Implementing community urban agriculture in Bonaire

Developing guidelines to set up and design sustainable communal urban agriculture projects in the Caribbeans SIDS with a focus on Bonaire, by using participatory action research.

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0. ABSTRACT

0. Abstract

Bonaire is a Caribbean Island that is part of the Dutch Kingdom. The island is currently facing serious challenges. One of the defined issues is the lack of local food production which leads to expensive fruit and vegetables in the supermarket. This results in unhealthy diets of the citizens which leads to 60% of overweighted inhabitants in Bonaire (Verweij et al., 2020). To fight this problem, the local government of Bonaire is starting agricultural projects such as community gardens. However, there is a need for examples and knowledge on how to set up successful agricultural projects. This information is currently missing in Bonaire, which makes providing guidance in such projects the main aim of this thesis.

To achieve this goal, I in my role as a researcher, became a member of an ongoing communal food initiative project in the agricultural department of Bonaire called "Nos mes por". My integration into the community created a unique opportunity to gain real-world experiences by using participatory action research (PAR) as a methodology. In short, there are two objectives namely (1) implementing actions for "Nos mes por" (gaining action) while also (2) generating information for the process and product design of community gardens in Bonaire (gaining knowledge).

This research methodology in this dissertation is compiled by using interviews, observations, and focus groups as research methods. This study resulted in both real-world actions which are applied in "Nos mes por" and specific guidelines defined by the members of the community garden to make the project successful. Moreover, strategies to set up and design communal urban agriculture initiatives in Bonaire specifically and SIDS generally are developed. However, future research in Bonaire and SIDS should test the guidelines to see how they work in practice.

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Glossary

1. LVV (Departement Agriculture, livestock, and fishing)

On 10 October 2010, the island of Bonaire became a special province of the Netherlands. This means that the island is part of the Dutch Kingdom, but it also is seen as an independent country with its own port, airport, water supply, electricity, and internet. However, Bonaire is dependent on the Dutch system for education, medical care, and police tasks due to its small size. In short, Bonaire has a local government called "Openbaar Lichaam Bonaire" which is a subdivision of the Dutch government (Pommer & Bijl, 2015). This local government has multiple departments such as the agricultural one. This is called LVV which stands for Agriculture, livestock, and fishing (Landbouw, veeteelt, en visserij). This operates as a knowledge center to spread information, training, and support for the agricultural, livestock, and fishing sectors in Bonaire. The main goal is to stimulate the inhabitants of Bonaire to create a self-sufficient community for food (Adriaens et al., 2019). One element to achieve this goal is by installing allotment gardens (Adriaens et al., 2019).
In this thesis, the term LVV refers to the government department that created an allotment garden on their terrain.

2. "Nos mes por" (Translated from Papiamentu to 'We can do it ourselves)

This officially stands for the name of the association that is made responsible for the community garden on the LVV terrain. The board of this association is installed on 3 March 2022 (O. Emerenciana, personal communication, 16 March 2022). In practice, the LVV department is still taking the lead in this project because they were the ones to start this initiative. Therefore, I use this term to talk about the complete project on the LVV terrain instead of only the board of the project. This makes it easier to talk about the social local food initiative that is located on the LVV terrain.
A synonym that is used in this research for the project of "Nos mes por" is a community garden. This concept refers to an area in a neighborhood where people meet to grow food. Each person has their designated plot in the garden (Philips, 2013). **This definition relates to the current form of the garden on the LVV terrain, which makes it possible to use this term in this thesis.**

3. Urban agriculture

Urban agriculture is defined as "small areas (e.g., vacant plots, gardens, verges, balconies, containers) within the city for growing crops and raising small livestock or milk cows for own consumption or sale in neighborhood markets" and can provide a source of food and income for urban dwellers (FAO, 2020). **Thus, this is a method in more urbanized regions where people are working together to grow vegetables without the intention to produce on a large scale.**

4. Food forest

A food forest can be explained as "multifunctional biodiverse agroforestry systems using several (3 to 7) plant layers of different height (strata), including trees, shrubs, and ground cover. They have the potential to provide food, livelihoods, environmental services (habitat, heat mitigation, carbon storage), and spaces for recreation, education, and community building" (Albrecht & Wiek, 2021, p. 92). This is an agricultural form that is often used in the Tropics, which aligns with the context of this study (Albrecht & Wiek, 2021). In food forests, the planting method of agroforestry is often used which is defined as a living system that becomes partly autonomous after a few years. This is due to the combination of biomass and plant and trees that is grown close together to create mutual benefits (Gietzen, 2016). **In this thesis, this term emphasizes the fact of using trees when cultivating.**

5. The separation between the setup process and the product of the community garden

In this study, a division is made between the setup **process** and the **product** of a community garden. The process refers to the method to achieve the design what is a community garden in this thesis. The set-up process is conceptualized as the method to set up community local food initiatives. Concretely, this relates to the steps that are needed to come to a real-world project of communal urban agriculture

The product can be seen as the outcome of the design process. Design strategies such as a social hub, routing, weekly meetings, no hierarchy are part of the product. **This means that there are two focuses and outcomes in this study based on the process or the product.**

Colors used for the figures in this dissertation

1. **Blue** is used to refer to the actions of "Nos mes por"
2. **Purple** refers to the product of setting up community gardens
3. The colors: **pink, green, and yellow** refer to the three sustainability pillars which are used in the process design of community gardens
4. **Grey** is used to indicate the general research elements

1. INTRODUCTION

1. Introduction

Bonaire, located in the southern Caribbean, is receiving an increased interest from the local government to stimulate agriculture, but how to realize successful community agriculture is challenging. The island, which is part of the Dutch Kingdom, has a population of 21,745 residents of which 70% are active in the labor sector (Centraal Bureau Voor de Statistiek (CBS), 2021). Besides this, the island has been argued to be a Small Island Developing State (SIDS). This group is characterized by its relatively small size, remoteness, non-diversified economy, rich biodiversity, cultural resources, strong tourism assets, and high pressure on resources (UNWTO, n.d.). Bonaire is not officially recognized by the UN in this category because it is still a part of the Dutch Kingdom. However, it has characteristics that apply to this concept such as limited resources, small but growing populations, remoteness, susceptibility to natural disasters, and excessive dependence on international trade (van der Geest & Slijkerman, 2019a).

These characteristics bring several challenges in different fields such as urban expansion, a changing climate, diversifying the economy, recharging fresh water into the soil, using renewable energy, maintaining nature, flourishing cultural heritage, and locally produced food and healthy diets (Verweije et al., 2021). The latter is accentuated by the local government of Bonaire as it seeks to promote cultivation on the island. One of the aims is to implement urban agriculture in neighborhoods as part of a wider program called "Program vegetables and fruit" (Openbaar Lichaam Bonaire, 2014).

It is demonstrated that community food production projects like urban agriculture, can add value to food challenges on the Pacific Islands. These islands are seen as SIDS which means that they struggle with similar issues as Bonaire. In addition, the problems with food insecurity in SIDS became more pressured by the COVID-19 pandemic as shown in research. Reasons for this are the high dependence on foreign tourism, reliance on imported food, and underdeveloped local food production systems. To solve these problems, there is an increased interest in analyzing existing projects (Hickey & Unwin, 2020). Evaluating these previous community projects can lead to enlargements and an increased amount of community food production initiatives (Iese et al., 2020). Besides this, research on previous failed projects should be conducted to learn from the lessons (Hickey & Unwin, 2020).

Therefore, this thesis is focused on analyzing existing urban agricultural cases to develop guidelines to set up community urban agriculture projects in Bonaire.

The following chapter will provide more information on the theoretical background and research problem. First, an overview of the existing literature will be given. This section will begin by defining urban agriculture in other SIDS. The last part of this section reviews the literature on urban agriculture in Bonaire itself. This information will provide an overview of the gap in research on the topic of urban agriculture in Bonaire.

After that, a description of the problem, societal and scientific relevance, and the aim of this research project are mentioned. Also, the sub- and research questions will be specified.

1.1. Context and literature background

1.1.1. Literature on urban agriculture in SIDS

Connell & Lowitt (2020) have demonstrated that sustainable agriculture practices have been **positively influencing food insecurity** in the Caribbean islands. However, some factors have been stopping this agricultural growth namely: history, economy, and institutions.

The problem of history is focused on the plantation institutions formed during colonial times. This difficult relationship with plantations is based on a history of force, terror, fear, and fraud due to slavery. This makes it more emotionally complicated for inhabitants to work in the agriculture sector. Secondly, the local food economy is very small, which makes it less appealing for citizens to start working in this sector. Lastly, the agricultural institutions such as governmental departments, knowledge centers, etc., are inadequate due to few improvements in these organizations since 1900. This leads to a lack of interaction and interdependency between the institutions and the agricultural actors. However, these organizations are needed to support actors in the food system and to enhance learning. This lack of interaction makes it more difficult to implement new developments such as urban agriculture initiatives (Connell & Lowitt, 2020).

To deal with these three challenges, a focus is proposed on creating social resilience which is defined as the power of communities to react to external problems through adaptation and innovation (Connell & Lowitt, 2020). Thus, agricultural projects should emphasize the **social aspect of the projects**. An example of such a social project is a community-driven urban agriculture initiative (Hallett et al., 2017). Moreover, the existing social connections and structures should be strengthened to achieve this social resilience (Hallett et al., 2017). This is reflected in the agriculture sector as a need to increase the existing interactions between formal and informal institutions and persons who are

concerned with local food production.
To conclude, the social aspect of agricultural projects should be emphasized and the current interactions between institutions and persons who are active in the cultivation sector should be stimulated.

1.1.2. Literature on urban agriculture in Bonaire

Previous projects and research in Bonaire are aimed at a **broad spectrum of urban agriculture** like the POP (Plattelands Ontwikkelings Project) project. This plan has addressed the development of agriculture in Bonaire by connecting more inhabitants with cultivation. One part of this project was focused on finding new methods of producing fruit and vegetables. Therefore, a special focal point is put on greenhouses because they not only protect against plagues and diseases but also stop iguanas and birds (Lotz et al., 2020). To make these new projects work, a collaboration between producers and interested people is needed to create profits in these new agricultural methods (Lotz et al., 2020).

The government of Bonaire focuses on **increasing the appeal** of the agricultural sector in Bonaire. To achieve this, there was a greenhouse project between 2017 and 2020 in Bonaire to educate students on growing fruit and vegetables. The goal was to increase a healthier lifestyle for the children by letting them grow their own vegetables and fruit at schools (University Utrecht, 2020). The focus was to educate young people on the topic of agriculture to create more interest in cultivation. Reasons for the disinterest in the agriculture sector are the low incomes and the bad future perspectives on the island. Besides this, the high theft rate of food negatively influences the interest in the agricultural sector and the decreasing social cohesion in the countryside (Geest & Slijkerman, 2019a). In addition, social-political problems are present on the island, and they need to be considered when developing sustainable urban agriculture (University Utrecht, 2020). The challenges are related to the postcolonial context of Bonaire, the small population size of the island which makes it more difficult to openly express your opinion as the family ties are strong, and the lack of trust in the local government (University Utrecht, 2020). In short, the social and educational aspects of urban agriculture need to be considered when implementing urban agriculture.

Important to know is that Bonaire's climate is unsuitable to produce all the varieties of fruit and vegetables that are used on the island. However, research has shown that **40% of the demand could be self-produced** (Geest & Slijkerman, 2019a). In addition, residents are becoming more interested in developing local products because they are aware of the economic benefits and the level of independence it can be for the residents of Bonaire (Geest & Slijkerman, 2019). Currently, the agricultural practices on the island are small, with both low investments and low profits. Therefore, people who are active in this sector are mostly retired or employed and they see this work as an extra source of income or a way to save some money for buying food (Geest & Slijkerman, 2019a). To invest in the agriculture of fruit and vegetables, recent research is conducted on new methods such as the implementation of hydroponic farms (University Utrecht, 2020). This research is however still limited.
Besides this, there is an increased interest in local food production activities from the local Government (OLB, 2014). They also mentioned that agriculture could be a shared passion that brings people in communities together in contrast to the current lack of enthusiasm for agriculture. Therefore, investigations on community projects are a must.
Moreover, Curaçao has already more developments in agriculture practices and the climate and environment on both the islands are comparable (Boers, 2016). This means that example programs in Curaçao could be used to learn lessons to implement urban agriculture in Bonaire.
To conclude, more research should be conducted on potential agricultural methods in Bonaire with a focus on community-driven projects. This drive is stimulated by the government. In addition, an exchange of knowledge from Curaçao is beneficial to increasing the amount of cultivation on Bonaire.

To summarize this chapter, the research from SIDS and Bonaire suggests that various issues are essential to be researched. First, previous failed projects on the topic of urban agriculture can be analyzed. Moreover, to create new initiatives, the existing agricultural institutions and their connections can be reviewed. This may lead to social resilience because the new projects are built upon the existing social structures. This is emphasized in Bonaire by a need to collaborate with producers and interested people to implement new harvesting methods. Moreover, more research on forms of community-driven projects in the agricultural sector may be conducted. To do this, a focus should be put on the social and educational aspects of the urban agricultural initiatives.
The aspects mentioned before, are described in the literature as being crucial for further research. Therefore, this dissertation will try to focus on these topics.

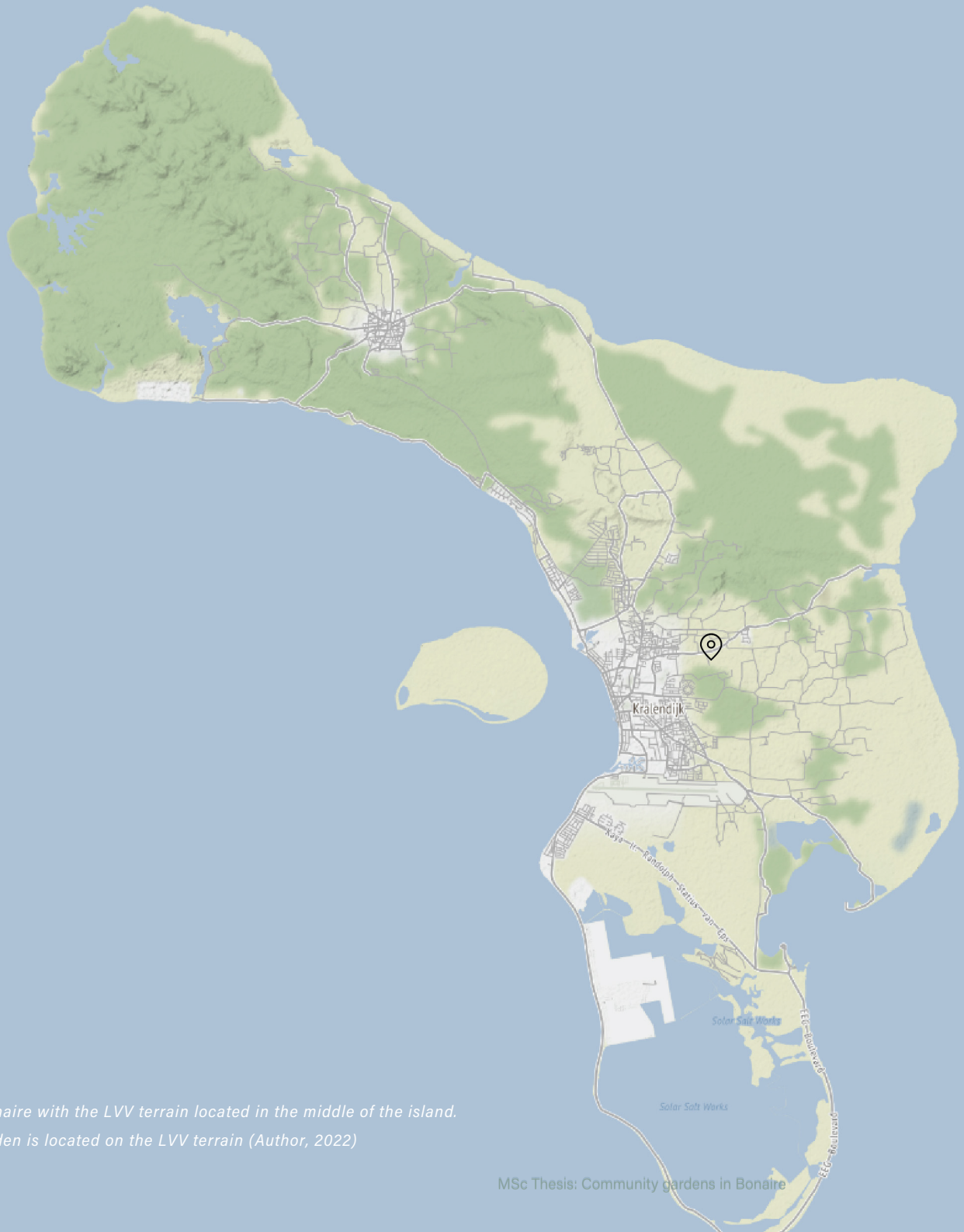


Figure 1: Map of Bonaire with the LVV terrain located in the middle of the island. The community garden is located on the LVV terrain (Author, 2022)

1.2. Project information of "Nos mes por"

"Nos mes por" is located on the LVV (Agriculture, Livestock & Fishery) terrain as part of the government agricultural department of Bonaire. This is situated in the middle of Bonaire at 4 km from the city center of Kralendijk, *see figure 1.*

The department is described as a **knowledge institute** to stimulate agriculture, animal husbandry, and fishing in Bonaire. To fulfill this goal, the integration of community gardens on the LVV terrain is mentioned in the Reorganization plan of the local government (Adriaens et al., 2019). Therefore, the project "Nos mes por" was developed in September 2021 (Adriaens et al., 2019). This initiative is part of the governmental project "Greenhouses in the neighborhoods" which is an element of the "Program vegetables and fruit" (Adriaens & Loozen, 2021). The project on the LVV terrain is used as a pilot for a community garden

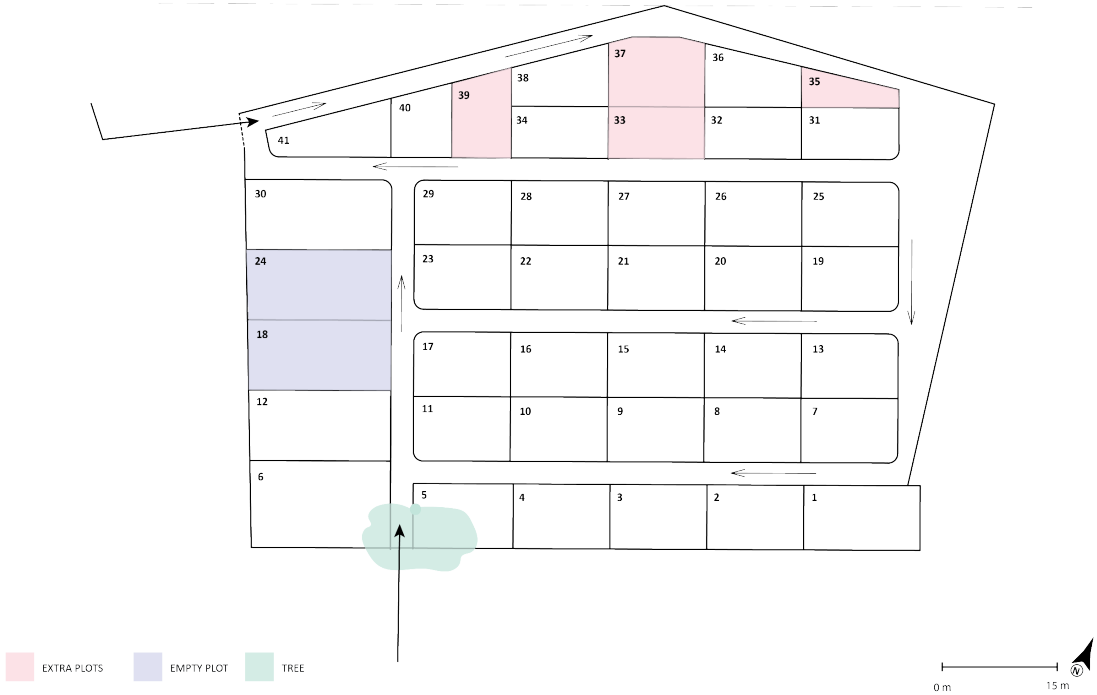


Figure 2: Map of the current design of "Nos mes por" which is located on the LVV terrain (Author, 2022)

in Bonaire. By doing this, the learnings can be used in the two other locations of community gardens, which are integrated into the "Greenhouses in the neighborhoods" project. These other sites are chosen by the government of Bonaire.

"Nos mes por" is a terrain of 7526 m2 that is divided into 41 plots each with a surface of 15 m2 and some shared space, *see figure 2.* There are 34 participants connected with the projects as some people have two plots. In the first months, the project was led by O. Emerenciana, but the government noticed that it was too complicated to only have one person in charge (O. Emerenciana, personal communication, 16 March 2022). Therefore, an official association called "Nos mes por" was built and a local person with previous agricultural experience was hired to steer the process, at the beginning of March. The goal of the association is to make the "Nos mes por" more independent from the government. Therefore, two of the three persons on the board are not working for a ministry. The board exists out of three persons who are O. Emerenciana, R. Jacobs, and H. Els. The facilitator is called S. Lourens and was hired by LVV to focus on the community garden while also performing general tasks for the agricultural department in Bonaire, *see figure 3.*
To sum up, the project is currently led by the agricultural department of the local government of Bonaire, but the goal is to make "Nos mes por" an independent association where the government only provides support.

