SiEUGreen
Sino-European innovative green and smart cities

Sino-European Innovative Green and Smart Cities

Deliverable 1.5a

Engagement Strategy - planning

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Due date: 03/04/2020
Version: 2.0

Co-funded by the Horizon 2020 programme of the European Union

Co-funded by the Chinese Ministry of Science and Technology

The project has received funding from the European Union's Horizon 2020 Research, and Innovation Programme, under Grant Agreement Nº 774233

Co-funded by the Horizon 2020 programme of the European Union

Co-funded by the Chinese Ministry of Science and Technology

Disclaimer

SiEUGreen

The project has received funding from the European Union's Horizon 2020 Research, and Innovation programme, under grant Agreement N 774233 and from the Chinese Ministry of Science and Technology.

Throughout SiEUGreen's implementation, EU and China will share technologies and experiences, thus contributing to the future developments of urban agriculture and urban resilience in both continents.

The project SiEUGreen aspires to enhance the EU-China cooperation in promoting urban agriculture for food security, resource efficiency and smart, resilient cities.

The project contributes to the preparation, deployment and evaluation of showcases in 5 selected European and Chinese urban and peri-urban areas: a previous hospital site in Norway, community gardens in Denmark, previously unused municipal areas with dense refugee population in Turkey, big urban community farms in Beijing and new green urban development in Changsha Central China.

A sustainable business model allowing SiEUGreen to live beyond the project period is planned by joining forces of private investors, governmental policy makers, communities of citizens, academia and technology providers.

Technical References

Project Acronym:	SiEUGreen
Project Title:	Sino-European Innovative Green and Smart Cities
Project Coordinator:	Dr. Petter D. Jenssen, NMBU Phone: +4791377360 Email: petter.jenssen@nmbu.no
Project Duration:	January 2018 - December 2021

Deliverable N°:	D1.5a
Dissemination level [1]:	PP
Work Package:	WP 1 - Support to institutional and social structures for creating resilient cities with UA
Task:	T 1.4 Development of engagement strategies for individual residents, local communities, international actors
Lead beneficiary:	5 - Nordregio
Contributing beneficiar-y (-ies):	14 - CASS, 13 - Hatay Municipality; 7 - Aarhus Municipality
Due date of deliverable:	01/04/2020
Actual submission date:	02/04/2020

[1] **PU** = Public
PP = Restricted to other programme participants (including the Commission Services)
RE = Restricted to a group specified by the consortium (including the Commission Services)
CO = Confidential, only for members of the consortium (including the Commission Services)

Document History			
Version	**Date**	**Author - Beneficiary**	**Summary of Changes**
1.0	31/03/2020	Nordregio	Final Version
2.0	03/04/2020	Nordregio	Final Version

Co-funded by the Horizon 2020 programme of the European Union
Co-funded by the Chinese Ministry of Science and Technology

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Abbreviations

ACHR	Asian Coalition for Housing Rights
BAEISU	Beijing Agriculture Ecological Ideas Services Union
ES	Engagement Strategies
HA	Housing Association
NGO	Non-Governmental Agency
SDI	Slum Dwellers International, SDI
UA	Urban Agriculture
ULL	Urban Living Labs

Executive Summary

This report presents SiEUGreen engagement strategies. These strategies aim to engage stakeholders in Urban Agriculture as well as with the different technologies that will be tested in the five showcases: Aarhus, Fredrikstad, Hatay, Beijing and Changsha.

The SiEUGreen project tests various technologies in Urban Agriculture (UA) in order to increase food security and resource efficiency, and foster smart, resilient cities. While establishing circular resource flows in urban agriculture and introducing new techniques, the project works with a variety of approaches to social engagement. The engagement from local communities and specific target groups is crucial for many of the technologies to work out as envisioned. The users' behaviour towards new technologies is at least as important as is the efficiency of technologies and, as such, play an essential role for the success to grow food and enhance the circularity of resources.

The report consists of two parts. **Part I** introduces the SiEUGreen showcases and explains the methodology for developing engagement strategies. It also includes the review of the participatory approach to urban planning and concepts such as 'empowerment', 'co-production' and 'urban living labs'. This theoretical analysis assisted in identifying principles that underpinned the development of the engagement strategies.

As described in the report, the showcases are quite different from each other. They are located in distinct regions, subject of different types of governments and institutional laws and cultures, and UA gardens are a mix of bottom-up and top-down initiatives. In addition, the technologies that will be tested in the showcases are different, ranging from low to high-tech. The **engagement strategies are sensitive to these differences and, as such, build on the particularities of each showcase**. Besides acknowledging these differences, **the development of the engagement strategies relied heavily on the dialogue with the stakeholders**.

The principles of developing strategies tailored to each showcase and in dialogue with the stakeholders mirror the methods employed, which included questionnaire surveys, in-depth interviews, study-visits, webinar and various online meetings. These methods assisted in identifying the challenges the different showcases may face engaging people in UA and implementing technologies and suggesting stakeholders that may be responsible for carrying out activities to enhance the engagement of other stakeholders. Based on these considerations, the SiEUGreen engagement strategies have a three-fold purpose:

→ To contribute to fulfilling the visions and objectives of the showcases

→ To engage local people in UA and reuse of resources

→ To facilitate the implementation of new technologies in UA

While **Part I** gives an account on the methodological and theoretical aspects that supports the development of the strategies, **Part II** presents guidelines for their implementation. Thereby, it begins with an explanation about how to read the document and the following chapters offer the engagement strategies for the five SiEUGreen showcases.

Each chapter begins with the **visions** and **objectives** of the showcase, maps the main **stakeholders**, pinpoints the main **challenges** to implement the technologies, to engage people in UA and with the new techniques and, ends with an **action plan**. The action plan includes various '*processes*' that reflect the main challenges. As these processes are quite complex, they are broken down into manageable '*activities*' for which different stakeholders are suggested to hold responsibility. Both *processes* and *activities* are related to the **objectives and visions** of each showcase. This procedure resulted in five distinct engagement strategies that were designed in dialogue with the main stakeholders from each SiEUGreen showcase.

Possibly, the engagement strategies presented in this report lack aspects that will need to be addressed in the future, while others may turn out not relevant for engaging people. These gaps in the strategies will be identified in continuous interchange with the stakeholders from each showcase, which will help to understand, for example, why a particular strategy was successful in one showcase but not in another. This knowledge will be reported in forthcoming SiEUGreen delivery **'D1.5b: Engagement Strategies – follow-up on the implementation.'**

PART I:

ENGAGEMENT STRATEGIES: THEORETICAL CONSIDERATIONS

1 Introduction

This part of the report introduces the SiEUGreen showcases, describes the methods used to develop the engagement strategies, and provides an overview of the relevant concepts underpinning the SiEU Green engagement strategies. The conceptual framework is based primarily on participatory planning literature.

The engagement strategies are closely linked with several other SiEUGreen tasks and deliveries. As further explained in Section 3, the development of the strategies relied on the visions and objectives of the SiEUGreen showcases, which are reported in D3.2. (Common Implementation Framework). In addition, the strategies outlined in this report will have a direct link with other SiEUGreen tasks such as:

- Task 1.4, part 2: Engagement Strategies - process evaluation. This deliverable will assess the engagement strategies after the showcase implementation has been monitored in task T3.3. Nordregio, as leaders of WP1, will in deliverable 1.5b, evaluate and draw learnings from the engagement strategies.
- Task 3.3: Benchmarking and impact assessment about the evaluation of the implementation of showcases.
- Task 5.3: To develop a sustainable business model for the commercialization of the SiEUGreen solution

And, will feed in to:

- Task 2.3: Cultural adaption of technology in circular economy
- Task 3.2: Showcase deployment
- Task 5.2: Development of exploitation and scaling plans for each of the five showcases about establishing a Sustainable Working Group to gain sustainable longevity of the showcases.
- Task 6.5: Policy recommendations

2 The SiEUGreen showcases in a nutshell

Technologies that showcase circularity of resources through urban agriculture (UA) will be tested in all SiEUGreen showcases. In Aarhus, a solar-driven toilet and a polytunnel will be implemented in two established UA initiatives, Brabrand Fællesgartneriet and World Gardens. In Fredrikstad, a new urban development will be used to test several advanced technologies that aim to make the site independent of the local sewer system and demonstrate a near-

zero-emission circular system for waste and water. In Hatay, a greenhouse is being built to showcase aquaponic and hydroponic technologies to grow food, offering an alternative to current agriculture practices in the region. The Chinese showcases of Beijing and Changsha will also test new technologies relevant to the SiEUGreen goal to contribute to resilient cities through UA and circularity of resources.

2.1. Aarhus

In the Aarhus showcase, SiEUGreen technologies will be tested in two established UA initiatives which are part of Taste Aarhus Programme[1]: Brabrand Fællesgartneriet and World Gardens.

2.1.1. Brabrand Fællesgartneriet

Brabrand Fællesgartneriet is one of the oldest UA initiatives of the Taste Aarhus Program. It was initiated in 2014 by an architect, who, together with 20 people interested in growing food, rented out six hectares of land in the peri-urban area of Aarhus Municipality. Currently, 100 families and individuals cultivate vegetables in an open-air area and in two large greenhouses that were previously used for commercial growing of ornamental flowers. The greenhouses allow for growing food over an extended period of the year and, as a result, this garden attracts a diverse range of participants from across the city.

As part of the SiEUGreen project, a solar-driven toilet has been implemented in the site (see Image 1). This toilet does not use water to flush the waste and, powered by the sun, transforms the waste into compost that can be used for soil. This technology aims to demonstrate alternative ways of dealing with human waste (faeces and urine) while addressing the scarcity of phosphorous, a non-renewable resource fundamental for growing food.

[1] The '**Taste Aarhus'1** program has been a key driver of the implementation of more than 300 UA initiatives around the city. The program is managed by Aarhus Municipality partially through self-funding (€1 million) and partially through funding provided by Nordea Bank (€1 million, 2015-2018). Taste Aarhus uses urban gardening as a tool to bring people together, activate underutilised spaces around the city and engage people in the practice of growing their own food (Aguiar Borges et al., 2018).

Image 1: Solar toilet implemented in Brabrand Fællesgartneriet

The solar toilet in Brabrand Fællesgartneriet was implemented on the site in September 2019 and is already in use. The fertilizers produced with the waste from the toilet will be tested in the gardens by 2021.

2.1.2. World Gardens

World Gardens is an association that runs community gardens in the neighbourhoods of Gellerupparken and Toveshøj. Gellerup is located on the outskirts of Aarhus Municipality and is defined by the Danish Government as a ghetto. A "ghetto", in the Danish context, is defined based on the socioeconomic characteristics of the residents. Once an area is considered a ghetto, the municipality is responsible for taking actions to redirect its development to transform the area from being a disadvantaged urban area into an attractive urban district. In the case of Gellerup, such actions included the relocation of various municipal offices to this area, the refurbishment of residential units as well as the demolition of several buildings. These interventions have changed the local environment substantially. As part of this process, some of the UA-plots that World Gardens is involved in will disappear since they are located on land in between buildings that will be demolished. To this date, it is not yet clear how the affected UA-plots of World Gardens will be compensated.

As part of the SiEUGreen project, World Gardens has been allocated funding to build polytunnels in three places in Gellerup. The polytunnels will showcase new means for the residents to grow vegetables and prolong the growing season. They will be implemented in the open yards close to the homes of two of the members of World Gardens, and one set of polytunnels will be located in the new City Park that is part of the redevelopment of Gellerup.

2.2. Cicignon Park, Fredrikstad

In Fredrikstad, Norway, SiEU Green technologies will be showcased through Cicignon Park project, a retrofit development set to transform a former hospital complex into a residential

and commercial area. Østfold Hospital, located in downtown Fredrikstad, has a property portfolio of 55000 m^2 and a plot area of 35000 m^2.

In December 2014, NEC AS bought the hospital, and the construction of Cicignon Park started in October 2018. Figure 1 shows the master plan for the area identifying the two hospital buildings that will be maintained and refurbished.

At least 14 residential units in the refurbished hospital building (Image 2) will be equipped with vacuum toilets. The project has a strong focus on the treatment of greywater, blackwater and organic waste for use in UA. For example, the toilet waste and organic household waste will be treated on-site, and part of this waste will become fertilizer that will be used to grow food on the balconies, rooftops and in a greenhouse in the common area of the development. Nevertheless, as the apartments in Cicignon Park will be occupied only in December 2020, a short time will be available to assess the implementation of the technologies. Therefore, a pilot case will be carried out in Oslo in spring 2020. Also in Olso, tomato growth in self-watering containers will be tested in 100 households. This system will be implemented in balconies, and the hobby greenhouses and the households will monitor yield through the summer.

Through these innovative technologies, the project aims to produce more energy (primarily from waste treatment) than it will consume and, in doing so, is expected to become a showcase of circularity of resources. Figure 2 illustrates the outcome of the refurbishment. The plans include implementation of UA on private (balconies) and in semi-public spaces (roof-tops and between buildings).

Figure 1: Cicignon Park master plan
Source: Nils Torps Architecture

Image 2: A hospital buildings that have been refurbished

Figure 2: Visionary picture of Cicignon Park
Source: Nils Torps Architecture

2.3. The Kisecik greenhouse, Hatay

In the peri-urban area of Antakya, the capital of the Hatay province, a greenhouse with 2000 m^2 of floor area is under construction. With support from SiEUGreen, this investment is expected to become a test area for the potential of aquaponics, hydroponics and vertical gardening systems to produce food in the region. Hatay Municipality owns the land where this green-house is being built, and the master plan for the surrounding area includes housing development as well as the support areas to host the Expo Hatay 2021[2] (e.g. pavilions, parks). Figure 3 illustrates the master plan and identifies the EXPO area, which accounts for 300 ha of the development. Figure 4 indicates the location of the greenhouse in relation to the EXPO area.

[2] http://expo2021hatay.com/home-2/

Figure 3: Master Plan for EXPO Hatay
Source: Hatay Municipality

Figure 4: EXPO Hatay area showing the location of the greenhouse
Source: Hatay Municipality

2.4. Beijing

2.4.1. Sanyuan Farm

Sanyuan farm covers an area of 66.67 hectares, 17.33 of which are used to operate the citizen vegetable garden project. The citizen vegetable garden project began in 2008 and aims to provide urban residents with leisure opportunities and food supply by renting out small plots of land. Each vegetable garden covers an area between 50 m^2 and 120 $m^{2,}$ and there are a total of over 1,400 plots. Here, people can experience the spring ploughing and autumn harvest, and feel the comfort of the countryside and nature. Activities on the farm include farming experience, fruit picking, foods processing of agricultural products, and handicrafts, and scientific experiments. In different seasons, Sanyuan Farm will launch different thematic educational activities, such as Arbor Day, Mother's Day, and Children's Day, among others. People plant a tree in spring; sow and pick in summer; yield harvest in autumn; store food in winter. This enables children to feel the rotation of the four seasons in farming activities, feed silkworm babies, collect honey, pick up fruits, and feel the charm of farming culture. Every year, about 30,000 people come to the farm to experience Sanyuan Farm, and visitors also have the chance to buy crops.

Image 3: Sanyuan Farm

Image 4: Plot with shelter for renting in the farm

The land on which Sanyuan Farm operates is government-owned and sublet at no cost to the farm's owner Beijing Sanyuan Agriculture Co., Ltd. There are two SiEU Green demonstration projects in Beijing Showcase: Aquaponics and Food waste disposal.

2.5. Changsha

Changsha is the capital of Hunan province, one of the most densely populated provinces in China. Given the large population and the location within the country, this province faces a challenge regarding food supply which requires long transport distance. The SiEUGreen showcase is located in Futiancangjun, Changsha, Hunan. The site has an area of nearly 320000 m^2 with a total construction area of nearly 740000 m^2. The development is currently under construction and, when complete, will consist of a school, houses and commercial buildings. Figure 5 and Figure 6 show the masterplan and a bird's-eye view of the development.

Figure 5: General layout of Futiancangjun

Figure 6: Bird's eye view of Futiancangjun

The Futiancangjun development will be used as a demonstration site for yellow and blue technologies. The blue technology includes the transformation of the plumbing of 17 residential units (including black water treatment\grey water treatment\rainwater treatment). A water treatment room nearly 80 m^2 has been built in the basement to treat black water, greywater and rainwater. The product of the black water treatment will be used as fertilizer for 100 balcony gardens. After treatment, greywater and rainwater can be used as drinking water for residents. Yellow technology will provide light and hot water to the residents of the community. These technologies enhance reducing, reusing and recycling of waste to secure food and water.

3 Methodology

The engagement strategies were developed using several different methods, including literature review, survey, interviews, workshops, online meetings and a webinar.

3.1. Desk study

The task began with the review of scientific literature covering relevant themes that surround the notion of 'engagement' (e.g. participation, empowerment). This review provided insights

on the principles in which the strategies should rely upon to become meaningful to the stakeholders from the different showcases.

The strategies also build on the SiEUGreen D3.2. 'Common Implementation Framework' which outlines the visions and objectives for each showcase, lists some of the potential stakeholders and identifies some preliminary engagement activities. The SiEUGreen typology developed in D1.2. (Baseline study including key indicators and development of a typology) was also used to describe the UA initiatives concerning the location of the UA in the city (peri-urban, intra-urban) the ownership of land (public or private), the technology employed to grow food (soil, greenhouses, pallets) and the governance arrangement (what are the actors involved in the UA initiative?).

3.2. Data collection

Apart from the review of relevant sources, other methods were employed to gather information about the cases and to, importantly, anchor and co-produce the engagement strategies with the showcase teams.

An email questionnaire (see Annex 1) was used to quickly gather information about the resources the showcases set aside to implement the strategies.

Interviews and online meetings were extensively employed to identify challenges, discuss needs and assign stakeholders' responsibilities. Nevertheless, excepting a few face-to-face, most of this information was gathered through telephone/skype interviews. For more details on the interview guides, see Annex 1.

A workshop with key stakeholders from World Gardens and Fallesgartneriet was an important method to identify challenges and also promote the interaction between the stakeholders from the different initiatives. As described in Section 7.2.3, synergies were found between both cases (e.g. a stakeholder from World Gardens' will help out the implementation of a test garden in Fallesgartneriet). As Cicignon Park is still under construction and the strategies, at the moment, are very much dependent on the developer and NMBU, a workshop was not appropriate to identify challenges in this showcase. Similarly, the distance and political changes in the government were the main reasons that prevented the realization of a workshop in Hatay.

Back to back, the workshop carried out in Aarhus, *study-visits* to Fallesgartenriet and World Garden, in Gellerup were undertaken. This field study was an opportunity to visit the solar-

driven toilet that was already implemented in Brabrand Fallesgartneriet and to visit the urban revitalization that took place in Galllerup.

A webinar was also organised to present the draft strategies and to promote the exchange of knowledge and dialogue among the main stakeholders of all the showcases.

3.3. Analysis

The methods for data collection were employed in different phases of the development of the strategies, which began with an overview of the ***available resources*** (people, time, financial) with survey and interviews to the main stakeholders of each the showcases.

After the overview of available resources, a **need assessment** was conducted to understand the specific demands of each showcase (e.g. issues related to management, implementation of technologies, engage people). In this step, challenges and potential stakeholders that could address these challenges were identified.

Based on this information, the first draft of the engagement strategies for each showcase was produced. This document was distributed to the main stakeholders of each showcase and to other SiEUGreen partners in December 2019 and became the foundation for a **cross-cases discussion** on the engagement strategies through a webinar, carried out in January 2020.

Sharing a draft between the main stakeholders of each showcase was also a mean for strengthening their ownership of the strategies so that they will implement. This webinar sparked a lot of discussions and unveiled uncertainties, specifically about the responsibilities (who does what?). Thereby, follow-up interviews were conducted with each showcase to address these issues.

Table 1 describes the methods employed to carry out these various phases of the engagement strategies.

Table 1: List of methods employed in different phases of development of the strategies

	Availability of resources	**Needs assessment**	**Cross-cases discussion**	**Follow-up meetings**
Aarhus	- E-mail survey with the manager of Brabrand Fallesgartneriet and the main stakeholders of World Gardens - Skype meeting with the manager of Taste Aarhus	- Two skype meetings with the manager of Brabrand Fallesgartneriet and the main stakeholders of World Gardens - Workshop with the participation of Taste Aarhus management group and UA practitioners of World	A webinar with the involvement of all SiEUGreen showcases, including the showcase leader, a couple of core stakeholders, Nordregio, NMBU, ViLabs, CASS, Crevis, NIBIO, January 2020	- Two skype meetings with Brabrand Fallesgartneriet and Taste Aarhus;

		Gardens and Fallesgartneriet in Aarhus, September 2019 - Study visit to Brabrand Fallesgartneriet and Gellerup		
Fredrikstad	- Skype meetings with NEC AS, October 2019	-		- Face-to-face - interview with the manager of the NEC AS, January 2020 - Meeting with NMBU to discuss the implementation of technologies in Cicignon Park, January 2020
Hatay	- Skype interview with the responsible for greenhouse	- One Skype meeting with the responsible for greenhouse		- Two skype meetings with the responsible for greenhouse
Beijing	Study visits in September and October 2019	- Two conference calls with project members, October 2019 and January 2020,		
Changsha		- Three interviews with Photon and two with Green Valley, May to December 2019:		

Communication with partners from WP3 and WP5 was essential to coordinate deliverables. For example, dialogue with researchers from WP3 contributed to a better understanding of the visions and objectives of the showcases and also to highlight issues about how to monitor the implementation of the engagement strategies. Discussions with researchers from WP5 were important for identifying potential stakeholders that will be part of the 'sustainability working group' that is being formed in WP5. This coordination will continue in the next stages of the engagement strategies.

Finally, it is worth highlighting that Nordregio is the main responsible for this deliverable as the researchers from Nordregio have carried out the literature review, established the framework to communicate the strategies and is accountable for the engagement strategies of the European showcases. CASS is responsible for the engagement strategies of the Chinese showcases, being the primary author for the Beijing strategies (Chapters 10). Hengkai co-authored with CASS, the engagement strategies for Changsha (Chapter 11).

3.4. Limitations

One limitation has been the short time spent in the showcase sites which included two days in total in Aarhus, one day at Sanyuan Farm by Nordregio and two visits by CASS, one day in Fredrikstad, and no visit to Hatay. Nevertheless, Nordregio has visited all the showcases at earlier stages during the SiEUGreen project time.

As the lead for the WP1, Nordregio has settled the methodology for developing the engagement strategies and CASS and Hengkai have delivered inputs from the Chinese showcases. This process can be improved with a better engagement of the Chinese partners in designing the methodology. Nevertheless, considering the early deadline of the D1.5, initially planned to M32, and the late engagement of the Chinese partners in the project, this was not possible. But it will be considered for D1.5b that deals with the follow-up on the implementation of the strategies and lessons learned.

