both decreasing the carbon footprint and develop a sustainable solution. We will use an electric shuttle which will be charged by energy produced by manures. The shuttle will decrease carbon footprint 12 g per passenger.

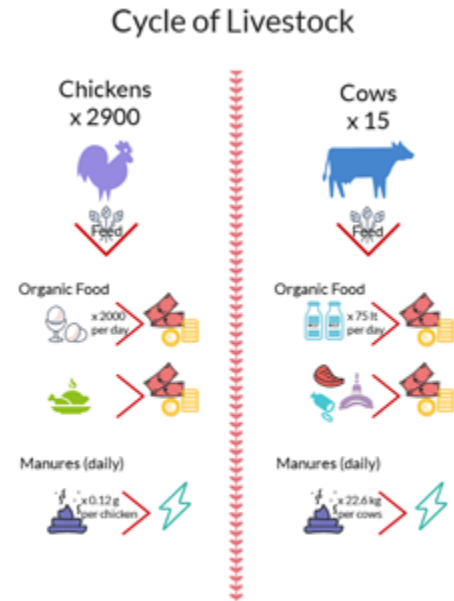
Waste management – We developed two solutions for waste management. First, we offered a ticket booth for the shuttles that gives ticket in return of trash. In addition, we grow a mushroom species which grow in the bags of organic waste. With both solutions, we managed to decrease amount of waste in normal trash bags.

Our most important sustainability aspects are biogas production and products management. Designing our farm, we gave importance to our input/output management and cycles. We created cycles by changing output of a cycle into an input. Biogas production is one of the most effective examples for it. For instance, the first cycle is related with chickens and cows. They both produce manure at the end of the cycle. After, the output of chickens and cows cycles' become the input of the energy cycle.

Group work – Considering the complexity of the project, we tried to divide the work according to the capabilities of each member of the group. However, as each topic was related to the others, each group member was responsible not only for their own topics, but also for working on other topics. In summary, this challenge required a high level of collective work that was difficult to manage.

Time management – We heard about the challenge in last two days of deadline, that's why for the first draft we have little time to search and work on the topics. For the second draft we had to complete our deficiencies and develop our concepts.

Reality and calculation (proofs of the concepts) – The development of sustainable ideas is also complex for this sector. Calculating and searching for real references of our ideas for the project were the most challenging points. We had to give up so much detail due to high costs, high surface consumption or failed prototypes.





Human and Urban Biotopes

It's a lovely sunny day in Bologna and you know the perfect place for a bike ride and relax in the fresh air. When you enter, the first thing you see is the Fantoni farm: the old dilapidated building has been transformed into a bright and full of life place, people eat and relax at the tables and from the windows of the greenhouse upstairs you glimpse guys sitting at the tables with laptops and others talking in groups. Take the road to your left and you will soon begin to see trees full of fruits and people gathering; the laughter of the children and the chatter of the people accompany you through gardens. See the enthusiasm of those who enter the biotopes greenhouses: inside they can travel around the world and discover its beauties. Colorful fish in aquariums, exotic flowers and lush plants: thanks to an app you can know everything about them. Nobody wants to leave. Next stop is a bistro: in front of you people are wandering around some greenhouses. Here are produced plants with modern and eco-sustainable systems: you've always wanted to know more and this is the right place. You're excited to find out that you can buy those fresh and delicious products in the market plaza. You go right there: in a colorful area you see people wandering among the market stalls and guys playing ball: they tell you that they are university students and live right here in a modern and avant-garde dormitory. It's the end of the day and, returning home through urban gardens, you see people relax in the common areas and others working in

their gardens. As you make the decision to apply for one to manage, you will return home excited knowing you'll be back soon.

In our project we have decided to pursue different aims, environmental, social and economic, which are however fundamental within a future development of our cities:

Biotopes: we want to raise awareness and inform on climate change and its effects on biotopes around the world. We recreate an exposition of the five main biotopes in the world: European, African, American, Oceania and Asian. To make the self-sufficiency of the biotopes and to reduce waste of water we will use the aquaponics technique, that is a symbiosis between aquaculture and hydroponic system;

Urban gardens: we want to give the opportunity to people living near Bologna to have a piece of land where they can grow fresh vegetables and fruits at zero km. In addition, the families that produce more than they consume, they can sell their products to the internal market;

Didactical gardens: these are a series of areas where many plants are cultivated with many different techniques, both in open field and in greenhouses and accessible to visitors with guided tours, workshops or events where will discuss numerous explanations and interesting insights on the world of agriculture and environmental awareness.

Student housing: we want to allow students of the University of Bologna to live, study, research

and relax in a modern space full of opportunities. The presence of biotopes, areas for events and workshops, the possibility of creating a start-up incubator, a time bank, urban gardens as well as giving job opportunities are also an opportunity to create a place for social development and cohesion;

From an economic point of view, the aim is to create a model managed by associations, cooperatives, partnerships and sponsors that through the production with innovative systems, the on-site sales and other activities in the area can maintain a certain self-sufficiency in management.

Some sustainable parts of our design include:

Aquaponics: in an aquaponic unit, the water from the fish tank cycles through filters, plant grow beds and then back to the fish. In the filters, the fish wastes are removed from the water, first using a mechanical filter that removes the solid waste and then through a biofilter that processes the dissolved wastes. The biofilter provides a location for bacteria to convert ammonia, which is toxic for fish, into nitrate, a more accessible nutrient for plants. As the water (containing nitrate and other nutrients) travels through plant grow beds, plants uptake these nutrients, and finally the water returns to the fish tank purified. This process allows the fish, plants, and bacteria

to thrive symbiotically and to work together to create a healthy growing environment for each other, provided that the system is properly balanced.