Around the same time, the local government of Bonaire hired me in the **role of a researcher** to gather learnings on "Nos mes por". The local government wanted to implement community gardens in two other locations in Bonaire and they wanted to use "Nos mes por" as an example (M. Adriaens, personal communication, 18 April 2022). However, this project was not working well. This was due to the low participation rate and the fact that only a few plots were cultivated (M. Adriaens, personal communication, 18 April 2022). This minimal scale of the project is a limiting factor for creating successful urban agriculture (Gulyas & Edmondson, 2021).
Thus, based on that information, the project of "Nos mes por" was not fruitful. This created an opportunity to perform research on how to make this initiative successful while also being involved in the project. The personal involvement of the researcher resulted in the participatory action research (PAR) approach by becoming a member of the community of "Nos mes por" (Walter, 2009).

Organization of "Nos mes por"

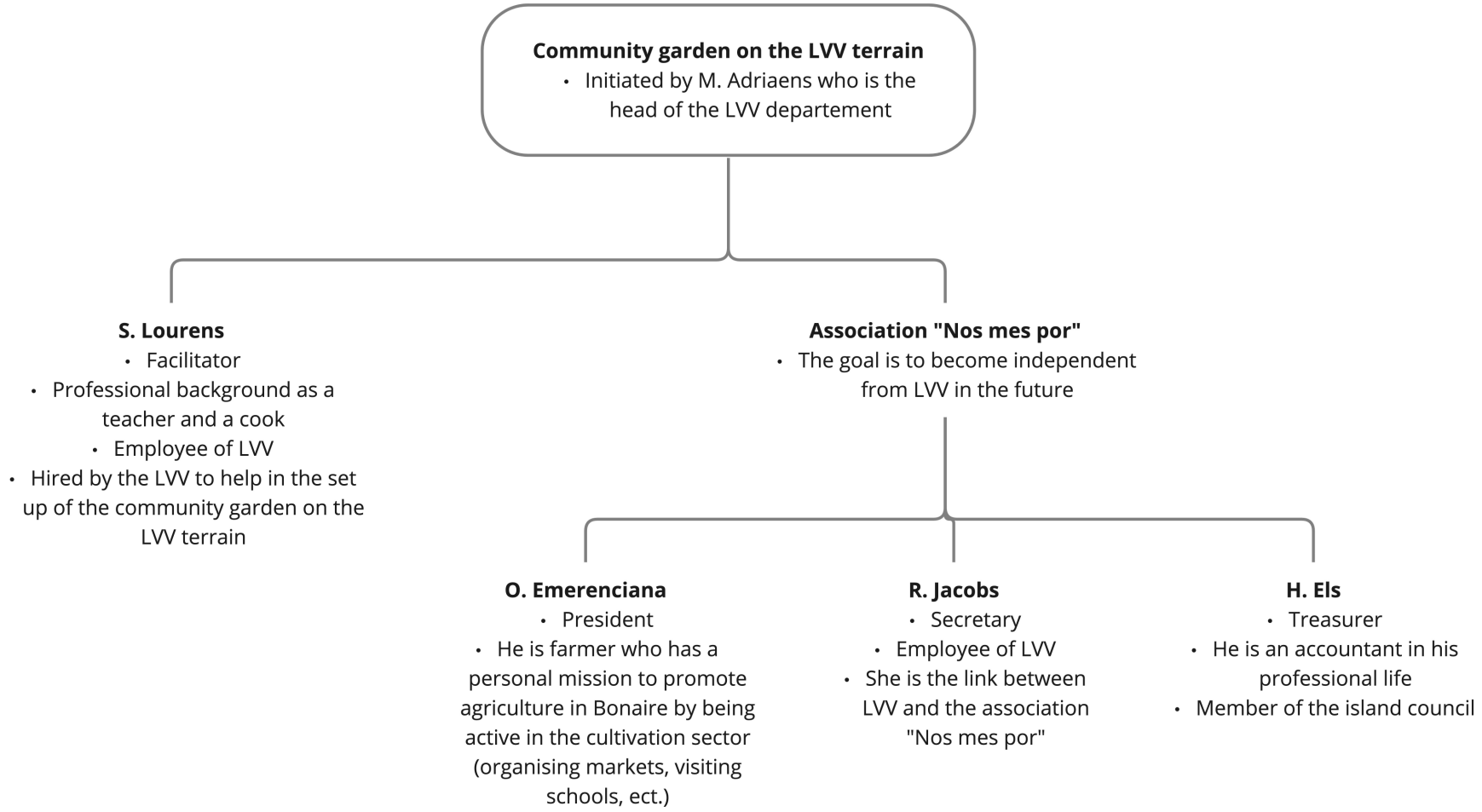


Figure 3: Organizational diagram of "Nos mes por" to show the relationship and connections between the people on the board and the facilitator who is hired by LVV (Author, 2022)

1.3. Problem description and problem statement

Research has suggested that **accessibility and use of healthy food** especially fruit and vegetables are a general problem in Bonaire, therefore the local government is making investments in the agricultural sector (Verweije et al., 2021). 30% of the population of Bonaire eats nutritious portions of fruits and vegetables every day. This results in 30 % of the total population with a diagnosis of obesity and another 30% diagnosed with overweight. (Kist-van Holthe et al., 2018). This leads to serious health problems such as type 2 diabetes, cardiovascular disease, fatty liver disease, psychological problems, and musculoskeletal disorders (Kist-van Holthe et al., 2018).

Moreover, Bonaire is currently **highly dependent on imported food**. This leads to various problems like high prices due to import taxes and transport costs, high vulnerability to price fluctuations and global developments, a significant level of food loss and waste, and environmental and natural resource degradation. The imported food is more energy-dense and highly processed leading to malnutrition and growing public health costs (Verweije et al., 2021). However, experts say that 40% of the food could be self-grown on Bonaire, which would decrease the amount of imported food (Verweije et al., 2021).

Fifty years ago, Bonaire used its **expertise in agriculture** both for self-sufficiency and export of agricultural products to Curaçao (Adriaens & Loozen, 2021). This also created a reliable source of income for the Bonaireans. Various factors such as drought, increased welfare, the rise of the status of office work, urbanization, and globalization led to a decrease in production. This led to an increase in food importation since that was easier and cheaper than cultivating it themselves. Besides this, the policymakers didn't prioritize developing the agricultural sector which contributed to the reliance on imported food in Bonaire. This resulted in a loss of know-how, willingness, and expertise on how to cultivate in the country (Geest & Slijkerman, 2019).

The study "Regioplan Beleidsonderzoek 2018" has shown that 43% of the households in Bonaire have an income below the average subsistence minimum. The prices of fruit and vegetables are **relatively expensive** which makes it difficult to buy them regularly. Due to the Covid pandemic, a lot of jobs are lost in the tourism sector, resulting in more poverty and debt for the population (Adriaens & Loozen, 2021). Investments in agriculture can be a solution to this problem as this is seen as one of the most powerful tools to fight poverty (Worldbank, 2021). Moreover, the local government wants to diversify the economy by focusing more on agriculture and the service sector (Kamer van Koophandel Bonaire, 2021).

In addition, there is an **increased interest** from the Dutch government to invest in sustainable local food production on the Caribbean's islands. The aim is to stimulate the design and set-up of projects to produce local food on those islands by 2024 (LNV, BZ & Koninkrijksrelaties, 2020). Other opportunities from the local government to increase cultivation in Bonaire are proposed in the Policy Vision 2014-2029 Bonaire about agriculture, livestock, farming, and fishing (Openbaar Lichaam Bonaire, 2014). The local government's ambition is to be **40% self-sufficient in producing fruits and vegetables** within the ecological boundaries presented by the environment and climate on the island.

Therefore, the project called **'Program vegetables and fruit'** was developed. The goal is to stimulate inhabitants to eat a daily portion of fruit and vegetables, to set up food production, and to professionalize this agricultural practice. **Thus, the government wants to create self-reliant, healthy inhabitants who are eating and producing fruit and vegetables (Adriaens & Loozen, 2021).** To be able to achieve this goal, the local government wants to implement urban agriculture in the neighborhoods (Geest & Slijkerman, 2019). The focus of this project on urban agriculture lies in the social aspects of improving the social cohesion in neighborhoods and intergenerational connections, while at the same time implementing agriculture in the culture of Bonaire (Adriaens & Loozen, 2021).

However, the examples and/or research on communal urban agriculture in Bonaire are **limited**. There was one project of urban agriculture in Bonaire, called "Mi mes hofitu", but in 2014 that discontinued after 12 years and is not active anymore. To use information, example cases from the comparable island Curaçao can be used. However, this knowledge needs to be applied to the local context of Bonaire.

Based on this lack of knowledge in Bonaire, design guidelines on both the setup process and the design of successful, local food initiatives are needed. The ongoing project on the LVV terrain called "Nos mes por" is analyzed and designed throughout the research process, because this is currently the only ongoing example of community local food production on the island. To define the success of the project, the members of "Nos mes por" are consulted for this. This social focus aligns with the goal of the local government to create more self-reliant citizens. "Nos mes por" is an active example of a social local food initiative in Bonaire. Therefore, it can generate lessons for other neighborhoods where the government wants to implement urban agriculture (M. Adriaens, personal communication, 3 May 2022).

In short, there is a need to find methods to implement and design new urban agricultural practices in neighborhoods in Bonaire, by analyzing a case study. These findings will help in creating useful and applied strategies for other locations on the island of Bonaire.

1.4. Societal and scientific relevance and ethical dilemmas

1.4.1. Contribution to SIDS

This dissertation will add to the **knowledge gap** described by Iese et al. (2020) & Connell and Lowitt (2020) through a study of the previous projects of community urban agriculture. Information from inactive and active cases will be used to generate data for this research. This information could help in understanding the levels of engagement already present in Bonaire which will help to create realistic strategies to set up projects in the future (Hickey & Unwin, 2020). Studying current projects will help in building community resilience and creating sustainable food security to overcome systematic shocks such as a pandemic (Hickey & Unwin, 2020).

In addition, the **social aspect** of this thesis research is accentuated by creating a community local food project. This adds to the literature of Hallett et al. (2017).

Moreover, the existing institutions and persons who are active in the cultivation sector of Bonaire have been approached and connected to perform this analysis. This contributes to building a **network of agriculture** on the island which is mentioned as a missing element by Connell & Lowitt (2020).

Further mentioned in the research is the emphasis on the **educational** aspect of agricultural projects. This analysis can contribute to the educational aspect described by University Utrecht (2020). This is done by focusing on this educational aspect when performing the analysis.

Lastly, this research supports **general research** on community local food initiatives in SIDS as there is little information available. This adds to the literature from Hickey & Unwin (2020).

In short, the contribution of this thesis to research in SIDS adds to general research on the topic of urban agriculture, collecting information on current projects of community urban agriculture, building a network of agriculture on the island, and analyzing the educational aspect of community gardens and contributing to knowledge.

1.4.2 Contribution to Bonaire

The analyses and results of this participatory research project can help in designing the community urban agricultural project on the LVV terrain. If this project becomes successful it will help Bonaire in the future. The information collected and translated in **useful methods and designs** suited to the particularities of Bonaire can contribute to the aim of making Bonaire self-sufficient (Openbaar Lichaam Bonaire, 2014). The focus on self-sufficiency will add to the general food security of Bonaire as food sufficiency is seen as one aspect of it (Baer-Nawrocka & Sadowski, 2019).

Moreover, the **hands-on approach of action research** in the LVV project will lead to a direct increasement in the agricultural practice in Bonaire by 2029 (Openbaar Lichaam Bonaire, 2014). This will help on a small scale to fight the health problems, decrease the dependency on food imports, and enlarge the expertise, and willingness to cultivate on the island (Verweije et al., 2021). In addition, the focus and integration with a real-world case will help the local government to let the island become 40% self-sufficient because the LVV project will produce fruit and vegetables that will be directly eaten by citizens.

Besides this, the research can guide the government in **improving the social cohesions** in Bonaire by providing insights into the LVV community. To be able to identify the problem, the current urban agriculture project on the LVV terrain needs to be analyzed. Therefore, the existing social connections will be researched.

Lastly, by conducting this research it will be possible to **create general learnings on urban agriculture** and an active example of a community garden in Bonaire. This will add to the research of Geest & Slijkerman (2019).

To sum up, this analysis can increase the food security of Bonaire, extend the agricultural projects, let the government become more self-sufficient, improve the social cohesions on the island, and general learning on urban agriculture can be found.

1.4.3. Ethical dilemmas

In general, there are two possible ethical dilemmas related to the set-up of this research being (1) the cultural history between The Netherlands and Bonaire, and (2) the use of action research in a postcolonial context.

First, Bonaire has a **long and sensitive history** with the Netherlands which started during the colonial times. Bonaire is still an official part of the Dutch Kingdom, after becoming a special municipality in 2010 (van der Geest & Slijkerman, 2019a). The differences in cultural background and languages present on the island lead to diverse challenges in living together (Openbaar Lichaam Bonaire, 2014). The difference in cultural background and language results in a separation between nonlocal researchers and the inhabitants of Bonaire (S. Bol, personal communication April 2022). This creates less trust in the researcher which makes it more difficult to receive information from the local members. Moreover, the local language in Bonaire is Papiamentu, but the official language of the island is Dutch (Dijkhoff & Pereira, 2010). This means that most of the inhabitants can understand and speak Dutch, but it is not their first

language.
Thus, not being able to speak this language as a researcher results in a loss of personal communication and important information when doing interviews. These cultural dilemmas need to be considered when interpreting the results of this thesis.

Secondly, the use of participatory action research as a methodology leads to ethical dilemmas in a **postcolonial context**. On one side, it can be said that there is a connection between PAR and its application in a postcolonial context to emphasize the situation of oppressed groups. The PAR methodology can facilitate the construction of a more democratic and just society by considering community, relationships, communication, and equality, and by using reflexivity and reflection in the process (Parsons & Harding, 2011). Due to the postcolonial history of Bonaire, it is useful to integrate this methodology into this dissertation.

On the other side, the PAR methodology can be seen as an **approach to reinstall academic epistemic privilege** by having educated elites who are conducting research in a less fortunate community.
Firstly, to address this problem, it is crucial to wonder **who is gaining** and in what way by focusing on building community empowerment through the research (Janes, 2015). Therefore, the participants of "Nos mes por" were asked at the beginning of this study what their challenges were and what they needed from me as a researcher.
Furthermore, the **distance between the researcher and the studied subjects** needs to be visible so that the power relations will become clear (Janes, 2015). Thus, a reflection on my role and socio-cultural background can help in this (Smith et al., 2010). This means that I am aware of my white, female Dutch-speaking background and how this is received in a country that has a Dutch colonial history. To limit that effect, I tried to understand the local language by carefully listening, expressing my not-Dutch nationality, trying to visit the garden daily to have informal conversations with the members, and performing physical labor in the garden. I will never fully integrate with and understand the Bonairean society, but by implementing these elements I can be a valuable partner of the community garden on the LVV terrain.
Thirdly, it can be beneficial to **include multiple perspectives and challenges** based on various theoretical frameworks (Levitan, 2019). This can help to understand the local participants by interpreting their challenges and issues from different angles. Therefore, multiple people from different cases will be interviewed to gain a better understanding of community gardens. Moreover, I will try to consult all the members of "Nos mes por" to grasp the diversity of issues.

In short, to minimize the effects of using action research in a postcolonial context, three aspects will be taken up. These are consulting the participants of "Nos mes por" in the beginning, representing, and reflecting on the relationship between me and the community, and including every participant in the research process.

1.5. Aim of the research project

The major aim of this thesis is to study and spread knowledge on how to set up and spatially design a successful and sustainable community urban agriculture practice on the LVV terrain in Bonaire, ***see figure 4.*** By doing this, the community initiative on the LVV terrain will be adapted in this research process to make it successful for the people involved with "Nos mes por". This contributes to the social aim of the Bonerian government to increase the self-reliance of the citizens (Adriaens & Loozen, 2021). This is done by letting the participants of "Nos mes por" define their own success in the project by including them in the process. To define this success, actions in a real-world process are happening, which can lead to social change in a community.
This outcome applies to the methodology of participatory action research (Allen, 2020b). That approach has two main aims (1) creating social change (action), and (2) contributing to scientific knowledge (Bacon et al., 2005). This dual aim is translated into accomplishing a development in the practice on the LVV terrain and creating insights on the topic of urban agriculture (knowledge).

More specifically, the **first research aim** is to create change in the project of "Nos mes por" to make it successful and sustainable. Secondly, strategies will be created through this research that can give direction in making community local food initiatives in Bonaire. The learnings of "Nos mes por" can be applied to other locations the government wants to use as places to start urban agriculture (M. Adriaens, 10 May 2022). In short, the insights of "Nos mes por" can be used in other neighborhoods which makes spreading knowledge on setting-up community gardens in Bonaire the **second research aim** of this thesis. The second aim will be answered by conducting this research on the case of the LVV terrain.

1. **ACTION:** Changing the process and design of the community urban agriculture initiative on the LVV terrain to contribute to the success which is defined by the participants. Creating real-world change in the project of "Nos mes por"
2. **KNOWLEDGE:** Design strategies to set up and design community urban agriculture in Bonaire that is successful and sustainable
    A. Guidelines for the set-up **process**
    B. Guidelines for the **product** design of community urban agriculture

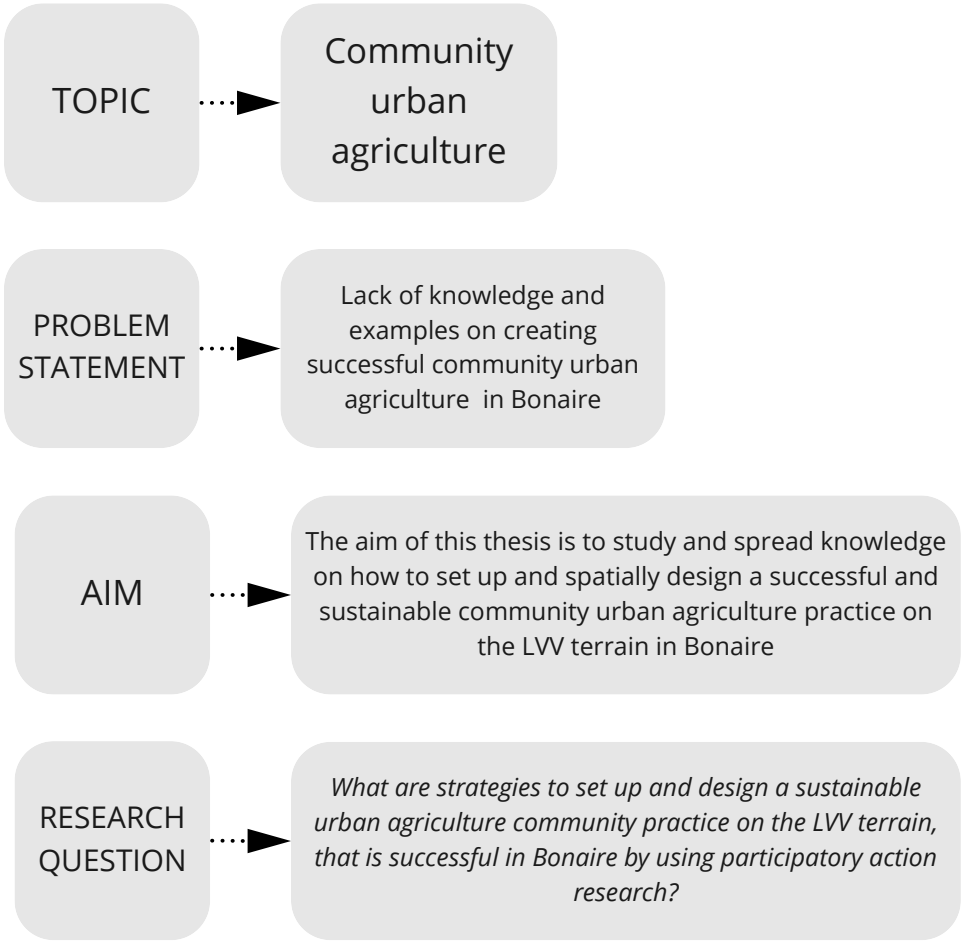


Figure 4: Research objective (Author, 2022)

1.6. Research question and sub-research questions

The research question is as follows:

"What are strategies to set up and design a sustainable urban agriculture community practice on the LVV terrain, that is successful in Bonaire by using participatory action research?"

The main research question can be divided into different sub-research questions. The combination of the answers will explain the main research question. Two sub-research questions are addressed to be able to provide a response for each of the two research aims, *see figure 5.* Therefore, this first sub-research question is *"What are real-world actions that should be used in "Nos mes por" to make it sustainable and successful in Bonaire?".*
This relates to the real-world practice connected with this thesis. The first sub-research question can be divided into smaller parts based on the PAR research method.

