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FrontAg#Nexus



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FrontAg Nexus

FrontAg Nexus is a project co-funded by the EU's PRIMA program, launched in May 2023, focusing on sustainable agri-food practices in the Mediterranean. It addresses climate change, resource scarcity, and food insecurity by promoting technologies like hydroponics, aquaponics, insect farming, and vermiculture. The project aims to enhance climate resilience, improve socio-economic conditions, and support year-round food production. It integrates renewable energy, the WEFE Nexus approach, and involves vulnerable groups, including women, youth, refugees, and SMEs.



FrontAg  Nexus

FOCUSE

FOCUSE is an EU and DUT-funded project that aligns with the Circular Urban Economies Transitions Pathway (CUE). Its research focuses on city-region food systems, investigating their sustainability, resilience, and potential for scalability. The project brings together a diverse consortium of partners from Italy, Sweden, Poland, and Spain, including academic institutions, research organizations, and local stakeholders.



Openings from the director of the Department of agricultural and food sciences

**Giovanni
Dinelli**

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Agricultural and Food
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It is with great pleasure that I present this volume dedicated to urban agriculture, a topic of growing importance in both scientific research and societal transformation. As cities expand and environmental challenges intensify, the role of agriculture within the urban landscape has evolved—from a marginal activity to a strategic component in creating sustainable, resilient, and inclusive urban systems. This volume brings together interdisciplinary perspectives, innovative practices, and case studies that illustrate the diverse forms and functions of urban agriculture around the world. It reflects a broader shift in how we think about food systems, land use, and community well-being, bridging the gap between rural and urban dimensions

At the Department of Agricultural and Food Sciences (DISTAL) of the University of Bologna, we have long recognized the strategic relevance of urban agriculture. Our department is engaged in a wide range of research and education activities that explore the interface between agriculture, food, and urban development. Through projects focused on vertical farming, peri-urban horticulture, sustainable water use, soil health, and food security, we aim to support innovation and policy development for more sustainable cities.

Moreover, DISTAL is actively involved in international collaborations and networks that promote knowledge exchange and best practices in urban and peri-urban agriculture. Our commitment to interdisciplinary research and stakeholder engagement is at the heart of our contribution to shaping the future of food systems that are not only productive and efficient but also just and ecologically sound.

I hope this volume will serve as both a reference and a source of inspiration for researchers, practitioners, urban planners, and policymakers interested in transforming urban spaces into thriving hubs of agricultural innovation and food resilience.

Exploring Urban Agriculture through Circularity and Resource Synergies

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Martin**

**Natalie de
Brun Skantz**

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Urban agriculture is evolving beyond food production, as it is increasingly recognized as a platform for experimenting with circular urban systems. At IVL Swedish Environmental Research Institute, our work focuses on how cities can make better use of underutilized spaces and overlooked resources, such as waste heat, greywater, or excess nutrients, etc., to cultivate food in ways that are both efficient and regenerative. By bridging environmental systems thinking with hands-on urban farming innovation, we aim to advance interdisciplinary research and support cities in developing scalable models that combine resource recovery, social inclusion, and sustainable food access.

As part of the UrbanFarm2025 initiative, we were delighted to welcome students and faculty from the University of Bologna to Stockholm, Sweden. Together, we explored a range of urban agriculture typologies from advanced, high-tech indoor vertical farms to more traditional outdoor systems rooted in community and landscape. These visits offered an opportunity to demonstrate how Sweden is actively experimenting with integrated solutions that link food, energy, and water, while addressing urban resilience and sustainability.

Reclaiming urban spaces for a Resilient Future

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The regeneration of underutilized and degraded urban areas can help address the complex challenges of climate change, urban inequality, and food insecurity. These spaces hold underused potential for enhancing urban resilience and sustainability when approached through integrated and inclusive frameworks.

Urban agriculture is a key multifunctional tool in this context. It supports local food systems, increases green in cities, improves microclimates, and promotes biodiversity. Beyond ecological benefits, it fosters social cohesion by creating shared spaces for diverse communities, enabling participatory practices, and enhancing food justice.

For this reason, UrbanFarm2025 focused on regenerating an underused urban area through agroecological and socially inclusive approaches. The challenge aimed to promote innovative, circular solutions that reflect the need to transform and improve our urban environments.

Incorporating agricultural practices into urban regeneration not only improves the quality of public space, but also strengthens social cohesion and adaptive capacity. These interventions represent an integrated pathway towards healthier and more equitable urban environments.

Urban agriculture as a lever for Urban Regeneration: reflections from the UrbanFarm2025 Student Challenge

• Francesco Orsini

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The UrbanFarm Student Challenge, now in its seventh edition, was established to promote innovation, sustainability, and interdisciplinarity in the field of Urban Agriculture. Since its launch in 2019, the competition has engaged students from universities across Europe and beyond in the co-design of urban agricultural systems integrated into real-world spatial contexts. Each edition has focused on different specific sites, inviting participants to propose feasible solutions that combine food production, environmental sustainability, social inclusion, and economic viability.

This year's edition, UrbanFarm2025, continued on the path set by the previous editions by addressing the transformation of an underutilised lot located within the KTH Royal Institute of Technology campus in Stockholm, Sweden. The selected site presented both spatial and socio-environmental challenges such as perceived isolation, limited functionality, and low ecological value. At the same time, it offered substantial potential for regeneration through the lens of Urban Agriculture.

Participating teams were invited to respond to this context by developing design proposals that integrate productive landscapes with multifunctional public uses, aiming to activate the space as a node of food production, education, community interaction, and ecological enhancement. The challenge required students to work across disciplines combining design thinking, agronomic knowledge, environmental engineering, and socio-cultural analysis, while aligning their proposals with the principles of circularity, climate resilience, and urban sustainability.

The projects presented in this volume reflect the diversity of interpretations, methodologies, and conceptual approaches developed by the teams. While differing in the proposed strategies and solutions,

all proposals share a commitment to leveraging urban agriculture as a driver of positive change within the urban fabric and as a useful tool to restore vacant spaces within cities. They also reinforce the educational objectives of the UrbanFarm initiative: to foster transdisciplinary collaboration, practical problem-solving, and critical reflection among the students, inviting them to work at the interface between food systems and urban development.

This collection of student-led work contributes to an evolving discourse on the role of agriculture in urban regeneration. It demonstrates how targeted design interventions rooted in agroecology, systems thinking, and local knowledge can respond to pressing urban challenges while enhancing the liveability, resilience, and inclusiveness of cities.