Cultivation of spirulina: spirulina is a single-celled algae and it provides a high nutritional contribution and is easy to grow;

Bioclimatic greenhouses: built on the roof of the Fantoni farm and the dormitories. These greenhouses improve the heating efficiency of the entire building and consequently lower its heating costs. In addition we designed photovoltaic panels for facades.

The first lesson we learned was the importance of collaborating, working and facing complications with people coming from different studies, backgrounds and skills.

The second is the need to always test yourself to grow as a person and as a team. Participating in an international competition has allowed us to push our creative limits on new levels of personal and professional maturity.

The last, but not least, lesson is that we can always do something to improve our lives and our world: whether through the search for awareness of the big issues or through small daily actions. We truly believe that today's decisions will be the world of tomorrow.



Elena Santelli, Antonio Viscardi, Irene di Marco, Zirong Pan, Enrico Rossi, Gabriele Baraldi, Marina Baldini, Leo Guerra, Mirco Poggini
Universities: La Sapienza Roma & University of Bologna



ReGenius Loci

Aquaponic Social Garden

Concept description

After passing the entrance gate, visitors will be immediately struck by the view, on their left, of the large glass greenhouse, as they walk along the main driveway. This, starting from the ground floor, will be developed, going up to the first floor, above the current barn. It will contain the main aquaponic system of the Fantoni farm, developed on 2 levels. In the lower part, on the ground floor, maintaining the existing columns, there will be the "blue core" of the aquaponic system that will house the aquatic organisms, while in the upper part, on the first floor, there will be the "green core", and therefore the plant component, on an area of 257 square meters. Thanks to the glass, everything will be completely visible from the outside.

We will no longer speak of a breeding tank, but of a real body of water rich in flora and fauna. We will no longer talk about growth beds, but about spherical gardening, a green that develops all around us. Moreover, the possibility to cultivate also many flowering plants, allows us to think about the olfactory component and the fundamental role it plays in the relationship between man and space. In addition, the multi-ethnic restaurant and the welcoming B&B will allow all our guests to enjoy a multisensory experience. From the fragrance of the freshly harvested product from the vertical towers to the wonder of the underwater world of our multi-trophic tanks, from the menu served between the brick columns of the barn to the workshops for



children and adults. From breakfast with freshly baked bread to the colourful microgreens. Welcome to our Aquaponic Social Garden where production and sociality coexist as in a virtuous ecosystem.

Innovation

Our idea is to give back to Fantoni Farm its agricultural character, but in a modern and sustainable perspective, where food served in the restaurant of the Farm comes from the aquaponic cultivation integrated with the building. So the project aims to build a space that: creates an example of circular economy, sustainability and food safety, creates a rich and virtuous social fabric through multi-cultural and cultural exchange and contact, becomes a reference point for urban farming and grows social inclusion through food and hospitality. The aquaponic system will be constituted of three independent breeding tanks, thus dividing the plant area inside the greenhouse.

This configuration will have several advantages: Optimisation of the water parameters in each tank, according to the needs of the plant and animal species present in it

Easier management of faults and maintenance without the need to interrupt the entire production process. Greater control and possible isolation of pathogens within each plant

Possibility of adapting each system to the needs of specific operators (children, elderly, people with disabilities, etc.)

Moreover, our idea includes the development of a system that creates closed entities within the protected environment of a building capturing water from direct rain, as a real way of water-saving and recycling systems, but presenting a controlled system, which combines a high level of biosecurity with a low risk of disease and external contamination (thanks to a real time and in situ monitoring of the closed cycle), enhancing the great potentiality of urban farming in terms of food safety.

Finally, the air treatment system of the "Fantoni farm" is integrated into the greenhouse system. In this way the plants exploit the CO₂ produced by the users and the heat used to warm the rooms.

Sustainability

The "Aquaponic Social Garden" represents the keystone for urban cultivation, for a new design of green in the city and for contribute to the 17 Sustainable Development Goals. Integrated with a photovoltaic system and a rainwater harvesting system, production will have a minimal impact on the environment. The organic waste from the kitchen will be used to produce compost by earthworms and *Hermetia illucens* and biogas. In this way, it will be possible to recover the waste from one process for starting new processes.

With the application of the multitrophic principle, thanks to the combination of different aquatic organisms, it is possible to create a natural and perfectly balanced ecosystem. Thanks to the production of "live food" (insects, *Daphnia*, *Hialella Aztec*) and microalgae to vary and enrich the diet, we will ensure higher quality organic waste and we can then decide how to feed our fish depending on the production of vegetables. Through disposable, miniaturized, easy to use and cost-effective sensors and a microfluidic paper based analytical device (μ PAD) with colorimetric out-put, we will monitor both the

correct development of fish and plants in the aquaponic system and the food safety, ensuring high quality and safe food production.

Lessons learnt

Aquaponics is not only a new way of urban farming, it is a real lifestyle. When you start to think about it you cannot change your mind in believing it is the best opportunity to change our future!

Working in groups was not easy because of the geographical distance and the different backgrounds. Despite this, the Challenge has proved to be stimulating. Aquaponics has multidisciplinary skills, so it was thanks to it that we were able to communicate and have fun, laying the foundations to continue working together.

Aquaponics acts already after the first application, being able to involve immediately the most unsuspected minds in a festive contagion without side effects.

Team Remarks

Our multidisciplinary team of students from three different universities is joined by a love of aquaponics and a desire to find concrete solutions to the 17 objectives of the United Nations Agenda 2030. Thanks to this project we have had the possibility to share our ideas and become richer. We have mixed our different knowledge in chemistry, architecture, engineering, aquaculture, video making, design, botanic to reach a shared goal: the integration of agriculture in cities, making cities and human settlements inclusive, safe, durable and sustainable.