These questions are:

1. **Critical reflection phase:** What are the current challenges to making "Nos mes por" successful in Bonaire?
2. **Research phase:** What are key lessons that can be drawn from comparable islands and previous projects to set up and design community urban agriculture?
3. **Strategic planning phase:** What are the general process phases to set up community gardens on the LVV terrain? & What are the guidelines to make the design of the social local food project on the LVV terrain successful and sustainable?
4. **Action phase:** How can the findings to set up and design community gardens on the terrain of LVV, be transformed into actions that can be applied to the current project?
5. **Professional practice phase:** What are the interventions influenced by this research process, to create a successful and sustainable "Nos mes por"?
6. **Critical reflection II phase:** What are recommendations for the implemented actions to make the setup process of "Nos mes por" successful for all involved in the future? & How can this PAR research on "Nos mes por" contribute to general knowledge?

The second sub-research question is: *"How can the findings of the analysis of the community garden on the LVV terrain be translated to other locations in Bonaire, to generate knowledge on local food initiatives?".*
This leads to the second research objective of generating knowledge on community gardens in Bonaire. This question is answered by performing this participatory action research and by reflecting upon the findings in the CRITICAL REFLECTION phase II.

1.7. Reading guide

This report is built around answering the main research question. By doing this, it is possible to generate knowledge on the topic of community urban agriculture in Bonaire. This means that the two aims of this thesis research namely establishing change in a real-world case and contributing to science will be achieved.
The phases of the participatory action research will guide the structure of this report. The first chapter will explain more about the theories of this research. After that, the Methods chapter explains the methodology of PAR and the separate steps of that approach. Each research phase will be explained by making the goal clear, who is involved in this stage, and talking about the research and analysis method. The same structure of the various phases will be used in the Results chapter to order findings. After this chapter, the discussion of this research is described. This will help in forming a fitting answer for the research question which is defined in the conclusion chapter.

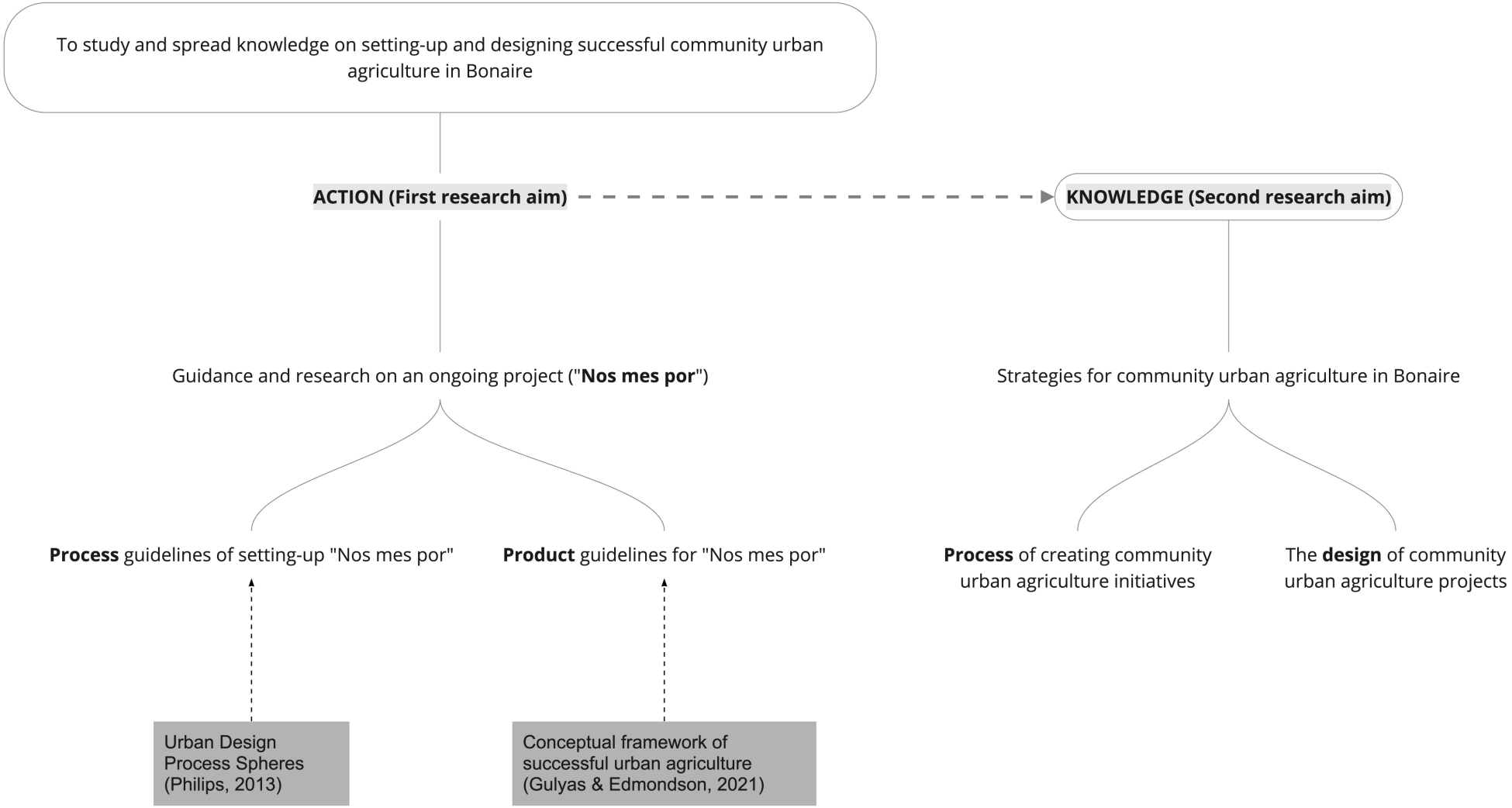


Figure 5: Visualization of the 2 research aims as they are mentioned in this thesis combined with the theories used in both the process and product. The theories are explained in chapter 2. Theoretical framework (Author, 2022)

2. THEORETICAL FRAMEWORK

2. Theoretical framework

Existing theories in literature on the setup process and success factors in the design of urban agriculture are chosen to define the background of this research. This framework is used to inform concrete interventions in the process. Moreover, the theories are implemented to analyze the data gathered from the data collection of the interviews, observations, focus groups, etc. This exists out of two methods: (1) The characteristics of successful urban agriculture (Gulyas & Edmondson, 2021) and (2) The urban agriculture design process spheres (Philips, 2013). These two theories are needed to find information for both the setup process and the outcomes of local food projects. To do this, the literature on successful characteristics is used to define success and which factors are needed to achieve this. This helped to find guidelines to have an efficient design (Product). The other theory is consulted to develop steps to set up a community urban agriculture project (Process), *see figure 5.*

The first theory called **successful urban agriculture** focuses on factors that are needed to create urban agriculture which leads to resilience in urban environments (Gulyas & Edmondson, 2021). This aids the goal of the local government of Bonaire to create self-reliant citizens by focusing on local food production. This can be explained by the connection between self-reliance and resilience. This is through the need of creating resilience to make sure that the process of having self-reliant citizens is not disturbed when an unexpected shock happens. This is especially necessary to fight elements like climate change (The UN Refugee Agency, 2017).
To help this self-reliant process, the participants of "Nos mes por" are supported in developing their own strategies to make the project successful. More concretely, the framework of Gulyas & Edmondson (2021) provides general aspects which are needed for successful urban agriculture to build urban resilience. These are used to structure and guide the findings of the participants of "Nos mes por". Besides this, it can be seen as a framework to analyze the examples in Curaçao and Bonaire with literature by defining which characteristics contribute to sustainable success for those involved. Besides this, it is possible to see how these specific strategies are contributing to a working project of a community garden. This aids in defining guidelines that can be used to set up successful cases in Bonaire which is the aim of this research.

Secondly, the **theory of urban agriculture design process spheres** provides a design method to set up community urban agriculture projects. This support making design principles to create urban agriculture in Bonaire, which fits the process aspect of this thesis investigation. To achieve this, the data from "Nos mes por", the case in Curaçao and Bonaire are structured with the theory.
The combination of this information is applied to the design of the "Nos mes por" project to create realistic and workable guidelines for the island of Bonaire.

2.1. Product side: Conceptual framework of successful urban agriculture

This theory describes the effect of urban agriculture on urban resilience. This means that urban agriculture could increase social and ecological benefits for cities and their population. For example, it can increase health by improving the accessibility to fresh food and by providing regular exercise (Gulyas & Edmondson, 2021). This method describes five aspects that are crucial to make urban agriculture contribute to social resilience. This social resilience is described as missing in SIDS (Connell & Lowitt, 2020). Moreover, building this resilience is necessary for the process of creating self-reliance in Bonaire, what is the goal of the local government (The UN Refugee Agency, 2017).
These five terms are (1) Large-scale, (2) Efficient, (3) Integration, (4) Inclusive, and (5) Safe. The findings of this literature are generated by reviewing academic literature on urban agriculture (Gulyas & Edmondson, 2021).

The first term **Scale** relates to both the availability of space and participants, *see figure 6*. This first aspect refers to the little amount of space suitable for agriculture due to different use such as housing and the limitation for expand (Gulyas & Edmondson, 2021). A challenge linked with this element is the problem of the contaminated ground as the available space is often not suited for gardening. Besides this, the cultivation method needs to be considered because this defines the physical scale of the project. This is an important factor to be studied in Bonaire because the tropical climate makes it complicated to plant. Moreover, the legal issue of land and ownership of plants is a problem that needs attention. Lastly, the participation rate is a key determinant of the scale of urban agriculture (Gulyas & Edmondson, 2021). This is an important issue in Bonaire since the number of people is limited on the island.

Challenges related to the second term called **Efficient** are the lack of knowledge about growing food. This is also described as a pressing problem in Bonaire (Geest & Slijkerman, 2019) it can result in inefficient practices. In addition, new technologies such as hydroponics can require a specialist to understand

them. This makes it complicated to invest in these more efficient methods. This is also a current issue on the island (Geest and Slijkerman, 2019a).

The third aspect, **Integration**, relates to problems around linking urban producers with the market. Also, challenges of food safety and rules around size and shape make it hard to integrate urban agriculture with the commercial market. Besides this, cultural factors can also limit the interest of citizens to buy urban agricultural grown fruit and vegetables. Lastly, the connection with other streams such as the waste and water streams are a valuable element to be considered. This is a relevant issue in Bonaire because the water system is dependent on desalination which creates high prices and makes it more demanding to cultivate (Verweije et al., 2021).

The fourth concept: **Inclusive** is issued with an unfair distribution of green spaces based on economic status. Besides this, the community urban agriculture projects are depending on relevant skills and contact with financial and material resources. This is also visible in the social-economic divided neighborhoods in Bonaire. In addition, this results in unequal financial and physical access to urban-grown food (Gulyas & Edmondson, 2021). This means that people with a higher income have more access to locally grown food compared with citizens with lower earnings.

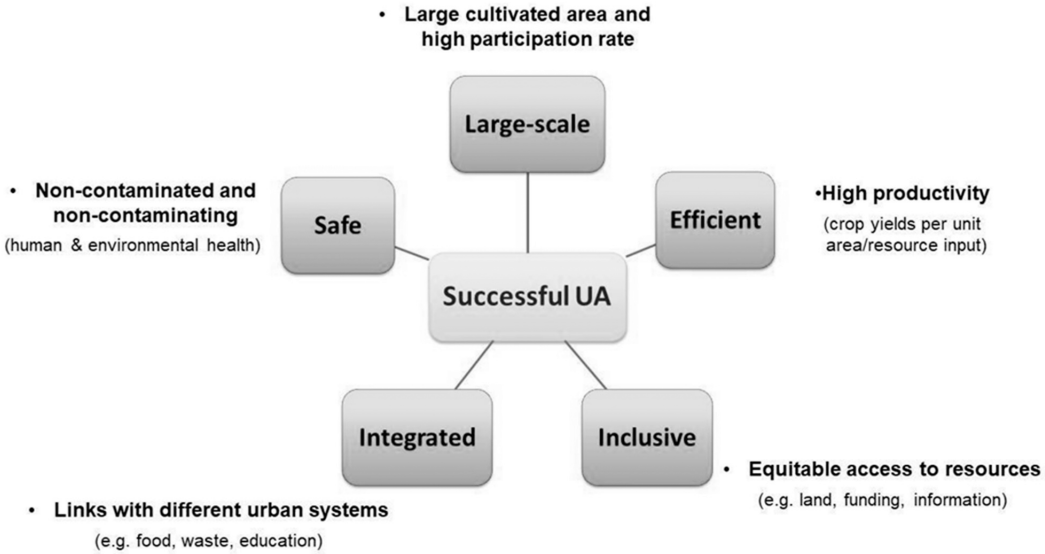


Figure 6: Key characteristics of successful urban agriculture (UA) (Gulyas & Edmondson, 2021)

The last factor, **Safety**, relates to both the impact on human and environmental health. This means that the urban soils and the groundwater can contain heavily toxic chemicals which makes it dangerous to cultivate. Besides this, the use of agrochemical pesticides in an area that relates to the city's water and food supply can have critical consequences for the citizens (Gulyas & Edmondson, 2021). These are general aspects that need to be considered since Bonaire is used to cultivate with chemical inputs and thus this can influence the health of the population (Geest and Slijkerman, 2019).

This model can also inform the designing of sustainable urban agriculture by emphasizing three aspects namely people, environment, and economics. By integrating those three elements into an agricultural project, **sustainability** can be achieved (Kilian et al., 2006). The people aspect is part of the Inclusive component because it focuses on equitable access to everyone. The economic part is visible in the efficient aspect since it defines how much is produced. Lastly, the safe character which thinks about the health of both the human and environmental side can be seen as the bigger term around the factor of the environment.

2.2. Process side: Urban agriculture Design Process Spheres

There are different approaches to set-up urban agricultural projects. However, this specific method is chosen to apply to the (1) adaptive process of the PAR methodology and to (2) emphasize the sustainable outcome. The adaptivity is integrated with the Urban agriculture process spheres by the iterative way of using the steps. This makes it possible to return to certain phases to make changes (Philips, 2013). This flexibility throughout the research process relates to the characteristics of the PAR methodology that is used in this thesis.
Moreover, the sustainable approach is highlighted by Verweij et al. (2020) in the Nature-inclusive vision for Bonaire in 2050. More specifically, the three concepts of ecology, economy, and culture need to be equally included in the future of Bonaire to fight the challenges on the island (Verweij et al., 2020). Thus, the general focus on the three aspects of the Urban agriculture design process spheres adds to the vision of Verweij et al. (2020).

This theory is based on case studies from different communal urban agriculture projects around the world while keeping a focus on the design process (Philips, 2013).

This method expresses the need of constructing urban agriculture by using a systemic, cyclic approach (Philips, 2013). In general, there are six spheres of the design process which are all interlinked with each other. **They are (1) Planning and advocacy, (2) Vision, (3) Synthesis, (4) System integration, (5) Lifecycle choices, and (6) Outreach and advocacy,** see ANNEX A. This cyclical approach makes it possible to see the design process as a circular or looped element where iterations are made in every step (Philips, 2013). To realize food security on the island, it is needed to create urban agriculture as a process that is ongoing and self-sustaining.

Besides this, there are **three main factors:** ecology, culture, and economics leading the six steps, *see figure 7.* These aspects are needed to emphasize the sustainable aspect of this design process. The interconnectivity of these three concepts makes it possible to tackle larger challenges such as food security starting with a sustainable view of the solutions (Philips, 2013).
The factor **ecology** focuses on the natural resources that are affected by agriculture. It is important to collaborate with this natural resource system instead of misusing it to create advantages (the University of Wisconsin-Madison, n.d.). Secondly, the term **culture** relates to creating opportunities and cooperative relations between communities (University of Wisconsin-Madison, n.d.). Lastly, the concept of **economics** looks at the business side to create a decent living for the people employed and active in the food sector. Additionally, food access should be for everyone (the University of Wisconsin-Madison, n.d.).
These three components form the base of sustainable urban agriculture and therefore an emphasis on all of them is needed. A problem in one of the aspects will negatively influence the other two concepts (the University of Wisconsin-Madison, n.d.). Therefore, an analysis of each of these three main factors in every sphere is needed to completely understand the situation of urban agriculture in Bonaire.

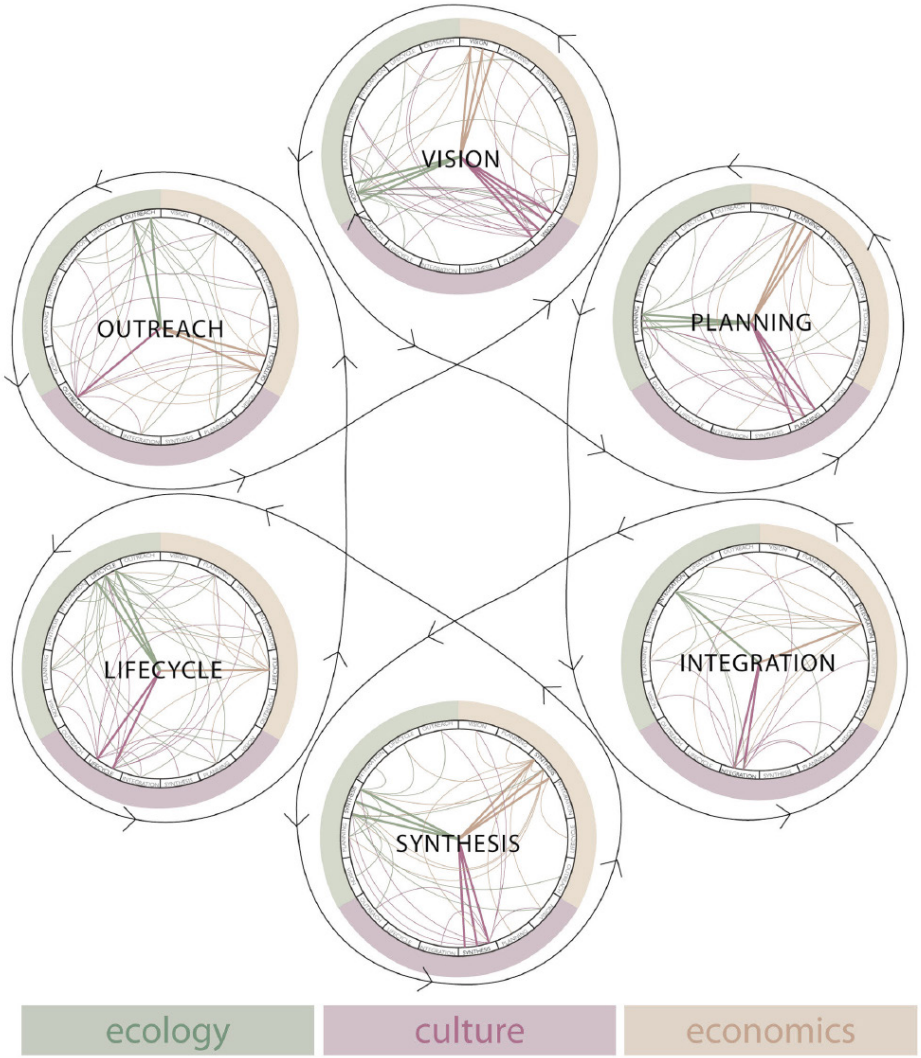


Figure 7: The Urban agriculture on Design Process Spheres (Philips, 2013)

2.3. Conceptual model

This section draws together the concepts which are defined in the previous sections, and it shows how everything is linked. This is essential to understand the connection between the objectives of this research, the research question, and the theories of the theoretical framework.

This linkage of the aspects in the research question is explained as follows. Based on the literature outlining success factors for urban agriculture, I developed design guidelines. In turn, these I used to inform setting up and designing "Nos mes por". Drawing on the experiences in the PAR process, I aim to draw conclusions to add to general theory of successful community gardens, *see figure 8.*

By doing this, the systematic approach of this thesis is also visible in the conceptual framework (Allen, 2020b). In addition, the **two research aims** of this dissertation are creating action and producing knowledge, and they are visible in the relationship between the terms, *see figure 8.* More concretely, developing the design strategies results in supporting the real-life case on the LVV terrain. Thus, this aligns with the action objective of this research. By creating action in an actual project, knowledge on how to design successful urban agriculture is generated. This fits the second research aim of this thesis of adding to the existing research on urban agriculture.

Each concept gets influenced by various variables. These impacts are explained in the following section.

2.3.1. Success factors in urban agriculture

Success factors can be seen as elements to make urban agriculture add to the resilience of a community that uses a location. This is needed to react to unexpected shocks such as a pandemic by being prepared for the shock (Hickey & Unwin, 2020). Moreover, the goal to have self-reliant inhabitants in Bonaire who are producing their own food is described by the local government (Geest & Slijkerman, 2019). This can be seen as successful urban agriculture when this objective is achieved. The model of Gulyas & Edmondson (2021) helps to accomplish this aim by defining the necessary aspects for successful urban agriculture. These can help to create successful agricultural projects in Bonaire which are supporting citizens to produce their own food.

Literature has shown that successful urban agriculture can be defined by **five aspects: (1) large scale, (2) efficient, (3) inclusive, (4) integrated, and (5) safe** (Gulyas & Edmondson, 2021). These terms are used to structure the guidelines found by the participants of "Nos mes por" with a theoretical background. Thus, these five aspects will provide a direction to determine the successful definition of the participants. By including the members in this process, the self-reliance of citizens in Bonaire gets stimulated which fits the goal of the local government.