Top left: Photo of the winning group (Flourish); Top right: workshop with students; Bottom: group photo during the site visits

Organizing Commitee



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Jury



Francesco Orsini



Michael Martin



Giuseppina Pennisi



Photo of the jury during the Grand Finale in Stockholm

Location



Photo of the case studio area

KTH Campus

The main campus of KTH Royal Institute of Technology is located in central Stockholm, in the Östermalm district. It combines historical architecture with modern research facilities, offering a vibrant and inspiring academic environment. The campus features red-brick buildings designed by architect Erik Lallerstedt in the early 20th century, surrounded by green spaces and public art. As Sweden's largest and most prestigious technical university, KTH's Stockholm campus hosts thousands of students, researchers, and staff from around the world, fostering innovation and international collaboration.

The case study site is situated within the KTH Campus in Stockholm (Sweden), a vibrant academic hub renowned for its emphasis on innovation and sustainability. The campus features a mix of historical and modern architecture, creating an inspiring environment for education, research, and collaboration.

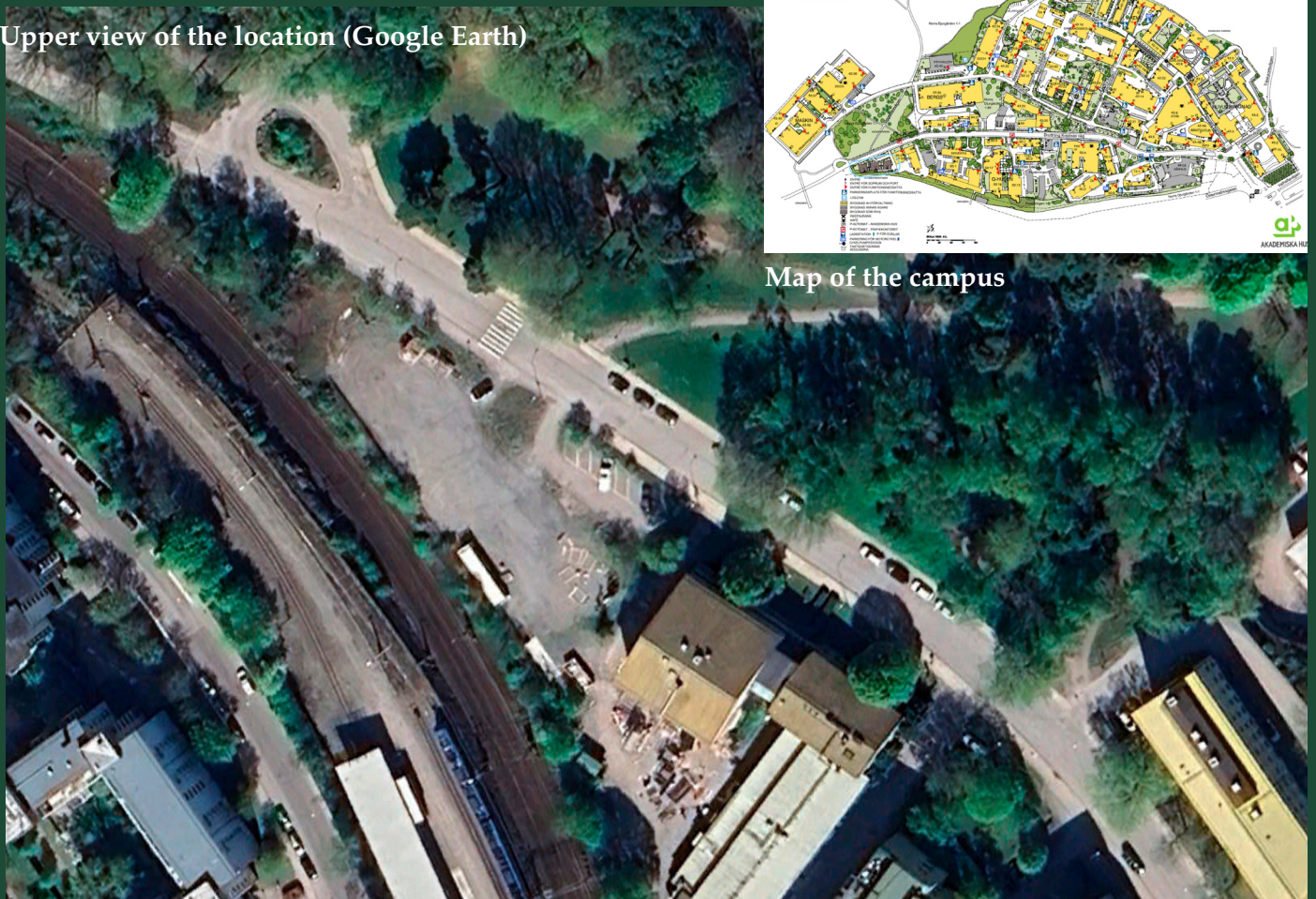
Currently, the case study area is an underused gravel space on the edge of the campus, which many perceive as distant and somewhat isolated and is often considered unsafe because of this. The site spans approximately 2,500 m² and is a flat, gravel-covered area with a few trees lining the path. To effectively carry out the project, the design proposals should focus on transforming this space into a multifunctional area that integrates agricultural activities to promote productivity, social engagement and recreation.

The site is positioned along Drottning Kristinas väg, a major corridor connecting KTH to the Albanova, Albano, and Frescati campuses. It is a 10-minute walk from the nearest public transport and just 5 minutes from the closest restaurant. It is adjacent to a vacant building and a park across Drottning Kristinas väg, with a railway line running behind it, further adding to its sense of separation. Despite these challenges, its strategic location presents a valuable opportunity to transform the area into a dynamic space that enhances connections to neighbouring campuses while addressing concerns related to safety and accessibility.

It is located on the western side of the KTH Campus, surrounded by Nationalstadsparken, the Royal National City Park. Within the area, there is an inspection well connected to Stockholm City's main sewer system, and utility connections for electricity and water have been extended from the nearest building. The foot traffic in this area is relatively low, consisting mainly of campus residents - namely students, researchers, and their families - along with campus staff. Additionally, occasional pedestrians and cyclists pass through, using Drottning Kristina's väg as a route between the city centre and Brunnsviken.

Currently, a research container operated by 'Green & Growing' rents land on this site. The company specialises in urban farming, producing and selling salads and spices to Swedish food markets. The research container is connected to the on-site electricity and water supply.