The principles on which we base ourselves are those of Urban Regeneration and Social Innovation, and in this regard, we believe that urban farming can serve as a regenerative engine of the social fabric.

Francesco Lombardo, Luca Settanni, Alessandro Biagetti, Eleonora Marcoccio, Lorenzo Scopetti, Marco Falasca, Gian Marco Tamborra, Francesco Serra
Universities: Roma Tor Vergata, Ferrara, Bologna

"The business model experience focuses on providing authentic and 'memorable' experiences by selling rather a story (experience) than only a product."

BUSINESS DIMENSION OF URBAN AGRICULTURE

by Bernd Poelling, South Westphalia University of Applied Sciences (SWUAS) - Jury member



Inspiring innovative examples of urban agriculture

All over the world Urban Agriculture and City Region Food Systems are gaining increasing recognition – both in general public debates, but also in science. I have two inspiring innovative examples of peri-urban farmers in mind; a hazelnut farmer in Nuremberg and a very small farm in Cologne. The 4 ha hazelnut farmer in Nuremberg processes the majority of nuts into different types of nougat creams without palm oil – including a vegan one. He sells the nougat creams and other hazelnut products locally on-farm (farm shop, vending machine), in the nearby city centre of Nuremberg, Bavaria, to local and regional gastronomies, and also online. The other example from Cologne rents small plots of parcels to interested city-dwellers for one growing season. The farmer prepares the fields with a huge variety of vegetables, herbs, and other plants, while the renters are responsible for cultivation and harvesting. They

pay a seasonal rent to the farmers and in return keep all the harvest.

Innovative business models in urban agriculture

City-adjustment strategies of urban and peri-urban farmers as well as food start-ups of Urban Agriculture (UA) newcomers in inner-city contexts can be classified into six overarching business models: differentiation, diversification, shared economy, experience, experimental, and low cost. Very interesting, inspiring, and business models to learn from are differentiation, shared economy, and experimental. UA belonging to the differentiated business model creates distinctions in production, processing and/or marketing with unique selling propositions. Farms integrate processing and distribution stages for vertical integration of the valued added chain. An example is to differentiate from the bulk market by offering premium prices for specific product features (super-fresh, ethnic, tasteful, etc.) based on personal, transparent and reliable producer-consumer relationships. As an expression of the new economy, initiatives based on 'shared economy' increasingly gain importance since a few years. Required resources to run UA in the form of a shared economy model, e. g. Community Supported Agriculture, are jointly mobilised and managed, including land, labour, credit, tools, machinery, network contacts, and knowledge. The business model experience

focuses on providing authentic and 'memorable' experiences by selling rather a story (experience) than only a product. Place-making and training or leisure activities (for example gastronomic experiences) are important elements that are combined with food production.

Bringing successful interaction between technological and social innovation

A: Urban Agriculture projects and businesses cover a wide range of sizes, involved actors, and goals. In Urban Agriculture there exists several examples of technological and social innovations. Technological innovations include for example aquaponics, microgreens, vertical production systems, rooftop farming, etc., while social innovations lead towards concepts of co-production in UA, like Community Supported Agriculture, Solidary Purchasing Groups, Food Coops, etc. Yet, these two types of innovations are per se not a contradiction. Although technological innovations are in many cases also creating high investment costs, there are UA examples in which technological and social innovation go hand in hand. An example is a citizen-driven aquaponics system in Dortmund.

This one has been initiated by an NGO, but by asking local people to take part in the design, planning, implementation, and running of the aquaponics system.



CONEGLIANO - EX ZANUSSI AREA



Green Senses

Phoenix

Symbiosis

The Wanderers

YS Design



Health Senses Path

Every person visiting Health Senses Path learns some new facts about a healthy lifestyle and experiences its elements with all the 5 human senses. Visitors start their experience by seeing a green wall at the main entrance. Once they learn about the place and its aims, they may pass through a ramp going outside to a park that they will visit later. Inside the building complex, there are supplements, natural cosmetics and perfumes factories which provide the guests with an insight into their work. They are also attracted by an overwhelming size of a vertical farm and its innovation, also, a tropical greenhouse. Not only do they learn more about a healthy food and lifestyle, generally – e.g. in a “health” library, but also may practice healthy cooking workshops and visit a restaurant making use of the produce from the site. When up on the green roof, people can relax with experiencing magnificent views on the adjacent park, Conegliano, and its whereabouts. Consequently, they walk through a multifunctional park filled with various experiences. A lot can be learned and... smelled in a botanical garden. The main square is a place for meetings and small events. The square is arranged on a circle with 5 ways leading to five ‘sense zones’. An amphitheatre is a beginning of the hearing zone, a playground invites to the touching area, herbs start the smell part, greenery – the taste part and a water blade - the sight zone. Inside the 5 zones in form of spirals, divided by green belts, there is also an outdoor gym, with which they can produce some electricity, a zone with many birds singing, a meditation area, a sports hall with saunas

or massages and a fitness room. Visitors are encouraged to experience all schedule points, but can also personalise it.