2.3.2. Design strategies

This aspect of design guidelines in this report is explained in two terms **process and product design**. The design process relates to the "sequence of creative problem finding, analyzing, and solving steps used by the designer to develop a fitting design solution" (Udroiu & Bere, 2018). The product design can be seen as the end product of a project. Moreover, guidelines help to see what is needed in a design at the beginning of a design process, in order to contribute to the end product (Kimball, 2013).

In short, this study develops strategies for both the setup process and the product design of "Nos mes por". This provides an answer to the research question.

2.3.3. Community urban agriculture on the LVV terrain "Nos mes por"

The term urban agriculture refers to a combined approach where food is part of the city based on the unified people, their living environments, and food (Philips, 2013). In this dissertation, the term is defined by two terms: a community which relates to the unified people, and sustainability which forms the connection between the people, their living environment, and food.

The first term relates to the fact that urban agriculture practices are part of the **community**, and they also influence it (Iese et al., 2020). For example, it can provide social cohesion, intergenerational exchange, community empowerment, etc. In this thesis, the community on the LVV terrain will be analyzed and consulted. The use of the research methodology of PAR aligns with this social aspect. The key characteristic of PAR is letting a researcher integrate with the studied society (Walter, 2009).

This second concept focuses on **sustainability**, which includes ecology, culture, and the economy (Philips, 2013). These aspects connect the design of urban agriculture with a sustainable-based process that helps integrate the design into the neighborhood (Kilian et al., 2006). Urban agriculture becomes sustainable when there is an emphasis on the ecological component in the city, it is considering the economic aspects and its social sustainability (Philips, 2013). This can lead to sustainable resiliency in communities.

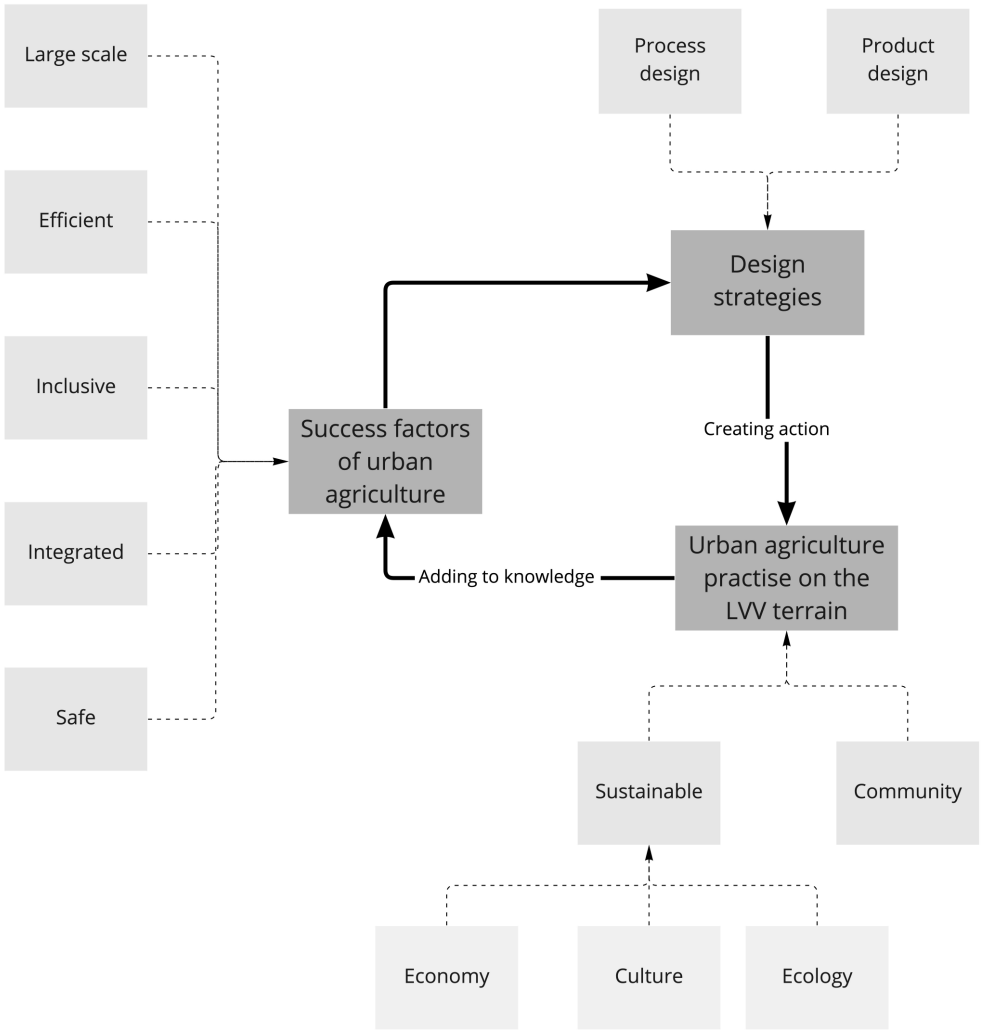


Figure 8: Conceptual model (Author, 2022)

2.4. Connection between the methodology and the theoretical framework

The theoretical framework in this thesis focuses on **cyclical methods** to setup up community gardens and how to make them successful. This framework can be analyzed by using a participatory action research (PAR) methodology since they both emphasize a systematic approach (Vaughn & Jacquez, 2020). Moreover, this approach involves actively intervening in processes to be studied, rather than only observing from the sideline. To achieve this, an iteration of the results and reporting the reasoning behind certain interventions and intermediate evaluation together with the participants in the project are key characteristics.

This PAR approach fits the cyclical way of the Urban Design Spheres where **food, environment, and people** are integrated (Philips, 2013). This systemic approach of the theoretical framework is translated into the research methodology through the integration of feedback loops between the different research phases. Therefore, moments to reflect upon the interventions are an integrated element of the PAR research approach (Vaughn & Jacquez, 2020).

Secondly, the Urban Design process Spheres are useful as a framework because they relate to the **action of PAR**. As described by Philips (2013), these spheres are researched to set up urban agriculture landscape projects more easily. This framework provided a guide with clear steps that need to be taken to design and maintain sustainable urban agriculture (Philips, 2013). By using the structure of these phases, it will be possible to analyze and change the process of the community urban agriculture on the LVV terrain. By doing this, the theoretical framework of Philips (2013) is used in a real-world project and consequently, actions will be generated. This relates to the action phase of the participatory action research approach.

In addition, the conceptual model of successful urban agriculture starts with a **social approach** by focusing on the urban population and the effects of urban agriculture on them (Gulyas & Edmondson, 2021). This means that there is an emphasis on civil participation which is a key characteristic of the participatory action research methodology (Allen, 2020b).

In short, the connection between PAR and the theoretical framework is made by (1) the systematic approach by using feedback loops, (2) the action phase that relates to the Urban Design process Spheres, and (3) the emphasis on the participation aspect in the conceptual model of successful urban agriculture. More information on the PAR approach in this dissertation is described in the next chapter.

3. METHODS

3. Methods

The following chapter will explain how the methodology of Participatory action research is used in this thesis. The relationship between the method and the research context is described. After that, the 6 phases of this research will be defined in more detail. An element of PAR is the focus on the research process instead of the outcomes (Amaya & Yeates, 2014). Therefore, every step of PAR will be defined. To structure these steps, every section will describe the general information on the phase combined with the research and analysis method that is used. To express the participatory aspect of this research approach, both the role of the researcher and an overview of the contacted persons in each of the phases will be defined. This will show the different roles during the analysis process. Lastly, the data storage, and ethical considerations are illustrated, see ANNEX B.

3.1. Overall methodological design

To determine design guidelines/principles of urban agriculture for neighborhoods in Bonaire, the research methodology **participatory action research** is chosen to steer and structure the process. This methodology is a qualitative research method. The focus of this methodology is to solve practical real-world problems by focusing on the direct engagement of communities (Vaughn & Jacquez, 2020). The general goal is to establish change or action by collaboratively generating this. Therefore, participatory research collaborates with stakeholders, community, constituents, and the end-users by including them in both generating and analyzing data (Macbeth, n.d.). Moreover, as explained in the literature this methodology is suited to be used in disciplines of community development and agriculture (Denscombe, 2010). In this thesis, the urban agriculture community "Nos por" is analyzed and intervened in.

3.1.1. Triangulation of the research data

To find effective solutions and triangulate the data, it is favored to use multiple different methods. By doing this, the information from one source gets checked by two other methods of collecting data (Walter, 2009). As is shown in research; (1) focus groups, (2) participant observations, field notes, and (3) interviews are adequate methods in PAR (Walter, 2009). Therefore, these are the three main techniques used in this research.
Since the goal of this research was to find guidelines to set up sustainable community gardens, it was important to collect data on the ecological, financial, and social aspects in all the different levels of the design. These three topics of ecology, economy, and society mentioned by Philips (2013) are leading in sustainable designs of urban agriculture. Therefore, the same elements are used for both the analysis of the terrain, and in the focus group with the organization of "Nos mes por". By doing this, the results could be compared with each other based on the same structure.

3.1.2. The four core themes of Participatory action research

The research methodology is characterized by four core characteristics (1) participation, (2) action, (3) research, and (4) social change, *see figure 9.* The four elements are connected as:

"Participation by stakeholders in a process aimed at advancing knowledge through a systematic research process that results in action for social change on the part of the stakeholders" (Liebenberg, 2018).

The first factor can be explained as collaboration through the **PARTICIPATION** of the actors (Liebenberg, 2018). This is done by emphasizing the input of the citizens which fits the focal point of the local government to educate and include citizens (Adriaens & Loozen, 2021). In practice, this meant that I interacted with the stakeholders of "Nos mes por" by participating in the board meetings, members' activities, organizing moments to receive feedback, and casual talks with the involved members of "Nos mes por", and being part of the social media channels like WhatsApp and Facebook. Therefore, the researcher became part of the community. As is written by Selenger (1997), this community participation element leads to a more authentic analysis of the social reality.

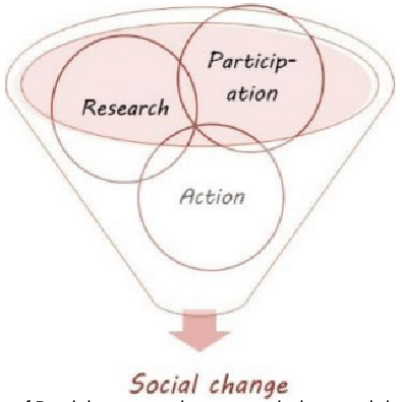


Figure 9: The three core themes of Participatory action research that result in social change for a community (Liebenberg, 2018a)

An important aspect of participation is to let the community that is affected by this research, collaborate in the research rather than only being subjects (Denscombe, 2010). Therefore, the researcher guided the community during the research process by posing questions to let the participants discover the problems themselves. Based on the different participatory methods as mentioned by Herr and Anderson (2005), the involvement of the community in this thesis is defined as 'cooperation', *see figure 10*. More specifically this means that the participants of "Nos mes por" are involved in identifying the research question, providing responses, and determining priorities. However, the researcher is in charge of analyzing the data, disseminating learnings, and directing the research process (Herr and Anderson, 2005). This 'cooperative' relationship instead of 'collective action' between the researched and the researcher is often used in PAR projects due to unexpected factors present in real-world cases (Smith et al., 2010).

Secondly, the term **ACTION** refers to the practical nature of analyzing problems to create change in the real world (Denscombe, 2010). In this research, the LVV terrain study was used to find workable strategies for Bonaire while at the same time generating info about future projects on urban agriculture. However, this means that interventions based on the results of this research happened throughout the process of setting up community urban agriculture. This means that a clear separation between the normal activities and the steered actions based on this research is needed. Examples of direct actions that took place are building a social location, hosting a workshop, and creating a WhatsApp and Facebook group.

The third term relates to the **RESEARCH** aspect of making new knowledge and reporting learnings (Allen, 2020). This means that new insights are generated by analyzing case studies, performing desk research, and conducting literature reviews to find information on designing community urban agriculture practices in other places. Used sources are experts in Curaçao, a case study in Bonaire, interviews on the organizational structure in Bonaire, and literature on designing urban agriculture projects. This knowledge is used to guide the ongoing process of "Nos mes por" by implementing and evaluating these findings.

The combination of these three factors leads to **SOCIAL CHANGE** which is the last characteristic of PAR (Liebenberg, 2018). This methodology emphasizes the use of theoretical data for a real community local food production initiative happening in Bonaire through the development of active interventions. This fits the key characteristic of PAR namely *"action and knowledge that is directly useful to a group of people"* (Liamputtong, 2009, p. 171).
By being involved in the project on the LVV terrain it was possible to generate data on community gardens in Bonaire. This was specifically helpful as there is limited experience with communal urban agriculture projects on the island and thus few data available.
Moreover, the social change is visible in the real-time interventions of the project "Nos mes por" to make it successful. The actions are observed and reflected upon. Based on that information, it was possible to adapt the interventions of "Nos mes por" to create recommendations for new design strategies.

Mode of Participation	*Involvement of Local People*	*Relationship of Research and Action to Local People*
Co-option	Token; representatives are chosen, but no real input or power	on
Compliance	Tasks are assigned, with incentives; outsiders decide agenda	for
Consultation	Local opinions asked, outsiders analyze and decide on a course of action	for/with
Cooperation	Local people work together with outsiders to determine priorities; responsibility remains with outsiders for directing the process	with
Colearning	Local people and outsiders share their knowledge to create new understanding and work together to form action plans, with outsider facilitation	with/by
Collective action	Local people set their own agenda and mobilize to carry it out in the absence of outside initiators and facilitators	by

Figure 10: Overview of the different participatory methods in a PAR approach structured from non-participatory to completely participatory (Herr and Anderson, 2005). This dissertation is referred to as 'cooperation' which is represented as the fourth aspect in this table.

3.1.3. The connection between methodology and the aim of the research

The methodology created change in the researched topic by **involving the various stakeholders and participants** (Denscombe, 2010). This means that the participants and the organization of the ongoing community urban agriculture practice on the LVV terrain are engaging in the research. It is mentioned in the literature that the involvement of the researched subjects in the entire research process leads to more sustainable projects (Gregory & Peters, 2018). Thus, this research methodology can help in creating a sustainable urban agriculture project in Bonaire as this is part of the objective of this study.

Besides this, the methodology helped in making the specific project on the LVV terrain successful by immediately applying the findings of the analysis. This is a form of applied research and an important element of the PAR methodology (Walter, 2009). More concretely, this means that general research findings are translated to the local circumstances of Bonaire. By generating knowledge for the **case on the LVV terrain**, specific strategies for "Nos mes por" could be found and implemented which leads to creating action. This is the **first aim** of this dissertation.

Secondly, PAR uses observations and reflections on the results to **keep adapting the interventions** (Andrade, 2014). Therefore, the case of "Nos mes por" keeps on being adapted till a successful project is created. Moreover, this continuation of reflecting on the findings, made it possible to find more general results and knowledge. This contributes to the **second aim** of spreading knowledge on community urban agriculture in Bonaire.

3.2. Research steps

As explained before, the research process is an iterative method where two points are crucial (1) the research should be immediately implemented in the real world, and (2) it is an open-ended process (Denscombe, 2010). To apply these two concepts, the following six steps in the research process are defined: **(1) critical reflection, (2) research, (3) strategic planning, (4) action, (5) professional practice, and (6) critical reflection II.**

These steps are used cyclically which means that iterations and adaptations kept on happening throughout the process (Denscombe, 2010). Therefore, the critical reflection stage is repeated at the end of the research process. Moreover, the steps don't have to follow a certain sequence and they can happen in a parallel and repetitive way, *see figure 11.*

In the following parts of this chapter, each step is explained in more detail on the research and analysis methods. This helps to see what happened in each phase and how that influenced the other phases.

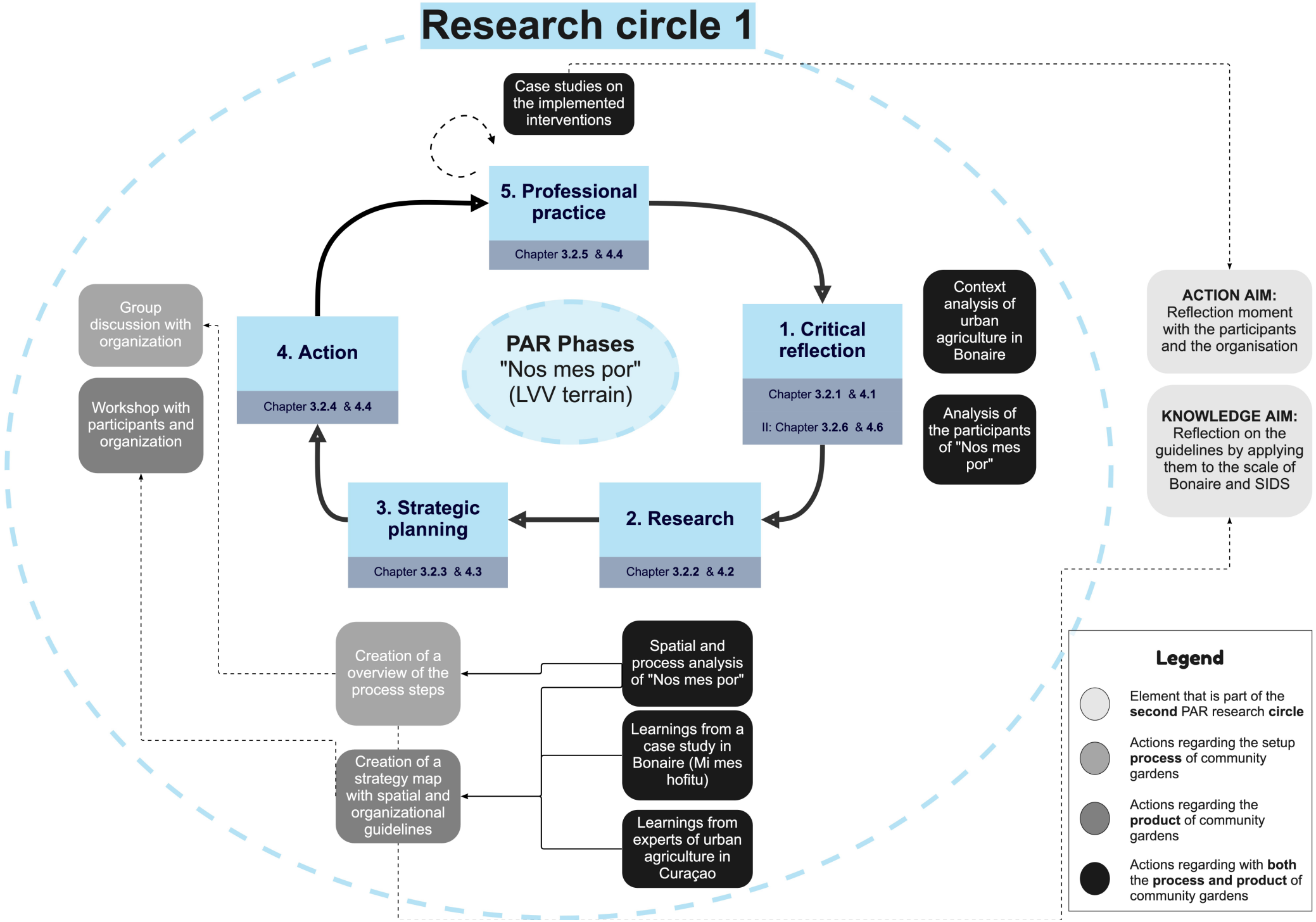


Figure 11: Overview of the different steps of the PAR study and the corresponding chapter of this dissertation (Author, 2022)

3.2.1. Critical reflection phase

Goal

To identify the problem of making the project on the LVV terrain effective, it is important to partner with organizations and institutions that are involved with urban agriculture. In addition, the partnership leads to building relationships between valuable stakeholders in Bonaire (Walter, 2009).
To achieve this, people involved in urban agricultural projects on the island were interviewed. This helped to understand the local context and the challenges in urban agriculture of Bonaire. Besides this, the participants involved in the case study on the LVV terrain were contacted to formulate the participants' issues to make the community garden successful. As is described in the literature, including the people who are affected by the research process is an essential element of PAR (MacDonald, 2012).
Thus, both the local people who are involved with urban agriculture in Bonaire and the participants of "Nos mes por" were interviewed in this step. This helped to understand the local situation while at the same time a personal relationship with the people in Bonaire was built.

People involved and the role of the researcher

People and institutions involved with projects and initiatives centered around **community urban agriculture in Bonaire** were contacted through WhatsApp. This resulted in an informal relationship with the institutions and actors of the agriculture sector in Bonaire. By doing so, the data could be enriched with context and more personal information (Swain & Spire, 2020). The actors contacted were both active in the governmental and the private sector on the island. In ANNEX C, an overview of the contacts is visible (name, profession (connection with community urban agriculture), background of the initiative, the current activity of the person, and the date of the interview).

The 34 **participants of "Nos mes por"** were contacted to create an overview of the people involved in the project. To receive as much information as possible without interfering on a big scale, small conversations during the process were held. This means that participants were asked short questions by talking to them when they were present in the "LVV Volkstuinen area". By using this method, nine participants were approached.
However, by using this informal and lucrative way of connecting with the participants, not every member is talked to. Therefore, phone interviews with the less present participants of "Nos mes por" were performed to establish a general overview. By using this method, 12 persons were contacted.