Upper view of the location (Google Earth)



Map of the campus

Teams

Re-Växa

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GreenFusion Hub

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Urban Greeners

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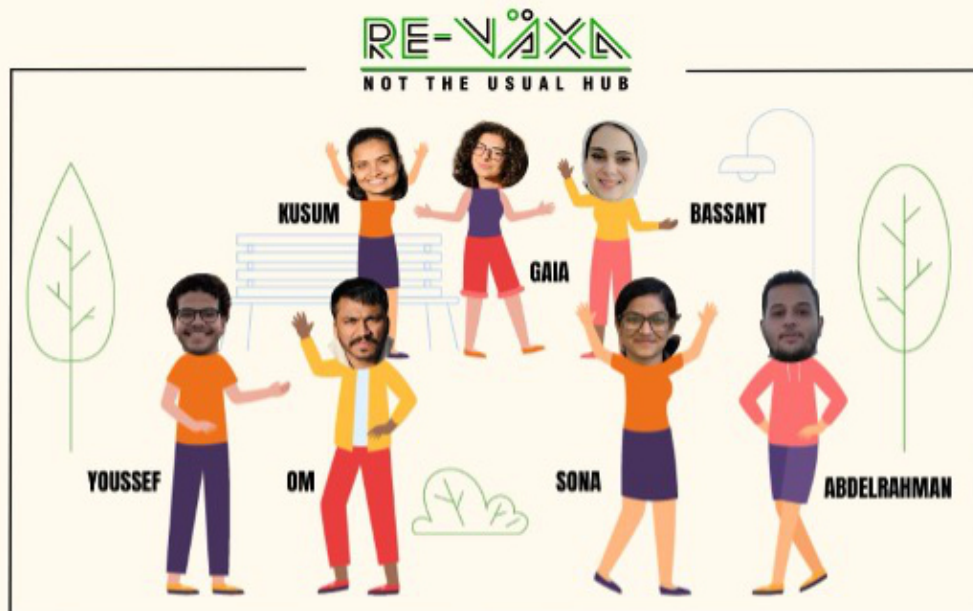
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Re-Växa



Abdelrahman Al-Geziri, Bassant Osman, Gaia Depalo, Kushum Dahal, Om Nilesh Shedge, Sona Jaison, Youssef Dahy

Concept Overview

Re-Växa is an innovative Urban Farming (UF) initiative transforming an underutilised gravel lot within the KTH Campus in Stockholm, Sweden, into a multifunctional space. Rooted in sustainability, our name “Re-Växa” blends the three fundamental sustainability principles Rs (Reuse, Reduce, and Recycle) with the Swedish word “Växa,” meaning “to grow.” This fusion represents our mission: fostering ecological balance, social integration, and economic viability through Urban Agriculture (UA). The project reimagines the site as a hub for food production, research, and community engagement, ensuring a sustainable, regenerative future, and attains the SDGs.

Environmental Sustainability

Revaxa employs cutting-edge sustainable agricultural practices to enhance biodiversity and resource efficiency. Our strategy is structured around three outdoor plazas, each integrating green infrastructure and ecological design to mitigate and adapt to climate change:

1. Plaza for Eating & Interaction: Featuring two climate-controlled greenhouses for herb and vegetable production (mint, basil, lemongrass, blue hibiscus, parsley, spinach, carrots, Swiss chard, kale, arugula, and curly mustard). Surrounding container gardens cultivate berries, while a Healthy Bar serves fresh, farm-to-table meals.
2. Event & Social Plaza: A green space for social events, meditation, and yoga, surrounded by diverse plantings including strawberry and blueberry crops.
3. Learning & Workshop Plaza: A circular space for educational workshops, art, and gardening activities. Integrated with bookcases and interactive learning modules, it empowers visitors with hands-on experiences in sustainable UF.

Additional sustainability initiatives:

- Hydroponics & Vertical Farming: Advanced containers grow edible flowers (saffron, lavender, hibiscus, chamomile, marigold) for culinary and medicinal applications,
- Water Management: Efficient irrigation, composting, and pest management reduce waste and optimise resource use,
- Bicycle-Friendly Infrastructure: A dedicated bike parking shed with vertical farming promotes eco-friendly commuting and enhances health,
- Green Architecture: Rooftop gardens on the restaurant and kiosks reinforce sustainability.

Social Sustainability

Revaxa serves as a collaborative hub, bridging students, researchers, and the local community:

- Community Engagement: Encourages knowledge exchange among KTH students,

- faculty, and UF enthusiasts,
- **Public Accessibility:** Designed to welcome the campus community and external visitors for cultural and educational interactions,
- **Water Features & Green Spaces:** Plazas incorporate calming water elements for relaxation and well-being,
- **Interactive Digital Integration:** A mobile app offers real-time data on plant growth, educational resources, and guided AR tours.

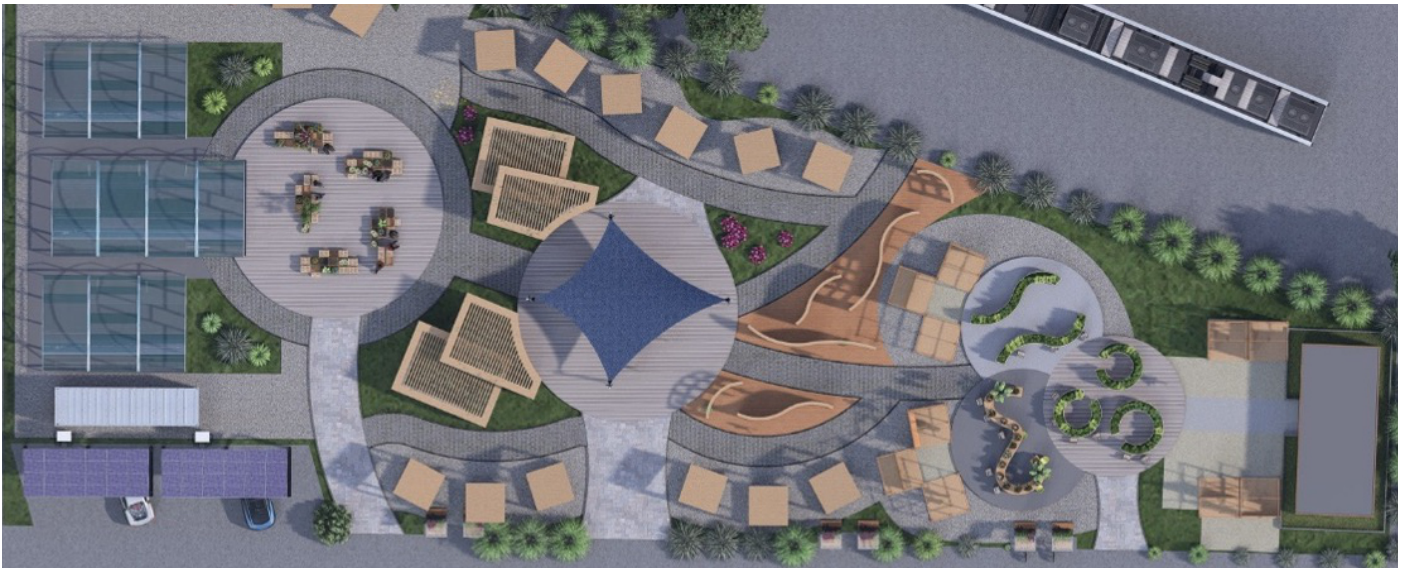
Economic Sustainability

To ensure financial viability, Revaxa integrates innovative monetization strategies:

- **Adopt-a-Plant Program:** Sponsors receive updates on plant growth and a share of the harvest,
- **Guided Tours & Workshops:** External visitors purchase tickets for educational experiences, while KTH students and staff enjoy free access,
- **Farm Rescue Box Initiative:** Surplus produce is packaged into discounted seasonal farm boxes, minimising food waste,
- **Multi-Function Kiosks:**
 - **DIY Smoothie Station:** Visitors create their healthy beverages,
 - **Urban Market:** Sells grown produce and herbal products,
 - **Coffee & Smoothie Bar:** Offers eco-conscious, health refreshments.