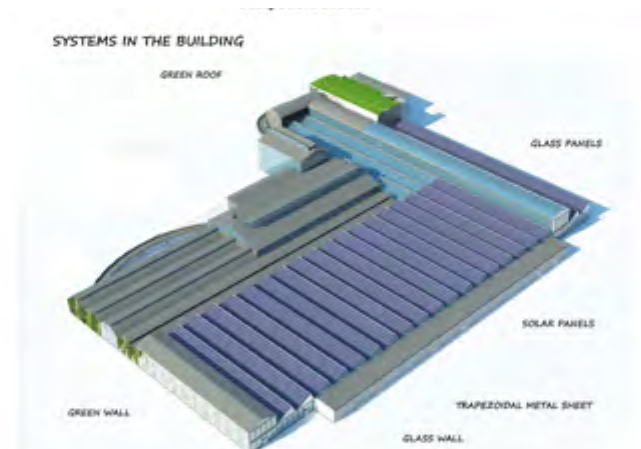
The concept consists of two main parts: urban farm with additional facilities and a multifunctional park. The key innovative element of the concept is a vertical farm working thanks to aquaponic system. The fish waste provides an organic food source for the plants, and the plants naturally filter the water for the fish. This creates an eco-system, where healthy food is grown without pesticides and toxins from soil. What is more, the producers do not depend on the weather conditions as in a conventional farm. Greenery and herbs are mainly grown, which are then used in a restaurant and cafes on the site. The produce is going to be sold also in organic shops and in outdoor market. Attention-grabbing may also become natural supplements, cosmetics and perfumes factories that could be observed and visited. An important and dominant element of the complex is a long and high tropical greenhouse covered by glass walls. There, in a „different world“, people can experience a feeling of hot and humid regions of the world and learn about some plants important for human health but absent in northern Italy. At least about a third of the roofs area is used for solar panels, but there is also a green roof as other instantiation of a fruitful use of the roof area. One of the most intriguing and original activity a visitor might experience is exercising on outdoor gym equipment furnished with energy generators. It can provide electric power

for a personal mobile device and constitute an additional power supply for the needs of the site, too.

Because of a pursuit of economic and environmental sustainability, renewable sources of energy play the first role in electrical power supply. Solar thermal panels are complemented with wind turbines system and biomass-fired power plant using the waste from the whole park. An additional source of electricity is outdoor gym with energy generators. Heat energy is saved, to some extent, thanks to the large greenhouse and clerestory windows in many parts of the building complex. Water is also saved by stormwater management and rainwater collection. Even the organic waste is used for compost production for the soil in the park. Besides, aquaponic system enables growing food on vertical farms in a complete eco-system with little intervention into the existing environment. When it comes to social sustainability, visitors on HSP are encouraged to take part in various activities increasing their health awareness and are provided with many spaces for social or familial interaction. It is also envisioned that school seasonal gardens in the city would supply the restaurant with fresh food and local farmers - with biomass. HSP will be

attractive for all age and social groups and will provide employment for numerous and varied workers.

Participating in the Challenge we learnt the importance of joined economic, social and environmental aspects of sustainability in a project. Focusing on these three aspects helped us to find attractive ideas that may be put into practice caring for the resources, people and the environment. It is possible to reach such a goal and, what is more, this is the optimal way of getting to a project, especially on such a scale as HSP in Conegliano. Moreover, we learnt urban farm strategies; reasons for it (zero kilometers, efficiency per area and many others) and challenges connected with it (such as water distribution, illumination, nutrition, pathogens control or air purification). It turns out for example that aquaponics can have many advantages for the ecology, producers and maintaining the food quality itself and even be a very attractive element interesting for both children and adults. Furthermore, we learnt the basics of a business model. This enables to have a more accurate idea of the resources needed and the importance of income and at least a partial self-reliance of a project.



Kenza Ammar, Kinga Rękosiewicz, Paweł Datkiewicz, Stefano Gasperini
Universities: Roma, Ecole Nationale d'Architecture (Rabat), TU Poznań



Phoenix

L'Azienda Zanussi

Upon arriving at L'azienda Zanussi, trees and shrubs that surround the flowering flower beds creating a mix of colors and happiness, are at first sight. In the walking corridors it's possible to feel the fresh air provided by the view, to admire the vegetation colors and to listen to birdsong. In the running and skating trails, the sound of people practicing physical activities, along with family and friends will be heard. The lawns allow visitors to perform activities such as gymnastics, yoga and meditation, as well as picnic with friends or family. Moreover, the spaces with concrete floors will be filled with games of contrasting colors, composing the landscape scenery and at the same time as well as working a meeting point for social and cultural activities. By getting in touch with the internal spaces, visitors will have the opportunity to see the biofactory production through panoramic windows and the cultivation by tissue culture in a lab focused on maintaining traditional grape varieties from the region. The design of the interior spaces has green walls, with the vegetation falling from the ceiling and covering the pillars, giving the impression of being in the middle of a forest. In the commercial corridors visitors will be able to get into direct contact with plants, besides smelling and touching them. In addition, there are restaurants where visitors will have the chance to try menus from all Italy, and to taste the regional dishes. The regional handcraft stores bring back the culture of Conegliano and by doing so adding value to the natives. Finally, the Enotecas composes the Prosecco's commercial progress of the area. By walking on the building

terraces, visitors will see the solar panels from one side to the other and the old castle framed by flowers in raised flowering beds.

The elements used for the development of the project followed the pillars of sustainability. In the biofactory, the high-quality vegetables will be cultivated in six different ways with LED technology powered by solar energy, along with the use of culture tissue to preserve the traditional grapes used in the production of the Prosecco Wine. The reuse of residues generated during the maintenance of vegetation, and fruit and vegetable remains, which after being submitted to the composting process becomes a substrate for the plants, create a closed cycle. There's also an app to incentive the reduction of CO2 emissions through bicycle rentals or the recycle of fruit and vegetable remains, where people accumulate points that can be later exchanged for food. In the innovation hub, to support local initiatives and startups, and in the food corridor there are restaurants, cafes, and bars, as a meeting point for the young people at night. For the local entrepreneurs the stores for traditional products such as wine, pasta, cheese and souvenirs, will be a must-see point for tourists. And, of course, a special store for vegetables from the biofactory, with grown local and fresh products for companies and citizens. For the cultural and entertainment scenario, a museum will preserve the Ex Zanussi's history, along with an art gallery to support the local artists and a book store with old and recycled refrigerator as a shelf to share books.