My role was seen as the **investigator** who is asking questions to the people connected with agriculture in Bonaire. By doing this, I created connections with the important actors. Besides this, I was able to get to know the community people of "Nos mes por" to become a committed member. This was done by forming a connection with the members of "Nos mes por", the board members, and the employees of LVV.

Research methods

To generate an overview of the community urban agricultural projects and the organizational structures in Bonaire, **semi-structured in-person interviews** were conducted. The interviewees were people of Bonaire who are active in the agricultural and social organizational sectors. The researched topics are (1) the person's background, (2) the level of involvement with an urban agriculture initiative in Bonaire, (3) the challenges of organizations in Bonaire, and (4) the knowledge of other community-driven local food projects on the island. By asking these questions, it was possible to generate data on the existing community local food projects and general challenges in social organizations in Bonaire. The latter was researched to make an overview of the existing projects because there is limited data available on this topic.
In addition, desk research of social agricultural project proposals written by the government was analyzed. This provided more background information to the interviews.

To identify the challenges of the community local food project on the LVV terrain, **semi-structured live interviews** with the participants were organized. The goal was to create a better understanding of the members and the problems they face in the project. Therefore, the three following subjects were explored (1) the information on the plans of each participant, (2) the presence of the sustainability factors in the members' plans, and (3) the personal factors defined as success in "Nos mes por". The first topic guided making a needs and resources plan for the organization (Philips, 2013). The other two topics were related to the theoretical framework and helped in understanding what the general challenges on the process and product side in "Nos mes por" are. The topics of the telephone interviews were the same as for the interviews in person, but an extra question on the reason for inactivity on the plot was added. By doing this, it was possible to create a deeper understanding of the specific problem.

Analysis methods

The interviews conducted in this phase are based on the **summarizing notes** which were taken during the conversations, see APPENDIX D. No recordings of the interviews were made to receive more open and real information on the topic (Muck, 2021). This also helped to keep the conversations more informal, which helps to build trust with the interviewee (Muck, 2021). This was especially necessary to get accustomed to the culture of Bonaire and to gain a position in relation to this community as a non-local.

The data were analyzed in a **thematic way** to find answers to the research questions. This means that the answers were structured by the questions to identify themes and patterns.

- **Goal:** Understanding the local context in Bonaire and "Nos mes por"
- **People involved:** Participants of "Nos mes por", network of urban agriculture in Bonaire
- **My role:** Interviewing and building a network
- **Research methods:** Semi-structured interviews
- **Analysis methods:** Summarizing notes in a thematic way

3.2.2. Research phase

Goal

The goal of this phase was to generate understanding from examples on how to set up and organize community urban agriculture initiatives in Bonaire. The information was needed to guide the process of setting up "Nos mes por". The knowledge from the examples was mainly focused on the product side of a community urban agriculture project. This can be explained because the initiatives are already installed which makes it easier to learn from the result. As limited data on how to set up community gardens is available through this method, the analysis of the ongoing process of "Nos mes por" was essential. To fill up this knowledge gap, the spatial and process characteristics of the project on the LVV terrain were analyzed. As this development on the LVV terrain is currently occurring, it is easier to compile knowledge on the process. Besides this, the analysis was needed to see the current challenges in the design of "Nos mes por" to be able to improve them.

To summarize, the data is collected from three different sources (1) experts from Curaçao, (2) a previous social local food initiative in Bonaire, and (3) the spatial and process characteristics of "Nos mes por". Besides this, the first two sources were focused on gathering data for the product design of community gardens. The spatial and process analysis of "Nos mes por" was used to develop strategies for the set-up process of urban agriculture projects.

People involved and the role of the researcher

To learn from experiences of active projects, **three experts** from Curaçao were interviewed. The people are (1) C. van Eman (who is active in implementing community gardens in Curaçao), (2) B. Visser (entrepreneur who implemented food forests in Curaçao), and (3) R. van Reenen (hired by the government to plant food forests in Curaçao with educational objectives). These people were contacted through WhatsApp. These persons are chosen because they are seen as the three persons most involved with community urban agriculture in Curaçao (B. Visser, personal communication, 12 March 2022).

To gather lessons from a previous project, people involved with **"Mi mes hofitu"** were contacted. Three persons who were part of the original organization (Rocky, Maria, Garcia) and two members (Miguel, Layo) were interviewed. The number of people was limited due to the older age of the project and the participants of "Mi mes hofitu". The people were contacted through WhatsApp. This project was active from 2004 to 2016 on the island of Bonaire.

The spatial and process characteristics of the **project on the LVV terrain** were analyzed by making observations during the board and participants' meetings, talking with the head department of LVV, and personal communication with LVV employees.

In this phase, I was working as an **active investigator** to gather theoretical data on the topic of urban agriculture. This provided me with background information on urban agriculture which was useful for the following research phases. Besides this, I build more personal connections with the inhabitants of Bonaire by conducting face-to-face interviews. This resulted in a better understanding of the local conditions and the creation of a network.

Research method

To gather as much information as possible, **semi-structured interviews** with the experts of Curaçao were organized. As is mentioned in the literature, this research approach is made to gather deep knowledge about a certain topic in small-scale research (Miles & Gilbert, 2005). The topics of the expert interviews are (1) the background of the project, (2) the process method for setting up the initiative, (3) the spatial characteristics of the end product, and (4) the success factors of the product, see ANNEX D. The first two elements were included in the interview guide to provide knowledge on the process side of

community gardens. The last two subjects were both focused on the design of the community urban agriculture practice. To structure these questions, the theoretical framework of Gulyas & Edmondson (2021) was used. The interviews were organized in an online environment due to the distance between Curaçao and Bonaire.
To create comparable content, the **semi-structured interviews** about "Mi mes hofitu" used the same research topics as the expert interviews. However, one question about the failures and the successes of "Mi mes hofitu" is added, see ANNEX D for the interview guide. By doing this, learnings from the mistakes were formulated what is useful for new projects in Bonaire (Hickey & Unwin, 2020). The interviews were conducted in person to create a better understanding of the interviewee.

A **mixed method** of observations, informal interviews, and desk research was done to provide a thorough analysis of the investigated project on the LVV terrain. This research was needed to find failures in the existing design of "Nos mes por". By doing this, information could be collected to compare the ongoing process of "Nos mes por" with the theory of Philips (2013). This created an overview of the current process and his missing elements.

Analysis method

The **axial and selective coding method** is applied in the transcripts of the interviews of both the experts and "Mi mes hofitu" (Dingemanse, 2021). The main topics were defined by the questions posed in the interview; thus, open coding was not necessary. The data is visualized in a table to keep an overview of the different topics and to compare the findings with the knowledge of "Mi mes hofitu". This content analysis was needed to find strategies to design community urban agriculture practices. By doing this, both organizational and spatial guidelines could be recognized. Also, some information on how the experts in Curaçao and the organization from "Mi mes hofitu" designed their set-up process, could be gathered.

The data from the mixed method (observations, informal interviews with LVV employees, and desk research) were analyzed **thematically**. This information was used for the analysis of the current setup process of "Nos mes por". Moreover, the spatial components were researched by the topics of an ecological system as described by Philips (2013).

- **Goal:** Gathering insights on community gardens
- **People involved:** Experts from Curaçao, people from "Mi mes hofitu", people from "Nos mes por"
- **My role:** Interviewing
- **Research methods:** Semi-structured interviews and mixed method
- **Analysis methods:** Axial, selective coding, and thematically

3.2.3. Strategic planning phase

Goal

The goal of this phase was to transform the findings from the observations, interviews, and desk research into an action plan. This is done by combining the results from the experts of Curaçao, "Mi mes hofitu", and the spatial and process analysis of "Nos mes por" into elements that can be used with the "Nos mes por" participants.
To fulfill the research objective of creating guidelines on both the process and product side of making community gardens on the LVV terrain, a separation between these two topics was made. Therefore, the learnings from the experts from Curaçao, and members of "Mi mes hofitu" were combined to find design guidelines for the product of successful community urban agriculture. The findings from the process analysis of "Nos mes por" were gathered to see what the status of the project was and what possible interventions were. Both the results which are created at the end of this phase were used as guidance during the ACTION phase.
To conclude, the insights from the interviews from both the experts from Curuçao and "Mi mes hofitu" were concluded because they focus on the product design of community gardens. The insights from "Nos mes por" were used to see what is needed in the setup process of a community local food initiative.

People involved and the role of the researcher

In this phase, I was in charge of analyzing and concluding the gathered data due to a limit in time. This resulted in a **collaborative relationship** instead of a collegial connection between me and the participants of "Nos mes por". This means that the members of "Nos mes por" were integrated as partners in the process instead of being supported to work as autonomous researchers (Bacon et al., 2005).
Nonetheless, relationships with the different participants of the LVV project were constructed by being actively involved in the participants' meetings, being a member of the WhatsApp group, and having small conversations with

the members. This influences the data analysis by immediately seeing how the research findings can be used in the local context of "Nos mes por". Therefore, more specific guidelines for the LVV terrain were found. For example, the negative influence of freely walking animals is less present in Curaçao. Therefore, the guideline of creating an open garden without fences in Curaçao was translated to having an open and accessible atmosphere inside the terrain instead of having a physical open garden.

Research method

The data of the interviews from both the experts and members of "Mi mes hofitu" were collected and translated into a **strategy map**, to make an overview of the design guidelines. This strategy map was based on the mind map approach to show a graphical representation around a central theme. This helps to find structure and connections in the analyzed strategies of successful community urban agriculture initiatives (Boeijen et al., 2014).

The data collected from the observations and the document analysis of the process of "Nos mes por" were combined in the **form of a table**, see ANNEX E. By doing this, guidelines on the process side of creating urban agriculture initiatives could be found. This information is based on the case of "Nos mes por" because of the researchers' involvement a throughout analysis could be performed. A table structure is used to make the findings easily interpreted while also representing the various phases of creating community gardens (Springer, n.d.).

Analysis method

The gathered data for the design of community urban agriculture was structured by the **five factors of success** as described in the theoretical framework by Gulyas and Edmondson (2021). The data from the interviews of the experts of Curaçao, and the members of "Mi mes hofitu" are analyzed in a **thematic** analysis to find general themes.
The information from Curaçao and the inactive project in Bonaire are combined because they both need to be adapted to fulfill the case characteristics of "Nos mes por". The learnings from Curaçao are useful but it needs to be adapted to the local situation in Bonaire because the islands have differences in population size and political structure. Moreover, the initiative of "Mi mes hofitu" has a more individual concept of urban agriculture namely: coming together to talk about the progress of the members' greenhouses at their homes. Based on this, the information is mostly used to create the process "Nos mes por" and not the visual design aspects. However, this data is valuable because it is already tested in the social context of Bonaire, and it has lasted for 12 years.

The analysis of the set-up process of "Nos mes por" is structured and organized by the **urban design spheres from Philips** (2013). The process phases of Philips (2013) were used to structure the data and connect it with the three sustainability themes. The main findings in the observations and the document analysis were analyzed in **thematic** analysis, to create more reliable information.

- **Goal:** Analyzing and concluding the findings
- **People involved:** Participants of "Nos mes por"
- **My role:** Collaborative relationship
- **Research methods:** Strategy map, process table
- **Analysis methods:** Five factors of success in a thematic way (Product), Urban design spheres in a thematic way (Process)

3.2.4. Action phase

Goal

Since it is a part of PAR to instigate change, the products of the previous phase are translated into actions for the project on the LVV terrain. This is done by using the findings from the STRATEGIC PLANNING phase to make "Nos mes por" successful. Moreover, this integrated the members in the data analysis of this study due to presenting the findings from the interviews and spatial analysis. By doing this, they could provide direct feedback on whether the product and process guidelines would be useful for "Nos mes por" and thus also for Bonaire. This integration of the members in the research is a key characteristic of PAR (Walter, 2009).
The actions to achieve this involvement were a focus group and workshop with the people of "Nos mes por". The focus group with the organization of "Nos mes por" was hosted to develop the next process steps. The product design of community gardens was tested by applying the strategy map in a workshop with the community of the LVV project.

People involved and the role of the researcher

To develop the **"Nos mes por"** process, the persons involved with the **organization** were invited to join a focus group. This means that two board members, the designer of the terrain, and the facilitator from LVV were present. By involving the persons responsible for the process of setting up "Nos mes por",

more valuable information could be found. This event was planned by sending an invitation to the WhatsApp group of the board.
A workshop was constructed to implement the design strategies found in the research, *see figure 12*. The mix of **organization representatives and participating members** made it possible to discuss sensitive topics such as the position of the board. Six members, the facilitator hired by LVV, the designer of the terrain, and one board member were present during the workshop. The invitation flyer was spread out on the social media channels of Facebook and WhatsApp. As not every member is part of these online communications, two physical flyers were hung at the entrance of the terrain of "Nos mes por". This was done to include as many participants as possible.

I, in my role as researcher, was acting as a **moderator** during the two actions: the focus group and the workshop. This role resulted in both creating data and influencing the real-world project on the LVV terrain. Thus, on one side general knowledge on how to set up and design community gardens was conducted. On the other side, the setup process of "Nos mes por" got influenced by providing information and guidance for the participants.

Research method

To develop the process of setting up the community local food initiative on the LVV terrain, a **focus group** was organized. This method is useful to discuss specific topics with people from the target group. Moreover, this approach helps to create free-flowing discussions that can lead to unexpected findings (Boeijen et al., 2014). Therefore, this method was appropriate to guide participants to find their solutions, without steering this process too much. This is a necessary characteristic of the PAR methodology (Walter, 2009). To do this, questions were asked to stimulate finding new ideas which are coming from the organization itself.
To use the findings of the STRATEGIC PLANNING phase, questions on each of the separate topics got made, see ANNEX E. The questions were defined by the who, what, where, when, why, and how (WWWWWH) method to formulate the challenges in a systematic way (Boeijen et al., 2014). The questions who and where were not integrated into the focus group because they were already provided with an answer. The "Who" question was answered by the role of the board who is in charge. This meant that all the questions of the focus group were oriented towards them. The "Where" question was less relevant because everything was related to the "Nos mes por" project and it already has a location. The "Why" question is answered by the theoretical framework of the Urban design spheres.
Besides this, the topic list, which was used during the focus group, started with the Synthesis sphere instead of the first phase of Planning. This is because the physical shape and the location of the community garden on the LVV terrain were already created. In the literature, the physical design of the urban agriculture project is already decided in the Synthesis phase (Philips, 2013). However, adaptations of the design of the community garden on the LVV terrain were still possible. The Planning and Vision spheres were researched by events and actions that took place before the researcher's involvement.

The product of a community local food initiative on the LVV terrain was tested by organizing a workshop. By hosting a **collaborative workshop**, it was possible to include the participants in this process of creating "Nos mes por" which makes them feel connected with the initiative. This fits the methodology of doing participatory action research (Walter, 2009).
During the workshop, the strategy map of the STRATEGIC PLANNING phase was used as a guide to develop strategies for "Nos mes por". The method of a mind map guided in making connections while also providing freedom to explore new thoughts and ideas (Moggridge, 2006). This stimulated the creativity of the participants which is an aspect of the participatory approach of the PAR methodology (MacDonald, 2012).
To use the strategy map of the previous research phase, adaptations were made. First, the spatial characteristics of the LVV terrain were added to the map. By doing this, the guidelines could be directed to the local context. After that, the strategies were clustered in more general topics. This provides more freedom for the participants of "Nos mes por" to come up with their ideas in the workshop.
The mind map was used as a template where the participants could fill in their ideas and give comments on the provided examples, see ANNEX F for the workshop structure.

Analysis method

To collect valuable data, both **personal notes** were used during the focus group. By asking for a specific time frame during this meeting (question of "When"), it was possible to create realistic planning for the organization of "Nos mes por" because they were the members of this focus group. The different phases in time are based on the answers during the group discussion with the organization of "Nos mes por". The categories in the timeline are based on the **three different sustainability themes**: culture, ecology, and economy. By doing this,

Figure 12: Picture of the workshop with the people of "Nos mes por" on 28 May 2022. This is an element of the Action phase (Author, 2022)

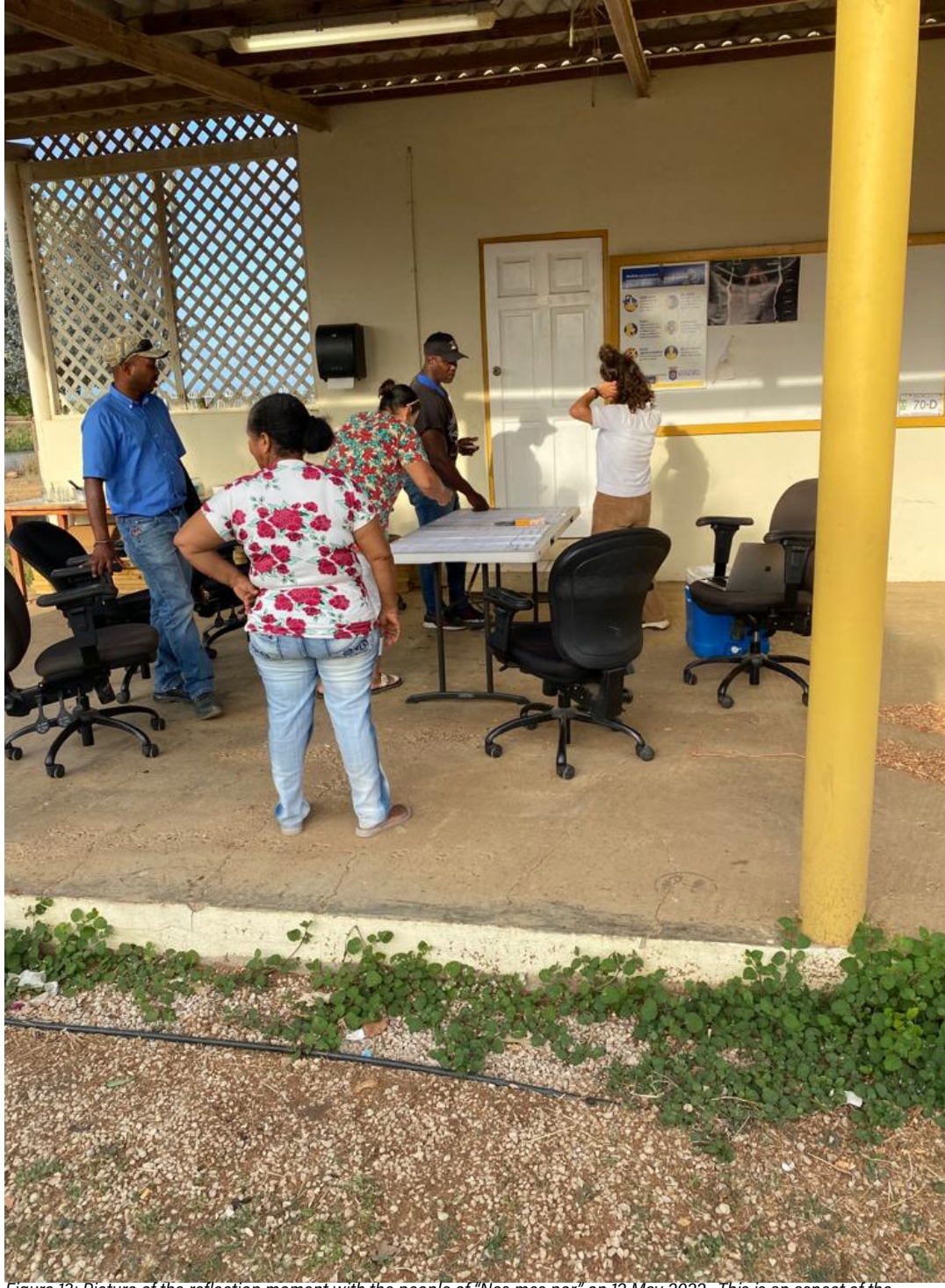


Figure 13: Picture of the reflection moment with the people of "Nos mes por" on 12 May 2022 . This is an aspect of the Critical reflection II phase (Author, 2022)

it was clear what needs to be done in each theme to create a sustainable community garden project. Symbols are used in the timeline, to represent the various steps that need to be taken. This makes it easier for all the people in Bonaire to understand the timeline because four different languages are used on the island. Besides this, literature has shown that a symbolic representation should be used to represent a future goal. This is crucial to let collaborative action happen, which is the main goal of PAR (Gärdenfors, 2004).
The information from the group discussion was added with an analysis of the first steps of creating the association "Nos mes por". These steps could be researched by observing the decisions that were made to create an association. This happened before the researcher was involved in the process of setting up the urban agriculture project. Lastly, the process strategies from the interviews with the experts of Curaçao and "Mi mes hofitu" were integrated into the process.

The results from the workshop were analyzed by the **comments** of the participants that were written down. This means that an **inductive thematic analysis** was performed. A part of the answers is in Dutch and the others are written in Papiamentu. The latter is translated by a local person. The language barrier also made it more difficult to explain the provided guidelines because the mind map was written in Dutch. This resulted in the loss of one example provided in the mind map because no comments were written down. By removing this guideline, the information becomes more reliable.