Conclusion

Revaxa, a sustainable UF at KTH Campus, combines environmental responsibility, social integration, and economic sustainability, demonstrating how cities can activate underutilised spaces for a greener future.



The project and the virtual models of the main square

Sustainable Sprouts



Emanuela Campana; Homa Ahrari; Mohamed Amer; Omnia Ali; Omkar Vishnu Borade; Omar Sugira Rwego

The butterfly effect illustrates how small changes can lead to significant, interconnected outcomes; a principle reflected in the design of multifunctional urban spaces. This paper explores the transformation of an underutilized urban plot into a sustainable, socially engaging, and productive environment through the integration of diverse functional zones.

The proposed design includes an Urban Agriculture Zone with raised garden beds and hydroponic systems to promote local food production and environmental sustainability. A recreational area that includes seating spaces, shaded relaxation spots, and a cafeteria that serves fresh food prepared with ingredients harvested from the site. Walking paths encourage community interaction and well-being. Educational workshops, a seminar hall, and interactive signage foster awareness of urban farming and sustainability. A pop-up market enhances local commerce by selling fresh produce and farming equipment. Sustainability initiatives include solar panels for renewable energy, a rainwater harvesting system for efficient irrigation and minimizing water waste, and composting stations utilizing modular bins, vermicomposting, and Bokashi methods.

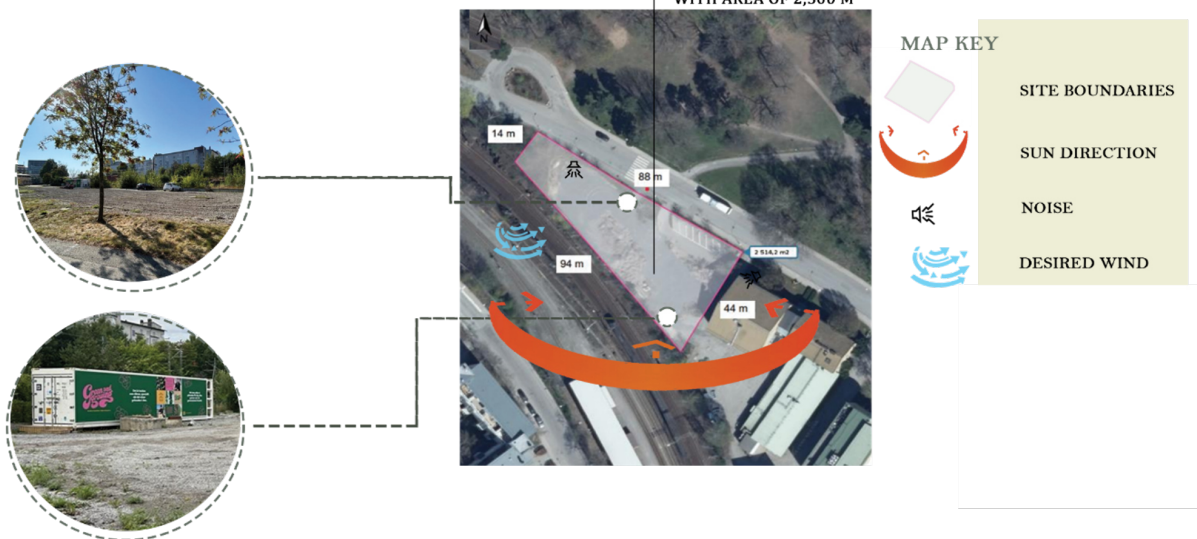
The use of repurposed and recycled materials such as old wooden pallets for raised beds and containers for market stalls further reinforces the project's commitment to sustainability. Additionally, regular workshops and events on urban farming, composting, and sustainability practices promote social engagement and environmental awareness.

By seamlessly integrating these elements, the project transforms the urban plot into a vibrant, eco-friendly hub that balances environmental productivity, social interaction, and economic opportunities. The design prioritizes sustainability from multiple perspectives, ensuring long-term benefits for both the community and the ecosystem. This multifunctional space serves as a scalable model for sustainable urban development, demonstrating how thoughtful design can generate lasting positive impacts.



SITE LOCATION:

IT IS LOCATED ON THE WESTERN SIDE OF THE KTH CAMPUS WITH AREA OF 2,500 M²



Project proposal, virtual images and site analysis

GreenFusion Hub



Prabuddha Sharad Magade; Saroj Joshi; Muhammad Aqib; Eylül Gedik

Creating a Vibrant and Adaptive Community Hub

"The GreenFusion Hub transforms an underutilized space at KTH into a dynamic, sustainable environment fostering social interaction, education, and environmental responsibility. At its core is a modular urban farm, integrating flexible structures and biophilic design to create a living, evolving space.

A shared community garden will promote hands-on learning through hydroponics and biomaterial applications. FIKA Flower Café, designed with reclaimed and prefabricated materials, will act as a social hub, drawing people to engage with sustainability initiatives. Pathways, seating, and green spaces enhance interaction, while native plantings and vertical gardens enrich biodiversity. The site will feature sensor-based irrigation systems to optimize water use, while a rainwater harvesting system will contribute to resource efficiency. We are also exploring biomaterials from recycled waste for spatial production, supporting both temporary and permanent structures, ensuring adaptability and ecological integration."

Building a Circular Economy

"The GreenFusion Hub ensures economic and ecological sustainability. FIKA Flower Café will serve locally sourced food and operate on a waste recycling system that minimizes environmental impact. The café will also act as an entrepreneurial space for students, offering hands-on experience in business operations while fostering interdisciplinary collaboration.