4 Literature review: strategies for engagement

In this chapter, some concepts related to public participation are introduced, as a mean of improving the understanding of what type of stakeholder engagement would be fruitful for the different showcases.

4.1. Participatory approaches in urban planning

Much has happened in the field of theories about participation since Arnstein's well-known Ladder of Participation (Arnstein, 1969). Arnstein was a social worker dealing with underprivileged groups in the US who experienced a high degree of manipulation from the side of the public authorities. To make sense of this difficulty, she systematised different ways that citizens could be involved in decision making. Importantly, Arnstein's model, presented in the form of a ladder (Figure 7), included the notion that citizens could be manipulated to believe they were involved in decision making when in reality they had no power at all. Arnstein described these forms as "non-participation" and found them commonplace (Arnstein, 1969).

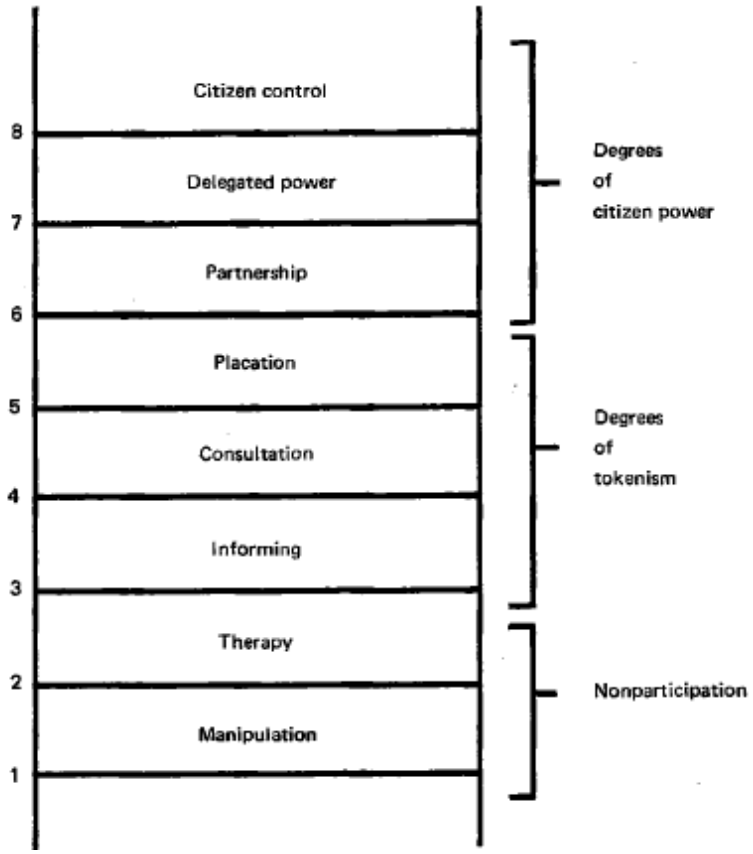

Figure 7: The ladder of participation
Source: Arnstein, 1969

The Ladder of Participation was intended to be a critical tool to examine false or real participation and has had a significant influence on the understanding of public participation in decision making. A common critique to this approach is that it has a normative understanding of what kind of participation is the most desirable, assuming that complete control of power by the citizens is always the most desirable form of participation (Oliveira e Costa and Tunström, 2018).

One example of development away from this normative framework has been Archon Fung's Democracy Cube (Fung, 2006) which shows a palette of different ways to a) communicate, b) recruit participants, and c) exert influence in public decision making, see (Fung, 2006).

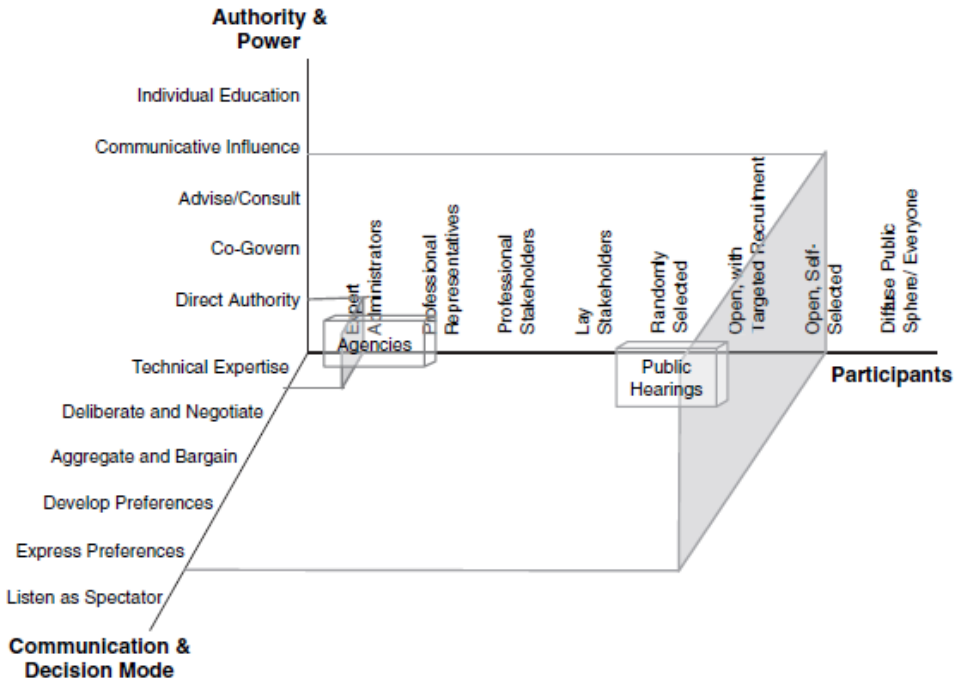

Figure 8: The Democracy Cube.
Source: Fung, 2006

The Democracy Cube can be used both as a framework to analyse participation activities and processes and as a guide for practitioners who are setting up a participation process. In this model or guide, none of the ways to communicate, recruit and enable influence is seen as better or worse than others. Instead, the three dimensions of participation should be selected according to the role they can fulfil in the project – what knowledge gaps do the entitled experts uphold, and accordingly, who could be included in the process to complement their knowledge (recruitment) and how is that best done (communication and level of influence) (Fung, 2006).

While the Democracy Cube can be a bit complicated to apply as a framework, the important take away is that different methods for communication create different possibilities for the participants to interact and influence the decision. For example, a public information meeting where participants simply listen does not encourage the participants actually to influence decisions. Alternatively, a workshop where participants are encouraged to gain a deep understanding of an issue may be more likely to result in suggestions and solutions. Importantly, the Democracy Cube acknowledges who participates and how these participants are invited. This dimension of participation is very relevant as it relates to the accessibility to participation events as well as the representativity of the participants.

4.2. Empowerment

Empowerment links to the concepts of 'participation', 'ownership', 'recognition', 'sharing' and 'democratization' and aims to bring about change at different levels in society (Berlina and Norlén, n.d.). This concept was fundamental for SEMPRE project (Berlina and Norlén, n.d.) that dealt with the design and delivery of services in rural areas, which have been facing tremendous challenges due to budget cuts. A central hypothesis in this project was that services would be more sustainable if they were developed together with users, instead of for them.

Building on Foucault, (1990), Berlina and Norlén (n.d) characterise empowerment at different levels: individual, group, organisational and societal. On the *individual level*, empowerment means that the individual's identity changes from a self-perception characterized by oppression and hopelessness to an entrusted recognition of the self in which individuals gain control over his/her own life. On a *group level*, individuals share their experiences and, by doing so, they become stronger as a group and can achieve change together. *Organisational* empowerment challenges taken-for-granted systems within organisations and is essential for organisations to keep up with ongoing changes in society. This acknowledges the flexibility and ability (or resilience) these organisations have to adjust their structures to emerging demands. Such demands are usually identified by the staff and/or users of the service and/or goods these organisations provide (Berlina and Norlén, n.d.). Berlina and Norlén (n.d.) explain that for change to be sustainable on a *societal level*, it has to be led by people; however, "(…) experiential knowledge and user perspective are not yet part of social policy design." (Berlina and Norlén, n.d.: 13). This statement points to the need for further development of participation in policy design.

4.3. Co-production

There is no commonly agreed-upon definition of co-production but is nonetheless used frequently to describe different forms of engagement between state and society in urban planning issues. It has almost become a buzz word in international research and development projects, and the engagement of citizens is a significant topic in public management research (Brandsen et al., 2018). As co-creation is an essential concept in the SiEUGreen engagement strategies, it is necessary to clarify the meaning in this context to prevent misunderstandings and to assure it is consciously used.

Co-production can be contrasted to and compared with theories of collaborative and communicative planning that have been present in the urban planning theoretical field for

several decades (Watson, 2014). As Watson (2014) explains, much of the literature on co-production is found within the disciplinary areas of development studies and public administration. The term originates from Elinor Ostrom's work (see, e.g. Parks et al., 1981), who defined co-production as the possibility of transforming a good or service through input from individuals who are not part of the organisation (Watson, 2014). This perspective has benefits for the goods or service and may also foster social capital through the process of a community coming together to address a common challenge. Watson (2014) identified some common features between co-production and communicative and collaborative planning practices:

- They are both concerned with the engagement between state and society for improving living conditions, often with an emphasis on the poor, and with how professionals can enable the engagement.

- While co-production could mainly take place, or at least be initiated from outside of the established channels, a collaborative approach can be important. If co-production turns into protest alone, it could turn into a situation where the users instead are entirely excluded from taking part in shaping the needed services.

- They can both be performed in democratic societies where individuals and groups may organise (Watson, 2014).

Hence, neither collaborative and communicative planning approaches, nor co-production, take a radical approach to social change as they pose essentially no challenge to the role of the state. Based on the experience of an international NGO that supports a network of slum dwellers in Africa (Slum Dwellers International, SDI) and Asia[3] (Asian Coalition for Housing Rights, ACHR), Watson (2014) points to some crucial differences between co-production and the participatory planning approaches of communicative and collaborative planning.

- Co-production works outside established rules and procedures of governance and is initiated in cases where formal channels for engagement do not exist or are unsatisfactory.
- Co-production processes are implemented by the users, which can include construction and service delivery. In bottom-up co-production, there is community control from initiation to intervention.
- The users themselves apply planning technology
- The users doubt that conflict with authorities can be dealt with via dialogue.
- The users gain skills and knowledge from practical experiences, thus learning has more practical than theoretical outcomes

[3] The NGO maintains a bottom-up structure that supports slum dwellers to use surveys, mapping and plans, creating platforms for advancing and leading urban development issues to the local and national authorities

- There is an aim to transfer local practices through global networks.

Consequently, a crucial aspect of co-production is the fact that the activities performed by the NGO and slum dwellers' come from outside of the sphere of the public authorities. This last feature disqualifies any kind of top-down planning initiative from being one of co-production. Watson (2014) points to that co-production is more probable to take place in situations where the state and welfare providers have been unable or unwilling to deliver services. A critical voice to co-production comes from Bovaird, (2007) cited in (Watson, 2014), who points out how co-production blurs the boundaries between private, public and voluntary sectors has the potential to weaken public accountability. This perspective might be less of a problem in states where welfare provision is scarce.

4.4. Urban Living Labs

As with co-creation, 'living lab' is a concept that is widely used but without an established common definition. Nevertheless, the aim to develop, try out and test solutions in a real-life context is a common feature of living labs (Steen and van Bueren, 2017). The concept was first used in the 1990s and, today, many different kinds of living labs are going on, (Chronéer et al., 2018), including 'urban living labs'. Steen and van Beuren (2017) argue that urban living labs (ULL) consist of four elements: (i) the interaction of multiple stakeholders from multiple organisations in a real-world setting around a shared object/goal; (ii) the users have active roles in developing the common object by, e.g. testing, creating or validating; (iii) researchers have an important role in facilitating the study and the multidisciplinary processes; and (iv) collaboration which is of major importance to achieve the goals (Steen and van Bueren, 2017).

Chronéer et al. (2018) contextualize urban living labs in regards to the need to come up with smart solutions to deal with urbanization and environmental problems while ensuring quality of life. In this respect, living labs are innovation processes that happen in close collaboration with citizens who contribute to solving challenges. The authors argue that urban living labs address challenges on three levels; local challenges for the users, common challenges for the city and global challenges such as climate change (Chronéer et al., 2018). As Figure 9 illustrates Chronéer et al. (2018) define urban living labs using six components: (i) an innovation to experiment, (ii) citizens to engage, (iii) a mix of methods for engagement of different stakeholders and data collection, (iv) management structure for governance, (v) infrastructure to support real-life experimentation, and (vi) a mixture of partners with stable and dynamic relationships.

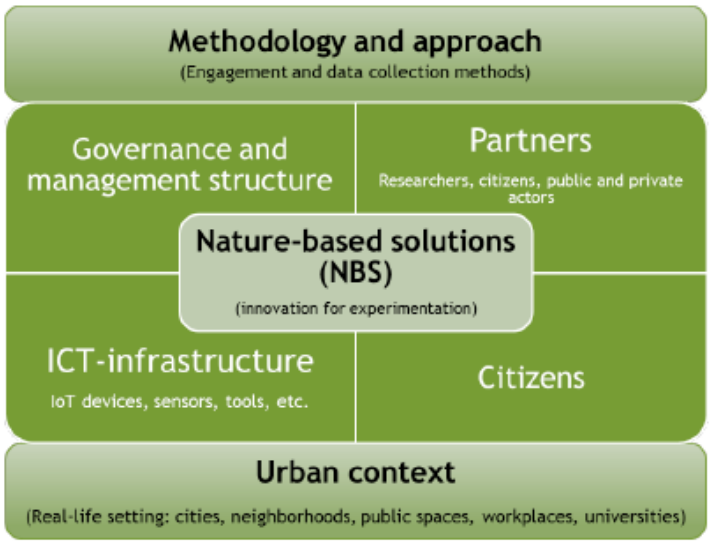

Figure 9. Six components in Urban Living Labs
Source: Chronéer et al. (2018).

The authors also emphasize the role of citizens as co-creators in designing solutions. They also acknowledge the challenge of engaging different citizen groups as engaging different groups may require different types of management structures, and hence, making the management of urban living labs rather complex (Chronéer et al., 2018). The urban living labs has a clear connection to the concept of co-production here with the focus on citizen engagement in solving challenges. However, it seems unlikely that urban living labs would occur outside of established governance structures. Instead, the collaboration between different spheres in society, including public actors, is crucial.

4.5. Participation in practice

At the theoretical level, the concepts of empowerment, co-production, urban living labs and the frameworks of Arnstein (1969) and Fung (2006) demonstrate the different levels of influence participants may exercise through participatory processes. Participatory events and processes can also be understood from a practical perspective. Here, five elements together constitute the character of a participatory event or process, including: (i) Who participates? (ii) When does participation happen? (iii) In which way do people participate? (iv) How much do people participate? (v) Why do people participate? (Sarzynski, 2015). Answering these questions helps to design participatory events or processes and to analyse the character of participation.

4.5.1. Designing the participatory process

When designing participatory events, it is vital to be aware that different ways of engaging people will lead to different results in terms of the character of participation. Taking this into

consideration in relation to the Ladder of Participation (Arnstein, 1969) highlights the importance of designing events and processes that are meaningful for the participants.

A vast range of handbooks on participation, community engagement, and principles for living labs have been published (see Text-box 1). Many of them include an array of important aspects to consider when aiming for local engagement. Linking back to the five important elements of participation, structured by Sarzynski (2015), some of these aspects are briefly introduced below. These aspects can be useful for the SiEUGreen showcase teams when planning activities that strive for stakeholder cooperation or citizen engagement.

Why do people participate?

- **Why participation and about what?** Be conscious of the aim of the participatory activity and that it is meaningful both for the organizers and for the participants. When formulating the objective of the activity, use a language that non-professionals will understand.
- **Give feedback!** Remember that those who participated should be informed about what became the results of their efforts. This needs to be planned in advance as it is hard to collect emails or phone number after the event has ended. Feedback is essential since it makes participation meaningful and helps to avoid distrust. People invest time, and they need to know what for.

Who participates?

- **Who should participate, and how can you recruit them?** Who would you like to participate, how can you reach them, and who might actually have the right to participate? A conscious approach to recruitment can create more just participation in relation to representation. Otherwise, there is a risk that only those that are already engaged raise their voices, while underrepresented groups remain unheard. Reach out to existing networks and associations.
- **Accessibility**. The event should be accessible for the participants in terms of where, when and how it will be carried out. Be aware that the venue and the activities should be adapted to people profile, e.g. different age, economic level, employment situation and different needs.

When does participation happen?

- **When participation?** Should engagement take place in the planning phase, the design phase, the construction phase, the user phase, the evaluation phase or something

else? The timing of participation defines what kind of influence the participatory activity will have on the process.

In which way do people participate?

- **How?** Which method suits the aim that you have formulated and the target group that you expect? If you run out of ideas, browse the internet or look to the suggestions in the textbox.
- **Online or offline.** A balance between online and offline methods for engagement tends to be a good idea. Online tools can enable participation in late evenings, when the offline event has ended, and for those who reside far distance from the venue. Nevertheless, care should be taken on the use of online tools that despite being smart and inclusive, may also be a barrier that prevents people in particular age to use them. It is also important that you have the capacity to process and respond to any data collected using online methods.

How much do people participate?

- **How much influence?** Consider what type of influence the participants should have. Will they design solutions? Will they listen to the information? Will they share their opinions? These questions refer to very different levels of influence and require different methods and settings. Be transparent. There is no gain in making it look as if participants have more influence than they actually do.

Text-box 1: Selection of handbooks and guidelines on community engagement and participation.

Selection of handbooks and guidelines on community engagement and participation

i. Guide to Urban Farming in NY state - 2012. Department of Horticulture at Cornell University, Cornell Small Farms Program.

ii. Urban Living Labs. Tips for "People and motivation" in living labs.

iii. Inclusion in urban gardens City of Vancouver, 2014. List of recommendation for inclusion, not necessarily engagement.

iv. UK government advice for community engagement for community gardens

v. Citizen participation for better urban green spaces – Nordic Forest Research (SNS).

vi. Urban green spaces: a brief for action - How to ensure adequate targeting, stakeholder collaboration and community engagement. WHO, Regional Office for Europe.

Community planning toolkit by Community Engagement, Belfast. Short descriptions of useful methods for engagement.

5 What is engagement in SiEUGreen?

The research project SiEUGreen addresses several societal challenges by introducing new technologies for UA. The circularity of resources lies at the core of the project that addresses coming challenges such as the scarcity of phosphorous. Phosphorous is a non-renewable resource that is fundamental to food production. The growing shortage of phosphorous demands new ways of enabling food production through circular systems, for example, by using fertilisers from waste (e.g. compost, biosolids, urine). Using circular resource systems in UA will contribute to increased food security, decrease waste in urban areas, foster social inclusion and contribute to urban resilience. Pursuing resilient development implies inclusion, collaboration and engagement with a range of different stakeholders. As pointed out in the introduction of urban living labs in Section 4.4, this background actualizes the potential for contributing to solutions on three levels, relating to local challenges for the users, common challenges for the city and global challenges such as in this case the scarcity of phosphorus.

Realizing the implementation of new technologies for circular resource systems requires the coordination and collaboration of actors from the public and private spheres as well as from civil society and citizens. Nevertheless, designing the SiEUGreen engagement strategies has been challenging as the five showcases are quite unique. They are located in distinct regions, subject of different types of governments and institutional laws and cultures, and the UA initiatives are a mix of bottom-up and top-down initiatives. In addition, the technologies that will be tested in the showcases are quite different, ranging from low to high-tech. Figure 10 provides an overview of the diversity of the SiEUGreen showcases:

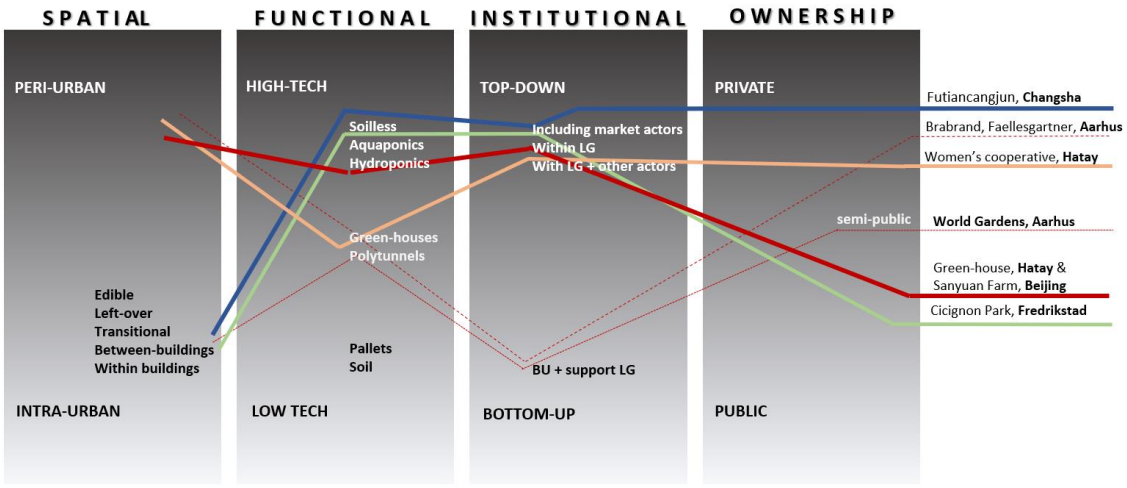

Figure 10: SiEUGreen typology

As indicated in Figure 10, some of the UA-projects have been initiated by people (e.g. Brabrand Fællesgartneriet and World Gardens in Aarhus), while other by the SiEUGreen

project together with private or public developers or authorities (e.g. Cicignon Park in Fredrikstad, Futiancangjun in Changsha, Kicicek greenhouse in Hatay). The profile of the end-users (e.g. age-group, gender, ethnicity, educational level) is of high relevance as it will shape somewhat different engagement activities.

This diversity between the showcases makes the participatory dimension quite complicated, and consequently, it is also challenging to define what character the participation will have in the project as a whole. As an example, in World Gardens, the members of the community design and build themselves the polytunnels that will be set, also by them, to carry out the UA. Thereby, in the World Gardens, the technology (polytunnels) has been implemented through a co-production process. On the other hand, in Cicignon Park, the private developer and NMBU plan, design and build houses where the residents will be invited to participate only when all the technology will be already in place.

Some concepts from the field of participatory research (e.g. co-production, empowerment) help shed light on how participation can take different forms and thus, they are used in the following section to discuss how different social groups can be engaged in the different SiEUGreen showcases.