The most important sustainable aspect of the design was the social one. It was aimed to design a building where people are welcome and feel as a participant in the building ecosystem, so three activities were developed. The first was the app to promote the CO2 reduction by using a bike or taking public transportation or by recycling fruit and vegetable wastes to gain points to later change for food. The second was the recycle of out of order and old refrigerator to work as shelves for book sharing, a way to invite people to read and share books with the community. Last but not least, the third one was the design of the community garden where citizens and tourists can learn techniques to grow their own food. The most special aspect of this garden is to driving community integration and also awareness of food production.

The end of the year is the busiest time in academic life in Brazil. We had thesis internship reports and a research project deadline. For us it was important to be together as a team. Although,

we didn't have so much free time during the week, so we've decided to do the team meetings on the weekends. How to keep the motivation flow during a meeting on a Sunday morning in school? Our answer: waffles and a lot of coffee. We were more productive and awake to focus on the job.

As individuals, each one of us has a particular way to process information. On the first stage of this challenge, we had a creative meeting to set the basic ideas for our project. We wasted hours trying to figure out the best way to produce ideas together instead of focusing on topics and giving some time to work the idea individually before sharing with the group.

The gold lesson from this challenge is communication. We had problems, delays, and misunderstands along the way, but without dialogue and honest feedbacks, we wouldn't be able to come so far. Communication made us thrive the obstacles and connect as a team.



Ricardo Souza, Alan Silva, Stella Áurea, Hélder Santos
University: Universidade Federal Rural de Pernambuco (UFRPE)

Zero+



Symbiosis (biology): “close relationship between different types of organisms in which they live together and benefit from each other”

For our team, the connection between architecture and agriculture is crucial. Our project was born from the intention to restructure an abandoned and polluting structure and turn it into a multifunctional, innovative, ecological and social greenhouse. Zero+ was chosen as the new area's name to remember the pre-existent activities “Zanussi” and “Zoppas”, but also to underline the zero-waste and zero-emissions policy.

By using new technologies, we want to create a sustainable, original and aesthetically pleasing space which can guarantee local development from a social, environmental and economic point of view.

Trying to limit demolition, we are upgrading the Ex-Zanussi complex while maintaining a great part of the pre-existing structures and adding some volumes: light transparent greenhouses facing South and West, optimal positions to capture the greatest number of sun rays throughout the arc of the day. Zero+ structure is essentially divided into two blocks. Entering the Northern Block, the host will find a huge exhibition gallery and, linked to that, he can access multiple rooms dedicated to culture, study and work, such as a library, screening rooms, co-working areas. Between the two blocks, an open passage brings people directly to the gorgeous green park where they can have a walk, visit and use the greenhouses, relax, let their children play

in safe areas: the reclamation of the polluted area around the industry through bioremediation and other innovative techniques is essential, first of all from the public health point of view. We are also planning to create a botanical and social garden consisting of edible soil-less gardens, to avoid the contact with pollutants still present in the soil. From the park, people can take a look inside the glazed greenhouses which are attached to the Southern block: here, the most of the production is made all year long, but they also host a bistro and laboratories for students and citizens in general. Connected to these by a green corridor, we find the “heart” of our structure: the ex industrial spaces transformed into an innovative urban farm where micro-greens, special vegetables with high vitamin values, are cultivated and new techniques are studied and improved. This scientific area is dedicated to specialists, but the glazed walls make it possible for the visitors to take a look inside from the market area, while having the chance to buy products made into the structure. In fact, the food production that will take place within the complex will consist of fresh products for immediate consumption, mostly tomatoes and berries along with other common vegetables, grown according to innovative agronomic techniques, but also primary processed goods such as jams and preserves.

Remaining within the needs of citizens, despite the high demand and supply of wine Prosecco, our team is far from proposing spaces dedicated for these wines for reasons strictly linked to environmental pollution caused by local

vineyards; it will be possible to organize wine tastings with the participation of organic and natural wine producers instead.

In terms of energy, we plan to fight against the waste of water and energy and to reduce air pollution. Our approach involves the integration of agricultural and architectural concepts in order to create a sustainable, functional and circular living organism. All of this will be possible through the collection of rainwater and its recycling, the use of photovoltaic and solar energy, in order to reduce CO2 emissions.

The food chain will also be cyclical: we will produce food in an urban context and make it directly accessible to consumers, so production and consumption have zero mileage. Plus, everything sold or consumed inside our building will avoid the use of plastic or other polluting material used for packaging or to be served.

The term “sustainability” plays an important role, both inside and outside the structure: at the entrance there are two long smog-eating walls, while on the roof of the corridor, which separates the greenhouses and the industrial building itself, there are lush climbing plants.

In correspondence with the greenhouses, artificial water gardens will be created: they will reflect the sunlight and therefore increase the incidence of the same on the cultivations, increasing the productivity; they will also be equipped with aquatic plants for the bioremediation.

In the internal spaces, in particular in the

exhibition gallery, tanks will be installed in which it will be possible to carry out a demonstrative aquaponic cultivation system, opened to all.

We want to increase the population’s knowledge, to promote a healthy lifestyle and to ensure a greener future for the city.

This project has been important for us to learn some important lessons. First of all, group work: we’ve always tried to link our two “worlds” in order to create an organic structure where architecture is at the service of agriculture and vice versa. Meet up, talk together about our doubts and ideas and also have different opinions about various topics helped us to learn.

Then, feasibility. It would be wonderful to imagine a perfect world, but when you clash with the reality of the facts, you have to be realistic. Having to deal with a pre-existing structure, having to calculate a business plan and economic incomes, we only proposed ideas that were completely plausible and guaranteed, and doing this we have designed something that, in our opinion, is possible to build in the reality.