- **Goal:** Implementing the findings as actions for "Nos mes por"
- **People involved:** Participants and the organization of "Nos mes por"
- **My role:** Moderator during focus group and workshop
- **Research methods:** Focus group, collaborative workshop
- **Analysis methods:** Personal notes structured by the three sustainability themes (Process), Comments by using an inductive thematic analysis (Product)

3.2.5. Professional practice phase

Goal

This step was focused on observing the interventions that were influenced by the researcher. The implemented actions were based on the participant's strategies which were developed during the workshop in the ACTION phase.
The decision of the people of the community garden to focus on these actions was influenced by two different elements (1) the group discussion with the organization, and (2) the general research process. As the complete research process influences the organization and design of "Nos mes por", this is a crucial action to consider. Thus, co-design with the organization and the members of "Nos mes por", was the method to decide which actions to implement. This was stimulated by the research methodology where actions are implemented without steering the community too much (Denscombe, 2010).
By observing and reflecting upon the actions, recommendations for the future were given in the CRITICAL REFLECTION II phase. To accomplish this, seven interventions were analyzed by both the researcher and the participants.

People involved and the role of the researcher

The people involved in the research step were me by being the researcher**, the board, and the members of "Nos mes por".** By organizing the different events and the actions for the members of "Nos mes por", they could actively participate in them. By doing this, the members could change the setup process and the outcomes of "Nos mes por".

I acted as an **observer** in each of the different actions, to collect reliable data. This means that I wrote down important elements that happened during the workshop, the focus group, and crucial situations in the WhatsApp and Facebook groups.

Research method

To create valuable data for the **case studies**, observations for each intervention were performed. More specifically, an analysis of the messages sent in the WhatsApp and Facebook groups was done. Besides this, an observation of the terrain was conducted to reflect on the creation of the social location. An analysis of the notes taken during each weekly meeting was summarized to reflect upon the meetings.
Moreover, a critical **self-reflection** based on the advantages and disadvantages of PAR was conducted. This made it possible to reflect upon the role of the researcher in the design of a community garden. Lastly, observations were written down during the focus group with the organization of "Nos mes por" and the workshop with the members of "Nos mes por". This information was used to evaluate the actions of organizing the workshop and the focus group.

Analysis method

The observations of the researcher were analyzed based on the **Plus-Minus-Interesting method (PMI).** In this method, the positive aspect of each intervention is listed together with the negative and the interesting elements (Boeijen et al., 2014). This makes it possible to improve upon the negative elements and to develop the good elements into stronger ideas (Boeijen et al., 2014). The social media channels and the weekly meetings were analyzed in more detail compared with the other actions. The reason for this is the high amount of data for these two interventions because they were not one-time events, but they happened multiple times. More specifically, the topics: number of participants, vibe, activity, language to communicate, sharing valuable information, and content were defined in the analysis.
In short, this means that **thematic analysis** was used to find patterns. Based on these findings, recommendations and reflections for the future are given in the next section called CRITICAL REFLECTION II.

- **Goal:** Analysis of the actions to improve "Nos mes por"
- **People involved:** Participants and the board of "Nos mes por"
- **My role:** Observer
- **Research methods:** Case studies
- **Analysis methods:** Plus-Minus-Interesting method (PMI) used in a thematic way

3.2.6. Critical reflection II phase

Goal

This phase is repeated in this thesis research because an important element of PAR is to keep improving the research process until the problem is solved (Walter, 2009). As iterations and repetitions are part of the PAR method, the Critical reflection phase is repeated in this thesis. This means that recommendations and reflections on the practical actions were needed to keep on improving the findings. This complies with the ultimate objective of creating social change in the community of "Nos mes por". These recommendations were based on the observations and examinations of the previous step called PROFESSIONAL PRACTICE phase.
Besides this, the theoretical interventions needed to be improved by making recommendations for them. This created opportunities to adapt the guidelines to set up and design community urban agriculture. By doing this, the second research objective to produce knowledge on community gardens can be fulfilled. Moreover, Hickey & Unwin (2020) has stated that more research on SIDS should be conducted to add to the lack of knowledge available on this topic. Therefore, the findings of this action research of "Nos mes por", are projected to the scale of Bonaire and SIDS. This refers to the two levels that are used throughout this study. By doing this it was possible to reflect on the findings and see how they contribute to the knowledge aim of this thesis.
In short, answers for the two research objectives are integrated into this last step.

People involved and the role of the researcher

The **participants of "Nos mes por"** were involved by organizing a reflection moment to look back and evaluate the interventions. By sending an invite in the WhatsApp and Facebook groups, both the **organization** and the members were invited. Six members, the facilitator of LVV, and one board member were present. This reflection moment helped to see what the opinion of the members of "Nos mes por" was.

I acted as a **facilitator** during the reflection session to steer the reflection process without influencing the members in writing down their opinions. This means that an objective attitude was necessary. Besides this, the recommendations of this phase were collected and written by the researcher. This means that the actors of "Nos mes por" were not involved in this step. This can be explained by the lack of time to let the members of "Nos mes por" reflect upon the recommendations.

Research method

To find more information on the case studies, a **live reflection moment** with the organization and the members of "Nos mes por" was organized, *see figure 13*. As this small island is driven by personal contact between each other, this is a fitting research method (O. Emerenciana, personal communication, 16 March 2022). By doing this, the opinions of the involved research subjects could be collected which led to a feedback loop between the researcher and the community. This is a valuable characteristic of PAR (MacDonald, 2012). To continue the informal relationship between the participants of "Nos mes por" and me, food and drinks were provided.

To evaluate the guidelines to set up and designing community gardens, the researched strategies were applied on a wider scale. This is done by performing **desk research**. The answers of the members of "Nos mes por" were analyzed and translated to the scale of Bonaire, to see which strategies can be

applied outside the LVV terrain. Moreover, the characteristics of SIDS are used to compare the conclusions generated by analyzing "Nos mes por". By doing this, it was possible to compare the learnings of Bonaire to multiple islands that struggle with the same challenges.

Analysis method

Based on the information of the previous research phase called PROFESSIONAL PRACTICE, **reflections** were made by using the PMI method, see previous chapter Professional Practice. This was done by combining the information from the researchers' observations with the opinion of the members of "Nos mes por". This means that a **thematic analysis** was used to see what the general advantages and disadvantages were. This leads to more reliable information because two separate resources are consulted. Moreover, linking these data sources leads to a feedback loop between the researcher and the members, which is a valuable characteristic of PAR (Selener, 1997).

To test the theoretical finding to be used in other locations, the strategies were applied to the **scale of Bonaire and SIDS**. The guidelines defined as unnecessary by the members of "Nos mes por" are deleted in the scale of Bonaire. Besides this, the case-specific conditions for the LVV terrain were not used. By using the information of the members of "Nos mes por", it was possible to adapt the strategies to the local conditions of Bonaire.
Furthermore, the guidelines were tested by seeing whether each strategy fits the key characteristics of SIDS. Thus, a **comparison** method was used. By doing this, it was possible to see which guidelines are suitable for other SIDS and which guidelines are only suitable for Bonaire.

- **Goal:** Reflection on the two objectives of creating action and knowledge of this study
- **People involved:** Participants and the board of "Nos mes por"
- **My role:** Facilitator during the reflection moment
- **Research methods:** Reflection moment (Action aim), desk research (Knowledge aim)
- **Analysis methods:** Reflections in a thematic analysis (Action aim), application of the guidelines to the scale of Bonaire and SIDS (Knowledge aim)

4. RESULTS

4. Results

To structure this chapter, the research steps of the PAR methodology are used. This is the same format as the previous Methods chapter. By doing this, the results of the various phases can be discussed. These steps are **(1) Critical reflection, (2) Research, (3) Strategic planning, (4) Action, (5) Professional Practice, and again (6) Critical Reflection**, *see figure 14*. As PAR is a cyclic approach, the Critical reflection step is repeated to make observations about the general research process (Selener, 1997).
In every section, first, the analysis methods of the results are explained. After that, the main outcomes of each phase are described.

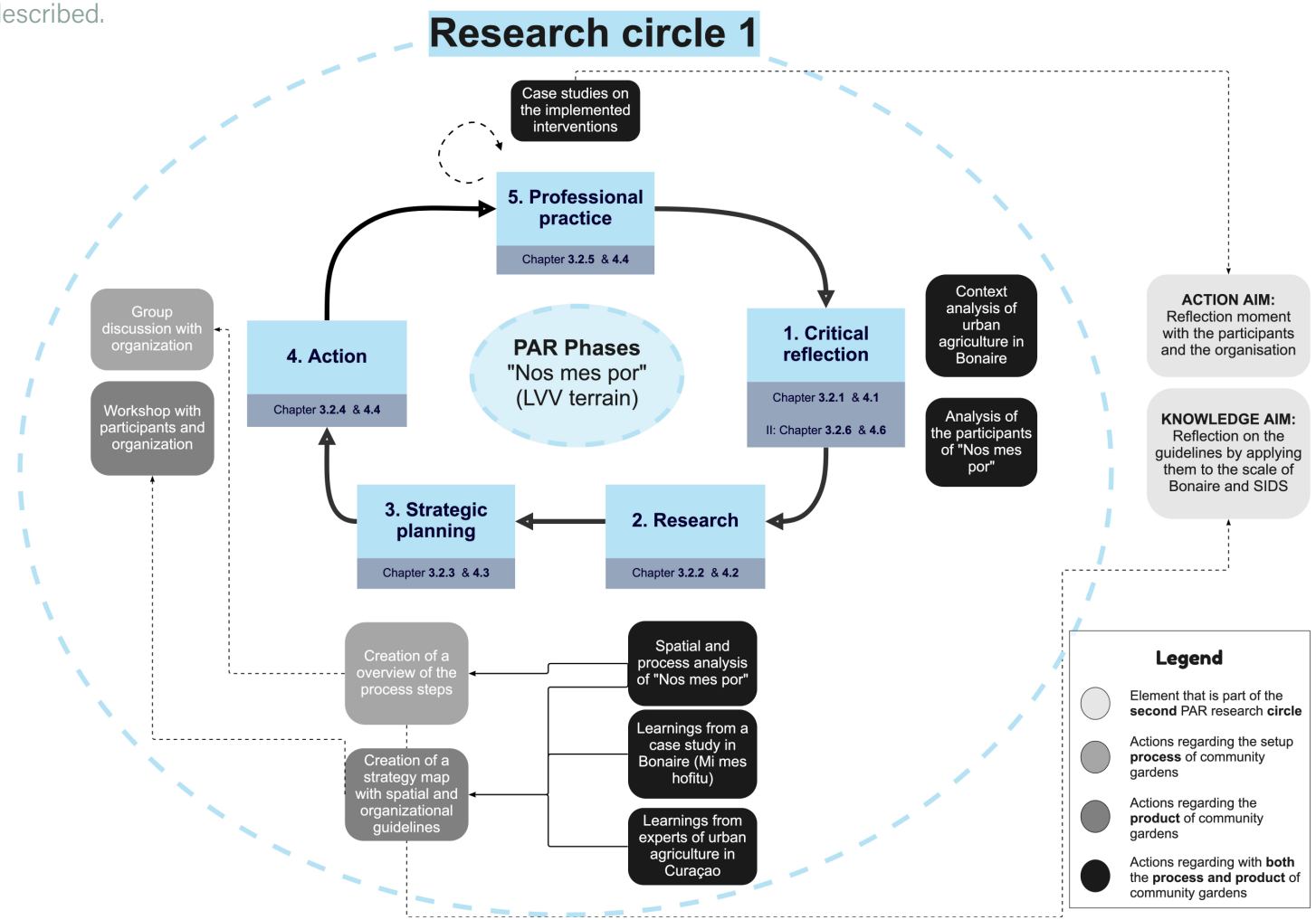


Figure 14: Overview of the different steps of the PAR study and the corresponding chapter of this dissertation (Author, 2022)

4.1. Critical reflection phase

To better understand the local context of urban agriculture in Bonaire and the project "Nos mes por", two analyses were made. The first result is an overview of the institutions, people, and projects around community urban agriculture in Bonaire. The second outcome is an analysis of the participants of the community urban agriculture project on the LVV terrain itself.

Context in Bonaire

To represent an overview of the community urban agriculture project in Bonaire, a **stakeholder map** was created. By doing this, the relationships between the different actors became visible. This is an important aspect when designing (AgriGo4Cities, 2017). The map is structured based on the professional background of the programs. This means that the projects with a governmental background are placed on one side, and the private initiatives on the other side, *see image 15*. By doing this, the mix of the governmental and private background of "Nos mes por" became clear. This project is set up and organized by the government, but the end goal is to have an independent organization that is responsible for the project. Besides this, the status of the various projects is used to see which activities happened in the past, are currently active, or are planned for the future. This made it easier to see which actors are important for "Nos mes por" and at what time they should be contacted.

As is visible on the map, the urban agriculture project on the LVV terrain is one step of the phase of "Greenhouses in the neighborhood", which is included in a bigger program, *see figure 15* (Adriaens & Loozen, 2021). Besides this project, the government started the POP program in 2014 to develop the agricultural sector, but that is not active anymore (Openbaar Lichaam Bonaire, 2014).

Examples of private initiatives are a gardening club, food forests, farming cooperation, a local food market, a gardening project for addictions, and Trasamé which is a program of social organizations in Bonaire. The latter is included to gather insights on how to connect inhabitants in a project in Bonaire (Boneiro Duradero, 2021). The information is used to see what the general challenges are to make successful projects on the island. These are valuable insights to test whether the strategies to create successful urban agriculture are complying with it. This is visible in the step, see 4.3. STRATEGIC PLANNING.

Analysis of the participants of "Nos mes por"

To see what the issues in the project of "Nos mes por" are, an **overview of the current challenges and the plans** of the members was made. This is needed to define the current issues in "Nos mes por" to make it successful. Besides this, the future of the project could be decided by analyzing the sustainable plans of the members and their successes.

By analyzing the data of the participants who hadn't grown any plant on their plot, it was possible to see their reasons to be inactive. This data could help to increase the participation rate, which will contribute to creating a successful project as it is mentioned by Gulyas & Edmondson (2021). A higher participation rate is an element of the Large-Scale factor, and this was emphasized by the government and board as a crucial point. Therefore, the participants' motivation to be inactive in "Nos mes por" was analyzed.

The most important reason was the lack of clear rules and guidance from the organization, *see figure 16*. Therefore, the decision was made to steer and guide the organization of "Nos mes por" to provide external help on how to set up and design a community garden.

Thus, the main issue defined by the participants of "Nos mes por", is the lack of structure and information on how to set up and design the community garden project on the LVV terrain. This challenge became the main focus of this study.

Besides the current challenges, also the plans of the members could be collected, *see figure 16*. This information is relevant to see what the needs of the community are and what resources are required to achieve that. The three sustainability factors are used to see what is essential in the social, ecological, and financial sectors.

A **social** theme that would be appreciated by the members is to regularly come together. 68% of the interviewed participants of "Nos mes por" value this highly. Moreover, helping each other is seen as a part of the culture of Bonaire as described by a member of "Nos mes por" (personal communication, 26 April 2022).

Besides this, around 45% of the interviewees know about planting **naturally** and they want to use that in their plot. Examples are only planting local vegetables and working with natural pesticides. However, this means that there is still room to guide and teach participants about working in an eco-friendly way.

The last sustainability theme focuses on the economy. Based on the conversations, it became clear that 40% of the group want to use their plot on the terrain of "Nos mes por" to create **financial** benefits. This is possible by including the plot in their own company or by selling the harvest. For example, a participant wants to use her garden to increase the awareness of agriculture among the visitors to her own children's daycare (personal communication, 26 April 2022).

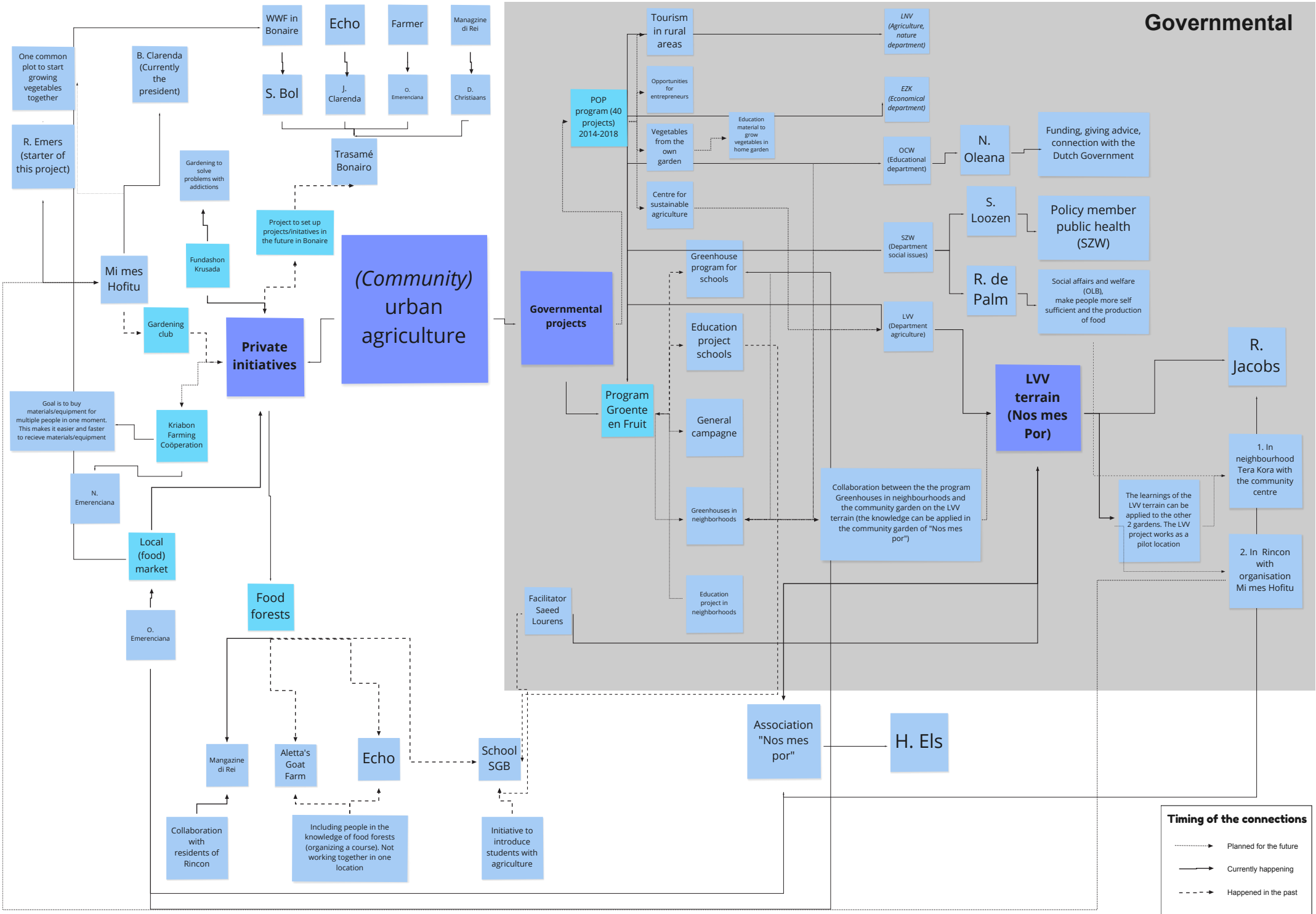


Figure 15: Overview of the institutions and people connected with urban agriculture in Bonaire. It is structured based on a private or governmental background (Author, 2022)

This means that advice on creating and maintaining a business is an important asset.

Reasons to be less present as mentioned by the participants of "Nos mes por"	The sustainable components (social, ecological, economical) as part of the participants' goals
1. Lack of clear rules and guidance from the organisation & Limited time available 2. Not aligning with the rules of Nos mes por (Creating a windbreaker) & Started already with growing plants at home (too small to plant in open soil)	1. SOCIAL • 15 persons value coming together with other members 2. ECOLOGICAL • 10 persons have experience and knowledge with using natural products, working in a natural way with the resources from Bonaire 3. ECONOMICAL • 9 persons are using this project for their own company and they want to make profit by selling products IN TOTAL: • 23 persons are interviewed with the person who is leaving included (being included for the reason to be inactive, not including this person to see what the future holds)

Figure 16: Overview of the participants of "Nos mes por" to see what the challenges are and what their plans are (Author, 2022)

Outcomes of the Critical reflection phase

To conclude, the map with the overview of Bonaire has shown that "Nos mes por" needs to keep a good relationship with both the private and governmental sectors. Moreover, this project can have an exemplary role as there are few examples of community urban agriculture initiatives in Bonaire. Furthermore, it became clear that a lack of structure and information on setting up a social local food project is the main problem in "Nos mes por". This provides an answer to the sub-question: *"What is the current problem with making "Nos mes por" successful in Bonaire?"*.
Besides this, the future of the project should emphasize (1) creating a social environment, (2) teaching the members about naturally performing agriculture, and (3) providing guidance in creating their own company. These elements are used throughout the next research steps by including them in the guidelines.

4.2. Research phase

This research phase created two elements the (1) analysis of the interviews from the experts of Curaçao and the participants of "Mi mes hofitu" and the (2) spatial and process examination of "Nos mes por". Based on the interviews from Curaçao and "Mi mes hofitu", strategies to create successful community urban agriculture could be defined.