5.1. Key concepts for SiEUGreen engagement strategies

The notion of **empowering organisations** is relevant to SiEUGreen. The organisations that will implement the technologies need to be responsive to the users' behaviours and flexible to adjust their strategies to facilitate the social acceptance of these new technologies. For example, encouraging acceptance of fertiliser made from human waste is likely to require extra efforts (e.g. educational campaigns, recurrent monitoring of the quality of the compost). Similarly, **individual empowerment** is one of the goals of introducing UA as a social and economical alternative. This is precisely the case of the Kisicek greenhouse in Hatay that aims to meet the needs of women and refugees. The opportunity for self-sustainment and increased skills in UA via collective learning can support individual empowerment.

Concerning **urban living labs**, several aspects can be related to the SiEUGreen project. The showcases will be a testing ground not only for technological innovations but also for social change. This will include a mix of methods for citizen engagement (see, for example, the Action Plans for each showcase in Part II of this report), as well as innovative approaches to governance at both the project and showcase level. At the project level, SiEUGreen partners

will work together to combine the delivery of technological innovations with innovative participatory approaches. This will support the adoption and ongoing use of the technologies beyond the life of the project. At the showcase level, different stakeholders (e.g. UA practitioners, local authorities, universities) are expected to partner to implement UA test-bed innovations. Thereby the project has a mixture of partners with more or less stable and dynamic relationships.

The concept of the urban living lab is also relevant to the SiEUGreen in the way that it emphasizes the role of people in designing solutions and innovations. This is particularly relevant to the work taking place in World Gardens in Aarhus. Here, the local association is planning and building the polytunnels that will be tested in the project. In other showcases, people are expected to engage in initiatives that are more of top-down character. For example, in Cicignon Park, the responsible showcase teams will need to tailor strategies to encourage the new residents to participate in UA and grow food in their balconies. In Kisecik greenhouse, students, members of a cooperative and farmers of the region are expected to get acquainted with alternative technologies of growing food (e.g. hydroponics and aquaponics). These examples reinforce the fundamental role of the users in testing and, thus, designing the implementation of new technologies to grow food and enhance the circularity of resources. Their behaviour towards new technologies will shape the way these technologies will be implemented. This should be of great concern for management organisations, as users' behaviour is at least as important as the efficiency of technologies and, as such, play an essential role in their success. In addition, attention to their behaviour can provide valuable lessons that can, for example, enable the up-scaling of these technologies to other contexts.

It is important to realise that it is not only the end-users who need to be involved in the implementation and testing of new technologies. Public officials, developers and associations are also part of the 'SiEUGreen urban living lab'. Their active involvement is crucial as it will enable the project to carry out the real-world experiments that are central to this project.

Nordregio and CASS, in close collaboration with the showcase teams, have developed engagement strategies that are tailored for each of the showcases. These strategies draw on the theory and tools described above. In particular, they took into consideration: who participates; when participation happens; what type of activity takes place and why the actors participate. Given the considerations above the SiEUGreen engagement strategies have a three-fold purpose:

→ **To contribute to fulfilling the visions and objectives of the showcases** described in D 3.2. Both vision and objectives were formulated in a joint process between the showcases and project leader of WP3. This implies that the strategies are tailored to the needs of each showcase and will strive for an inclusive approach including the development of a range of participation means, that fosters the different stakeholders

→ **To engage local people in UA and reuse of resources.** This implies exploiting not only the environmental but also the social and economic potential UA has to contribute to inclusive and resilient cities.

→ **To facilitate the implementation of new technologies in UA** by involving the community in the planning and implementation of technologies through a co-productive approach that is planned and led locally in a way that engages the community and professionals

5.1.1. Methods for engagement in SiEUGreen

Some of the methods for engagement suggested in the Action Plans in the Engagement Strategies for the SiEUGreen showcases (see Part II), are briefly discussed below.

→ Public meetings, inauguration events and community activities

Public meetings have taken place in Cicignon Park to inform the community about ongoing changes in the vicinity and inauguration events are suggested for the greenhouse in Hatay and Cicignon Park. Public meetings have the potential to gather a large number of people at the same time and can be used to communicate information from the side of the organisers. They can also be used to collect opinions from the participants or consult them on specific matters. On the other hand, it can be difficult to attract participants to open public meetings and events, and some people might feel uncomfortable to speak up in public meetings. It can also be challenging to handle potential conflicting views on topics that are to be discussed in public meetings (Community Places, 2014).

Public inauguration events can be an inclusive way to share information about possibilities for people living in the vicinity to engage in UA in the showcases. It can contribute to creating ownership beyond the direct users of the UA. Enabling UA-practice for a wider audience via setting up pallets for citizens beyond the residents in Cicignon Park is an example of such an event. Inviting neighbours to participate in digging activities for the polytunnels like World Gardens have done, is also a way to encourage the general public or the public in the immediate surroundings to take part in UA and can contribute to feelings of ownership. These are different ways to engage the local community practically. Taste Aarhus has strategically

included such events in their mission by requiring from beneficiaries of their project to hold open public events at least twice per year.

→ Training sessions and workshops

Various training sessions and workshops to enhance learning on specific topics are suggested in the Action Plans in the SiEUGreen Engagement Strategies (see Part II of this report). Training sessions can be used to increase community knowledge on a small scale UA such as growing in polytunnels in Aarhus or among residents in Changsha and Cicignon Park about how to use circular resource systems. It can also be used for entrepreneurs and commercial farmers in Hatay to promote aquaponics and enhance knowledge on aquaponic systems. Practical learning opportunities ensure that learning is not only based on discussions (Watson, 2014) and the mastering of new skills can allow for the empowerment of individuals and groups. Developing knowledge on new techniques is crucial both in bottom-up and top-down UA-initiatives. In bottom-up initiatives, it is important for the use and acceptance of new technologies. In top-down initiatives, enhanced knowledge and the mastering of skills can contribute to interest in partaking in circular resource systems, and it can be helpful for the management organisation to get qualified input from the users on how technique and UA-facilities can be improved.

→ Formation of long-term organisations and management groups

Some of the showcases need to build up collaborative institutions, and management groups have not existed previously. As both Cicignon Park and the greenhouse in Hatay will deal with the installation of complex technical systems, these showcases will need their steering organisations to be managed in collaboration between various stakeholders. For example, in Hatay, various public offices will have to cooperate.

Cicignon Park and Changsha need to set up structures for the long-term management of the advanced technology in the residential buildings, and at least in Cicignon Park, the residents might have a significant influence in the long-term management.

The showroom in Cicignon Park and the regional educational centre in the greenhouse in Hatay require multiple stakeholders to collaborate.

→ Web-based engagement

SiEUGreen has developed the Commurban mobile phone app which can be used among all the showcases to interact with each other locally or internationally. All showcases are encouraged to promote this digital tool as part of their action plans. This web-based

engagement tool can be reached and used from any location and at any time, it permits an exchange of views with others, it is cost-effective, and it can reach a large number of people while not requiring as much engagement timewise from the users (Community Places, 2014). Community Places (2014) shares the notion of some backsides as well; the moderation of commenting can be resource-intensive or difficult; it requires an internet connection and not everyone like using it.

→ Business models, employment and economic self-sustainment

In addition to participatory activities, the development of business models is also acknowledged in the engagement strategies as business models are crucial for the long-term sustenance of the technologies that are showcased. This is the case for the greenhouse in Hatay and the showroom in Cicignon Park and partly. In addition, the members of the women cooperative in Hatay can further develop their businesses which will contribute to improving their economy. The showcases in Brabrand Fællesgartneriet and World Gardens, Aarhus, both enable part-time employment.

Having seen and discussed some concepts and methods that underline the development of the SiEUGreen Engagement strategies, Part II describes the engagement strategies for each SiEUGreen showcase.

PART II:

GUIDELINES FOR ENGAGEMENT STRATEGIES PER SHOWCASE

Co-funded by the Horizon 2020 programme of the European Union

Co-funded by the Chinese Ministry of Science and Technology

6 Introduction

Part II of this report presents engagement strategies for the showcases in Aarhus, Fredrikstad, Hatay, Beijing and Changsha with a focus on the engagement of the local community and specific target groups. The strategies describe the ongoing processes (e.g. construction of polytunnels in World Gardens) and point out other tasks that need to be carried out to engage stakeholders with the UA and the SiEUGreen technologies. Each showcase has an 'Action Plan' that defines the main processes (e.g. establish long-term management for the Kisecik greenhouse). These processes aim to support the use and maintenance of the SiEUGreen technologies while contributing to fulfilling the objectives and visions of each showcase.

These guidelines are primarily intended for use by the showcase teams and project partners. The action plans are the most crucial part of the document, as they specify activities that should be carried out to contribute to a proper implementation of the new technologies and the circularity of resources.

The remainder of the introduction provides some guidance about how to read the engagement strategies, including presenting the basic structure, providing a background to the showcases in relation to one another, describing the format of the action plans and giving an overview of the Commurban application. The remaining chapters (7, 8, 9, 10 and 11) present, respectively, the strategies for Aarhus (Brabrand Fællesgartneriet and World Gardens), Fredrikstad (Cicignon Park), Hatay, (Kisicek Expo Zone), Beijing (Sanyuan Farm) and Changsha (Futiancangjun).

6.1. How to read the engagement strategies?

Following a brief reminder about the projects in the showcases, the strategies include:

- The vision and objectives for each showcase (as described in SiEUGreen D3.2)
- The challenges that the showcase/project may face to implement and maintain technologies as well as to engage people in UA and circularity of resources
- The list and description of the main stakeholders
- The Action Plan that describes the processes and activities that need to be implemented to fulfil the visions and objectives of each showcase. It also suggests which parties should be responsible for different activities.

More specifically, the **action plan** outlines the activities that should support the showcase team to a) succeed with the implementation of new technologies in UA and circular resource systems, b) keep the technology well used and well maintained beyond the life of the project,

and to c) contribute to the fulfilment of the objectives that the showcases have identified for their projects in SiEUGreen.

6.1.1. Understanding the showcases

The ways in which stakeholders are informed or engaged in UA and in testing new technologies depends on the 'type' of showcase and their phase of development.

→ The 'type' of the showcase.

Nordregio has developed a typology that can be used to understand the character of UA in a specific UA-project or a larger area like a city. According to this typology, each UA-project has a particular dimension of spatiality, functionality, institution, and ownership. While working with the engagement strategies, we have observed the way that the character and organisational functioning of a UA project result in different stakeholder engagement needs. One major point of difference relates to the institutional dimension of the typology. The type of engagement activities that the showcase leaders need to carry out differ if the case is top-down or bottom-up or co-governance. In the case of residents engaging in balcony growing in Cicignon Park (top-down) the potential challenges for engaging the envisioned end-users are higher than in, for example, the example of World Gardens (bottom-up). Here, the end-users are the members of the grassroots organisation themselves and are already those most invested in trying out the new techniques for growing. The typology helps to give a quick overview of some of the most robust features of the projects in the showcases (see Figure 11).

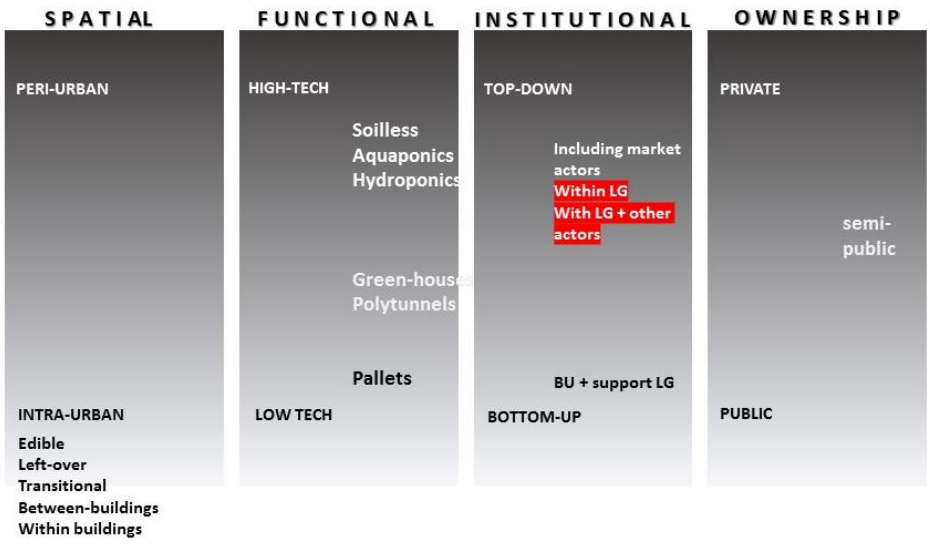

Figure 11: SiEUGreen UA typology

→ The development phase of each showcase.

The temporal dimension is divided into two phasis – the Preparatory phase and the UA and technology management phase. The processes in the action plan can span over both phases. All the SiEUGreen showcases are at different stages in terms of implementation of UA and technologies (e.g. in Aarhus UA is already implemented in different projects, while in Fredrikstad, it has not been).

Preparatory phase: Activities in this phase concern planning and preparing the site for UA and the technology. The preparatory activities can be practically oriented construction activities such as preparing the ground for setting up polytunnels (World gardens, Aarhus), or construction of a whole building (Cicignon park, Fredrikstad). The preparatory activities can also include planning for and preparing the social systems that need to be in place for the UA and technology to work. For example, this can be about informing the closest neighbours or general public on significant changes that will take place in their surroundings (the construction of Cicignon park, Fredrikstad), or setting up employment structures for persons that will carry out the UA (like recruiting refugees to work with the aquaponics in Hatay).

UA and technology management phase: Activities in this phase take place once the construction is finalized, and the UA-facilities can be used for growing and include the maintenance of the technology. These activities are related to the practical engagement of actors in UA and technology. They may consist of raising the knowledge on growing among the general public (workshops on growing in polytunnels in World Gardens), or about how to use the technology correctly (solar toilet in Brabrand Fællesgartneriet, balcony gardening in Cicignon park, Fredrikstad).

6.1.2. Processes and activities in the action plans

The action plans are divided into processes and activities. An action plan can include various processes. The processes reflect the challenges identified in each showcase, which are then, broken down into manageable activities for which different stakeholders are responsible. Both processes and activities are related to the objectives and visions of each showcase.

An example of a process can be “enabling the correct usage of the solar-dry toilet, in Brabrand Fællesgartneriet or “to encourage the practice of UA by residents on their balconies” in Cicignon Park. These are considered processes as it is unlikely they can be achieved by merely arranging a single event, but will instead comprise a combination of activities - a process. Alternatively, an activity is to provide “Instructions on using the toilet” and “Provide material

for good usage of the toilet" which are steps needed to enable the correct usage of the toilet. Figure 12 shows the strategies, in which 'P' refers to 'Processes' to which several 'Activities' (A) are needed.

Figure 12: Example of process and activities from Cicignon Park.

Under the description of each process, tables ('text-boxes') include information about the activity, the target group for the activity, and – importantly – a suggestion on the actor responsible for making the activity happen.

6.1.3. The Commurban app in the action plans

The Commurban app is a digital tool developed within the SiEUGreen project by Crevis and OKYS in WP3. Promotion of this app is included in the action plan of each of the showcases. The showcase team should introduce the Commurban app at appropriate events as well as exploring other avenues for promotion as appropriate. Once the Commurban app is established as a tool for communication and engagement in the showcase, it can be used as intensively as the users desire.

The Commurban app enables communication and facilitates social engagement between UA-practitioners intending to collect, embrace and rewarding the users best practices. It includes an online resource centre (available for web, smartphone and tablets) with openly accessible best practices, toolkits, success stories and challenges that UA-practitioners have met in their daily practice. Users can present do-it-yourself projects with step-by-step instructions inspired by the research outcomes of SiEUGreen regarding agriculture, smart balcony greenhouses, community farming techniques, household waste recycling, water management and recycling techniques. The users of the Commurban app can: (i) be inspired by and experiment new UA projects, as well as share UA projects with the Commurban community, or (ii), learn how to implement a UA project. The users can also update the original entry in Commurban, adding challenges they face and how those were resolved.

7 Aarhus - Engagement strategies

Around 300 UA-initiatives are ongoing in Aarhus Municipality. These have been initiated either from the municipality via the Taste Aarhus Programme, or by residents with the support of the Programme. In SiEUGreen, two gardens will test new technologies in urban agriculture

that support circular resource flows: Brabrand Fællesgartneriet and World Gardens. This Chapter describes the engagement strategies developed for both.

7.1. Objectives

The vision guiding the City of Aarhus' participation in SiEUGreen is that the *City of Aarhus creates a more socially inclusive and sustainable community through the promotion of urban agriculture*. The **showcase team** is a mix of actors, and they speak from two positions 1) from a top-down position at the municipality via the Taste Aarhus project managers and 2) from two local bottom-up initiatives in Brabrand Fællesgartneriet and World Gardens in Gellerup. This means that the governance style is both top-down and bottom-up, with the municipality supporting ongoing bottom-up initiatives. Depending on the organisation of the local initiatives, and the type of technology that will be implemented as part of the SiEUGreen project, the engagement strategies for the two cases in Aarhus will depart from different starting points while aiming for the same objectives.

Table 2: Aarhus: vision and objectives

Vision:	The city of Aarhus creates a more socially inclusive and sustainable community through the promotion of urban agriculture.
Objective 1:	Increase the possibilities of cultivating edible crops in Aarhus Municipality, among other things by supporting the establishment of new urban gardens and edible urban spaces.
Objective 2:	Contribute to changing perceptions and attitudes towards the use of land for UA
Objective 3:	Promote technologies for more efficient use of land for UA. Increase the land used for UA
Objective 4:	Facilitate access to healthier and more fresh food (pesticides-free, consumed within a few days after harvesting)
Objective 5:	Increase the quantity of food produced locally
Objective 6:	Reduce, reuse, recycle waste: Establish circularity
Objective 7:	Make use of UA as an integration strategy for refugees and migrants.

- Objectives 1 and 4. Are realized by the showcase teams by establishing new urban gardens and edible spaces.
- Objectives 2 and 3. Can be done within the local community by offering possibilities and technologies for UA, but also to the wider community by broader dissemination.
- Objective 5. Will be fulfilled if there are engaged UA-practitioners that succeed with their growing.
- Objective 6. Is reached by using fertilizer from the solar toilet and by building polytunnels from recycled material, as well as by using old greenhouses for new activity.

- Objective 7. Can be met by making sure both migrants, refugees and native-born residents are involved.

7.2. Brabrand Fællesgartneriet

As explained in Section 2.1.1, a solar dry-toilet will be implemented in Brabrand Fællesgartneriet. Therefore the aim of the engagement strategy for Brabrand Fællesgartneriet is two-fold: (i) promoting a well-functioning solar-driven toilet, to further (ii) enhance the social acceptance of the use of the fertilizers from the solar toilet to grow food.

7.2.1. Challenges

Figure 13 situates the Brabrand Fællesgartneriet UA initiative within the SiEUGreen typology, and it is used as a starting point to discuss the challenges the engagement strategies could address for the good implementation of technologies

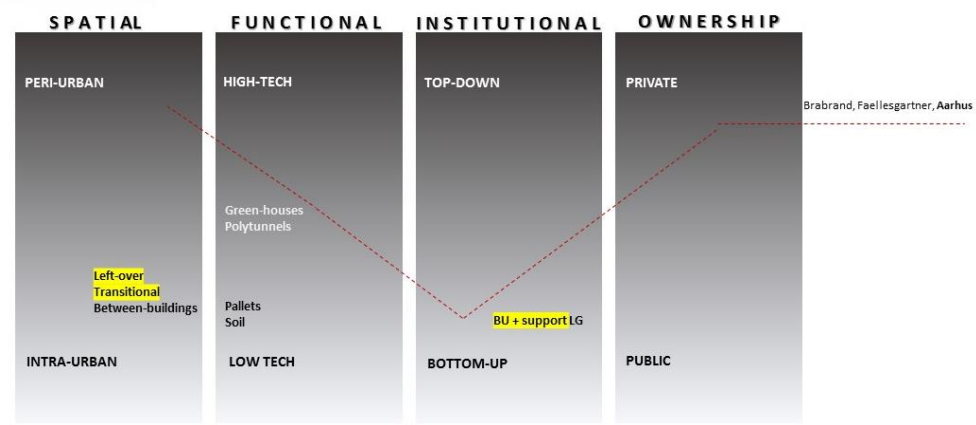

Figure 13: Typology for Brabrand Fællesgartneriet

One of the main problems that Brabrand Brabrand Fællesgartneriet faces is the insecurity concerning the land. The land is privately owned, and it is currently on the market. In addition, this part of the city has been growing significantly with new residential development. Unfortunately, this issue cannot be addressed in the engagement strategies as it involves private actors and would demand perhaps changes in the local development plan of Aarhus to assure land for urban agriculture.

Concerning technology, the main challenges relate to, firstly, **promoting a well-functioning solar-driven toilet** and secondly, to further **support the social acceptance of the use of biosolid for growing food**. These are the main aspects that need attention to successfully achieve the goal of showcasing alternative ways of recycling waste.

Several practical issues are related to the first challenge. Although this kind of toilet has been implemented in Norway, in a community garden and a ski hut[4], both initiatives are quite recent, and none of them has used the compost as a fertiliser to grow food. Therefore, there are some concerns about the monitoring of the capacity of the toilet and uncertainties about how often the waste will need to be removed from the toilet basin and where it will be disposed of for further treatment. Concerns were also expressed regarding the treatment of the liquid part of the waste, which is mostly composed of urine, and how to avoid this waste penetrating and contaminating the soil. Thereby one of the crucial issues of the engagement strategies is to identify the steps needed to guarantee the safe use of the toilet, which implies assigning responsibilities to the different actors to assure proper monitoring.

Easier to address, but not negligible, are challenges regarding safeguarding against theft of the solar panels and providing instructions to the users of the toilet. These are in fact, quite relevant steps as the solar panels are an important component for the treatment of the waste and the correct use of the toilet has implications for the quality of the waste (e.g. do not put disinfectant in the toilet basin) and the social acceptance of the toilet (odour that may arise with wrong utilization).

Connected to the promotion of a well-functioning toilet is the organisation for the maintenance of the toilet. It is not always clear who is the beneficiary and who should contribute to human resources in a transdisciplinary and international project. On the one hand, the toilet is an opportunity for the UA-association; on the other hand, it is also an opportunity for the research partners who can try a new solution in a specific social setting. As such, the question of who should take responsibility for different issues that will assure the toilet to functioning well is not necessarily self-evident

The core issue in the second challenge is the acceptance of the use of biosolid as a fertilizer to grow food. According to the chair of Brabrand Fællesgartneriet, some of the members expressed concerns about the use of human-faeces based fertilizers, as some of the toilet

[4] . The garden community in Norway is smaller than Brabrand Fællesgartneriet , but the ski hut receives more visitors than Brabrand Fællesgartneriet. In the garden community they have not yet used any compost. For the ski hut there the dried toilet waste has been burned so far. However, it is considered to use the compost to provide regrowth of vegetation where the construction work has created barren land.

users may have diseases, or take medicines or drugs that could jeopardize the quality of biosolid and engender the health of the food consumers. Thereby, there is a need for strategies that inform the public about how to treat the waste to produce safe and reliable fertilizer that can be used to grow food.