The last and most important lesson was the chance to deal with sustainable and ecologic innovations. In our universities we still have few chances to learn this important aspects and we’d like to bring the environmental emergency to the fore because it shouldn’t be treated as irrelevant. Everything we learnt here will certainly be useful in our future and it will give us the chance to build a slightly better world.



Gaia Pazzagli, Nicoletta Vettori, Elisa Matutino, Elena Pagani, Francesco Ubaldi, Davide Tita, Anne Bankeng Maffo - Universities: Firenze and Bologna



Concept description:

On his way home, while wandering in the quiet streets of Conegliano, the highschool student reaches the ex-zanussi area and expects to see the old abandoned factory. But he is attracted by colourful graffities on the walls that arouse his curiosity about the massive changes that happened there.

When he enters the site, he finds a facade with colourful lights blending with the natural colors of the farm. He is welcomed by people gathering underneath a huge dome. First, he enters the art gallery and sees the artworks made of plants and colours. Then, he walks up to a second level which leads him to the art centre to see and hear the artists working, talking and listening to music. Next, he reaches the shared space where artists and agronomists socialize, share their big ideas and find a way to do it together. Then, he finds himself in a huge space where he can see in the second floor agronomists in their research labs and people attending classes sitting around. On the other hand, he smells delicious food coming from the restaurant where he can eat a fresh meal prepared and grown in the site. He sees huge beer tanks behind a glass wall and people working inside to produce it. He walks over a bridge that leads right to the indoor vertical farming. He buys fresh food from the market. Finally, he decides to walk around in the fields outside to enjoy the fresh odor and colors of flowers integrated with the domes of imagination where artists work in their rented studios. He downloads the farm tour application

to start his learning experience and goes home dreaming of what he could possibly do in this educational facility.

Circular economy (beer mushroom soiless thematic park)

One of the key concept is to optimize the use of the input through the circulation of the product and by-product within the area. Indeed, we think that is crucial an increase of the customer awareness on the product-journey by proposing different strategies for managing the by-product derived from the overall process. Following the concept of GILGAMESH, a microbrewery will be established using a traditional brassage where a double-tank system is used for warming and fermenting in the beer production. Local fruit and hop will contribute to the differentiation and amplification of the breweries products along the years in order to accomplish with the emerging requirements of the customer. The mushroom factories will be utilised the by-product of this process for producing the Oyster mushrooms performing an interesting example of integrated

process aimed to decrease the cost and limiting the waste of input.

Dome of imagination

The dome is designed for rentable studios for artists. The rooms are located below the ground level to keep the artists away from any source of noise and distraction. The ceiling of the rooms are replaced with a dome for a wider view for the surrounding, then a light well is inserted in it, to catch the inspiring nature of Conegliano. While moving the light well on a circular path in the dome, the artists have different views all day. The dome is on a drum to create openings for natural ventilation. The dome is made from ETFE as it is a recycled sustainable material, and also it is a non-sticky material, so the domes will not catch any dust from the air and thus a clearer view. At night, the studios are illuminated by LED lighting and the light well act as an exterior lighting element for the garden with different orientations that gives an attractive feature for the building inspired from the lighting in the music concerts in Conegliano.

Leaving aside all the technological aspects delivered in the project, we believe that a successful urban agriculture project should be designed to create a strong commitment with the future users and local stakeholders. We also believe that it is crucial to encourage people especially new generations, to participate in protecting the environment and teach them how to use technology to grow food. The commitment is crucial for promoting the integration of the project in the area where is located and thus leading to a fertile relationship. In order to do that, The indoor space would be multifunctional and very dynamic, encouraging social relationships within the community and a connection with the territory, based on the greatest land enhancement. The structure dynamic will be possible through a movable walls system and multifunctional foldable furniture. The versatility will ensure a

completely free usage of the structure leaving to the local community the possibility to have free expression of their willingness.

It is very complicated to resume the lesson learnt during the Challenge due to the fact that for most of us was our first competition. We think that time management, importance of competence and trustiness are our lesson learnt. The importance of the time management was fundamental along the project implementation and thanks to the use of software and innovative platform we easily achieve our task. Identifying and recognizing the different competence lead to the creation of an interesting and dynamic working environment. The necessary translation of technical concept in manageable concept for all team member was the unexpected challenge that emerged during the project. Following this concept, the mutual trustiness on the ability of someone that you have never seen in your life is the basement for a fruitful work.

Once upon a time, there were three Egyptian architecture students Haidy Taki El-Din, Hadil Tarek Mai El Hadidi, an innovative business student Virginia Castellucci, two agronomists from Myanmar Lorenzo Fellin Pietro Caldelli Tonini, and last but not least a girl from Sardinia (we would like to be international) Antonella Frongia.... and "tutto il resto è noia"



Haidy Takieldin Adel Ali Mousa, Hadil Tarek Abdelaty Abdelhafez, May Loaay Mohamed Elhadidi; Pietro Tonini, Lorenzo Fellin, Virginia Castellucci, Antonella Frongia
Universities: Cairo, Bologna, Trento



The Green Hub

Upon arrival at the parking, the visitor sees the outdoor exhibition with its tent structure covering the outdoor seating area. Then the user could choose to enter various spaces; the main lobby that includes the shops, the gym, The Trevison cafeteria or the local store. People are gathered together in front of the main lobby entrance in the social piazza either talking, playing, reading or just sitting to enjoy so quality time in the piazza. You can smell the fresh food smell coming from the cafeteria and hear the little kids while they play in the kid's area. After entering the main lobby he goes to buy a souvenir from the shops and some balloons for his kids. The tour starts with the guide and they enter to the educational farm. He wears gloves and then people start feeding the fish and watch the workers while they take care of the plants. The guide then takes the tour to the seminar room to watch an educational short film about the importance of urban farming and climate change. The tour ends in the lobby and the family is hungry. Time for lunch!