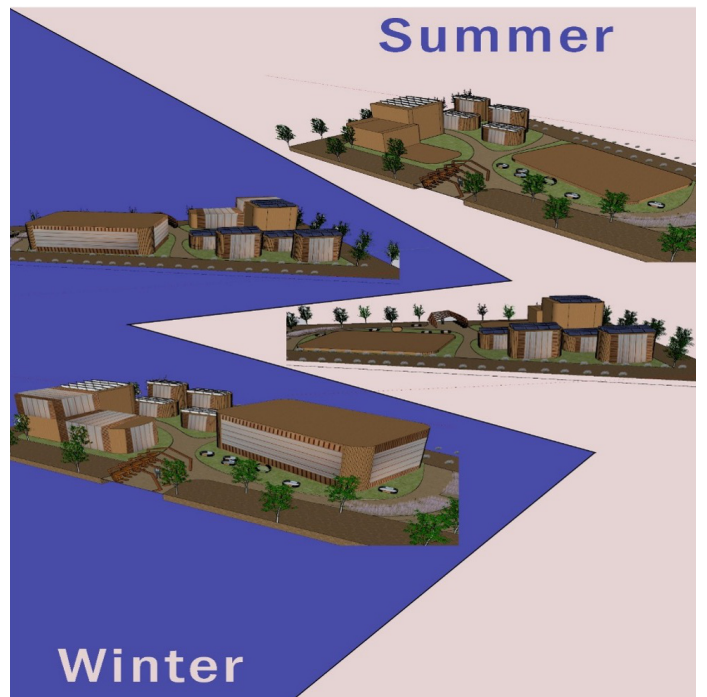
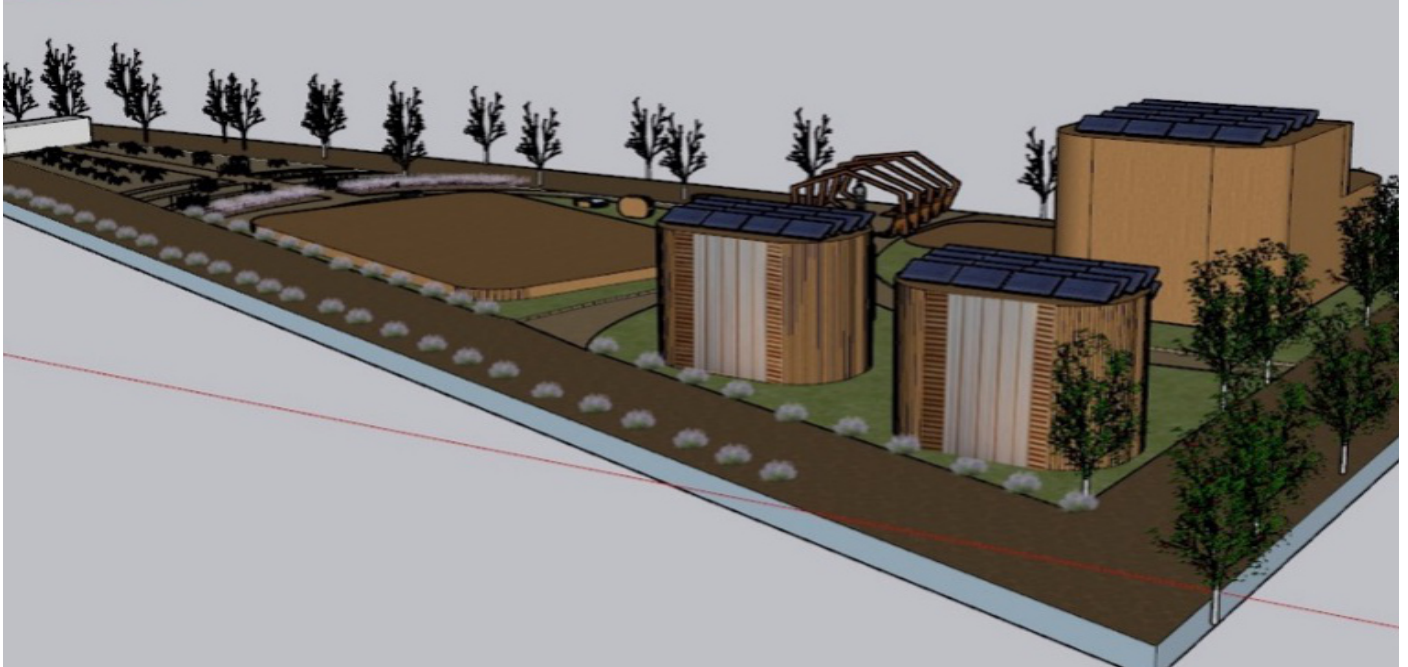
A closed-loop urban farm with vertical farming and seasonal flower cultivation will generate revenue while supporting biodiversity. These flowers will enhance the aesthetic appeal of the site and be sold locally, creating an eco-friendly revenue stream. Structures will use modular, repurposed materials, and smart irrigation systems will optimize water use. The project also seeks to collaborate with local businesses to strengthen the economy while incorporating biomaterials in construction for a resilient and low-impact design. A composting and recycling station will be implemented to ensure efficient waste management, demonstrating the viability of circular design in urban settings."

Championing Environmental Responsibility

"The GreenFusion Hub is a living laboratory, integrating sustainable urban agriculture with innovative design. Vertical gardens and modular green roofs will enhance climate resilience, while native plants will restore ecological balance. The site will also include pollinator-friendly flower beds to support local ecosystems and increase biodiversity.

A waste recycling system will ensure resource efficiency, and low-impact construction methods will be prioritized. Temporary and permanent structures, built from biomaterials and prefabricated elements, will be adaptable and environmentally conscious. Visitors will be able to engage with the project through interactive digital tools that provide real-time data on plant growth, composting efficiency, and environmental conditions, bridging academic research with public engagement.

By activating this space, the GreenFusion Hub fosters resilient, inclusive, and interactive urban development, demonstrating scalable solutions for sustainable cities."



Final virtual image of the proposal, activities and seasonal changings of the area

Urban Greeners



Kiran Chaulagain; Manish Shrestha; Elsa Ropponen; Kesho Lal; Sandy Bassem Moris Youssef; Karma Abdelaziz Ali el Gazzar; Rana Ibrahim Naeem Mashreky

Food production, particularly in metropolitan areas, is becoming increasingly difficult due to rapid urbanization and climate change. In order to solve this, our initiative will turn an underutilized area of the KTH Campus in Stockholm into a hub for communal gardens and vertical farming. We hope to establish a productive and community-focused sustainable food system by fusing contemporary farming methods with communal green areas. In addition to enhancing the environment and optimizing campus space, this initiative will encourage urban agriculture, social interaction, and experiential learning.

Our concept integrates technology and social interaction through shared green areas, a communal picnic garden, and vertical agricultural units. The hydroponic system will efficiently grow fresh produce, while the communal garden provides a peaceful picnic area for students and community members to relax and connect with nature. To support the vertical farming units, we use plastic buckets secured with bamboo structures for stability. For mobility, our wooden boxes are designed with wheels at the bottom, making them easy to move. Additionally, we plan to install a small pond for aquaponics, integrating fish farming with plant cultivation. Seating and pathways will enhance accessibility and promote well-being. In winter, we will organize events like ice-skating and campfires, offering a warm and engaging space for everyone to enjoy the colder months.