7.2.2. Stakeholders

The stakeholders involved in the implementation and management of solar-driven toilet and their roles and influence are briefly described below:

- **NMBU**: is a core stakeholder as it is responsible for the implementation and for supporting the monitoring of the toilet. NMBU has three major areas of responsibility, which includes different staff members. i) providing means to monitor the capacity of the toilet, give instructions about how the toilet should be used; how the waste should be treated and run regular tests about the quality of the waste. ii) dealing with eventual technical issues that the toilet may face (e.g. odour, any problems with the equipment). iii) planning the test garden and support Taste Aarhus to carry out the UA in the test garden.

- **Brabrand Fællesgartneriet management/Board**: the manager is expected to support the maintenance of the toilet. This includes assigning people to clean and also provide material to support the good use of the toilet (e.g. toilet papers, sawdust, alcohol for hand sanitation, etc.)

- **Brabrand Fællesgartneriet UA practitioners:** who will be the primary users of the toilet, so their commitment in following the instructions on how to use the toilet is very important. As the users will experience the use of this technology, they will be important actors to identify advantages as well as shortcomings. Their opinions should be heard along with the use of the toilet to revise the engagement strategies. They will also be important ambassadors of this technology as they may spread the word about the advantages (and also disadvantages) of this technology.

- **Taste Aarhus:** is a central stakeholder, who mediates the communication between the Brabrand Fællesgartneriet management and NMBU. Taste Aarhus also plays a role in advertising the solar-driven toilet within the program. As the manager of the Program has been quite active in the negotiations with public authorities in Aarhus in issues related to the implementation of the solar-toilet, her knowledge and experience can be exploited to replicate the implementation of this technology in other places.

- **Janitor:** An unemployed person will be recruited and employed part-time to maintain the toilet (e.g. emptying the waste bin, keeping track on the availability of material to assure a good use of the toilet). This person will be financed by Taste Aarhus.

- **Monitors**: They will be one or two students from NMBU, who will overview technical and social issues. NMBU will technically and financially support the activities of the monitors. The janitor and the monitors are expected to cooperate.

- **Aarhus municipality**: Taste Aarhus is the contact between Brabrand Fællesgartneriet and SiEU Green. In addition, the municipality will employ a UA practitioner from World Garden to carry out the growing in the test garden.

- **Other stakeholders:** as the implementation of the solar-driven toilet aims at demonstrating different technologies to treat waste and promote the circularity of resources; Brabrand Fællesgartneriet will probably be targeted as a place for knowledge transfer. It is expected that other sectors of society (e.g. NGOs, students, academics, journalists, media) will become interested in this technology. Brabrand Fællesgartneriet may profit from this attention by shedding light on the importance of urban agriculture for the circularity of resources, gaining support for the inclusion of UA in local development plans.

7.2.3. Action Plan

Considering the challenges discussed above, three processes are identified as important to assure the successful implementation of technology in Brabrand Fællesgartneriet. These are:

- Enabling the correct usage of the toilet;
- Support good maintenance of the toilet;
- Social acceptance of the alternative fertilizer

7.2.3.1. *Process 1: Enabling the correct usage of the toilet*

This process is directly related to the challenges of promoting a well-functioning toilet and the objective 6, 'Reduce, reuse, recycle waste and establishing the circularity of resources'. As the waste of the toilet will become fertilizer for food production, in the long run, this process may also contribute to achieving objective 5 'increasing the quantity of food produced locally. Text-box 2, lists the activities to ensure the correct use of the toilet identifies the target group as well as the main responsible for the realization of the activity.

Text-box 2: Brabrand Fællesgartneriet -Enabling the correct usage

Process 1. Enabling the right use			
Activity id	**Activity**	**Target group**	**Responsible**
A1.1	**Instructions on using the toilet** Why: Inform the users of the conditions for using the toilet (e.g. how to proceed after the use, e.g. put a serve of sawdust over the waste, dispose the toilet paper on the basin, do not use water, do not smoke in the toilet) When: Now	Users	NMBU Nordregio
A1.2	**Choose area for treatment** of the waste Why: necessary to have a designated space for this When: Spring 2020	Users	NMBU Brabrand Fællesgartneriet

7.2.3.2. *Process 2: Maintenance*

The maintenance of the toilet is expected to have a significant impact on the social acceptance of the technology. As the users will make a judgment of the costs, benefits and risks of dealing with the technology, supporting right conditions for the use of the toilet is a crucial step. This process relates to objectives 5 and 6. The activities listed in Text-box 3 are quite specific and have been identified in dialogue with NMBU, Taste Aarhus representative and the manager of Brabrand Fællesgartneriet.

Text-box 3: Brabrand Fællesgartneriet - Maintenance

Process 2. Maintenance			
Activity id	**Activity**	**Target group**	**Responsible**
A2.1	**Secure the solar panel** Why: Fear that the solar panel gets stolen When: Now	-	NMBU
A2.2	**Monitor the use of the toilet** Why: keep track about how many people and for what purposes the toilet has been used (see Appendix 2) When: once the toilet is put in use	-	Monitors
A2.3	**Provide material** Why: keep track of the availability of material to ensure a good usage of the toilet (e.g. toilet paper, alcohol for sanitation, sawdust) When: continuously	-	Maintenance person
A2.4	**Monitor the amount of waste**, install a sensor in the waste bin Why: make sure that the toilet works in its optimal capacity When: Autumn 2019	-	Monitors
A2.5	**Remove the waste** Why: it is an important stage of the treatment of the waste. It requires technical assistance about where to place and how to treat the waste. Check once per week When: Continuously	-	Maintenance person
A2.6	**Deal with the liquid waste** Why: avoid the contamination of the soil with undesirable waste. Connect a container to the liquid outlet. When: Continuously	-	Maintenance person
A2.7	**Monitor the quality of the waste** Why: To see the possibility to use it as a fertilizer When: Continuously	-	Monitors

7.2.3.3. *Process 3: Social acceptance*

As indicated in section 7.2.2, many of stakeholders are involved in the implementation of the solar-driven toilet. Thereby social acceptance of alternative technologies is likely to unfold at different societal levels. For example, the **Brabrand Fællesgartneriet** members will be the primary users of the toilet and will try out the human-based fertilizer to grow food. If the use of this technology is successful with this group, there will be a great opportunity to disseminate and replicate this technology to other contexts. To reach a social acceptance for using human originated fertilizers, a test garden will be established at Brabrand Fællesgartneriet. NMBU will support Aarhus Municipality in deciding which crops to grow and give instructions about how to mix the soil etc. Given this reasoning, this process can be related to objectives 1, 2, 4, 5 and 6. Text-box 4 suggests some activities that can be implemented to involve a great number of stakeholders.

Text-box 4: Brabrand Fællesgartneriet- Social acceptance

Process 3: Social acceptance			
Activity id	**Activity**	**Target group**	**Responsible**
A3.1	**Open launch day** of the growing season and use of the solar-driven toilet Why: inform all the members about the solar-driven toilet (purpose, usage, maintenance) (see Appendix 2). When: please add	Users Community, Planners Sanitary department Students	NMBU Board Taste Aarhus
A3.2	**Public communication event** Why: to communicate to the UA-practitioners about the solar toilet and about the SiEUGreen project When: Spring 2020	UA-practitioners in Brabrand Fællesgartneriet	NMBU Taste Aarhus Brabrand Nordregio
A3.3	**Plan test garden** Why: Increase the acceptance of alternative fertilizers among UA-practitioners. When: Start spring 2020		NMBU Aarhus municipality
A3.4	**Start-up test garden** Why: Increase the acceptance of alternative fertilizers among UA-practitioners. When: Summer 2021	UA-practitioners in Brabrand Fællesgartneriet General public	NMBU Aarhus municipality

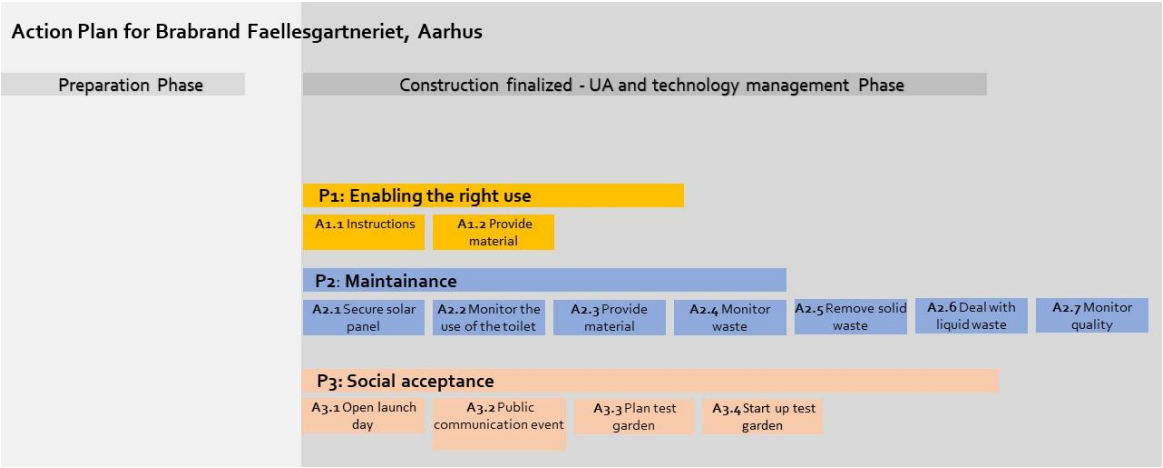

Figure 14. Action plan for Brabrand Fællesgartneriet

7.3. World Gardens

As explained in Section 2.1.2, World Gardens is the residents association of Gellerup, which receives support from local public organisations, such as "Boligsociale hus" which maintains a part-time employee to carry out the work in the association. Financial support also comes from Aarhus Municipality, specifically Taste Aarhus Program, which sponsors the association to get new people involved in UA. In return, World Gardens holds public workshops and participates in public events arranged by the municipality. The institutional character of the UA-initiative is thus a bottom-up initiative with local public support.

While SiEUGreen contributes with funding for the polytunnels, World Gardens coordinates the economy for building the polytunnels, the planning and physical preparation, finding and buying material as well as carrying out the UA-practice and also engaging the surrounding community in different kinds of events. This structure is crucial for the Taste Aarhus vision on collaboration with grassroots organisations.

The focus of the engagement strategy is a) testing the polytunnels as a new way of practising UA in Gellerup, and b) supporting fertilizers from the solar toilet to become well-integrated and accepted in gardening.

7.3.1. Challenges

The practice of UA in World Gardens is characterised by low-technology, as most of the people grow food in the soil and pallets. As part of the SiEUGreen, some members of the association are designing and building a polytunnel which will be tested and is likely to increase the productivity of food. This polytunnel will be implemented in the central park of Gellerup. World Gardens foresees two main challenges for using polytunnels being one of them connected with the location of the polytunnels - in between buildings and in the local city park

which is very accessible for anyone who lives in the area or just passes by. This may be a challenge as the polytunnel can easily be subject to vandalism.

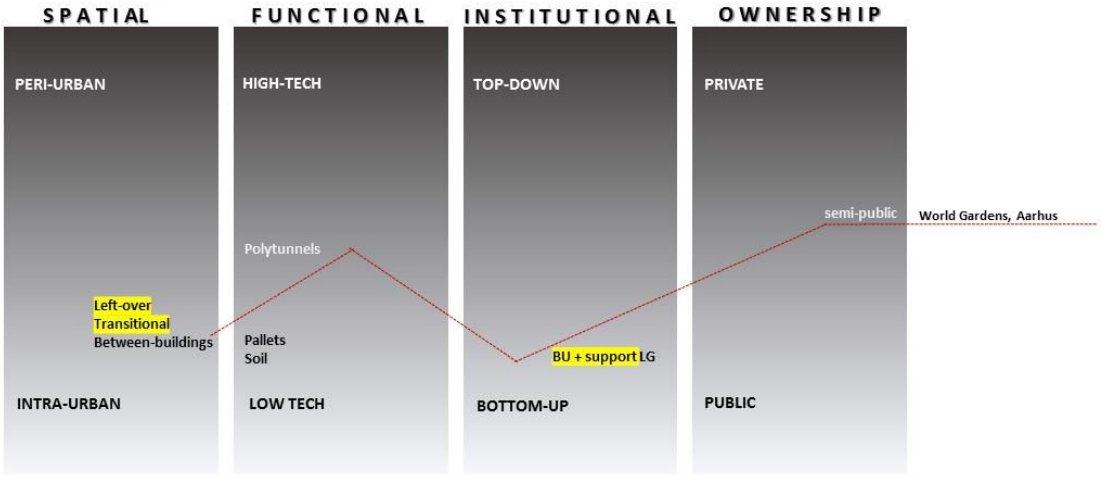

Figure 15: UA-typology characteristics for World Gardens in Aarhus.

The association foresees some challenges connected to the **establishment of new places for UA due to their high level of accessibility**. It might be that children and other people might be to "curious" about the polytunnels, picking crops, destroy something or even vandalize. One polytunnel will be located in the midst of a new park in a housing area, and two others in the yards in front of the apartment houses of two of the members of the association. When it comes to the one in the park, engaging young people by giving them their "own plots", could be one way to counter the challenge. When it comes to the other two polytunnels, the worry is less pronounced since the members of the association know the neighbours and can explain to them what is going on.

One challenge for the polytunnels to work well in Gellerup is the **weather conditions** which can be rough in winter and autumn in Aarhus. One concern is that the polytunnels would not stand the harsh weather, and another is that the weather might keep new people from joining the activities and/or that those who are involved may not spend enough time to maintain the plots in good condition. These matters can be addressed by proper construction, weather shelter and, if possible, by getting access to a closely located community space with toilets. It is not clear though how the association can ensure that the plots look nice all year round, which they would like to be the case.

In Gellerup, there is a high number of foreign-born residents, while many members in the association World Gardens are Danish-born. When inviting the community to activities, there is often a mix of ethnicities. This relates to UA as contributing to integration. Whether the

association **explicitly reaches refugees** (bureaucratic terminology which encompasses persons that belong to a specific legal category), could be clarified.

7.3.2. Stakeholders

In September 2019, Nordregio held a workshop at the premises of the City Planning Authority in Gellerup, Aarhus with participants from the municipality (SiEUGreen partners and local contact persons), from World Gardens and Brabrand Fællesgartneriet. As Figure 16 illustrates a number of stakeholders with different relations to the World Gardens association were identified during this workshop.

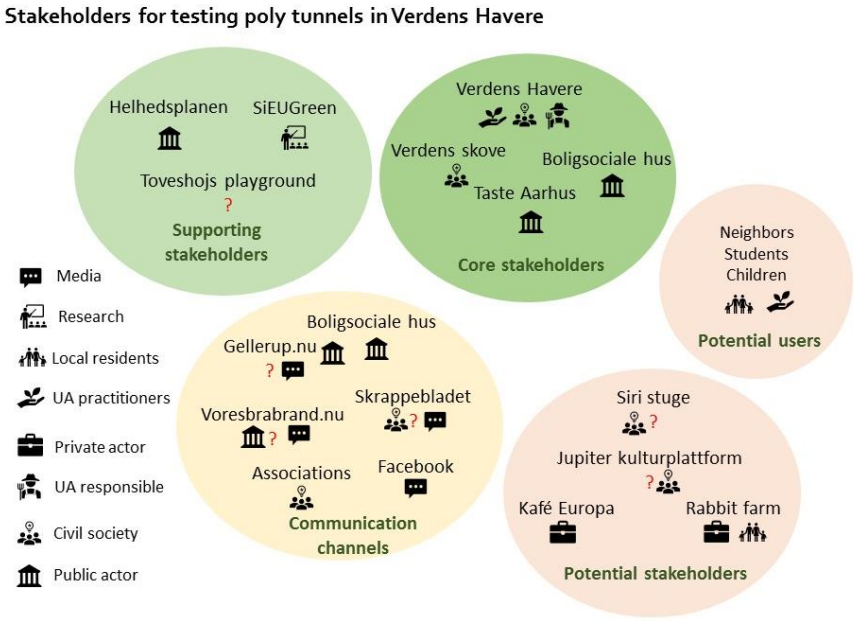

Figure 16: Stakeholders mapping – polytunnels in World Gardens

As Figure 16 suggests the stakeholders for World Gardens divided into five groups: *Core stakeholders*, including the showcase team; *Supporting stakeholders* which means that they are involved in World Gardens' activities regularly. *World Gardens have identified potential stakeholders and Potential user*s as groups that could become involved. *Communication channels* collect the channels that are or can be used for communication. The core stakeholders are briefly described below:

- **World Gardens,** which is the community-based association with active members living in Gellerup. The board consists of seven persons, and in addition, there are about 15-20 persons that are active in growing and other related activities.

- **Boligsociale hus** (appr. "Social living house") which is the association's most important stakeholders. Consists of a collaboration between the public actors Brabrand Boligforening (the local public housing company), Aarhus municipality, and Landsbyggefonden (a foundation founded by public housing organisations). The

Boligsociale hus supports World Gardens in various ways; two persons are employed on part-time to work for World Gardens and, in addition, it creates the possibility of engaging unemployed persons for a few hours per week. It also makes UA-sites available in the community, facilitates networking and enables communication channels

- **Verdens Skov** (World Forest) is an association that organizes growing activities for children and youth on the premises that belong to World Gardens.

- **Taste Aarhus**: which, in line with the comprehensive plan for the redevelopment of Gellerup, facilitate their work; enables them to grow in the area and provides four-year support to carry out UA.

- **SiEUGreen** supports World Gardens with funding, analysis, monitoring and other support. The municipality via **Taste Aarhus** is the contact to SiEUGreen and the provider of funding and some equipment.

Among the supporting stakeholders is **Tøveshojs** playground that provides dung from the rabbits and goats that are part of the playground. Moreover, World Gardens sees potential stakeholders in other local associations, in the **café Europa** situated in the premises of the City Planning Authority as well as in e neighbour that also is a small-scale farmer. The association also sees that they can expand their network of UA-practitioners to other neighbours, children and especially students that soon will move into the new-built student apartment blocks. Within the identified stakeholders, there is no actor that accurately represents newly arrived refugees. **'Community'** which is referred to in the action plan, refers to a very general idea about people that live or work in Gellerup or that dwell there for other reasons.

World Gardens can benefit from a number of primarily local **communication channels**, both digital, printed and face-to-face meetings. This includes the Commurban app that is developed within the SiEUGreen project and can be used by UA-practitioners to inspire each other's both in their local association and internationally with other UA-practitioners, including the other SiEUGreen showcases.

7.3.3. Action plan

The action plan for World Gardens has five processes and several related activities.

- Planning and design the polytunnels;
- Build the polytunnels;
- Put the polytunnels in use;
- Encouraging UA-culture among local residents and

- Increase skills and learnings about circular systems

The first two processes will make the growing in polytunnels physically possible by preparing the design and construction as well as building the polytunnels and prepare them for UA. Process 1 and 2 relate directly to objectives 1, 3, 4, 5 and 6.

7.3.3.1. *Process 1. Planning and design of polytunnels*

Text-box 5: World Gardens – planning and design of polytunnels

Process 1. Planning and design of polytunnels			
Activity id	**Activity**	**Target group**	**Responsible**
A1.1	**Design polytunnels** Why: To try new ways of doing UA and extending the growing season When: Spring 2020	-	World Gardens
A1.2	**Design a watering system** Why: Needed to provide irrigation to the food that will grow in the polytunnels When: Spring 2020	-	World Gardens

7.3.3.2. *Process 2. Build polytunnels*

Text-box 6: World Gardens – Build and prepare polytunnels

Process 2. Build and prepare polytunnels			
Activity id	**Activity**	**Target group**	**Responsible**
A2.1	**Get building material** Why: To build the polytunnels with recycled material When: Winter 2020	-	World Gardens
A2.2	**Digging event** Why: Prepare the sites for the polytunnels. Use the opportunity to invite persons from the surrounding community When: Autumn 2019/Winter 2020	Surrounding community, neighbours	World Gardens
A2.3	**Set up polytunnels** Why: - When: Winter 2020	-	World Gardens

7.3.3.3. *Process 3. Put polytunnels in use*

The first two processes relate to the physical preparations for setting up the polytunnels. The third process relates to social aspects of setting up the polytunnels and includes communicating with the surrounding community to make them aware of who and why the polytunnels are implemented in the neighbourhood. This activity may create a feeling of

ownership in the community, so that the residents feel compelled to take care of the polytunnels contributing, thus, to minimise the challenge of growing food in places which are very accessible to all people.

The process also includes the division of responsibilities concerning the polytunnels located in the City Park. This is more difficult to establish since the World Gardens members do not live nearby. Some of the questions that need a reply are: who will maintain the polytunnels? Who is responsible for the contact with **Verdens skove** and other associations that are involved in activities in the allotments here?

Text-box 7: World Gardens: Using the polytunnels

Process 3. Put polytunnels in use			
Activity id	**Activity**	**Target group**	**Responsible**
A3.1	**Anchor among neighbours** Why: To inform about the polytunnels, address potential "curiosity conflicts". Notifying via social media, local newspapers etc. When: Winter/Spring/Summer 2020	Neighbours	World Gardens
A3.2	**Distribute responsibilities** Why: Establish who will be responsible for maintaining the polytunnels in the City Park When: Spring/Summer 2020	World Gardens	World Gardens
A3.3	**Proactive actions against vandalism.** which can include the donation os plots to young people Why: avoid that the polytunnels located in the City Park get destroyed. When: as soon as the polytunnel is in place		

7.3.3.4. *Process 4. Encouraging UA-culture among local residents*

This process relates to the challenges of **establishing new places for UA, which are very accessible to all** and the **weather conditions**. It refers to the objective about changing attitudes toward UA, which, in the long run, can contribute to expanding the UA-practice in the community further. Thereby, this process relates to the objectives 1-4 and 7. Objective 7, about UA as a means to encourage the **integration of immigrants and refugees**, can be fulfilled, making sure that these people are invited and participate in some of the open activities.