No better place for lunch than the Trevison cafeteria while the kids go and play in the kid's area.

The building is self-sustained as it is considered to be a closed loop; the aquaponics system is considered to be a closed loop itself as the fish and plants sustain each other, then the plants are either sold or used in the cafeteria to generate income for the project, the water waste is used to irrigate the ivy façade or in the toilet flush system.

The Trevison Cafeteria: Considered to be a key a point in our project, this cafeteria helps serve the signature dishes found in the province of Treviso using daily products from the farm. This helps to create a unique bond between the user and the food cultivated to raise his/her awareness about urban farming and sustainable development.

Local store: A store that helps provide the local community with its needs of organic produce from the farm on a daily basis. This helps us to contribute into creating a healthier community and thus contributing to SDG 11: Sustainable Cities and Communities.

Educational Farm: By specifying a part of the farm for educational purposes and community awareness. This part will host the educational tours either for the school's students or the regular visitors. The user could interact first hand with the plants and fish to experience the process. This helps raise awareness and educate the younger generations about this field.

Outdoor Areas: Considered to be the key player to our concept. The outdoor areas in this project help provide a space for outdoor activities for the local community in the heart of the city instead of the old abandoned area. It contains various seating areas for different activities and needs. We wanted the local community to have a sense of belonging to the place to ensure its viability and livability.

We wanted to contribute to the community as much as we could by providing various services either for free or discounted fees in order to help create a healthy and happy community.

For us the main challenge was to tackle all three pillars of sustainability together in good balance while creating a self-sustained building.

As for the environmental sustainability, we decided to keep the building as it is and add minor improvements to reduce the waste of energy. As for the systems we used an energy efficient HVAC system (Air to Air Heat Exchanger) with double glazed glass to reduce heat gain/loss. On the Northern part we added VA wind turbines to generate energy on site to mitigate GHG emissions thus tackling SDGs 7 & 13.

For Social sustainability, we tried to contribute to the city and the community as much as possible. We added various spaces that provide services to the community like piazza, gym, store, cafeteria and educational farm to cover SDG 11.

Finally for the economical sustainability, we chose the cultivation of grapes to contribute to the wine industry in the area. Also we have shops that are rented to help generate extra income to the project with the local store that sells the farm's produce to the public. Also we tried to choose systems have low maintenance to reduce the running costs and thus covering SDGs 8 & 12.

The first lesson we learnt was the importance of understanding the different disciplines that the architect has to work with and he could coordinate with their systems to design spaces that he never tackled before. To cover these different disciplines we had to read and search to learn about the systems in agriculture or how to create business models, on other times we talked with professors or friends to help us understand even more.

The second lesson was the importance of urban farming and how the architect has a role in infusing the urban farm into the urban fabric of the modern city. Create a farming space in the heart of the city was a real challenge as we had to make our project homogenous with its surroundings in both appearance and functions.

Thirdly, we learnt how to design a project having an existing structure. Retrofitting this building to adapt to our functions and spatial program was an important step in the design process in order to reach a fully functional project in circulation, spatial requirements and aesthetics. Working with a new environment and culture different than ours helped us gain more experience in the design process.

We are really thankful for this opportunity, we learned about different disciplines, different cultures and cities. The conclusion of these project took us a step further, and as architects it brought us to a new level of knowledge. We became a better team and most importantly better humans for our planet.



"New farms are the key of Agricultural Urbanism. A new generation of buildings, that might be built on priority as extensions of older ones"

AGRICULTURE MEETS ARCHITECTURE

by Augustin Rosenstiehl, SOA Architects (<https://www.soa-architectes.fr>) - Jury Member



Urban vacant lands and urban agriculture (UA)

Modern Urbanism has organized multiple homogenic zones and areas all over our traditional cities: industrial, commercial, activities, projects, residential, gated communities. Each one is gardened with a kind of nature, which is most of the time a monoculture of modern Nature. Specific farms should be specialized to restore every soil of each of those lands.

Architecture meets horticulture: bringing visions for sustainable cities

New farms are the key of Agricultural Urbanism. A new generation of buildings, that might be built on priority as extensions of older ones, could be new civic centres and entrance doors to the rural areas and the future fields, landscaped like public spaces and worked in an agroecological way.

An example of innovative UA project

Aggrozouk is a wonderful tool invented and built by Florent Sebban and a member of his AMAP (farms in which consumers are shareholders and pay the real cost of the crops, including the cost and salaries). This machine,

which is very agile, closer to an electric bike than a tractor, allows a much more complicated, diverse and rich horticultural environment. Plans are now on open data.



OTHER TEAMS

N.Y.N – Belluno

Old buildings can be green. Having said this, we need to make them sustainable into the future. To be successful, retrofitting must aim to balance the needs and attributes of the building with the requirement for performance and ensure that the building is enjoyable and comfortable to work in. Applying our main concepts into our building in Belluno (Orzes primary school) is the aim for getting a sustainable green, retrofitted building, with the indoor vertical farming involved to grow different plants and herbs.

UPTeam – Bologna

Our idea is that the abandoned building of “FantoniFarm” should be transformed into an innovative center for holding innovative agriculture events where individuals, different institutions from agriculture or similar areas of studies can have the chance to gather up and share their ideas, inventions or creations. These gatherings are held in from trainings, workshop, or maybe in a similar form as TED talks. The advantage of this center is that the building is located near the largest food park (F.I.C.O), which is visited by more than 3.5 million people per year. Inside six hectares of productive soil, participants could practice their acquired knowledge from this innovative center.

Agro d’Erable – Bologna

We want to center our project on social development, interactions between people and to include the project in the more general thematic that are environment and sustainable development. The project should be accessible for all, regardless of fortune, background or social status. Through this ancestral profession that is farming, our desire is to give a new home but also a new start, new possibilities, hope and will to marginal people.