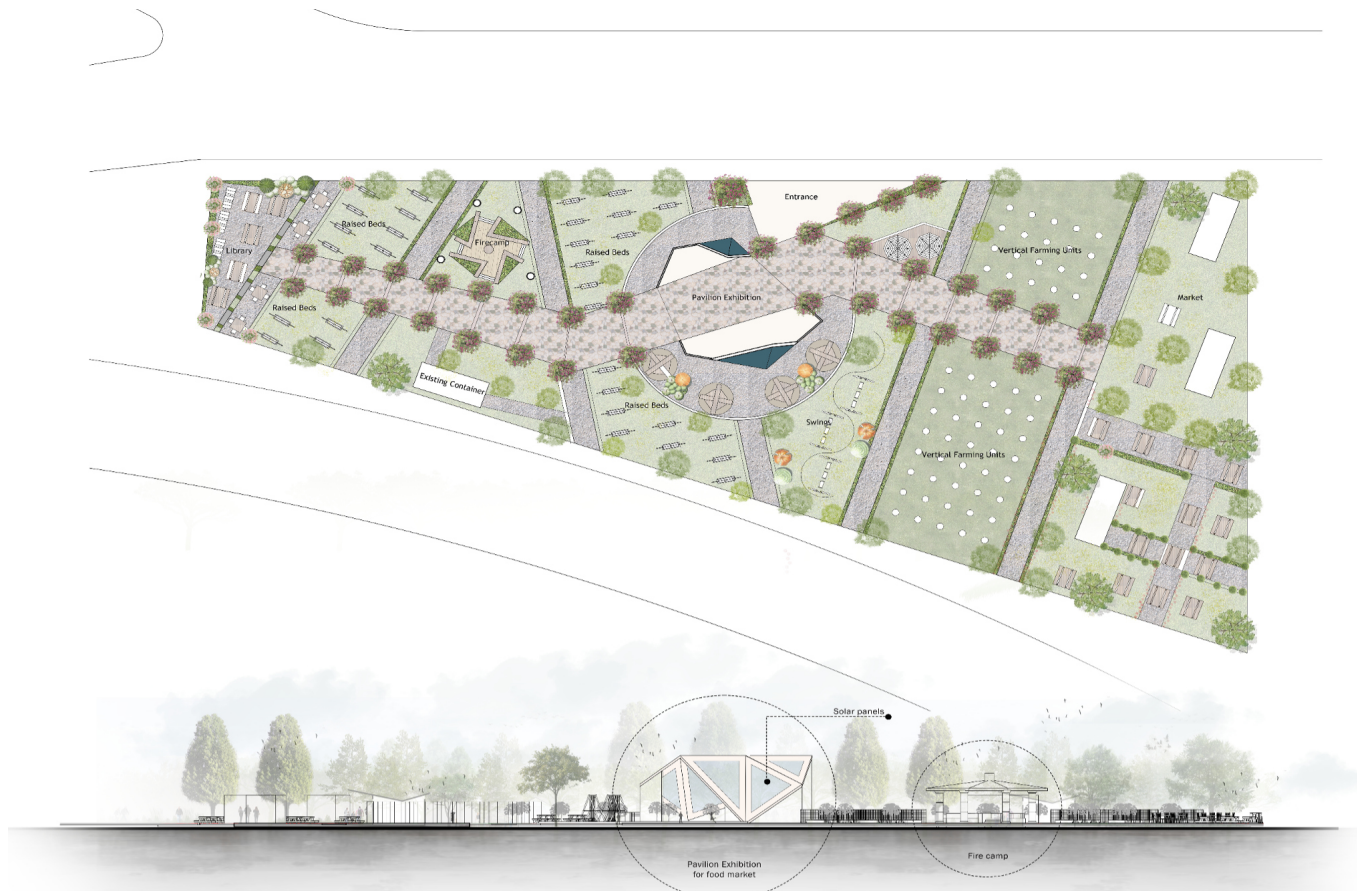
The mild summer climate is ideal for growing crops, with the soil typically being acidic and having sandy or loamy textures that offer good drainage and nutrient retention. With an average annual rainfall of 540 mm, these conditions are perfect for growing crops like lettuce, cabbage and kale in vertical farms, as well as crops like carrot, tomato and strawberries in raised beds. The combination of favorable soil and consistent rainfall ensures healthy, productive plants throughout the growing season.

Similarly, we use natural insecticides like neem oil and insecticidal soap to control harmful insects, and we plant flowers like marigold to help keep pests away. We also space our crops evenly and rotate them to keep plants healthy and prevent disease. Effective pest and disease control is ensured throughout the growing season by these combined techniques.

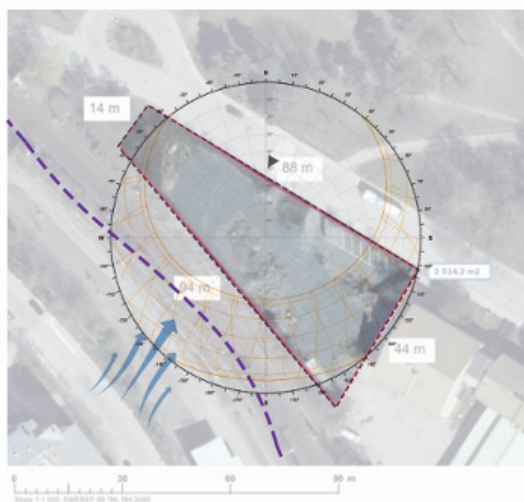
The foundation of our marketing strategy is the development of solid local partnerships. We will go out to nearby restaurants and the university canteen to set up supply agreements, and we'll get in touch with local businesses and supermarkets to provide our fresh products. Furthermore, we will utilize social media channels to interact with consumers, spread awareness, and highlight our environmentally friendly farming

methods. With the support of this multi-channel strategy, we will be able to expand our consumer base, raise our profile, and generate steady demand for our goods in the neighborhood.

With the help of innovative technologies, eco-friendly practices and community engagement, we are aiming to create a resilient system that focuses on environmental sustainability, economic profitability and social inclusion.



Site Analysis



- Key:**
- Site Borders
 - Preferred Winds
 - - - Railway
 - ▶ Main Site Access
 - ☉ Sun Path Diagram

SWOT Analysis

Strengths

- Strategic location within KTH Campus.
- Existing infrastructure (electricity, water, and sewage connections).
- Existing urban farming element (Green & Growing container for hydroponic farming).