Text-box 8: World Gardens - Encouraging UA-culture among residents

Process 4. Encourage UA-culture among local residents			
Activity id	**Activity**	**Target group**	**Responsible**
A4.1	**Children events in City Park** Why: To engage in the polytunnels, address potential "curiosity conflicts." When: Summer 2020	Children in the community	World Gardens / Verdens Skov
A4.2	**Community & Garden Kitchen events** Why: Social activity with the community. An opportunity to include new UA practitioners When: Regularly	Community, neighbours	World Gardens
A4.3	**Arrange weather shelter** Why: Make it nice to do UA independent on weather When: Summer 2020	UA-practitioners. Neighbours?	World Gardens
A4.4	**Workshop on building polytunnels & recycled material** Why: Highlight the importance of and boost the use of recycled material. Spread knowledge on UA, polytunnels and making polytunnels When: Summer 2020?	Community, neighbours	World Gardens / Taste Aarhus support?
A4.5	**Workshop on growing in polytunnels** Why: to familiarize the community with the growing technique, inspire residents who do not grow their food. An opportunity to include new UA practitioners , potential stakeholders and potential users When: spring/summer 2020	Community, potential stakeholders, potential users,	World Gardens/ Boligsociale hus/ Taste Aarhus
A4.6	**Communication efforts** Why: Inform and invite the community to practice UA. Spread knowledge on UA, polytunnels, recycled materials, alternative fertilizers When: Continuously	Community, stakeholders, potential stakeholders, potential users, the wider community in Arhus and beyond	World Gardens/ Boligsociale hus/ Taste Aarhus
A4.7	**Promote Commurban app** Why: For UA-practitioners connect and learn from each other not only in Aarhus but also between the other SiEUGreen showcases. When: to show in open events	Community, neighbours, etc.	World Gardens / Taste Aarhus

7.3.3.5. *Process 5. Increase skills and learnings about circular systems among users and others*

This process relates to the promotion of technology (objective 3) and increasing local food production (objective 5). These objectives can be fulfilled by organising workshops to the members of World Gardens and also to the wider community.

Text-box 9: World Gardens - Encourage UA-culture among residents

Process 5. Increase skills and learnings about circular systems among users and others			
Activity id	**Activity**	**Target group**	**Responsible**
A5.1	**Workshop on growing in polytunnels** Why: Promote technology When: Summer 2020	Members of World Gardens, potential users	World Gardens / Verdens Skov
A5.2	**Workshop on the maintenance of polytunnels** Why: Promote technology. Ensure good maintenance When: Summer 2020?	Members of World Gardens, potential users	World Gardens

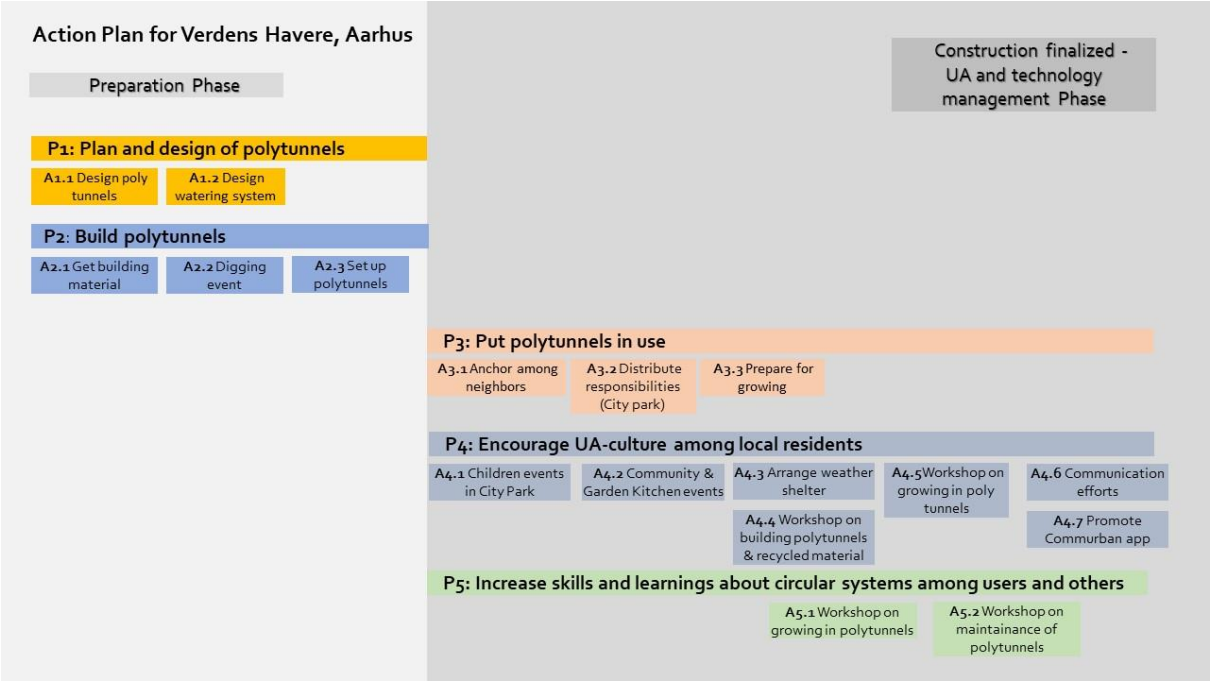

Figure 17: Action plan for World Gardens, Aarhus.

8 Cicignon park – Engagement Strategy

As described in Section 2.2., Cicignon Park is the showcase that will test the most advanced technologies (e.g. vacuum toilets, biogas production). Dealing with the waste within site, Cicignon Parks, aims to become a self-sufficient development as it will probably function independently from the public networks of sewage. Thereby, this showcase will be a great example of a sustainable urban development that relies on the circularity of resources.

8.1. Challenges

The UA in Cicignon Park is characterised by being intra-urban, located inside the buildings (in the balconies) and in between buildings (the greenhouse). High-technologies will be implemented in the development, and likewise, although less high-tech, is the greenhouse which will potentially be equipped with aquaponics. Moreover, there will be some low-tech UA in the shape of pallets in between the buildings. The governance structure is top-down since the construction is initiated and carried out by the developer with the technical support of NMBU. In Fredrikstad the flats are private, but the land is leased from the municipality. Therefore, land ownership is represented in between private and public property. Figure 18 illustrates some of these features

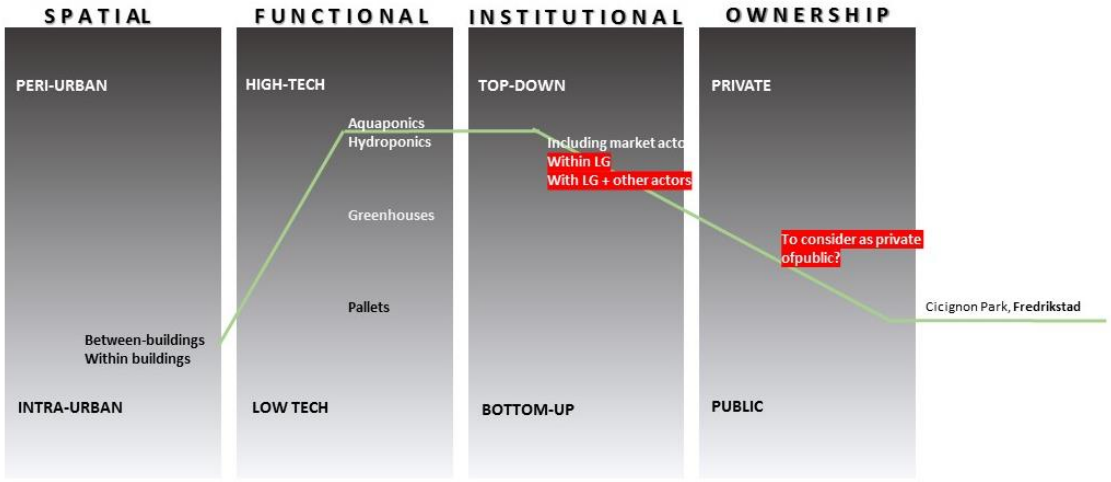

Figure 18: UA-characteristics of Cicignon Park

The biggest challenge for Cicignon Park is that it is a top-down initiative, which is, however, very much dependent on the residents that will live in the area. The engagement of the future residents in UA is fundamental for maintaining the circularity of resources within the development and, thus, to achieve the vision of Cicignon Park as a green and sustainable urban development. The balconies of the apartments will be equipped with flower boxes which will be visible from outside. So, it is essential for the green profile of the development that the residents actually use them. This challenge requires several activities to boost the

willingness of the residents to contribute to realising the vision of a green and sustainable urban development.

A showroom open to the public to communicate the green profile of the development and to offer 'short courses' to the future residents on how to deal with the new technologies and reinforcing their fundamental role for maintaining the circular system may be a proper strategy. Nevertheless, challenges regarding the **ownership and management of the showroom** are expected.

Creating a **long-term management system** for the old hospital building that is being refurbished, herein called Block A, is also crucial. The heating and water systems, the aquaponics, and other technologies tested in this building need to be adequately maintained. Parts of this management can be outsourced, but the housing association need to know how to take care of the technologies and the showroom.

Besides the objectives mentioned above, Cicignon Park should also **contribute to changing attitudes towards UA,** reaching out stakeholders beyond those directly involved in the development.

8.2. Stakeholders

Several stakeholders are part of Cicignon Park; most of them are listed below.

- **NEC AS** who is the developer responsible for the construction of Cicignon Park, who is willing to test a set of forerunner technologies that enhance the circularity of resources (e.g. dry toilets that will be implemented in Block A, biogas reactor that will treat the sewage) with the support of UA.

- **NMBU** who are the experts on the new technologies, as some of them have been implemented in other places in Norway. Students from the university will be involved in the implementation and monitoring of these technologies. NMBU will also play an important role in the showroom, by providing information to the public and future residents about the technologies.

- **NIBIO** – conducts research on the sociological perspectives on the implementation of circular resource system.

- **Scanwater** – it is a company, specialised in water technology. They will support the showcase with the implementation of technology and knowledge for management.

- **Fredrikstad Municipality** – it is a crucial stakeholder, especially concerning permits, necessary for the implementation of new technologies.

- **Future dwellers/residents:** as mentioned above they play a fundamental role to achieve the vision of the development.

- **The Housing association (HA):** will be responsible for managing and maintenance of the buildings, and semi-private spaces of the development, including the green-house and the showroom.

- **Students from NMBU:** will contribute to the monitoring and produce knowledge about the performance of the new technologies.

- **Showroom visitors –** the general public, including school children, university, public stakeholders, planners and policy-makers from other cities, etc.

- **Neighbours.** The surrounding area of the development is a bit heterogeneous with single-family houses, few apartments and few institutions (psychologic clinic, school). There is a need to involve the neighbours in the early phase of construction of Cicignon Park, to anchor in the community the sustainable character of the development.

8.3. Objectives

The vision for Cicignon park is to *"demonstrate Fredrikstad as a resilient, climate, environment and human-friendly development with near-zero emissions, circular economy, low climate, and water footprint."*. The private developer NEC AS is in charge of the development of Cicignon Park. This showcase has a top-down approach, meaning that the initiator and actor responsible for developing the project is not the same as the persons that will live in and use the facilities. As the developer highlights, to realize the vision, the future dwellers and the housing cooperation must be well aware of it. This is one of the matters that is addressed in the Engagement Strategy.

Table 3: Cicignon Park: visions & objectives

Vision:	**To demonstrate Fredrikstad as a resilient, climate, environment and human-friendly urban development with near-zero emissions, circular economy, low climate and water footprint.**
Objective 1:	Contribute to changing perceptions and attitudes towards the use of land for UA
Objective 2:	Promote technologies for more efficient use of land for UA. Increase the land used for UA
Objective 3:	Identify and promote the most appropriate plant growing techniques for each location in their cities / metropolitan areas in a cold climate
Objective 4:	Include UA in comprehensive plans and strategies
Objective 5:	Facilitate access to healthier and more fresh food (pesticides-free, consumed within a few days after harvesting)
Objective 6:	Increase the quantity of food produced locally

Objective 7:	Reduce, reuse, recycle waste: Establish circularity. Reduce water consumption and recycle resources from the households (blackwater and organic household waste) to UA and for production of biogas
Objective 8:	Prudent use of natural resources, energy and agricultural inputs
Objective 9:	Lower GHGs emissions

Cicignon park has nine objectives that the Engagement Strategy should contribute to.

- Objectives 1 and 2 are related to activities that are enabled by the showroom, and to SiEUGreen as disseminators of the results of testing new green technologies.
- Objective 3 can be met by monitoring how well the residents succeed with UA in Block A.
- Objective 4 goes beyond the mandate of what the developer and NMBU can do themselves. For this objective, they instead need to lobby to the public planning authorities. In addition to objective 4, the developer also envisions that Cicignon Park shall contribute to changes in Norwegian laws and regulations on water and sewage systems so that vacuum toilets could become compulsory in new buildings.
- Objectives 5 and 8 are dependent on the proper use and good management of the facilities and technologies implemented in Block A, as well as on the residents' engagement in urban agriculture.
- If neighbours, university students, school children and the general public are invited to engage with UA in Cicignon park, they could also be stakeholders contributing to objectives 5 and 6.
- Objective 9 will be reached by proper management of the technique in Block A.

8.4. Action plan

Considering the challenges discussed above, five processes are identified as important to assure the successful implementation of technology in Cicignon Park. These are:

- Public information
- Public engagement
- Showroom as a centre for information & communication
- Engagement of residents
- Long-term management of technologies

8.4.1. Process 1. Public information

The first process is about keeping the general public and the closest neighbours informed in the early stages of the development via public meetings, and media communication. In the

future, the showroom will be the basis for outreaching the general public and other stakeholders (e.g. academia, public authorities and schools) contributing to objectives 1, 2 and 4.

Text-box 10: Cicignon Park. Public information

Process 1. Public Information			
Activity id	**Activity**	**Target group**	**Responsible**
A1.1	**Open public information meeting**. Broadcasted on TV Why: Information about the development When: 2018	The general public	NGH NMBU
A1.2	**Information meeting neighbours** Why: Information about the development When: 2019 Sept:	Neighbours to Cicignon park	NGH NMBU
A1.3	**Public opening event of the showroom** Why: Information & engagement When: when Cicignon Park is concluded	General public, Neighbours, students, Cicignon school, residents of central Fredrikstad, Academia	NGH NMBU

8.4.2. Process 2. Public Engagement in UA

The vision of a green development through the circularity of resources can be spread beyond the residents, by inviting the general public (neighbours, students, Cicignon school, residents of central Fredrikstad) to engage in UA practices in the Cicignon Park. For example, currently, during the construction of Cicignon Park, setting up pallets in the site, where neighbours and other people can grow food, can be a strategy to anchor and reinforce the role of UA in the development. A similar strategy was successfully employed in Aarhus during the construction of a residential development close to the harbour (O-Haven garden). If the early practice of UA in the site thrives, it can continue after the development is concluded.

The showroom is also an excellent opportunity to attract and inform other actors. This centre can offer educative activities such as workshops on growing in pallets and making fertiliser from waste (e.g. compost). This can positively impact the attitude on circular systems while reaching out other people in the community and thus contribute to objective 1, 5, 6 and 7.

Text-box 11: Cicignon Park: Public engagement in UA

Process 2. Public Engagement in UA			
Activity id	**Activity**	**Target group**	**Responsible**
A2.1	**Set up pallets for the general public** Why: invite a wider community to practice UA When: During construction	Neighbours, students, Cicignon school, residents of central Fredrikstad	NGH

A2.2	**Invite the public to grow in pallets** Why: to inspire the community beyond Cicignon Park to engage in UA. Targeted communication needed. When: Before the workshop on growing in pallets	Neighbours, students, Cicignon school, residents of central Fredrikstad	NGH NMBU
A2.3	**Workshop 1 on growing in pallets** Why: To get users started, raise knowledge When: During the construction phase	Neighbours, students, Cicignon school, residents of central Fredrikstad	NGH NMBU
A2.4	**Set up UA facilities Cicignon Park** Why: To give the opportunity to residents in Cicignon Park to do UA, in addition to residents in UA When: after finalizing construction	Cicignon residents (apart from Block A)	NGH
A2.5	**Workshop 2 on growing in pallets** Why: To get users started, raise knowledge When: After residents moving in	Cicignon residents (apart from Block A) + Neighbours, students, Cicignon school, residents of central Fredrikstad	NGH NMBU
A2.6	**Promote Commurban app** Why: For UA-practitioners to connect, learn and inspire internationally and w. each other When: To show in open events	Neighbours, students, Cicignon school, residents of central Fredrikstad	NMBU NIBIO

8.4.3. Process 3. Showroom as a centre of information & communication

Setting up a showroom is a means of paving the way for permanent dissemination of how the technology works in the building and how it contributes to circular resource systems in urban agriculture and water and waste management. The showroom will be a location for disseminating the techniques and the results, and will as such target neighbours, students, schools, residents of Fredrikstad, public authorities, researchers, and corresponding actors in the region, and international visitors. Crucial for the showroom to function well is to establish a structure for long-term ownership and management. The transfer of responsibility from the developer to the housing association and the role of NMBU on short and long sight are important matters to address. To succeed with the communication via the showroom, specific persons with pedagogical skills and relevant knowledge need to be appointed, so-called “showroom manager”. The showroom will principally contribute to objectives 1, 2, and 4 about outreach and dissemination to the general public and strategic target groups.

Text-box 12: Cicignon Park: Showroom as a centre for info & communication

Process 3. Public Information and Communication via Showroom			
Activity id	**Activity**	**Target group**	**Responsible**
A3.1	**Interim organisation for ownership, responsibility, and management of showroom** Why: Necessary to set up a preliminary organisation for the showroom during the SiEUGreen-project time, and to prepare for the transition to a permanent structure. Including employment of showroom manager. When: Spring/Summer 2020	-	NGH NMBU HA on long sight
A3.2	**Initial communication strategy** Why: to start communication and engagement in the showroom as soon as it is finished When: Spring/Summer 2020	Residents in Block A Residents in Cicignon Park All showroom target groups	NGH NMBU Scanwater
A3.3	**Set up a long-term organisation for ownership, responsibility and management** Why: Design a long-term structure and organisation for the showroom post SiEUGreen When: January-March 2021 or when there is a formalized housing association (HA)	-	NGH NMBU HA
A3.4	**Adapt communication strategy** Why: Adapt with a long-term perspective When: As soon as the structure is set	All showroom target groups	Responsible for showroom
A3.5	**Public opening event** Why: to communicate the circular resource system When: When constructions are finished	All showroom target groups	Responsible for showroom NGH NMBU HA, Scanwater
A3.6	**Promote Commurban app** Why: For UA-practitioners connect and learn from each other not only in Fredrikstad but also between the other SiEUGreen showcases. When: to show in open events	All showroom target groups	Responsible for showroom
A3.7	**Start a series of engagement events** For example, residents could hold workshops for visitors; on how to grow in pallets, on balconies, how to create circular mini-systems etc.	All showroom target groups	Responsible for showroom

8.4.4. Process 4. Engagement of residents

Since the initiative of installing high-tech solutions for waste management and UA is top-down, it is not self-evident that the residents will actually engage and collaborate to reach the vision. Therefore, the showcase leaders need to find ways to make the residents feel

ownership over the vision, to get the skills they need to practice UA, and to correctly use the waste management systems. One way of involving the new residents is to invite them to sign a letter of commitment to the principles of the development reinforcing their willingness to contribute to the vision.

As the NEC AS does not have the skills to carry out the education of new residents, this should be managed by the stakeholder responsible for the showroom. The engagement of the residents will contribute to the fulfilment of objectives 5-8.

Text-box 13: Cicignon Park: Engagement of residents

Process 4. Engagement of Residents in Block A			
Activity id	**Activity**	**Target group**	**Responsible**
A4.1	**Workshop and courses to inform and educate the new residents** Why: residents will need to learn how to make use of UA facilities and possibly also how to adapt to some of the technique in the building. When: Autumn 2020	Residents Block A	NMBU NGH Scanwater
A4.2	**Vision and info tour for buyers** Why: potential buyers need to know about, and agree to, the vision of the building When: Winter 2020 / Spring 2021	Potential buyers of apartments in Block A	NGH NMBU?
A4.3	**Workshop balcony gardening** Why: encourage residents to grow on balconies When: after moving in Summer 2021	Residents Block A	NMBU?
A4.4	**Workshop UA, technology use & fertilizers** Why: residents to learn about the circular system and how they should use it When: after moving in Spring 2020	Residents Block A	NMBU?
A4.5	**Promote Commurban app** Why: For UA-practitioners connect and learn from each other not only in Fredrikstad but also between the other SiEUGreen showcases. When: when residents move in	Residents Block A	NMBU/NIBIO

8.4.5. Process 5. Long-term management of technology

Cicignon Park includes unconventional technologies that require proper management. Thereby, there is a need to institute an organisation responsible for the area once the construction is finished and the residents have settled down. This implies that responsibilities should be transferred from the developer and NMBU to the Housing Association (HA).

Continuous evaluation to keep track of how the residents experience and adapt to the technologies should be carried out. In the short-term, this could be done by relevant WP-leaders in collaboration with NMBU. Still, for the long-term monitoring, the HA should benefit from the research work so that they can continue to evaluate the progress easily. This process relates to all objectives except the objective 4.