Interviews with the experts and "Mi mes hofitu"

The **interviews with the experts** showed that there is a difference in the organizational setup and maintenance of the community gardens, see ANNEX G1. So is B. Visser running the garden using the 'food for work' principle which means that participants who work more, will receive more harvest, while C. Eman is paying three persons to actively garden. These two options are possible in the organizational design of "Nos mes por", thus they were integrated into the next research phase STRATEGIC PLANNING. In the spatial design of the community garden, four overlapping aspects were defined; (1) a social location, (2) an open garden without fences, (3) a small location to store equipment, and (4) using of the planting method of agroforestry. Moreover, each of the experts provided guidelines for the five factors of success and information for both the setup process and the design of community gardens.

Based on the interviews of the participants from "Mi mes hofitu" guidelines for the setup process were defined. It became clear that the association existed out of a tight group of people where everyone knew each other. In addition, the service design of "Mi mes hofitu" was on a different scale because every member worked in the garden of their home. This meant that the weekly meetings were extra important to keep the organization active. Besides this, the lessons learned in the interviews showed that "Mi mes hofitu" grew too fast which led to less motivated members, see ANNEX G2. Moreover, the installment of the new board resulted in removing the existing organizational structure which made the association less active. These elements are translated into strategies for "Nos mes por" in the next phase 4.3 Strategic planning.

Spatial and process analysis of "Nos mes por"

As the findings from the interviews mostly provided information on the product side of urban agriculture, a **throughout analysis of the setting up process** of "Nos mes por" was performed. Besides this, the spatial characteristics of the project on the LVV terrain are researched to see the current design.
Based on the analysis, the Planning and Vision phase are already represented in the current process of "Nos mes por". For the Synthesis, Integration, Lifecy-

cle, and Outreach steps, different elements mentioned by Philips (2013) are missing and thus not integrated into the initial setup process of "Nos mes por". This means that subjects of these steps can still be implemented in the process of creating urban agriculture on the LVV terrain. Regenerative site strategies, community accessibility, and creating system networks are examples of topics that are mentioned by Philips (2013) to create sustainable urban agriculture, but missing in the process of community agriculture in Bonaire, see ANNEX E. Most of the topics of the economy theme are missing in the analysis of the urban agriculture process on the LVV terrain. This means that a lot of financial necessities like a business roadmap, a financial resource evaluation, and budget scenarios were absent in the current process. However, it is mentioned in the literature that the three principles need to be present (social, ecology, and economy) to achieve sustainable development (Becker, 2010). These missing elements are tested in the focus group with the organization of "Nos mes por", see 4.4. ACTION phase.

The ecological characteristics of the LVV terrain were analyzed to understand the current **spatial challenges of the design**. This showed challenges in six subjects (1) habitat, (2) climate, (3) hydrology, (4) solar, (5) soil, and (6) open space, see ANNEX H.
The first subject shows that to fight pests, pesticides are widely used in Bonaire. This is extra dangerous because there is no regulation for the use of pesticides on the BES islands (Lotz, Debrot, Neijenhuis, & Stanghellini, 2020). This is both contaminating for humans and nature. Besides this, a fence is built to stop the free-roaming animals from entering the terrain (van der Geest & Slijkerman, 2019b). This creates a separation between the surroundings and the community garden, which makes it less accessible.
Secondly, the climate is known as a dry tropical climate with a strong trade wind for 9 months per year (Openbaar Lichaam Bonaire, 2014). This makes it difficult for small plants to grow because the wind can twist and break the young seedlings (Winters & Miskimen, 1967).
Thirdly, the hydrological situation of the community garden is dependent on the LVV department. This is due to the grey water connection with the water treatment plant which is located near "Nos mes por". This dependency results in a lack of water pressure during the week and after working hours (Meeting with board and participants, personal communication, 17 March 2022).
The fourth element Sun is related to the lower efficiency of people working in agriculture due to a humid and warm environment.
Fifthly, the soil is captivating large amounts of water as the terrain is located on an old dam. This means that large parts of the terrain have a clay underground which stops water from easily integrating into the soil. Therefore, floods on the LVV terrain during the rain period between September and January can occur (B. Emer, personal communication, 25 March 2022).
Lastly, the open space of the project is challenged by the accessibility of the terrain. To stop the animals like iguanas and goats from entering the terrain, a fence was built. However, the gateway is not designed and no parking spots to enter the terrain are made (Meeting with board and participants, personal communication, 17 March 2022).

Outcomes of the Research phase

To conclude, first various strategies for both the spatial and organizational elements of a community garden were found. This information has provided guidance and steering for the setup and design of "Nos mes por".
Secondly, mostly the economical topics were not present in the current process of creating the community garden on the LVV terrain. Besides this, the current spatial challenges in the design of "Nos mes por" were defined in six different issues. These spatial challenges are used to make the strategies of the interviews adapted to the local context of Bonaire. Both the strategies for the process and the design of community gardens is used in the next research phase called STRATEGIC PLANNING. The combination of this information provides an answer to the sub-question: *"What is background information from comparable islands to set up and design community urban agriculture projects?".*

4.3. Strategic planning phase

The data from the previous phase was translated into concrete guidelines that could be used for the process and the product design of "Nos mes por". The first product was a strategy map with exists out of strategies in each of the five success factors. This helped in developing the design of the terrain and the organization of "Nos mes por" towards a more successful product. The second product was a table with the different setup phases needed to create urban agriculture. It was therefore possible to steer the current process of creating "Nos mes por.

The product strategies

To create an element to showcase the strategies to have a successful community local food initiative, a **mind map structure** was chosen. This was built based on four different data sources (1) strategies from the interviews with the experts from Curaçao, (2) strategies based on the interviews with the participants of "Mi mes hofitu", (3) spatial issues of the current design of "Nos mes por", and (4) challenges in organizations in Bonaire. It is important to know that the organization's challenges were integrated into the guidelines of the other three data sources and thus they are not separated strategies.
First, more general guidelines with specific examples could be analyzed from the interviews with both the experts of Curaçao and the people of "Nos mes por". For instance, payment is seen as a strategy to make the project on a larger scale. Specific examples to reach this is, are implementing a volunteering fee or hiring an employee to work in the garden, *see figure 17.*

After that, the spatial problems of the current design of "Nos mes por" were added to apply the guidelines to the local context of the LVV terrain. There were six spatial issues connected with the design of "Nos mes por". These are translated into eight guidelines that are used in the strategy map, *see figure 18.* Lastly, more general challenges related to social organizations in Bonaire were represented in the strategy map. These issues were found by conducting interviews with the local people who were part of Trasamé. Based on this information five general problems related to social organizations in Bonaire could be defined. These are (1) similar projects are happening at the same time, (2) not enough people are involved in the project, (3) there is a lack of long-term visions in the projects, and (4) the ownership of members in the projects is missing, and (5) it is difficult to find funding (see the section on 3.2.1. CRITICAL REFLECTION).

Strategies for the 5 factors of success which are defined by Gulyas & Edmondson (2021)

Inclusive	Integrated	Safe	Large-scale	Efficient
Include a small location to store some equipment (by doing this, every member will have access to tools and equipment to work in their garden)	The garden has multiple functions and is therefore integrated in the community (food production, education, after-school care, business opportunities)	Design an open garden to show that you trust people	Make a location without fences inside the terrain, create an open space	Use agroforestry as a planting method (little energy is needed to create a high food production thus minimal water is needed)
Sell materials and seeds (gardening tools)	Use social media to make the garden an example (create publicity) for others to learn form Similar projects happening at the same time	Prevent food products being stolen by people who are not connected with the garden	Make a social hub	Create a vision to see what you want as organization
Create abundance so that everyone feels welcome (create enough food for every participant)	Organise a market to sell products from the garden to the people in Bonaire	Prevent trowing away waste inside the garden because it looks like an empty place	Build a pleasant place to be in	Include experts on the topic of agriculture in the organization to coach participants
Make open gardens (spatially) without fences	Visit agricultural places on the island (farmers) to exchange ideas and to learn	Use agroforestry (food forest) as a planting method because it creates a natural ecosystem (it uses the rules in nature)	Setup regular (daily) contact between the members trough the telephone or in person	Protection from the sun by using trees (agroforestry)
Everyone need to be the same	Connect the community garden with practical functions in the area (for example a wifi connection)		Organize events	Work with AI (daily measurements replace them with a sensor)
Include people with a disability or that cannot come physically	Use the money by selling products to have infrastructural changes in and around the garden Difficulties with funding		Use social media to post pictures from the working days, background information etc. (To make a positive image)	Make a planning for the coming years. By doing this, you can see which food can be harvested in which time Lack of long term vision in projects
Let the project be directed by a local person	Create a circular economy inside the garden (economy inside the garden, nothing goes to waste)		Organize weekly meetings on Saturdays	Implement a high volunteering fee to have more production
Accept everyone's values	Put extra attention to water connections		Educate the members with knowledge on agriculture	Make a brand to have extra employees by selling products in the supermarkets
It's a hobby (no obligation to be present during every participants meeting)	It is needed to create edible green (not just green, it need to be food)		Dedicate a large area to cultivate to produce vegetables for multiple people	Plant products that require less maintenance (herbs, fruit trees etc.)
Find a position for everyone to participate in the project Ownership is missing			Include a payment (volunteer's allowance, employment ect.) Not enough people involved in projects	
Make the garden part of the environment so that everyone can receive information (clear routing, outdoor signs etc.)				
		Use natural products to fight pests instead of using pesticides (for example Neem)	Create protection from the sun by using trees (agroforestry)	Build a wind breaker
		Built a border fence to stop the problems with loras, iguanas, goats, donkeys	Install a parking area	Water pipe is connected with LVV to receive grey water
		Prevent the terrain from flooding during the rain season. The soil is captivating water (clay)	Design a clear gateway	

Figure 17: Complete table based on the information from the interviews with the experts of Curaçao and participants of "Mi mes hofitu", and the 6 spatial challenges of design on the LVV terrain (colored in green). Also, the 5 issues linked with social organizations in Bonaire are integrated (Author, 2022)

The strategy map made with the information from the four sources was used during a workshop with the participants on "Nos mes por" in the ACTION phase.

The process steps

To make the process steps more concrete, the information from the process analysis of "Nos mes por", was added to a **table structure**. Based on the analysis, questions to receive more information or to implement a new intervention were asked. For example, the requirement to expand the communication network is an aspect specified in the Lifecycle phase in the Urban Design Process sphere. In the bylaws is written that a magazine will be created, thus the questions on what, how, and when around the creation of this magazine were developed, see ANNEX E.

Ecological subject	Guideline for the LVV terrain
HABITAT	Pesticides are used which are bad for the environment and people
	Built a border fence to stop the problems with loras, iguanas, goats, donkeys
SOIL	Prevent the terrain from flooding during the rain season. The soil is captivating water (clay)
HYDROLOGY	Water pipe is connected with LVV to receive grey water
CLIMATE	Plant trees around the field to stop the wind
SOLAR	Protection from the sun by using trees (syntropic farming)
OPEN SPACE	Clear gateway
	Parking area

Figure 18: Connection between the ecological challenges and the strategies in the mind map (Author, 2022)

Outcomes of the Strategic planning phase

To summarize, in this phase the two tools to guide "Nos mes por" during the development process and design were made based on the information from 4.2. RESEARCH phase.
The process of "Nos mes por" was guided by using a table with the different steps to set up urban agriculture. To be able to use this information, questions on current and potential interventions were asked. This answers the sub-question: *"What are the general process phases to set up community gardens on the LVV terrain?".*

Moreover, the design of both the terrain and the organization of "Nos mes por" is conducted by using a strategy map that shows various guidelines. This map provides an overview of the guidelines and thus an answer to the question: *"What are the guidelines to make the design of the social local food project on the LVV terrain successful and sustainable?".*
Both the table with the questions on the process design and the strategy map for the product design are used in the next phase of this research process called ACTION phase. By doing this, the organization of "Nos mes por" could be provided with guidance and information on urban agricultural projects, which applies to solving the problem mentioned in this research.

4.4. Action phase

The guidance tools for both the process and product side of creating a community local food project in Bonaire were created in the previous phase of 4.3. STRATEGIC PLANNING. This information was applied to the case on the LVV terrain to create action. The action to define the setup process was a group discussion with the organization of "Nos mes por". To design the product of "Nos mes por", a workshop with the members of "Nos mes por" was organized by me.

Guidelines for the set-up process of "Nos mes por"

Based on the findings from the group discussion, a **timeline** to set up "Nos mes por" is made. **Three millstones** and five different phases can be recognized in the timeline. The first milestone that needs to be achieved is hiring a facilitator with agricultural knowledge to lead the project on community urban agriculture. This is needed to structure the project and to connect with the participants of "Nos mes por". Besides this, the role of a moderator supports the project when different interests and actors are involved (Moragues et al., 2013). This was visible in "Nos mes por" because the members have various motivations to participate in the projects such as setting up a business, growing food for self-sufficiency, or learning about agriculture.
After that, there are two milestones described by the organization of "Nos mes por" that need to be reached. These are (1) creating a core team of participants and (2) installing a motivated board and making decisions. These steps need to be taken to go to the next phase of setting-up community gardens on the LVV terrain, *see figure 19.*

In short, the first stage in the **timeline** is defined as creating an organization to provide guidance and structure for the participants. Moreover, the participants should be asked about their needs and wishes for the project to define the typology. As this is explained in the literature, it is an important step to create a successful local food initiative (Philips, 2013).
The second phase is characterized by increasing the number of participants' meetings and having a facilitator who knows agriculture. Moreover, a year of planning needs to be made to see what possible events are. Lastly, collaboration with the government should be maintained to set up a community initiative.
The third phase is mostly focused on creating a motivated board existing out of members who have time available. This is needed to make decisions to create an operation plan, creation of renewable energy, find funding, etc.

After that, there should be a wider outlook and collaboration with companies to organize courses and sell products. Lastly, a connection with educational providers should be considered to create jobs on the terrain, *see figure 19*.

Guidelines for the product design of "Nos mes por"

The workshop used the strategy map of the previous phase STRATEGIC PLANNING, as a guidance tool to provide guidelines for the design of community urban agriculture projects. By organizing the workshop, the **strategy map** could be tested in the **local context** of "Nos mes por".

Each factor of success is explained separately to show the results in more detail. This section clarifies the differences between the answers of the members of "Nos mes por" during the workshop and the strategies provided by the interviews conducted in 4.2. RESEARCH phase. This resulted in a clear overview of the requirements which are suitable for the social and physical context of Bonaire.

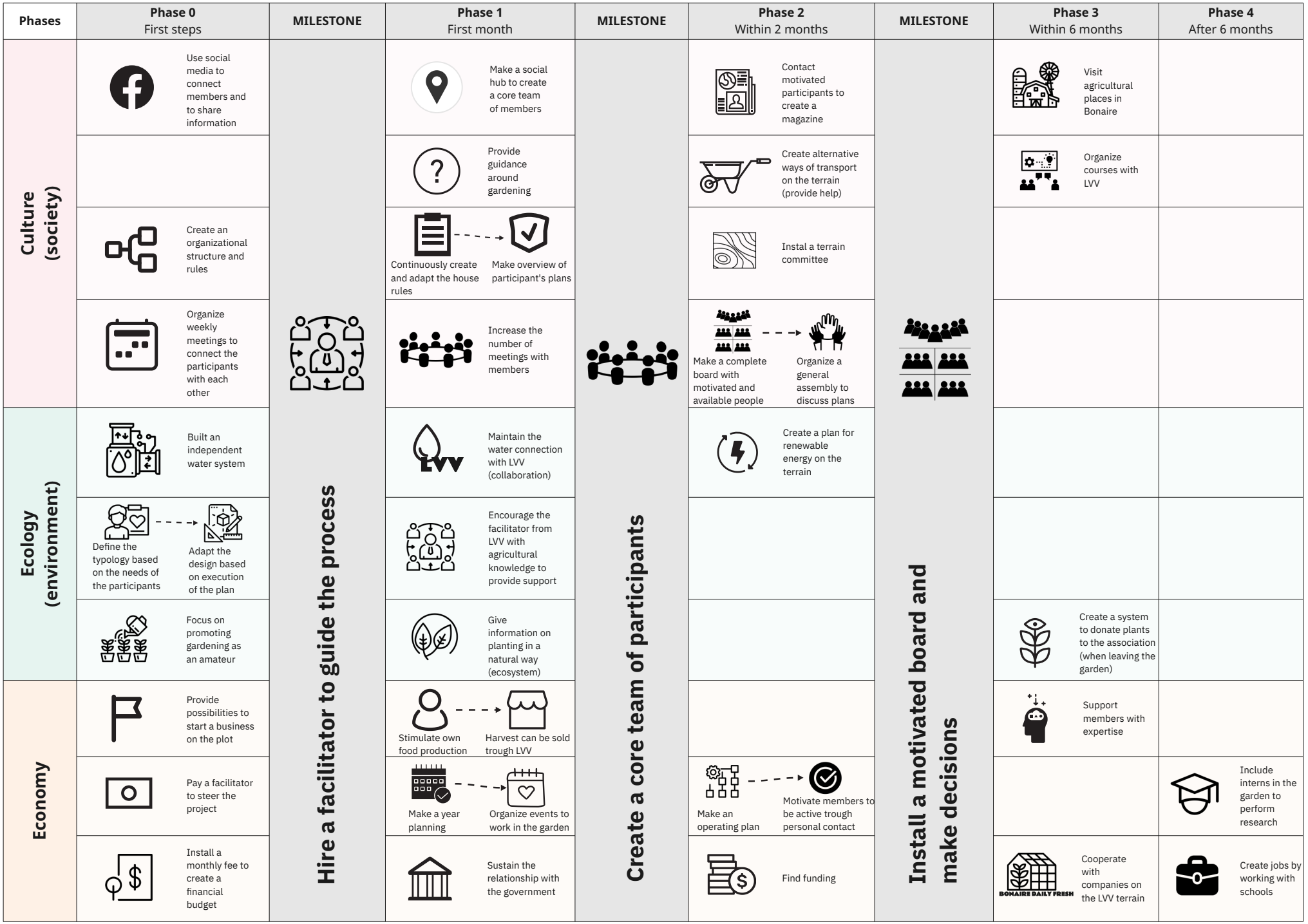


Figure 19: Process timeline with the 5 phases to set up the community urban agriculture project called "Nos mes por". (Author, 2022)

A. Large-scale

The factor of **Large-Scale** has gotten the most examples from the members. This means that most of the guidelines were focused on creating a higher participation rate and a larger cultivated area. Most of the strategies from the mind map were added with examples of how to implement the strategy in "Nos mes por". For example, 'Creating agreements about the type and location of trees' is seen as a translation of the requirement of 'create protection from the sun by using trees' to the local context of the LVV terrain.

The guidelines: 'built a pleasant place to be in (green oasis, social environment, etc.)', and 'dedicate a large area to cultivate' lead to opposing answers of being (not) needed, *see figure 20*. This first strategy was seen as necessary by one part of the group and even supported with a planning method that supports planting trees naturally. The second intervention is partly described by the fact that one large field is not necessary to grow food, but everyone has at least space for fruit and vegetables. The strategies of 'organize weekly meetings on Saturdays', 'include a payment', and 'regular (daily) contact between the members through the telephone or in-person were not essential based on the results from the members of "Nos mes por". The people say that daily gatherings, two times a week or every two weeks on a Thursday, are preferred instead of organizing the weekly meetings on Saturday.
Besides this, only making contact when something important is happening in place of daily contact through the phone or in person, is chosen by the people of "Nos mes por".
Lastly, the participants defined the extra condition 'Create extra space for members who are active' to increase the participation rate.

Figure 20: This is the Scale element of success that is a part of the guidelines to change "Nos mes por". The strategies are adapted based on the workshop with the participants of "Nos mes por" on 28 April 2022 (Author, 2022)

B. Efficient

The conditions for the second factor **Efficient** were added with examples during the workshop. However, some strategies collected from the cases in Curaçao and the inactive case in Bonaire were seen as unnecessary for the community garden on the LVV terrain. These are: 'Implement a high volunteer allowance to have more production' and 'Work with AI', *see figure 21*. The guideline around working with Artificial Intelligence (AI) to optimize the planting methods, was seen as an irrelevant requirement. Consequently, this is not implemented in the product design of "Nos mes por" to make it successful.

Figure 21: This is the Efficient element of success that is a part of the guidelines to change "Nos mes por". The strategies are adapted based on the workshop with the participants of "Nos mes por" on 28 April 2022 (Author, 2022)

C. Safe

For the third factor of success named **Safe**, only one requirement given by the researcher was not accepted by the people of "Nos mes por". This is the design strategy of an 'open garden to show that you trust the participants', *see figure 22*. During the workshop, the members defined this action as disadvantageous because (1) animals can enter the field and eat the vegetables, (2) wind can easily blow over the terrain, and (3) the sun is shining intensely over the garden.