Opportunities

- Urban agriculture, hydroponics, vertical farming, composting.
- Social integration and gathering space for recreation and collaboration.
- Improved accessibility & visibility—enhance lighting, pathways, and public engagement.
- Economic potential collaborate with local businesses, student startups,

Weaknesses

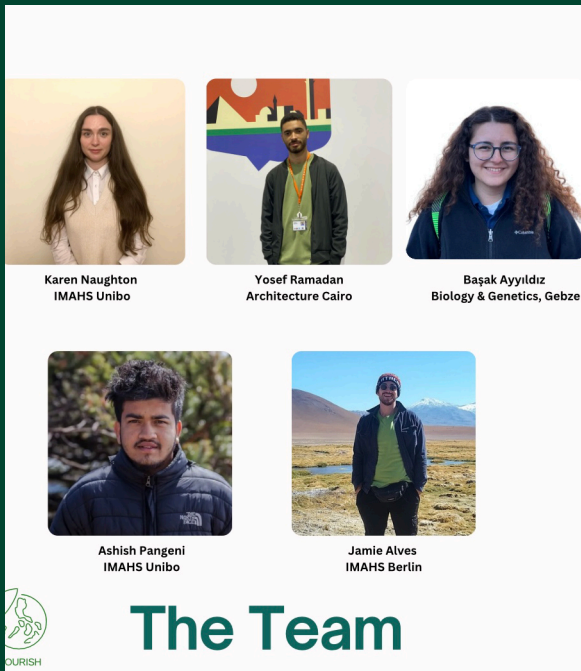
- Underutilized space currently a gravel covered, abandoned lot.
- Safety issues due to poor lighting and isolation.
- Limited foot traffic despite proximity to a major corridor.
- Regulatory constraints—only temporary structures are allowed.

Threats

- Seasonal challenges and harsh winters may limit farming activities.
- High maintenance costs—farming systems require long-term funding and expertise.
- Competition for campus space—other university projects may take priority.
- Regulatory barriers, Stockholm's zoning laws, and KTH policies may limit interventions.



Project design and site analysis



Jamie Davida; Ashish Pangeni; Karen Naughton; Yousef Ramadan; Basak Ayyilidiz

The project aims to transform a neglected gravel lot at KTH into a welcoming, sustainable urban farm that fosters mental well-being and social interaction. Designed as a temporary and fully removable installation, it demonstrates how underutilized spaces can become thriving hubs of learning and engagement. The project highlights the role of Swedish native plants, sustainable agriculture, and biodiversity in creating an inclusive and vibrant community space.

A central trellis with portico archways allows visitors to walk through from either side, acting as a structural focal point. The garden features two entrances, one through a traditional Swedish round-pole fence known as Långgårdsgård and another through the trellis archways. A natural shrub barrier of Cotoneaster lines the roadside and railway border, absorbing heavy metals and providing a protective screen.

A recycled wooden trellis crafted from driftwood, old brewery barrels, or repurposed railway sleepers provides shade and visual interest. Slightly off-center, a greenhouse built from reclaimed wood and recycled glass jars supports year-round food production and biodiversity. The outward-facing jars offer nesting spaces for pollinators and birds, while others house plants for display. Inside, students and locals can grow tomatoes, basil, cucumbers, and dill, alongside other greenhouse-friendly crops. A rainwater collection system irrigates an internal hydroponic setup with leafy greens. Within the greenhouse, a designated tea garden features chamomile, mint, and green tea, supporting the formation of a student tea club.

Box planters throughout the space contain Swedish native crops such as lingonberries, wild blueberries, sea kale, kale, and sea buckthorn, providing nourishment for both people and pollinators. A small section of raised beds allows community members to cultivate their own edible gardens, fostering local engagement. A traditional Swedish fire pit offers warmth in winter while generating biochar to enrich soil nutrition.

An outdoor stage with semi-circular wooden bench seating made from recycled materials serves as a venue for live music, recitals, and student performances. A pergola overhead supports native Swedish hops, honoring local brewing traditions while offering shade and greenery. Nearby, a pollinator hotel and birdhouses provide shelter for wildlife.

Outdoor study areas feature seating with recycled tables, painted chess boards, solar-powered lighting, and outdoor plug sockets. Partially underground seating retains warmth in colder months, while box planters between booths provide insulation and greenery. A recycled roofing system collects rainwater and directs it into upcycled

industrial containers for irrigation. The far end of the garden includes a composting area for organic waste recycling.

Multilingual signposts guide visitors, promoting inclusivity within the international student community. The project will also gain popularity and funding through student union events, creating opportunities for students to participate and engage with sustainable urban farming. Economic feasibility is supported through EU grants, business sponsorships, and crowdfunding, ensuring long-term viability while maintaining accessibility. Key funding sources include Horizon Europe, the LIFE Programme, and Stockholm's Environmental Investment Grants, aligning with the city's sustainability.



Virtual images of the project

Urban Green Synergy



Bibek Shah; Fahim Shaikh; Firdevs Sena Ertürk; Ishwarpartap Singh Deol; Jyothis Sanalkumar; Lekshmi Brahmesh Maya; Muzan Abdelrahim; Sujan Khanal.

This initiative aims to transform the 2,500 m² underutilized gravel space at the KTH Campus in Stockholm into a multifunctional urban agriculture hub. We have a creative concept for producing food sustainably and a community space that enhances social interaction while supporting KTH's sustainability reputation.

We are proposing a **wooden greenhouse structure built** using chemically treated wood to prevent damage from humidity ensuring durability. The greenhouse supports a diverse range of edible plants including leafy greens, vegetables and herbs creating a productive agricultural space. Additionally some plants are also growing in movable wooden crates. A circular resource management system will collect rainwater and process campus food waste into nutrient-rich compost, which will nourish plants growing both in greenhouse and wooden crates. The integration of natural design elements will ensure a sustainable, aesthetically pleasing environment that complements the campus surroundings.

To enhance biodiversity and food production, **dwarf apple and pear trees will be planted as boundary hedges** thus providing seasonal fruit and supporting local pollinators. Additionally, a movable aquapond will be integrated into the design, allowing for flexible placement and seasonal adjustments. This pond will host fish species suitable for Stockholm's climate such as carp, perch, and tench, which can tolerate cooler temperatures and contribute to a balanced ecosystem. A small hydroponics system for research purposes will also be included, allowing students to explore innovative farming techniques and conduct experiments on plant growth, nutrient optimization, and sustainable water use.