Text-box 14: Cicignon Park: Long-term management of Technology

Process 5. Management of Technology			
Activity id	**Activity**	**Target group**	**Responsible**
A5.0	**Agreement on the division of responsibilities and sharing of costs** Why: Need to formalize agreements on sharing of costs and responsibilities for the showroom, the greenhouse, the maintenance of pipes and other technology, the biogas reactor. When: Spring 2020	-	NGH NMBU
A5.1	**Formalize housing association (HA)** Why: needed for managing the buildings and When: When: after moving in Spring 2020	For and by residents in Block A	Residents of Block A NGH
A5.2	**Workshops for members of the HA** Why: acquire knowledge on the management of technologies When: After formalized HA Summer2020	residents in Block A	NMBU NGH Scanwater
A5.3	**Transfer of responsibilities** Why: formal agreement on who does what on long-term When: Winter 2020	Transfer to housing association	NGH
A5.4	**Employ company for service agreement** Why: HA needs professionals to carry out the work When: After constructions are finished, or residents have moved in	-	HA
A5.5	**Set evaluation scheme for continuous evaluation** Why: HA to keep track of how well residents are contributing to UA and use technology properly When: to be carried out once per year	Residents	WP3-leader NMBU HA

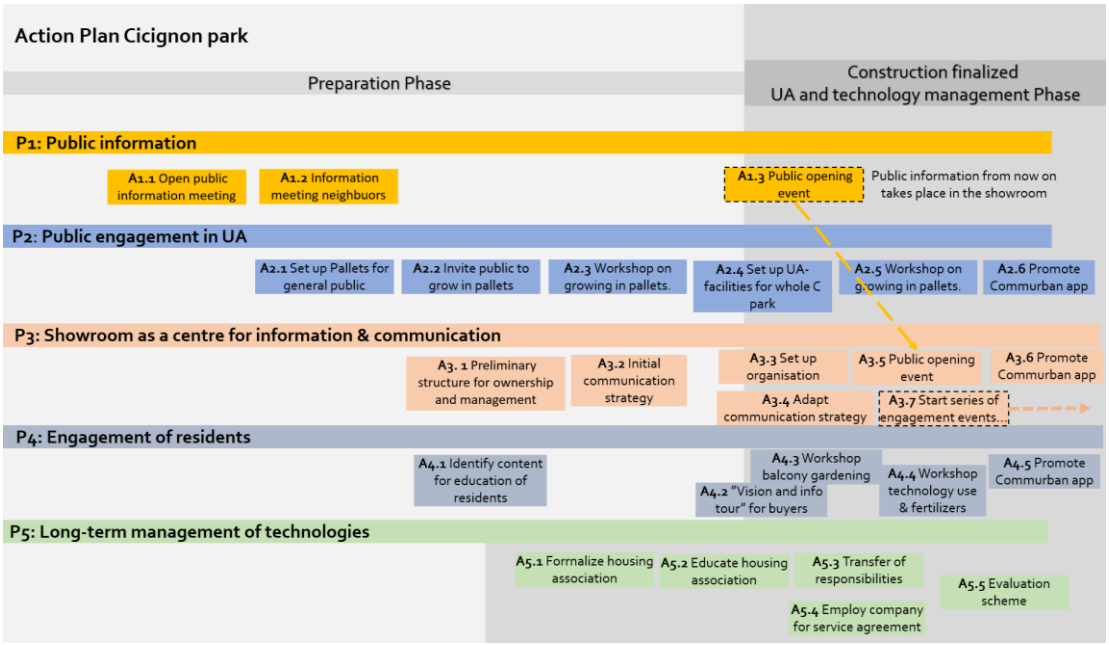

Figure 19. Action plan for Cicignon Park

9 Hatay

Hatay is Turkey's seventh-most densely populated province located in the southern part of the country. The proximity of Hatay Province to the Syrian border has had a strong influence on population development in recent years, leading to a sharp increase in the number of inhabitants, particularly in border municipalities. The rapidly increasing population places a burden on Hatay's economy, which largely depends on agriculture.

The scope of the Hatay showcase is the provision of access to new UA-related technology and knowledge, to create job opportunities, increasing food production and resource efficiency.

9.1. Objectives

Hatay Metropolitan Municipality aims to *"increase efficiency in agriculture by using new technologies and also aims to increase healthy food provision for inhabitants, Syrian refugees and other disadvantaged residents in particular"*. These ambitions will be reached with the construction of the Greenhouse in Kisicek Expo Zone, and with close collaboration with a women's cooperative[5]. Moreover, the implementation of the greenhouse is important to raise awareness of new means of doing agriculture, including organic agriculture using aquaponic and hydroponic technologies that are likely to put less pressure on the land.

Table 4: Hatay: vision and objectives

Vision:	*As Hatay Metropolitan Municipality, with this project instead of traditional cultivation Hydroponics and Aquaponics cultivation systems will be applied in our greenhouses. With these alternative high technology cultivation systems, we can increase efficiency.* *With this study, which can be applied directly or indirectly to urban life and is also an educational project, our Syrian guests and disadvantaged citizens will be provided with the opportunity to grow their own healthy and organic foods in their back gardens*
Objective 1:	Facilitate access to healthier and more fresh food
Objective 2:	Increase the quantity of food produced

[5] This cooperative is managed by an entrepreneur in partnership with Hatay municipality. It currently engages 250 women who live and grow food in peri-urban areas of the different districts of the region. The members use their own land for UA, the municipality provides the material to build a greenhouse of 180m^2, and the entrepreneur manages the exchange of UA production between the women and the municipality. The production of 6m^2 of the area of the greenhouse belongs to Hatay municipality.

Objective 3:	Prudent use of natural resources, energy and agricultural inputs
Objective 4:	Establish circularity by reduce, reuse, recycle waste
Objective 5:	Increase understanding of the social and economic potentials of Urban Agriculture
Objective 6:	Increase knowledge of organic gardening practices
Objective 7:	Technology transfer
Objective 8:	Training of disadvantage people (Syrian refugees and local women)

- Objectives 1, 2 and 5 are reached by engaging women in UA and exploring alternative ways for the food produced in the greenhouse to reach the market
- Objective 3 and 4 are reached by establishing circular system with aquaponics in the greenhouse.
- Objectives 5, 6 and 8 are reached with workshops held in the greenhouse that will target the socio-economic needs of disadvantaged people
- Objective 7 is reached by using the greenhouse as a regional centre that showcases alternative technologies for food production

9.2. Greenhouse in Kisecik Expo Zone, Antakya

As explained in Section 2.3, a greenhouse showcasing aquaponic and hydroponic technologies is being built in the peri-urban area of Antakya. The following sections describe the main challenges, stakeholders and the action plan for the engagement of different actors in this project.

9.3. Challenges

As indicates in Figure 20 the greenhouse in Kisecik Expo Zone is located in public land in the peri-urban area of Antakya. This greenhouse is supported by SiEUGreen project in partnership with Hatay Municipality. Therefore, it is a top-down initiative, meaning that it was introduced by the public authorities rather than by the people who carry out agriculture or gardening.

Figure 20: Type of greenhouse in Hatay

The showcase has four main challenges. The first relates to **finalise the implementation of technologies in the greenhouse,** as there have been some uncertainties about the solar panels and the species of fish that can be used in the aquaponic system. E**stablishing a long-term management organization** for the greenhouse is also a challenge. Some matters related to the long-term economic sustainability of the greenhouse remain unclear, as well as how the refugees can be included in the management after the close of the SiEUGreen project. Neither has it been decided what will happen to the crops that are harvested in the greenhouse.

The third challenge is about **establishing the greenhouse as a regional centre for education on UA.** This includes identifying and specifying activities that help to implement an educational structure that addresses the needs of various social groups. The showcase team also needs to elaborate a strategy for how the greenhouse will **contribute to social and economic inclusion of different social groups**. It seems that the employment of refugees is not feasible in the short-term. Nevertheless, it is needed to develop activities to improve their skills in UA, aquaponics and hydroponics that may lead to further employment opportunities (e.g. implementation of such technologies in other places of the region). There should also be a plan for how the members of the women's cooperative will benefit from the training in the greenhouse.

9.4. Stakeholders

Several stakeholders are to be involved in the different phases of implementation and management of the greenhouse. Some of them are listed below.

- **Parks and Garden department, Hatay municipality (principal manager)**. This person/authority should hold the responsibility for the technological, financial and operational management of the greenhouse.
- **International office of Hatay Municipality**: this person/authority is in charge to plan the activities that the greenhouse will host during the EXPO2021 in Hatay
- **A local expert from Hatay Municipality**, who will be responsible for the operation and maintenance of the technology (aquaponics and hydroponics)
- **SAMPAS**, engineer and aquaponic expert: who helps in the implementation of the technology, provide knowledge to the municipality staff about how to maintain the system
- **Antalya University**: a consultant from the university will train Hatay municipality staff to become able holding workshops in UA, hydroponics and aquaponics.

- **NMBU**: Provides assistance to how to implement the technologies in the greenhouse
- **Employees**: possibly civil servants from Hatay Municipality (cleaning, tech maintenance, etc.)
- **Refugees** association: which represents the interests of the refugees. During discussion with the Hatay Municipality, this association has expressed willingness to take part in education/training about UA and the technologies of aquaponics and hydroponics. Nevertheless, it seems that the participation of refugees in such courses will require a payment for their hours invested in learning. This issue remains, at the moment unsolved.
- **Contact person between SiEUGreen and Hatay Municipality** who will provide information about the implementation of the technologies, food production, implementation of engagement strategies, etc.
- **Women cooperative members**: learn new UA technologies
- **Pupils in primary school and college**: learn and experience UA
- **Farmers from the region**: who will learn new technologies for growing food
- **Business investors** that are willing to replicate the new technologies in other places of the region;
- **General public**: people interested in UA, visitors, consumers, etc.

9.5. Action plan

The action plan for Greenhouse in Kisecik Expo Zone is divided into four processes:

- Finalise the implementation of technologies in the greenhouse;
- Establishing a long-term management organisation for the greenhouse
- Establishing the greenhouse as a regional centre for education on UA
- Contributing to social and economic inclusion on a long-term perspective.

9.5.1. Process 1: Finalise the implementation of technologies

Currently, there are uncertainties about the installation of the solar panels which are part of the operational system of the greenhouse. Another issue regards to the type of fish usually used in aquaponics is not found in the region. Therefore, there is a need to find another specie that fits the purpose of aquaponics efficiently.

Type fish that should be used in the aquaponic system is not found in the region. There is a need to find an alternative species that can replace

Text-box 15: Greenhouse Hatay: finalise the implementation of technologies

Process 1. Finalise the implementation of technologies			
Activity id	**Activity**	**Target group**	**Responsible**
A1.1	Sort it out the **purchase of the solar panels** Why: the solar panels are needed to complete the energy system of the greenhouse When: as soon as possible		Hatay Municipality NMBU
A1.2	**Find a suitable fish to become part of the aquaponic system** Why: need to replace the fish that is usually used in the system for a specie that is available in the region by weather conditions and legality. When: as soon as the greenhouse opens	-	Hatay Municipality NMBU

9.5.2. Process 2. Management and long-term organization of the greenhouse

The long-term management requires the design of a business model for the greenhouse to have a sustainable economic structure for greenhouse maintenance and for the activities that will take place in the greenhouse. This includes assigning responsible persons for the different tasks (e.g. maintenance) and find means to earn an income from the food produced in the green-house, or finding other ways to support the maintenance of the greenhouse economically. This is clearly connected to Task 5.3 (see chapter 1.1). This process is central for the well-functioning and longevity of the greenhouse and thus relates to all objectives.

Text-box 16: Greenhouse Hatay: Management & long-term management

Process 2. Management and long-term organization of the greenhouse			
Activity id	**Activity**	**Target group**	**Responsible**
A2.1	**Set a management structure,** with a director, and officials with the responsibility to respond for (1) the implementation & maintenance of the UA technology, (2) human resources (employees), (3) social and communitarian activities (workshop, courses, beneficiaries of food production, etc.); (4) financial issues and planning and a (5) communication manager Why: set an accountable management board When: Spring 2020	Community	Hatay municipality (Parks & Garden department)
A.2.2	**Institute the executive board**, with the participation of representatives from different departments of Hatay Municipality (Parks and Garden, Education, Health, International, Waste treatment), other relevant local/regional institutions (e.g. university) and stakeholders	Community -Refugee Assoc. -Women Initiative -Universities	Hatay municipality (Director: Parks & Garden department)

	(women's' cooperative manager, representative of the refugees, local farmers, community, among others), a SiEUGreen representative. Why: (i) Set a long-term business model, including management of human and financial resources (ii) Discuss and deliberate upcoming activities, (iii) institute a participatory budget for the green-house. The members will meet at least once every three months and deliberate about upcoming activities, financial planning and other issues (planning how to include UA in other social activities and networks) When: Spring 2020	-Chamber of Commerce -Chamber of Agriculture	
A2.3	**Communication management of the greenhouse.** Create a page on Facebook, Instagram, and a webpage within Hatay Municipality for the greenhouse informing the public about the greenhouse and SiEUGreen project. Create a mail list with all relevant stakeholders and send out newsletters Why: Disseminate to the community When: Social media should be fed once a week and newsletter should be sent every second month reporting the decisions taking during the executive board group	Community	Hatay municipality
A2.4	**Public event to inaugurate and settle a shared vision for the Greenhouse** Invite the community and all the actor previously mentioned to the opening of the greenhouse. During this event, a workshop to settle a vision for the greenhouse will be carried out. The Commurban app will also be disseminated as a mean to maintain dialogue and exchange of ideas among SiEUGreen UA practitioners Why: to anchor the greenhouse within the community When: Spring and summer 2020	Community	Hatay municipality

9.5.3. Process 3. The greenhouse as a regional education centre

The greenhouse should become a centre for education on UA for a range of different target groups. This means the managers need to develop dynamic pedagogies with different kind of workshops or educational material directed to, for example, children, vulnerable groups, technology providers, public authorities etc. The members of the women cooperative are clearly a target group. However, this must be well planned since the women live all over the region and would need a good reason to travel to the Kisecik area.

The process relates directly to objectives: 5,6 and 8.

Text-box 17: Greenhouse Hatay: Establishing an educational centre

Process 3: The greenhouse as a regional education center			
Activity id	**Activity**	- Target group	**Responsible**
A3.1.	**Create a hosting committee,** which will be in charge of booking visits and other activities (seminars, workshops) tailored for different social groups Why: educate different groups about the social, economic & environmental potential of UA and UA technologies When: As soon as the greenhouse opens	- Students from different levels - Members of Women initiative - Entrepreneurs / farmers - General public	Hatay Municipality
A3.2	**Training for Hatay Municipality staff to hold educational courses and workshops on UA and technologies for UA** Why: capacitate people to perform educational activities, i.e. design and carry out workshops and seminars tailored to the different social groups When: September 2020	- Hatay Municipality employees, - Refugees	Antalya University
A3.3	**Workshop on aquaponics & hydroponic (large scale)** Why: disseminate new technologies to different actors of the region When: different occasions	- Entrepreneurs / farmers	Hatay Municipality SiEUGreen team
A3.4	**Workshop on aquaponics & hydroponic (small scale)** Why: co-create possibilities to implement technologies (aquaponics, paper-based) within members of the women cooperative When: different occasions	- Members of Women initiative - NGOs with interest in UA systems	Women initiative board Hatay Municipality SiEUGreen team
A3.5	**Workshop with students** Why: engage the youngest of different ages in the practice of UA When: different occasions	- Students	Hatay Municipality
A3.6	**Set a program for visitors from the general public** Why: engage everyone in UA When: as soon as the greenhouse opens	- General public	Hatay Municipality
A3.7	**Workshop on business models** Why: increase the capacity of the women to secure the household economy When: different occasions	- Members of Women initiative	Hatay municipality
A3.8	**Institute a partnership for research on UA technologies** Why: serve as a hub to test aquaponic and hydroponic growing When: when partners demand	- Students from the university University Hatay municipality Farmers	Hatay Municipality Universities in the region
A3.9	**Create internship opportunities on UA technologies for women and students**	- Members of Women initiative	Universities of the region (e.g.

	Why: encourage the practice of aquaponics When: especially during Summer in Turkey.	- Students for different levels	Antalya, İskenderun)
A3.10	**Promote the Commurban app** Why: For UA-practitioners to connect, learn and inspire internationally each other When: During events	Students, members of the women initiative, general public, public authorities	NMBU/NIBIO

9.5.4. Process 4. Long term social and economic inclusion

The greenhouse should contribute to long-term social and economic inclusion of diverse groups. Besides the activities related to education already mentioned in Process 2, Text-box 18 lists other activities that can be implemented.

Text-box 18: Greenhouse Hatay: long-term social inclusion

Process 4. Long term social & economic inclusion			
Activity id	**Activity**	**Target group**	**Responsible**
A4.1	**Institute the greenhouse as a trade centre,** **Why:** qualify people that will be able to replicate the technologies in other places of the region **When:** as soon as the greenhouse opens	- Refugees - Women - Unemployed, disadvantaged groups	Hatay Municipality Companies
A4.2	**Engage in a local food market,** where the aliments produced in the greenhouse can be commercialised with lower price. The products can be sold in the organic bazaar, in the social markets, that exist in 15 places around the region, and in the Municipal Gastronomy House. **Why:** show the economic potential of UA **When:** once a week	- Community	Hatay Municipality UA practitioners
A4.3	**Create and manage an UA land bank** where public land can be used for the UA practice. The inactive landfill that belongs to Hatay Municipality is already planned to become a site for UA. This land bank can also match private landowners who are interested in borrow their land for UA practitioners, who lack land to grow food. Why: showcase alternative ways of enabling the practice of UA When: as soon as the greenhouse opens	Community	Hatay Municipality

A4.4	**Workshop on multi-culture agriculture.** Highlighting economic activities that can be performed together with the practice of UA (e.g. extra income with social care, leisure, landscape, catering, homemade products)	Community Entrepreneurs Investors Members of Women initiative	Hatay Municipality Women initiative
A4.5	**Creating value from waste programme.** Series of workshops including subjects such as: how to make compost from organic products, alternative fertilizers (biosolids and pee) and also how to make polytunnels using recycling material (learning from Aarhus experience) Why: highlight the potential of waste When:	Community Entrepreneurs Investors Members of Women initiative	Hatay Municipality Women initiative

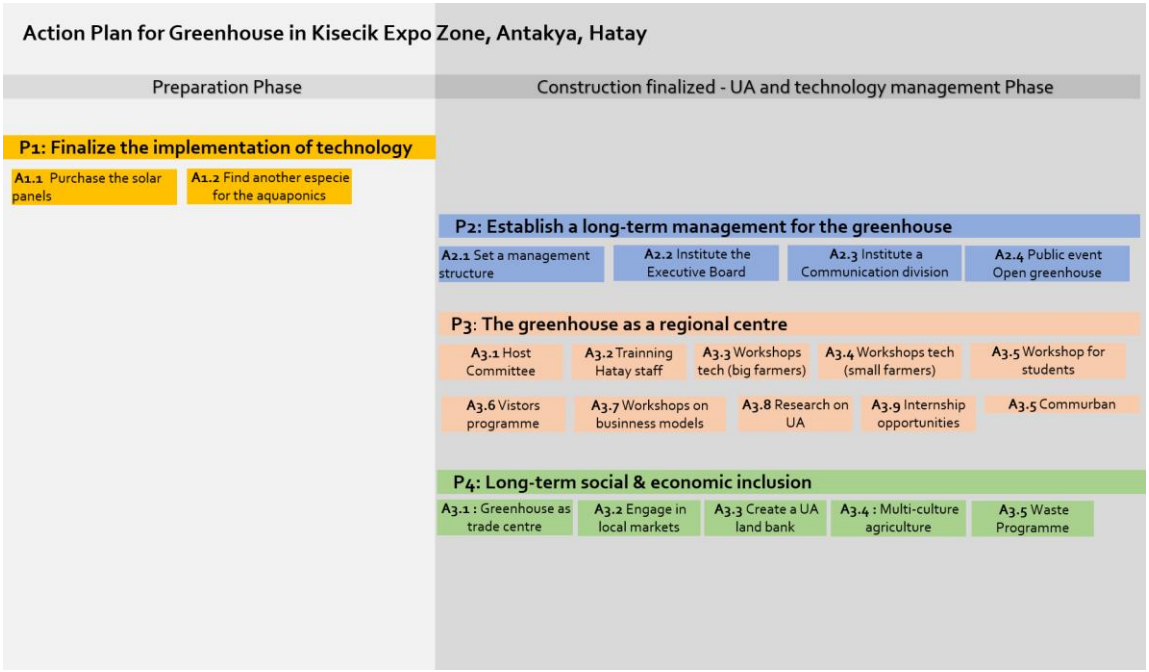

Figure 21: Action Plan for Kisecik Greenhouse, Hatay

10 Beijing

Beijing is a large city with a permanent population of more than 21 million people. The population density in the core area of the city is very high. According to the statistics of 2018, the population density of Xicheng District is the highest, reaching 25,767 people per square kilometre. The population density of Dongcheng District is 21,763 people per square kilometre, the population density in urban suburbs is relatively low. Therefore, in the past few years, Beijing's UA has mainly focused on suburban agriculture for leisure and tourism experience. These suburban agricultures are initiated from top-down, with government support for suburban leisure agriculture, and bottom-up initiatives from residents, because urban residents have great demand for leisure agriculture. This type of UA in the suburbs of Beijing is most often market-oriented, meaning that the purpose is to gain profit via UA, and its operating model is relatively mature. The land ownership varies, but in China, the government owns the land and decides the land use.

There are very few UA that uses empty, vacant land within the city. Family-based agriculture, especially balcony agriculture, is gradually being promoted. The initiation of urban family-based internal agriculture is mainly as bottom-up initiatives.

Figure 22: Map of Beijing—Location of Sanyuan Farm

10.1. Sanyuan Farm

As explained in the introduction, (see Section 2.4) the Sanyuan Farm will contribute to demonstrating aquaponics technology and new techniques for disposing of food.

Aquaponics

In Sanyuan Farm, there is a 3,000-square-meter solar greenhouse. The aquaponics project is carried out in this greenhouse, which requires 80 square meters of space. The temperature in the greenhouse is maintained above 15 degrees Celsius. The total length of the aquaponics container is 20 meters, the width is 4 meters, the diameter of the fish tank is 4 meters, the height is 1.2 meters, and the volume of the breeding area is 15.07 m^3. The shallow liquid flow three-dimensional soilless cultivation pipeline is 0.4 meters wide and 6 meters long, with a total of 8 pipes, and the planting area is 19.2 m^2. Each growing season[6] is expected to produce 1,500 kg of fish and 6,000 kg of vegetables.

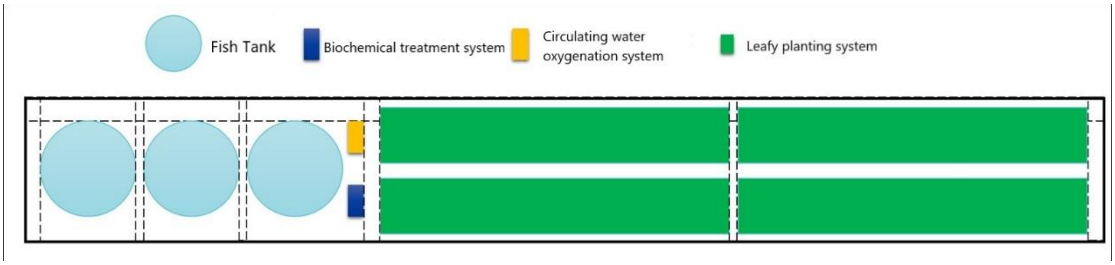

Figure 23: Design of the aquaponics system

The aquaponics system was completed at the end of October 2019, including the planning, system design and the design of construction plans for the early projects, preparation of system facilities and equipment in the mid-term, installation of microbial reactors, and testing of the system acceptance. At the beginning of November 2019, 600 fish were put in the aquaponic system. Each fish weighed about 200 - 250 grams. Normally, 900-1000 fish can be put in. The first aquatic species introduced was California bass. Seven days after the aquatic system was started, nutrients began to accumulate in the water. After the EC value[7] reached 1000 μs/cm, about 4600 vegetables were transplanted in the first batch. The vegetables were purple leaf lettuce and loose-leaf lettuce.

[6] A growing season corresponds to the growth cycle of a vegetable, e.g. the growth period of a lettuce is 120 days.
[7] The EC value is used to measure the concentration of soluble salts in solution, and it can also be used to measure the concentration of soluble ions in liquid fertilizers or planting media. High concentrations of soluble salts can cause plant damage or cause root death. The unit of EC value is expressed in mS/cm or mmhos/cm. The measurement temperature is usually 25° C.