Agro d’Erable – Conegliano

We decided to create a space for the local inhabitants and tourists that would offer a large range of services and activities whilst generating enough money to maintain an urban farm via a good agricultural production. We have adapted our system to the needs and limits of the site with the aim to reduce greenhouse gas emissions and to make the project energetically independent. We have also – as much as possible - decided to reuse what is already in place and keep the general structure of the building. The idea is to revalorize the site and give it a new reason to exist. Our project also aims to remind the visitor of its past.



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"Our native environment has become a concrete jungle where the actual natural world has completely been displaced. We live in ever-taller building and we are loosing our connection to the ground, perceiving it as a remote entity, almost a memory"

CITIES SHAPED BY FOOD: A NEW ARCHITECTONIC AVANT-GARDE

by Arch. Michele D'Ostuni and Arch. Antonella Trombadore, (DIDA) Dipartimento di Architettura University of Florence



Since its first appearance on earth, the need for food has always shaped men's life. It does not come as a surprise then, that humans stopped being a nomad species when they finally learnt the fine art of agriculture.

In Palestine, archeologists found the rests of what was probably one of the very first settlements in human history: Jericho. Founded around the 9.500 b.C., excavations showed that by the early 8.000 b.C. Jericho was hosting around 2-3 thousands inhabitants, organized into a proper community able to build walls and produce art. In 1.500 years, that very small settlement became a town, which could grow and develop for other 5000 years, thanks to the development of the very first agricultural techniques: complex irrigation systems and trace of grains and wheat were found in the archeological site. Eventually, even Jericho had to fall, the increasing population, greed, needs, war, drought and famine finally

destroyed it after six thousands years of existence.

Throughout history cities have been in a codependent relationship with their countryside, and their survival strictly depended on the capacity of the land to produce food: food transportation was extremely complicated and that limited the capacity for cities to expand. The very basic laws of geometry can explain that, as the larger the city grew, the smaller the size of its hinterland became with the inevitable consequence that the latter could no longer feed the former: 15th century Bologna was one of the biggest cities of its time with a population of 75.000 people, famine was most certainly much known by its inhabitants, until the black plague decimated its population partially resulting in easier food access for those that survived.

Up to the 19th century, food had determined where and how cities were built, but, during the industrial revolution, the appearance of new infrastructures that were able to connect cities at high speed suddenly changed this paradigm: once the first railways started to be built in Europe it was clear that they represented an unprecedented opportunity to distribute food all around cities and countries. The boundaries of urban environment and rural hinterland started to fade and the city sprawl was then unstoppable.

We now live in a world where most population is gathered in big cities, and urbanization trends show us that in the immediate future the percentage of people living in urban areas is destined to grow even more.

Our native environment has become a concrete jungle where the actual natural world has completely been displaced. We live in ever-taller buildings and we are losing our connection to the ground, perceiving it as a remote entity, almost a memory. Even though, we are now used to live in a urban environment (even feeling lost when we are far from it) we still are animals,

defined by animal needs which primary instinct is to feed.

“We are now a urban species, living in a urban habitat [...] and while we may have broken our ties with rural living, we haven’t broken ties with our need to eat. [...] Energy conservation will drive us to shorten the global food chain. It all leads us back to the city: cities have resources like land, water, labor and a ready-made market for food production. It actually makes a lot of sense to shorten our food chain by growing food right in the cities where we ‘co-producers’ live” [Food and the City - Jennifer Cockrall-King, Prometheus book, 2012]

In this scenario the abundance of squares, rooftops and vertical surfaces in our urban areas is an untapped opportunity for bringing nature and food back to the city.

It is time now for a new architectonic avant-garde, able to collect and express the needs of our society reshaping to its very core the way we perceive the urban environment, able to design buildings and neighborhoods not just for humans but also for plants. A new architecture which is not only respectful of the environment but that promote a new natural setting within the city. In the past 20 years we have seen the number of green facades and sustainable buildings constantly rising, which, luckily, opened the way for always newer experimentations: now, being green seems to be just not enough, we need to go one step further and favor the design of organic buildings capable of providing us with fresh and clean vegetables encouraging food safety and food security within the cities. We may now realize (again) that food is not something that we can take for granted anymore.

Urban farming must then be encouraged on a global scale in order to promote local food communities, shortening the distribution chain, educating people to a new city-based food culture.

ORGANIZING COMMITTEE

A special thanks to all the professor and students from University of Bologna and University of Florence that made this challenge possible and successful.

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ContaminationLab

The “Banca del Monte e Cassa di Risparmio Faenza” Foundation is a private, nonprofit institution, which is committed to the development of the human, social, cultural, and economic capital of the city of Faenza and its surrounding territory. Its mission takes shape through a variety of actions and initiatives – such as grant-making, calls for projects, and in-house projects – within a strategy that covers a few major thematic sectors, namely youth education and training, scientific and technological research, arts and culture, welfare and public health.

The Foundation currently represents the historic and ideal heritage of the “Banca del Monte”, a bank and charitable institution founded in the mid-fifteen century by the Franciscan Beato Bernardino da Feltre.

In the last few years, the “Banca del Monte e Cassa di Risparmio Faenza” Foundation has gradually re-focused its institutional action towards innovation and training of future generations. A crucial role is played by its own project named Contamination Lab, a startup pre-incubator founded in 2014 and aimed at facilitating the development of the creative and entrepreneurial skills of selected teams of local youths. Since 2018, through the Contamination Lab, the Foundation has also activated a project of regeneration of a green and agricultural area just outside the city centre, named S. Bernardino, aimed at transforming a wide rural space into a social and cultural place rooted in principles of entrepreneurial experimentation, social innovation, and environmental sustainability.



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