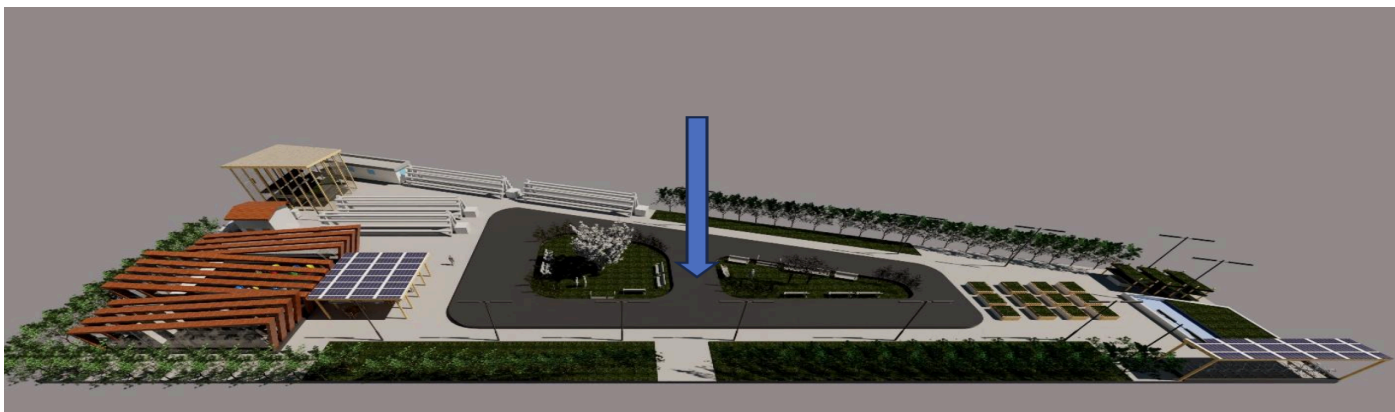
During summer, the space will be transformed into a vibrant urban garden offering students and faculty an engaging environment. Movable iron tables and benches will be installed throughout the site, creating inviting spaces for relaxation, study, and informal gatherings. Educational resources such as banners and QR codes will provide visitors with insights into sustainable farming techniques and urban agriculture principles, fostering a deeper understanding of food systems and crop cultivation aspects. Composting, cultivation, and all major agricultural activities will primarily take place during summer, utilizing optimal growing conditions.

In winter, the area will be transformed into a community-centered recreational space featuring an ice-skating rink and a campfire zone with a café, ensuring that the site remains active and welcoming throughout the year. This seasonal adaptation will offer students and local residents an opportunity to gather, socialize, and enjoy outdoor activities even during the colder months.

By integrating sustainable agricultural practices with thoughtfully designed communal spaces, this project aims to serve as a model for urban food production while enhancing campus life. The initiative aligns with the three pillars of sustainability:

- **Environmental sustainability** through zero-waste farming, biodiversity, and green infrastructure.
- **Economic benefits** by supporting local food production and research-driven agricultural advancements.
- **Social engagement** by creating a multifunctional space for education, recreation, and community-building.

This urban agriculture hub will function as a **living laboratory** for KTH researchers and students, facilitating studies on resilient food systems, urban greenery, and sustainable design.



Virtual design of the area

Harvest Hub



Noureen Karar; Yusuf Sabry Elsamalouty; Simay Akpınar; Elif Uzluer; Jayasinghe Arachchige Sakuntha Rasanjana; Dinithi Dharmarathne; Ran Tao

In a world progressively aware of the environmental crisis, the Smart Portable Greenhouse (SPGH) and Meet-Up Kitchen (MK) stand as innovative responses committed to the three pillars of sustainability: environmental health, social equity, and economic viability. This project transforms the Project Site into a vibrant hub for locals and university residents, circulating the joy of organic produce while nurturing community bonds, creating an environment of encouragement, achievement and Responsible behaviors.

Innovation Meets Accessibility: The SPGH integrates technology and horticulture by employing a personalized QR code entry system. As participants scan their codes for access, a dedicated mobile app guides them through Harvest tasks, enhancing engagement and accountability. Users can monitor plant care schedules, participate in composting activities, and track their contributions, fostering a sense of responsibility and collective stewardship. This AR-driven approach effectively blurs the line between digital interaction and tangible ecological impact, marrying convenience with commitment.

Circular Ecosystems and Resource Recovery: The SPGH leverages a circular model of sustainability, actively involving the community in composting efforts through designated brown and green waste sections. By transforming organic refuse into nutrient-rich fertilizer, participants close the loop on waste management. In addition, innovative approaches such as Bokashi composting and biochar production are utilized, ensuring maximum resource efficiency. The biochar produced from residual plant materials can serve as a substrate for microgreen and mushroom cultivation, creating an interlinked cycle that promotes ongoing agricultural productivity.

Social Sustainability and Community Building: At MK, the culinary heart of this initiative, individuals come together to prepare and share meals crafted from the greenhouse's bounty. This welcoming social space not only cultivates friendships but also celebrates inclusive gatherings, where harvest days become opportunities for joy and shared experiences. By encouraging all participants—even those without harvesting rights—to bring food to communal events, the MK fosters social equity and interaction among diverse community members.

Economic Sustainability: The SPGH and MK aim to reinforce economic viability. By enabling local residents and students to actively participate in urban farming, the project encourages the growth of a *self-sustaining community* economy. Participants earn points for contributions, which *can later be redeemed for fresh produce*, creating an incentive to engage in sustainable practices. Additionally, surplus produce can be sold at local markets or used in community events, generating income and fostering local entrepreneurship.

Gradually, the project seeks to decrease reliance on external food sources, empowering users to cultivate their own food security

A Blueprint for the Future: The SPGH and MK's commitment to sustainable materials further enhances its ecological footprint. Utilizing recycled aluminum, mycelium panels, and solar energy, this project aspires to embody the principles of environmental responsibility while showcasing innovative architectural design. Features such as modular kitchen units and a retractable roof for optimum airflow prove that sustainability can harmoniously blend with functionality.

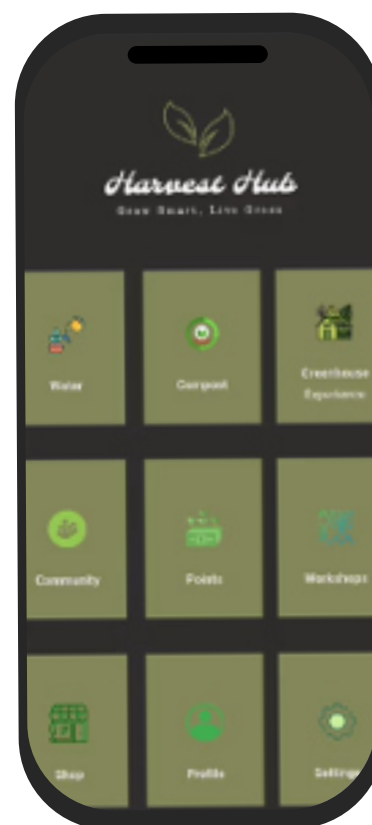
In summary, the SPGH and MK exemplify a pioneering Sustainable Business model for sustainable urban farming and community engagement. By intertwining environmental stewardship, social interaction, and economic resilience, this dynamic initiative represents a forward-thinking response to contemporary sustainability challenges. Together, we can sow the seeds of change and cultivate a greener tomorrow.




MACRO SITE ANALYSIS



The graphic design of the area, the site analysis and the smartphone app





A special thanks to all the students who took part in this international challenge. Your enthusiasm, creativity, and commitment made this experience truly rewarding.

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