Image 5: The aquaponics system in Sanyuan Farm

At present, fish farming is still in the initial stage. The lettuce has been harvested three times, and the yield has not been counted. The reason is that the current input of fish is less and water nutrition is not good, which results in weak vegetable growth.

Food waste disposal

The food waste disposal is a dispose of food waste where microbial decomposition takes place. This will be tested in Sanyuan Farm.

In October 2019, microorganisms that can decompose kitchen waste were screened out. Finally, the genetically modified beauty worm was selected to harmlessly treat the kitchen waste anaerobic fermentation crude residue and biogas residue. Select the kitchen waste after degreasing and transfer the worms larva to a special treatment tank according to a certain ratio, and add a predetermined amount of primary slag and biogas slag (about 25 kg each), and control the temperature and humidity range. The garbage is rapidly digested, in about seven days. The processing can be seen in the pictures below:

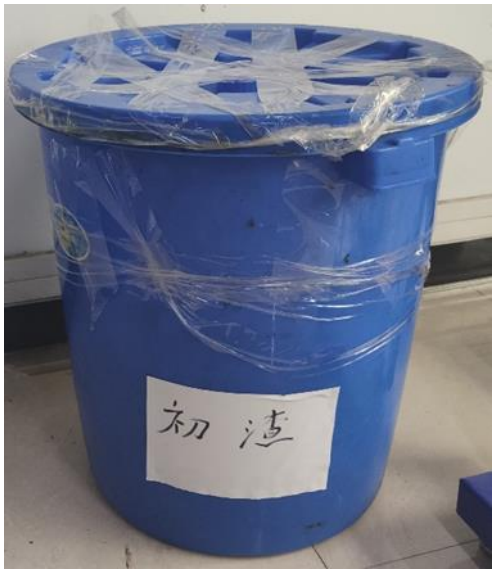

Image 6: Containers for food waste

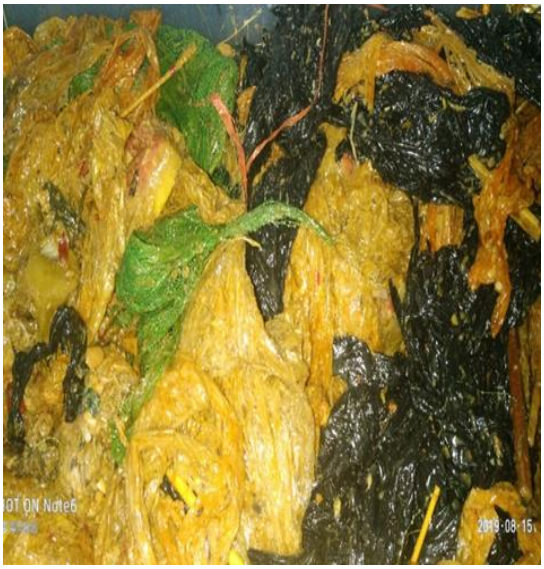

Image 7: Before decomposition

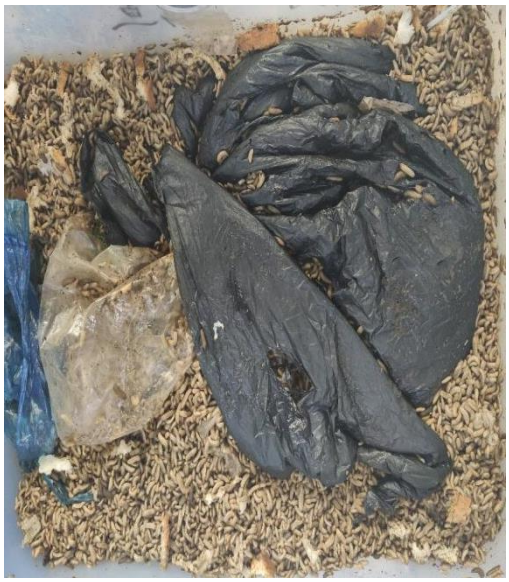

Image 8: Decomposition process

Image 9: Decomposition completed

Catering garbage is eaten, digested and absorbed by genetically modified beauty worms to achieve the goal of reducing garbage emissions and no pollution.

After the first-level biotransformation is utilized, the insects raised are made into insect protein and used as feed for livestock, poultry and fish. It can also be processed into high value-added protein powder, oil, and other products, which can be used as feed for ornamental animals, livestock, and fish to realize the recycling of kitchen waste and create revenue.

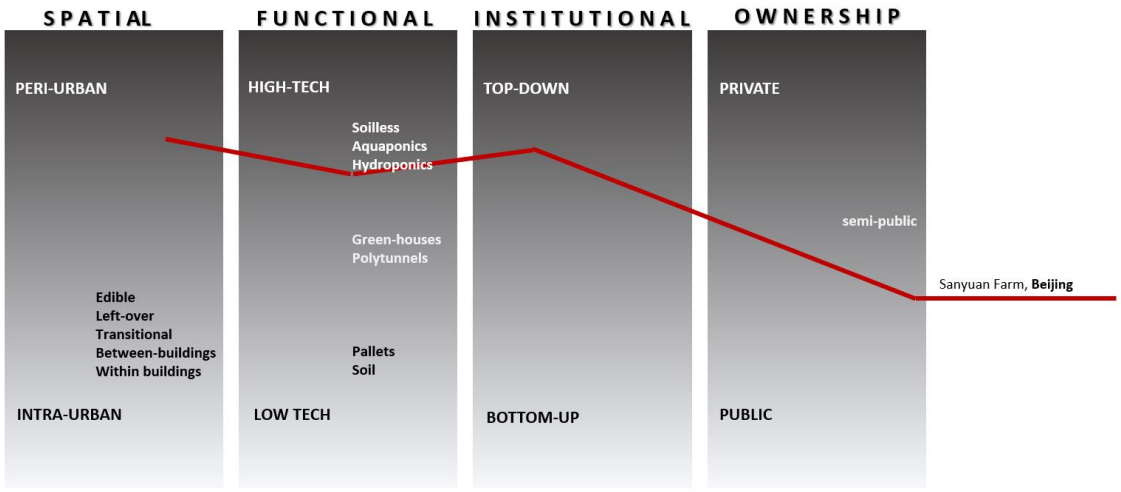

Figure 24: Typology of Sanyuan Farm, Beijing

10.1.1. Objectives

Table 5: Beijing – Vision and objectives

Vision:	Through this project, development and demonstration of technologies and equipment such as reduction of kitchen waste compost and planting vegetables on balconies, and the exploration of resource utilization mode of urban waste, The subject will reduce urban waste and make it harmless, increase the supply of urban vegetables, and Increasing the living welfare of the elderly people in cities.
Objective 1:	Urban Agricultural Technology Integration and Demonstration. Develop and expand the function of agriculture, allowing agriculture to evolve from traditional functions to more functions, such as education, science popularization, leisure, greening, social integration, etc.
Objective 2:	Increasing the living welfare of elderly people in cities. The ageing trend in China has been accelerating. The proportion of elderly people over 60 years old in Beijing is as high as 25%. We hope that the promotion of UA will improve the amateur life of elderly people and increase their society Socializing
Objective 3:	Increase the supply of safe, green and healthier food.
Objective 4:	Through the improvement of greenhouse technology and compost technology, reduce waste and resource utilization of kitchen waste.
Objective 5:	Strengthen people's understanding of UA, improve children's health food knowledge.
Objective 6:	Use of balcony, roof and other unused lands of the city.

- Objective 1, 4. Can be realized by the showcase teams by demonstrating the aquaponics system and technology of food waste disposal in Sanyuan Farm.
- Objective 2, 3, 6. Can be done within the local community by offering equipment and technologies for home planting, but also to the wider community by broader dissemination.

10.1.2. Challenges

The challenges they face include the following:

- Sanyuan Farm is located far from the urban area, which generates some difficulties. Urban residents who rent farmland only have time to go to the farm on weekends or holidays, up to 2-3 times a month. In winter and summer, they go less often. This makes it difficult for the participants to dedicate the time that is actually needed throughout the growing seasons. The remoteness is also a challenge to the economic sustainability of the farm since it makes it difficult to attract visitors to recreational events and consume its local products, which means less income to the farm.

- Sanyuan Farm operates entirely in a market-oriented model. Urban residents have no direct influence on-farm management and decision-making. They only purchase services. Sanyuan Agricultural Company is the leader of the entire farm. These stakeholders are loosely connected. The connection is not close. If the farm service is not good, the participants will choose other farms.

- Sanyuan Farm must maintain continuous innovation of business model in order to attract urban residents and educational institutions.

- Sanyuan Farm is mainly for outdoor planting activities. Due to the climate, it is difficult to carry out agricultural activities in cold winters.

- The land lease price of Sanyuan Farm is relatively high. Not everyone can afford the rent, which is relatively high with regards to the average income in Beijing. Thus the promotion of renting a piece of land in the farm is restricted to middle-class families, and the participating urban residents are mainly middle-class families with good economic conditions.

- The planted products need storage equipment. It is difficult to guarantee the amount of agricultural products that urban residents plant on the farm. If the residents do not pick them in time, the products may be wasted. If the farm helps to pick them, they need to buy some refrigeration equipment.

10.1.3. Stakeholders

A number of stakeholders are involved in the implementation and management of Sanyuan Farm. Their roles and influence are briefly described below:

- **Beijing Sanyuan Agriculture Co., Ltd.**: is a modern urban agriculture professional company under the Beijing Shounong Group, is the owner and manager of the farm.

- **Beijing Agriculture Ecological Ideas Services Union (BAEISU)**: is a core stakeholder since it is responsible for the implementation and promotion of greenhouse technology, compost technology and balcony vegetable garden, and the business model development of UA.

- **Users/Urban residents**: Urban dwellers rent small plots of farm-land to grow their own vegetables, or participate in farm activities. They have no direct influence on-farm management and decision-making.

- **Government department**: The government has issued some policies to support the development of leisure agriculture in the suburbs. For example, Beijing Municipal Government and Haidian District Government supported Sanyuan Farm in issues

related to land for UA. The land used by Sanyuan farm was originally farmers' land. After the government nationalized the land, it was allocated to Sanyuan Farm for free. Sanyuan farm can use the land permanently and free of charge.

- **Schools and other educational institutions**: Educational institutions such as schools cooperate with Sanyuan Farm and regularly organize education and science popularization activities on the farm. These educational institutions can affect the business model of the farm to a certain extent, Sanyuan farm will set different service items according to the needs of the educational activities.

- **CASS**: is responsible for evaluating the social benefits of UA.

- **Other stakeholders:** Some social groups collaborate with Sanyuan Farm on agricultural projects.

10.1.4. Action Plan

In order to realize the vision and objectives of Beijing showcase, we need to start our work from four aspects:

- Technology development and project maintenance
- Seek support and cooperation
- Broader promotional activities
- Increase citizen participation and improve services

10.1.4.1. *Process 1: Technology development and project maintenance*

Text-box 19: Sanyuan Farm: Technology development and project maintenance

Process 1. Technology development and project maintenance			
Activity id	**Activity**	**Target group**	**Responsible**
A1.1	**Aquaponics System** Why: Explore sustainable circular agriculture through the aquaponics system and promote the concept of circular agriculture. When: August 2019-June 2020	Users	BEAEISU Sanyuan Farm
A1.2	**Food waste disposal** Why: Explore ways to harmlessly treat kitchen waste to reduce urban waste pollution When: August 2019-June 2020	Users	**B**EAEISU Sanyuan Farm
A1.3	**Green-house** Why: Reduce the impact of seasons and cold weather on agriculture When: January 2018-December 2020	Users	Sanyuan Farm
A1.3	**Project maintenance** Why: Open the fishpond aeration system and test the technical indicators of the aquaponics system When: continuously	-	**B**EAEISU Sanyuan Farm

10.1.4.2. *Process 2: Seeking support and cooperation*

Text-box 20: Sanyuan Farm: Seeking support and cooperation

Process 2. Seeking support and cooperation			
Activity id	**Activity**	**Target group**	**Responsible**
A2.1	**Seeking government support** Why: It is difficult to promote on a large scale by enterprises alone, requiring government intervention and support When: June 2020-December 2021	-	BEAEISU
A2.2	**Cooperation with Aquatic Association and agricultural enterprises** Why: Aquatic associations have wider sales and promotion channels, we need to use their power to promote aquaponics projects When: June 2020-December 2021	-	BEAEISU

10.1.4.3. *Process 3: Broader promotional activities*

Text-box 21: Sanyuan Farm: Broader promotional activities

Process 3: Broader promotional activities			
Activity id	**Activity**	**Target group**	**Responsible**
A3.1	**Cooperation with educational institutions** Why: Cooperate with educational institutions to understand their needs and arrange related activities according to their needs, which can better promote UA and give young people more opportunities to learn about UA When: Continuously	Educational institutions Schools Students	Sanyuan Farm
A3.2	**Promote the concept of UA to urban residents through the Internet** Why: In big cities, online promotion and publicity is a very effective means, such as WeChat, Weibo and other social networks When: From June 2020	Urban residents	BEAEISU
A3.3	**Pilot activities for garbage-for-vegetable change in urban communities** Urban residents can collect household food waste and then give the waste to the farm staff to use for growing vegetables at a certain exchange rate. In the future, we will consider promoting these activities to urban core areas. Why: Transmitting the idea of ecological cycle for urban residents and reducing the discharge of food waste When: From July 2020	Urban residents	BEAEISU

10.1.4.4. *Process 4: Increase citizen participation and improve services*

Text-box 22: Sanyuan Farm: Increase citizen participation and improve services

Process 4. Increase citizen participation and improve services			
Activity id	**Activity**	**Target group**	**Responsible**
A3.1	**Provide more thoughtful services to farm customers, such as land custody, agricultural product storage, etc.** Why: Better services attract more urban residents When: From May 2020	Customers at Sanyuan Farm	BEAEISU Sanyuan Farm
A3.2	**Design a questionnaire to investigate farm customers' understanding, willingness and suggestions for UA** Why: Increase consumer participation in ternary farm activities and promote the concept of UA When: June 2020-December 2020	Customers at Sanyuan Farm	CASS Sanyuan Farm

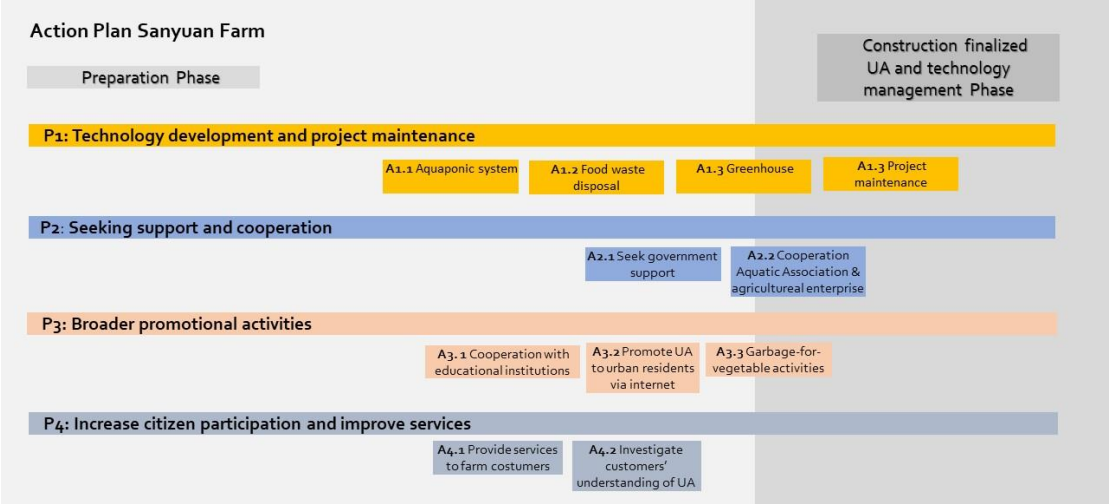

Figure 25: Action Plan for Sanyuan Farm

11 Changsha

The showcase is located in Futiancangjun, Changsha, Hunan. Changsha will exhibit the comprehensive recycling technology of urban sewage, the recycling technology of nutrients in sewage, and solar energy utilization and balcony garden. Changsha showcase will install low flush toilets to collect a high concentration of black water, from which the nitrogen and phosphorus elements will be recycled to prepare struvite slowly releases ecological fertilizer. Changsha showcase will build a small water treatment station in the basement that adopt biological treatment system to treat the greywater(washing water and kitchen water) of 17 households. Changsha showcase will install light water-retaining materials on the roofs to regulate storm runoff, and adopt wetland system for rainwater disposal. Changsha showcase will install solar water heaters and photovoltaic panels (PV) to reuse solar energy. Changsha showcase will promote 100 households' balcony gardens for Changsha residents. According to the available space characteristics of each family balcony, the balcony is equipped with personalized planting equipment, which is used for planting leaf vegetables, fruit vegetables, sprout vegetables, edible fungi and so on. Below is a detailed description of each demonstration technology:

Blackwater treatment

In Changsha Futianzangcangjun, it is estimated that all the 17 households in one unit adopt low-flush toilets to save toilet water, and the pipes of demonstration households are transformed to achieve separation of sources of high-concentration polluted water. Nitrogen and phosphorus in high-concentration black water were recovered to product struvite (magnesium-ammonium-phosphate, MAP). By continuously optimizing reaction conditions, the nitrogen and phosphorus nutrient elements can be recovered to the greatest extent, and the recovery rate of phosphorus can reach 90% and 85% of nitrogen. We combine struvite with other fertilizers to produce new fertilizers to increase the fertilizer utilization rate of crops and increase the yield of crops, and applied the product to the urban agriculture of the residents in the site. The effect of magnesium ammonium phosphate on soil improvement will also be studied.

Grey water treatment

Use biological treatment system to treat the grey water (washing water, kitchen water) by the demonstration families. The treatment process of grey water is as follows: first, the water volume is regulated by the regulating tank and then it enters into the air flotation tank after

oil separation treatment. After the removal of surfactant by air flotation aeration, it enters into the integrated equipment for biological treatment. The integrated equipment adopts the automatic membrane hanging method of indigenous microorganisms. In order to meet drinking water standards, treated water will go into ultraviolet disinfection equipment and reverse osmosis devices. Therefore, the treated water can reach the reuse standard of water quality irrigation water, and realize the efficient and sustainable use of water resources.

Rainwater treatment

Green light water-retaining materials and supporting equipment are adopted to collect rainwater from the roof of urban residential buildings and directly send it to the green ecological purification system of constructed wetlands for treatment, so as to realize the diversion of rainwater and sewage.

Balcony garden

In Changsha, 100 households will be selected to set up a balcony vegetable garden. According to the actual situation of the selected family from below choices such as fruit class, leafy vegetables planting machine, meaty plant maintenance equipment, edible fungus training equipment or sprouts. 100 households' residents could choose two to three kinds of equipment and will receive very professional technical guidance. On the one hand, the balcony garden can make dweller eat safe green vegetables, on the other hand, can make balcony afforest again to achieve beautification purify effect.

Yellow technologies

We will also demonstrate solar energy recycling technology in demonstration areas, using solar water heaters to provide hot water for residents. Solar photovoltaic panels provide lighting for residents.

Table 6: Technologies showcases in Futiancangjun.

a/a	Technology
Green technologies	
1	Water-based hydroponic culture
2	Paper-based plant growing technology
3	Balcony gardens
4	Soil-based traditional plant growing
Blue technologies	
1	Struvite precipitation from biofilter percolate
2	Low flush toilets
3	Greywater treatment using a Biofilter/ Filterbed treatment system
4	Greywater treatment using a biomembrane system

5	Green roof light weight aggregate (LWA) for water retention
6	Wetland/pond system for stormwater disposal
7	Wetland/infiltration system for stormwater disposal
Yellow technologies	
1	Photovoltaic panels (PV)
2	Solar collectors for heating water

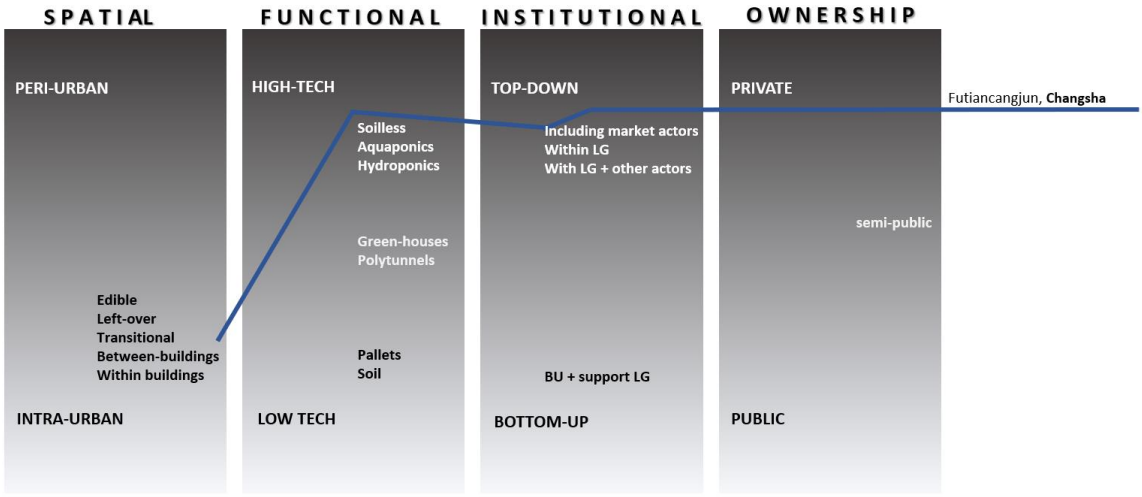

Figure 26: Typology of Futiancangjun, Changsha

11.1. Objectives

Table 7: Futiancangjun: vision and objectives of

Vision:	The project vision is to demonstrate this urban development as resource-efficient, intelligent and sustainable, with reduction, reuse and recycling of waste, suppling secure food and effective utilization of solar energy.
Objective 1:	Reduce water consumption, replace mineral with organic fertilizer
Objective 2:	Increase access to healthier food
Objective 3:	Use of balconies

11.2. Challenges

The greatest foreseeable challenge for Changsha showcase is connected to the fact that it needs to be active to make sure that the **future residents engage in the growing facilities**. The engagement of future residents is important for the urban agriculture system and for the infrastructure to be the green add to the surroundings that the developer and architect have envisioned. One important thing needed to make sure is that the dwellers actually accept these concepts and uses the showcase's products. This challenge generates the need for a number of activities to take place, in order to make future residents feel ownership over the vision and thereby be willing to contribute to it.

Finding a **long-term management system for Futiancangjun** is also a crucial matter that needs to be solved. The solar system, the water system, the balcony gardens and all the other new

solutions that are demonstrated, need to be maintained properly. Except for knowledge on how to manage the techniques, it is also important that the property management agency is well aware of, and agree to, the vision of the building. The property management company of Futiancangjun is called Hongyu property, which is the brother company of Hengkai. Hongyu property will take care of the follow-up management of the whole system. Hengkai will be responsible for solving technical problems.

There is a great challenge to **operate this urban agriculture model in future**. Because the idea of urban agriculture in China is still a rather avant-garde concept, almost agricultural products are produced in the countryside. The demonstrated infrastructure and applying technology is used inside the building. So residents and developers worry about the safety of the living environment(Eg: Do chemicals and odours run in the basement water treatment room evaporate? Or does the sewage treatment room run into trouble and cause water to overflow?), which will be an obstacle to the future development of this model.

China's land is public, although the developer is private and they rent the land on a long-term contract. On the one hand, developers have to increase the investment to build a decentralized sewage treatment plant in the community. On the other hand, fewer centralized wastewater treatment plants are easier for the government to manage, while more decentralized wastewater treatment plants are distributed in different communities are difficult for the government to manage. So China's current situation is still a centralized sewage treatment plant, Changsha showcase only complete a small demonstration project in Futiancangjun. To obtain the support of the government departments and form policies from top-down needs to strive to cooperate with other large enterprises to make a larger demonstration project to gain greater social influence. Then the government policies will be the most pushing that more real estate developers are willing to establish the same model with Futiancangjun.

11.3. Stakeholders

In Changsha the following groups are engaged in the showcase activities:

- **Residents in Futiancangjun, with special focus on the elderly:** Because the balcony garden will demonstrate in households, the residents shall participate in the activities including planting, renewable energy, etc.
- **Schools in Futiancangjun**: Students will learn about the realization of novel urban agricultural technological techniques and new approaches for social engagement. There will be a workshop in the schools to promote SiEUGreen concept.

- **Government**: China's land is public owned and managed by the Chinese government. The future development of the business model needs strong support from the government because the developer is private and rent the land on a long-term contract. A technology sharing session with the government to advocate the SiEUGreen concept of large-scale promotion and implementation should take place.

- **Companies (technology providers, suppliers):** Because the whole SiEUGreen system includes the blue/yellow/green/social technologies, the technology providers are crucial. They will obtain commercial opportunities due to the SiEUGreen project. Hengkai (HHEP) is the builder and leader of Changsha showcase, responsible for exhibition promotion and technology demonstration in Changsha showcase and Hongyu belong to this stakeholder group as well as Futianxingye (developer), Huayin (designer), Qingzhuhu (builder), Hongyu (property management); BGVS Beijing Green Vally is a company who cooperates with residents' communities to provide community residents with sprouts seeds and planting equipment, and provides regular technical guidance to residents; and Photon company responsible for the development and production of small-scale home planting equipment, providing equipment needed for planting in Beijing showcase and Changsha showcase.

11.4. Action plan

Five processes are part of Changsha Action plan. These are:

- Concept communication;
- Public Engagement in UA;
- Public information & communication;
- Engagement of residents and
- Management of technology

11.4.1. Process 1. Concept Communication

The first process is to make the developers, designers, builders and owners of Futiancangjun familiarize with the concept of urban agriculture at an early stage. These concepts were transmitted to them by meetings so that they could perfectly integrate ideas with building construction in later development.

Text-box 23: Futiancangjun: Concept communication

Process 1. Concept Communication			
Activity id	**Activity**	**Target group**	**Responsible**
A1.1	**Make a presentation for developer** Why: Concept Communication When: 2018	Futianxingye	HHEP
A1.2	**Meeting with designers** Why: Concept Communication When: 2018 Oct	Huayin	HHEP
A1.3	**Participate in the construction of demonstration infrastructure** Why: Concept Communication	Qingzhuhu	HHEP

	When: 2019.06-2020.04		
A1.4	**Open public meeting.** Why: Concept promotion When: 2019 Apr	Owners of Futianzangjun	Developer of Futianzangjun ,HHEP

11.4.2. Process 2. Public Engagement in UA

By inviting the general public and specific target groups such as owners of Futianzangjun, students of Futianzangjun, residents of Changsha to engage in balcony gardens, the vision of the UA can be spread beyond the residents. By providing paper vegetable growing machine or other types of UA-facilities gives space for a greater engagement, inviting them to visit the showcase and offering educative activities such as workshops on growing in these balcony equipment and how to make circular systems for fertilizers, Changsha showcase can impact the attitude on circular systems in UA beyond the residents in the showcase building.

Text-box 24: Futiancangjun: Public engagement in UA

Process 2. Public Engagement in UA			
Activity id	**Activity**	**Target group**	**Responsible**
A2.1	**Conduct a questionnaire** Why: find target groups interested in balcony gardens When: 2020 May	Residents of Futiancangjun ,students	HHEP
A2.2.	**Provide paper vegetable growing machine and other relevant UA-facilities** Why: invite a wider people to learn UA When: 2020 Aug	Residents of Futiancangjun	HHEP,BGVS, Photon
A2.3	**Teach the residents to learn how to grow vegetables on paper and use other relevant UA-facilities** Why: Let users start to get knowledge about UA When: 2020 Sept	Residents of Futiancangjun	HHEP,BGVS, Photon
A2.4	**Workshop on balcony gardens** Why: Let more people start to get knowledge about UA When: 2020 Oct	Neighbour, students, Futiancangjun school, residents of Futiancangjun	HHEP
A2.5	**Provide complementing UA facilities** Why: Engage Futiancangjun residents in UA When: 2020 Nov	Residents of Futiancangjun	HHEP, Photon

11.4.3. Process 3. Public information and communication

Building a showcase on Urban Agriculture in Futiancangjun means paving the way for permanent dissemination of how the technology works in the building and how it contributes to circular resource systems in urban agriculture and in water and waste management. The demonstration project of Futiancang will be a place to disseminate technology and achievements and will target the government, academia and residents. For the Changsha showcase, it is essential that it has a structure for long-term ownership and management. At present, HHEP is responsible for the construction and management of Changsha demonstration project. However, in view of the future development needs of this model, it is still necessary to transfer the operation and maintenance management process to the developers to attract more developers' interest in the urban agricultural model.

Text-box 25: Futiancangjun: Public Information and Communication

Process 3. Public Information and Communication via Futiancangjun showcase			
Activity id	**Activity**	**Target group**	**Responsible**
A3.1	**Attend influential academic conferences about environmental** Why: Enhance the popularity of circular resource systems in urban agriculture and in water and waste management When: Influential academic conferences holding	Academic participants	
A3.2	**Workshop on SiEUGreen concepts** Why: Let more people start to get knowledge about circular concepts of SiEUGreen project When: 2021 Mar	Neighbour, students, Futiancangjun school, residents of Futiancangjun	HHEP
A3.3	**Make a presentation for public government** Why: To get the support from government departments When: 2021 Apr	Public Government	HHEP
A3.4	**Invite government departments and academic authorities to visit the Changsha showcase** Why: Improve the influence of circular concepts of SiEUGreen project When: 2021 Apr	Government departments, academic authorities	HHEP

11.4.4. Process 4. Engagement of residents

Out of curiosity, many residents participated in the promotion of the balcony garden. But because of its non-coercive effect, the residents will gradually lose interest. Therefore, the showcase leaders need to find ways to make the residents feel ownership over the UA-vision, to get the skills they need to grow, and to properly use the waste management systems. One

way is that project team members keep close touch with residents and host other social events and social software to increase residents' sense of participation and happiness.

Text-box 26: Futiancangjun: Engagement of residents

	Process 4. Engagement of Residents		
Activity id	**Activity**	**Target group**	**Responsible**
A4.1	**Identify content for education of residents** Why: residents will need to learn how to make use of UA facilities and possibly also how to adapt to some of the technique in the building. This has to be planned for When:2020 Sept	Residents of Futiancangjun	HHEP
A4.2	**Workshop balcony gardens** Why: encourage residents to use the facilities When: 2020 Oct	Residents of Futiancangjun	HHEP
A4.3	**Planting record survey** Why: keep track of users and help them solve problems When: after distribution of UA-facilities	Residents of Futiancangjun	HHEP
A4.4	**Promote Commurban app** Why: for UA-practitioners to connect, learn and inspire internationally with each other When: when residents use	Residents of Futiancangjun	HHEP

11.4.5. Process 5. Management of technology

The showcase building in Futiancangjun includes a lot of unconventional techniques that require proper management. At present, HHEP is responsible for the showcase. In the future, if the demonstration project needs to be transformed into a business model and developed in the long term, therefore, the showcase has an important transition to make, that must be an another organization (related to the property management company) that can always responsible for the building once the construction is finished and the residents have moved in. Continuous evaluation in order to keep track of how the residents experience and adapt to the facilities, should be carried out. On the short-term, this could be done by HHEP, but for the long-term monitoring of how the residents use the UA-facilities. HHEP teammate also need find an approach that the Hongyu (Hongyu property management company) can benefit from the researcher work so that they can continue to evaluate the progress easily.

Text-box 27: Futiancangjun: Management of Technology

	Process 5. Management of Technology		
Activity id	**Activity**	**Target group**	**Responsible**
A5.1	**Set evaluation scheme for continuous evaluation** Why: Keep track of how well residents are contributing to UA and use technology properly	Residents of Futiancangjun	HHEP

	When:		
A5.2	**Communicate with Hongyu** Why: Let HA learn how to manage When:2021 Oct	Hongyu	HHEP
A5.3	**Transfer of responsibilities** Why: formal agreement on who does what When: 2021 Nov	Hongyu	HHEP
A5.4	**Evaluate and discuss a business model for developer and Hongyu** Why: for the circular system developing When: 2021 Jun	Developer, Hongyu	HHEP

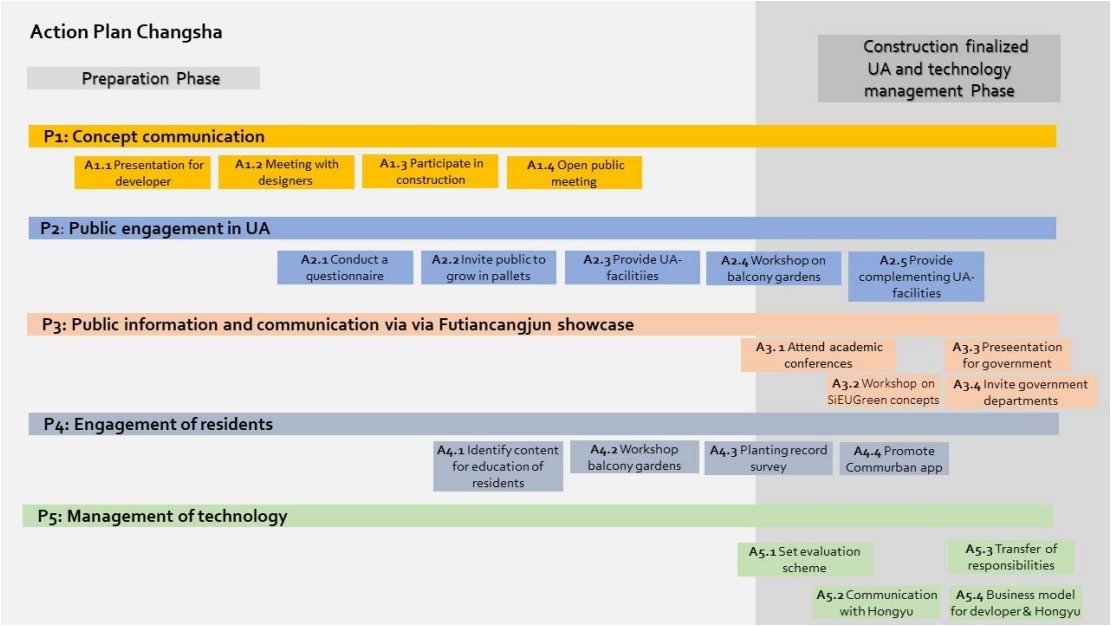

Figure 27: Action plan for Futiancangjun, Changsha

12 Final considerations & next steps

The engagement strategies presented in this report were developed, acknowledging the particularities of each SiEUGreen showcases and in dialogue with the main stakeholders. Possibly, the strategies lack aspects that will need to be addressed in the future, while other activities may turn out not relevant for engaging people. These gaps in the strategies will be identified in continuous interchange with the stakeholders from each showcase. This will help to understand, for example, why a particular strategy was successful in one showcase but not in another.

The lessons learned from following up the implementation of these strategies will be part of a report to be delivered at the end of SiEUGreen project **'D1.5b: Engagement Strategies – follow-up on the implementation'**

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14 Appendixes

14.1. Appendix 1: Survey guides

Email survey

One of Nordregio's tasks in SiEUGreen, is to create **Engagement Strategies, Deliverable 1.5**, for each of the showcases in the project. When it comes to Aarhus, the showcases are Brabrand Fællesgartneriet and the World Gardens. The Engagement Strategies will support the fulfilment of the vision and objectives in SiEUGreen and in the showcases[8], by guiding the showcases in their interaction with actors that are important in the realization of the new techniques.

As part of the process of creating the Engagement Strategies, Nordregio sends out this survey to managers of, Brabrand Fællesgartneriet and World Gardens. On the 20th September 2019 in Aarhus, we will meet to discuss the Engagement Strategies. The survey will be used in the preparation of this event.

Please send the survey back to sandra.oliveiracosta@nordregio.org and luciane.aguiar.borges@nordregio.org on 21st of August the latest.

Thank you for your help!

Best regards,

Sandra and Luciane

Questions about Engagement Strategies

1. Who do you need to engage with[9] to make the polytunnels and alternative fertilizers work and be used as envisioned? The more precise you are, the easier for us to understand.
2. Among the stakeholders, you mentioned in question 1, who do you think is most important for the polytunnels and the alternative fertilizers to work and be used as envisioned? Why?

[8] Deliverable 3.2, made by VILABS, includes the visions and objectives formulated and/or selected by the showcases. You can go back to this deliverable if you want to remind yourself about how they look like.
[9] These could be for example inhabitants, volunteer gardeners, staff in school or other institutions, a department at the municipality, a company etc. In this survey, we use the general term "stakeholders" for all these actors/persons.

3. What ideas do you have for engaging the stakeholders? Please specify if you would need to engage different stakeholders in different ways.
4. Do you believe you have the resources you need to engage with the stakeholders (competence, capacity, economy)? Please explain.
5. Would you like any support to engage the stakeholders in your showcase? Please explain.
6. How do you communicate, or plan to communicate, with the stakeholders (frequency, communication tools etc)? Please explain if you think you need to communicate with different stakeholders in different ways. You can attach communication plans or alike, if you have.
7. What are the main challenges / resistances that the users may have to the technologies? (e.g. people may not accept alternative fertilisers – human faeces and urine; use of dry toilets, etc.)
8. Do you have any suggestions about how to overcome the challenges described in the previous question? Please explain.

Interview Guide for Brabrand Fællesgartneriet - UA Initiative

In our interview, we would like to cover the following three themes.

- Basic information about the initiative (foundation process, land ownership, funding source, daily operation and activities, stakeholders involved)
- The demographics of participants (their characteristics, their roles in the initiative)
- The current engagement and decision-making system

Questions:

1. How was this UA initiative founded? Who, where, when, why?
2. How was the initiative funded in the beginning? (also about the current funding source)
3. How was the land accessed in the beginning? (also about the current land)
4. How did other stakeholders help with the foundation? (The government, the NGO, the private companies, the individuals, the media...) (to see which stakeholders we could reach in future interviews)
5. What are the main activities of this initiative? (is it only about gardening or it includes more social events?)

6. What technologies are applied to this initiative? How are these technologies promoted currently? The existing toilets?
7. How many members or garden users are involved in the initiative? Who are they? (demographics?)
8. How do people become garden users in this initiative?
9. How is the communication mechanism among garden users and other stakeholders? (to see whether it's a two-way dialogue or not?)
10. How are the decisions made? To what extent are the garden users involved in the decision-making of this initiative? To what extent are their voices listened to?

Interview Guide for World Gardens UA Initiative

In our interview, we would like to cover the following four themes.

- Basic information about the initiative (foundation process, land ownership, funding source, daily operation and activities, stakeholders involved)
- The demographics of participants (their characteristics, their roles in the initiative)
- The current engagement and decision-making system
- the influence of redevelopment project in Gellerupparken and Toveshøj

Questions:

1. How was this UA initiative founded? Who, where, when, why?
2. How was the initiative funded in the beginning? (also about the current funding source)
3. How was the land accessed in the beginning? (also about the current land)
4. How did other stakeholders help with the foundation? (The government, the NGO, the private companies, the individuals, the media...) (to see which stakeholders we could reach in future interviews)
5. What are the main activities of this initiative? (is it only about gardening or it includes more social events?)
6. What technologies are applied to this initiative? How are these technologies promoted currently?
7. How many members or garden users are involved in the initiative? Who are they? (demographics?)
8. How do people become garden users in this initiative?

9. How is the communication mechanism among the garden users and other stakeholders? (to see whether it's a two-way dialogue or not?)
10. How are the decisions made? To what extent are the garden users involved into the decision-making of this initiative? To what extent are their voices listened to?
11. Considering the ongoing redevelopment project in Gellerupparken and Toveshøj, how do you think the World Gardens initiative will be like in the coming years? (the land, participants, operation, funding, stakeholders…)

Interview Questions about Gellerupparken and Toveshøj

Part 1: The redevelopment project in general:

1. Could you give us a brief introduction about the redevelopment project? (its origin, intention, process, stakeholders, outcome…)
2. how do you think the redevelopment will transform this area?
3. Organization of the departments working with this initiative – you work at "Integration og Bydelsudvikling"…
4. How are the decisions made regarding the redevelopment details of this area? How is public participation achieved? To what extent does the voices of the participants count?

Part 2: The redevelopment and the UA initiative:

1. Is urban agriculture discussed as having a role in the regeneration? (Can't find much about green areas in the strategy). More in Toveshoj maybe – et gront kvarter? An objective for the UA is to "make use of UA as an integration strategy for refugees and migrants"… do you relate to this?
2. What do you know about Verdenshavere or Smag pa Aarhus, and is there an active discussion about what will happen with these projects in Gellerup Toveshoj? Will gardens be removed?
3. Vision SiEuGreen/Aarhus: Aarhus creates a more socially sustainable community through the promotion of urban agriculture

Demolition and relocation and people:

1. What is the plan for the demolition of existing buildings and the relocation of residents? Are they going to be relocated elsewhere in the city or they will be allocated an apartment on-site (since the area will be densified to give space to attract more newcomers?)
2. Do you believe the strategy will help people without employment? Social strategy connected to the redevelopment? Working close?

Public opinion

1. How is the ghetto policy in general and the regeneration of Gellerup in particular, received by the inhabitants in Gellerup? Any resistance movements? E.g. Beboer og medstifter af borgergrupper mod byggeri ved Aarhus Stadion

Future:

2. If there will be a change of population composition in the future, how do you think it would be? And how do you think it could affect the current World of Gardens? How do you see the future of the world of gardens initiative?
3. Since it takes a decade (by 2030?) for this redevelopment project to be finished, how do you think about the transitional use of the land, and how do you think about the world of gardens projects in this period?

Interview Guide for Fredrikstad – Skype meeting on 30 October 2020

Purpose with meeting: Understand their work with establishing contacts with the surrounding community, how they work with tenants perspective to make sure they will adapt to the technology and use UA.

Background: Nordregio will draft an engagement strategy for Fredrikstad, supporting them in taking action for engaging community and future users of UA inside building (families), but also in connected facilities that are publicly accessible such as the power plants show rooms and the greenhouses.

Questions:

3. Where do we find the most recent information about what you will do in terms of UA? inside the building, greenhouse and publicly accessible supporting systems such as showrooms for water cleaning, fertilizers etc?
4. Can you briefly explain to us, since there might have been some changes in the plans?

5. What challenges do you see for actually making the dwellers use the UA and alternative sanitation/fertilizer/energy systems? To use them correctly? To be willing to buy the apartments? Have you done analysis on who would like to live like this (potential buyers)?
6. In which phase are you now? Planning/Construction/Operation? Date for moving in? Some publicly available facilities that will be accessible while construction is ongoing? Like pallets?
7. Stakeholders. Who do you see as most important to involve in an early stage for ensuring that the UA+ will be used as envisioned?
8. What actions have you made and what do you plan to do?

Skype about Hatay, 20191106

Purpose with meeting: Understand their work with establishing contacts with the surrounding community – if of interest? How to reach refugees for employment?

Background: Nordregio will draft an engagement strategy for Hatay, supporting them in taking action for engaging community and refugees in greenhouse with aquaponics and hydroponics as well as for the showcase greenhouse.

Questions

9. Where do we find the most recent information about what you will do in terms of the two different projects?
10. Can you briefly explain to us, since there might have been some changes in the plans?
11. In which phase are you now? Planning/Construction/Operation?
12. What challenges do you see for actually employing refugees?
    - For installing aquaponics and hydroponics?
    - Being sure they are used correctly?
    - Who will be responsible for them?
13. Stakeholders. Who do you see as most important to involve in an early stage for ensuring that the UA+ will be used as envisioned?
14. What actions have you made and what do you plan to do?

Workshop guide Verdens Havere September 2020

1. Who are the stakeholders of the UA that World Gardens engage in?

2. Which challenges do you see for the new technology to be established and used in the UA of World Gardens?
3. What opportunities do you see with being part of SiEUGreen?
4. What needs do you have to realize the UA with the new technique?
5. What activities are you planning to realize the UA with the new technique?
6. What activities are you planning to engage the surrounding community in UA?

14.2. Appendix 2: Support material for Fællesgartneriet

Form to control the use of the toilet

Please indicate with an 'x' for what purpose you used the toilet. If you wish, give your opinion about the toilet (e.g. suggestions for improvements)

	Purpose			Assessment			
User	Faeces	Urine	Both	Good	Bad	None	Comments
1							
2							
3							
4							
5							
6							
x							

Brabrand Fællesgartneriet: draft Program of the Open Day

10:00 – 10:20	Welcome and Open words	Mari & Pernille
10:20 – 11:00	SiEUGreen project – why a solar-driven toilet	Petter
11:00 – 13:00	Cooking and lunch	All
13:00 – 14:30	Workshop on alternative fertilizer – why is it important? Evidence of using urine to grow food (	
14.30-15.30	Choosing a common site to treat the waste and grow food with the alternative fertiliser	

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 774233

SiEUGreen

Sino-European innovative green and smart cities

Co-funded by the Horizon 2020 programme of the European Union

Co-funded by the Chinese Ministry of Science and Technology