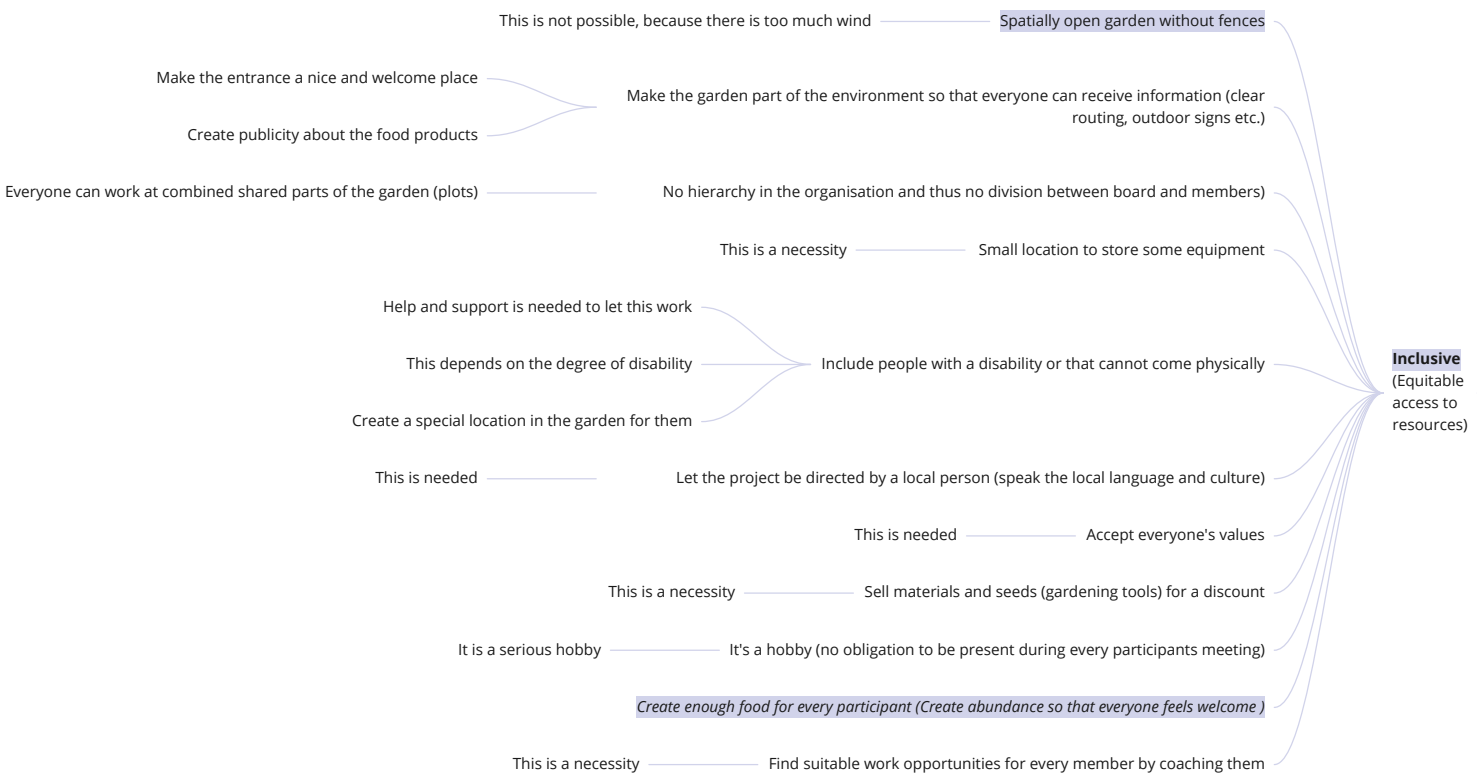
Figure 22: This is the Safe element of success that is a part of the guidelines to change "Nos mes por". The strategies are adapted based on the workshop with the participants of "Nos mes por" on 28 April 2022 (Author, 2022)

D. Integrated

For the factor of **Integrated**, two of the eight predefined strategies by the researcher are illustrated as partly unneeded by the members of "Nos mes por". These are: 'Establishing a connection with practical functions in the surroundings (such as a WIFI connection)' and "Organize a market to sell products from the garden to the people in Bonaire', *see figure 23*. These guidelines are kept the same based on the mixed answers from the participants. The other six guidelines are documented as useful to be integrated into the product and process design of the community garden on the LVV terrain.

Figure 23: This is the Integrated element of success that is a part of the guidelines to change "Nos mes por". The strategies are adapted based on the workshop with the participants of "Nos mes por" on 28 April 2022 (Author, 2022)

E. Inclusive



The last cluster around the success factor **Inclusive** has only one strategy that was defined as impractical by the people of the community garden on the LVV terrain. This was the strategy to 'design a spatially open garden without fences'. This is seen as impossible by the participants of the workshop because there is too much wind in Bonaire which leads to young plants breaking down, *see figure 24*. The other nine guidelines described by the researcher in the previous phase STRATEGIC PLANNING, are seen as requirements for the design of "Nos mes por" based on the information gathered during the workshop.

To next section will describe the connection between the timeline of the setup process and the strategy map.

Figure 24: This is the Inclusive element of success that is a part of the guidelines to change "Nos mes por". The strategies are adapted based on the workshop with the participants of "Nos mes por" on 28 April 2022 (Author, 2022)

Connection between the process and the product design of "Nos mes por"

As explained in the literature, the product and process development of a design are integrated. This leads to a product with the best qualities combined with a method to reach this result (Earle & Earle, 2001). Therefore, it is important to explain the connection between the strategy map and the process timeline because the strategy map works as the guideline for the product, and the timeline as the guideline for the process. The connection between the process and the product design of "Nos mes por" is based on two elements namely (1) the separation in service and spatial design and (2) the use of the theory of Philips (2013).

First, the connection between the setup process and the design of community urban agriculture is visible in the 10 priorities chosen during the workshop with the people of "Nos mes por". These priorities are chosen from the list of guidelines that were developed in the strategy map. These are concrete actions that are priorities. The list was divided into five service priorities and three spatial priorities, *see figure 25*. The separation in **service and spatial design** of the urban agriculture design is defined because these are not the same products,

PROCESS: 5 organisational guidelines for Nos mes por

1. Identify stakeholders
    a. Include social/societal organisations
2. Invest in ecoliteracy and stewardship
    a. Organise a course about food value and processing
3. Create a vision for Nos mes por
    a. Brainstorm session with the members
4. Enhance collaborative conversations
    a. Prevent a hierarchy in the organisation
        i. Members can work together in common area's, mix of ages in board
5. Develop economic incentives
    a. Sell materials with a discount for the members

PRODUCT: 3 spatial guidelines for Nos mes por

1. Invest in community accessibility
    a. Design a sliding gate on wheels
    b. Make a clear parking spots outside the garden with greystone
2. Create a green infrastructure
    a. Build a wind breaker made from natural materials
    b. Prevent flooding (implement greystone and check terrain during rain period)
3. Built resilient ecologies
    a. Implement agroforestry (trees) to create a natural system

Figure 25: List of 8 guidelines with are prioritized by the members of "Nos mes por". The guidelines are based on the aspects mentioned by Philips (2013) (Author, 2022)

but are linked with each other (Lynn Shostack, 1982).
The service design focuses on the organizational guidelines of making and maintaining a community garden in Bonaire. This relates to the process of creating "Nos mes por". Examples are no hierarchy in the organization, including social organizations in the garden, and developing economic incentives.
The spatial design is described as the physical requirements to establish urban agriculture such as a social hub, an easily accessible gateway, and windbreakers made from natural materials. The spatial requirements are applied to the current terrain design of "Nos mes por" to see what the physical changes are, *see figure 26*. These are (1) designing a sliding gate on wheels, (2) making parking sports, (3) building a windbreaker from natural materials, (4) preventing flooding by implementing greystone, and (5) implementing syntropic farming.

Secondly, as the 10 requirements are more specific to the situation of the LVV terrain and its organization, more **general guidelines** were developed. More specifically, the following eight guidelines are mentioned: (1) Identify stakeholders, (2) Invest in eco-literacy and stewardship, (3) Create a vision for "Nos mes por", (4) Enhance collaborative conversations, (5) Develop economic incentives, (6) Invest in community accessibility, (7) Create a green infrastructure, and (8) Build resilient ecologies, *see figure 25*. This was done by translating the strategies of the participants of "Nos mes por" towards more general guidelines which are defined in the **theory of Philips (2013)**. This theory is focused on providing guidelines for the **set-up process** of urban agricultural projects. By doing this, the connection between the setup process and the product strategies to design community urban agriculture was emphasized. Thus, the separation in service and spatial design and the eight strategies on how to design "Nos mes por" form the interlinkage between the process and the product design in this thesis research.

Outcomes of the Action phase

To summarize, this research phase was defined by a group discussion with the organization of "Nos mes por" and a workshop with the participants and the board of "Nos mes por". By doing this, the strategies from the previous research phase 4.3. Strategic Planning was translated to the project on the LVV terrain. The connection between the process and the product design is established by the separation of the guidelines in service and spatial design and the connection with the theory of Philips (2013). This answers the research question: *"How can the findings to set up and design community gardens on the terrain of LVV, be transformed into actions that can be applied to the current project?".*

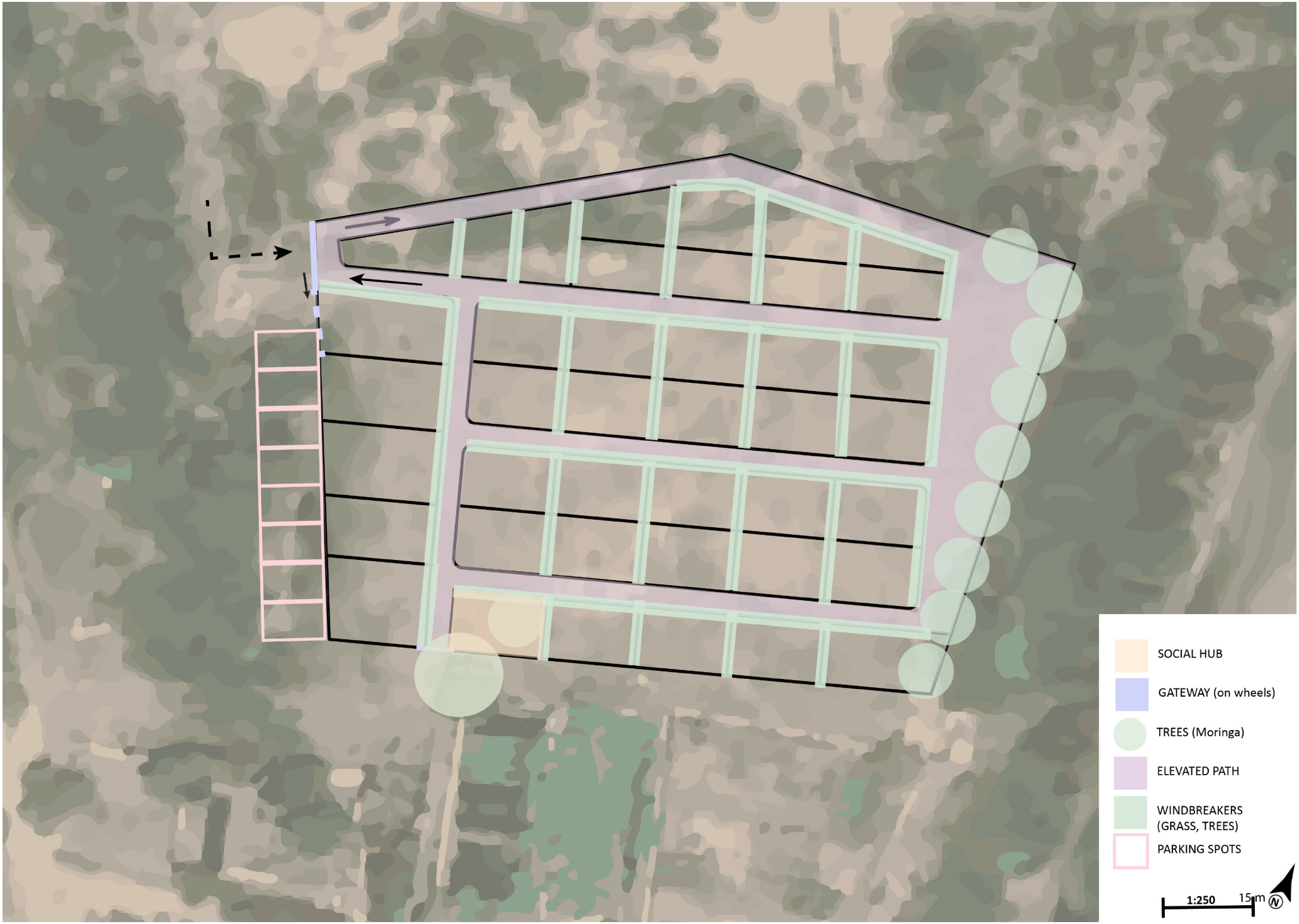


Figure 26: Plan adapted based on the 5 spatial guidelines mentioned in the workshop with the members of "Nos mes por" (Author, 2022)

4.5. Professional practice phase

As explained earlier, the ultimate end goal was to keep changing the process until a successful solution to set up and design the community garden on the LVV terrain, was found. As the group discussion and the workshop are actions of the process of creating "Nos mes por", they result in new interventions. These new actions can be seen as an element of the Professional Practice stage as they are the direct effect of organizing the group discussion and the workshop, thus actions in real life. A reflection on the interventions will make it possible to improve the process of making community gardens on the LVV terrain. This is described in the next section 4.6. CRITICAL REFLECTION II.

The following seven interventions are influenced by the research conducted on the community garden on the LVV terrain.

1. The role of the researcher
2. Using social media
3. Organizing weekly participants meetings
4. Hosting a workshop with the participants
5. Hosting a group discussion
6. Motivating participants through telephonic contact
7. Installation of the social hub

The first six actions were guided by the influence of the general research process. The last action of installing a social hub is directly determined by the group discussion with the organization of "Nos mes por". More specifically, the actions to build a social location, integrate social media channels, organize weekly meetings, have contact between the members through the phone, and include a researcher in the project are determined in the Large-scale factor of the strategy map. This means that those actions could contribute to increasing the cultivated area and the participation rate of "Nos mes por". Moreover, the group discussion with the organization and the workshop with the people of "Nos mes por" were interventions of the Efficient aspect that is mentioned in the strategy map.

1. Action: role of the researcher

This project of urban agriculture on the LVV terrain is a new concept in Bonaire. Therefore, there is no previous research on how to steer the process and design of "Nos mes por". This made the role of the researcher by using the PAR methodology a valuable element to establish knowledge while making changes in the real-world case of "Nos mes por". The observations are made by using advantages and disadvantages that are described in the literature, *see figure 27 & 28*.

Figure 27: Presence of the researcher (me) in the community of "Nos mes por" (Author, 17 March 2022)

OBSERVATION: Role of the researcher		
Postive features (Plus)	**Negative features (Minus)**	**Interesting**
• Commitment on the project (someone full-time involved with the initiative). This helps to make a better understanding of the community (Walter, 2009) • My role is part of the collaborative research method. This helps to create practical and workable strategies (Walter, 2009). • The researched persons were able to learn from the researcher, by being involved in the thesis. For example, the organization of "Nos mes por" has learned about the concept of an operating plan after the groups discussion (MacDonald, 2009).	• Influencing the 'natural' process (collecting soft data and no hard data) (Walter, 2009) • Time frame for the change is too short (my time of 10 weeks is not long enough to see the complete transition) (MacDonald, 2012). PAR is an research method that keeps on going till the issue is solved (Walter, 2009) • Difference in culture and language (Dutch and Papiomentu). This results in a loss of data because not everything is understood (MacDonald, 2012)	• PAR has a research leader what is not common in this type of research (Walter, 2009). The reason for this is my obligation to fulfill a thesis research in this specific time period. Therefore, I was by accident involved in the beginning phase of installing "Nos mes por" as an organization. This gave me the opportunity to fully commit to this project what resulted in a more leading role • Housing situation of the researcher was next to the researched terrain. This made it possible to interact with the community outside of the working hours. At on hand, this increases the commitment of the researcher in the subject (Walter, 2009). On the other hand, it decreased the objectivity of the dissertation.

Figure 28: Observations of the role of the researcher based on the PMI method (Author, 2022)

2. Action: use of social media

A strategy to increase the participation rate within a community urban agriculture project is to use social media to connect and inform the member as this mentioned by B. Visser and C. Eman, see ANNEX G1. In addition, this action was presented in phase 0 of the process to set up urban agriculture, *(see Timeline described in figure 19)*. This idea is supported by literature on how to design sustainable urban agriculture (Philips, 2013). Therefore, a WhatsApp and a Facebook group for "Nos mes por" were developed at the beginning of the research. Thus, this action was implemented through the general research process. The activity of the social media is observed and separated in the WhatsApp and Facebook groups, *see figure 29 & 30*.

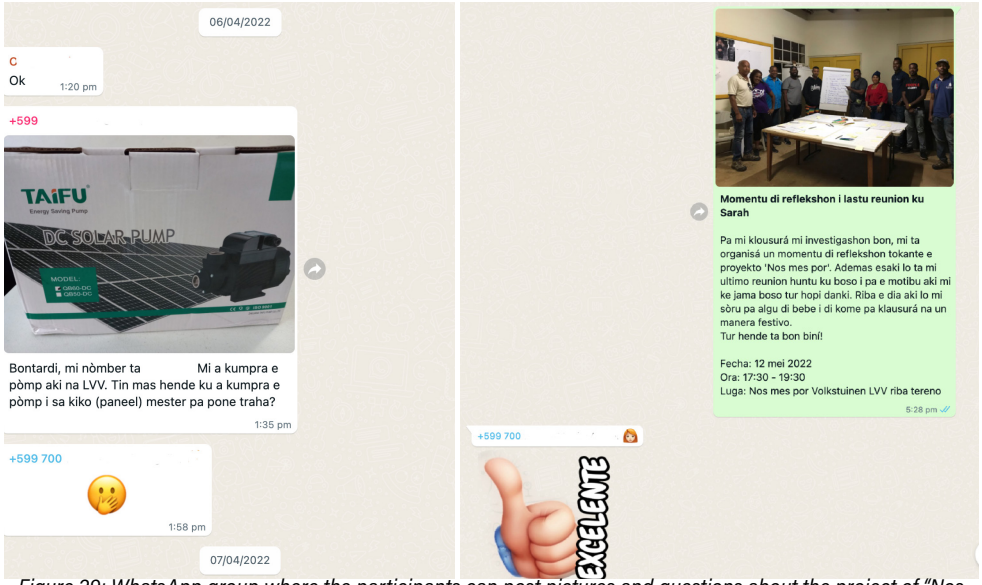


Figure 29: WhatsApp group where the participants can post pictures and questions about the project of "Nos mes por". I was able to use this channel to communicate with the members of the project. The language used in this social media channel is Papiamentu (Author, 6 April 2022)

OBSERVATION: Social media		
Postive features (Plus)	**Negative features (Minus)**	**Interesting**
Numbers of participants: • 80% of the participants are still a member • **FACEBOOK**: 80% of the members are not part of the Facebook group Vibe • Negativity was present in the beginning of the group when the water and fence wasn't working properly. A response from LVV, who is the owner of the water came later. • The communication rate of LVV increased during the weeks. That also resulted in a more positive vibe in the group. • The Whatsapp group is used active. Almost every 2 days a message is being send *(This helps in creating an active community where members are in contact with each other)* Language • Decided to use a Papiamentu to communicate with each other *(Native language for a big part of the group, People out South-America cannot speak Dutch fluently, Papiamentu is closer to Spanish)* Valuable info • Information about the working days is being shared in the whatsapp group • **FACEBOOK**: The subscribed members can see the organized events and can say if they are going. (*It's easy to share important information)* Content • Many positive elements around the project are being shared between the members what stimulated the community feeling. Shared elements are: (*Pictures of the weekly meetings, Events: topic for the next weekly meeting, YouTube video's about agricultural methods, Pictures of the harvest are shown)* • **FACEBOOK**: Events are shared with the group and members can say if they are present	Number of participants • People have left the group for various reasons (data is gathered by talking with participants): *(Negative vibe inside the group (only complains), Part of too many groups), Too many messages are shared in one time* Vibe • Negative element about the project are shared in the group as complains. This can lead to a difficult relationship between the members. Valuable info • The information sent is not always related with the project "Nos mes por". (*Images of Easter are being send, YouTube video's about a topic not directly related with agriculture are shared)* • Members who are not part of the group don't receive this information • **FACEBOOK**: There are already many Facebook group and events where the members are part of Content • Too much information is shared what means that not all the practical questions of members are being answered.	Number of participants • 20% of the group has left the group in a month time. • **FACEBOOK**: 10 members are subscribed to the Facebook group. 4 persons are organization thus only 20% are a member of the Facebook group. Language • 4 different languages use to communicate in Bonaire (Papiamentu, Dutch, Spanish, English) (*Discussion about the language to be used in the first day in the Whatsapp group)*

Figure 30: Observations of the social media based on the PMI method (Author, 2022)

3. Action: weekly participants meetings

To connect the participants and to have more active members, weekly meetings were organized, *see figure 31*. This intervention is already visible in phase 0 of the process timeline because this can help to build a core team in the next phase, *(see Timeline described in figure 19)*. This intervention was integrated into "Nos mes por" from the inception of the research, which means that this action was stimulated by the general research process, *see figure 32*.

Figure 31: Picture of a weekly meeting with me and the members of "Nos mes por" and the facilitator of LVV (Author, 7 April 2022)

OBSERVATION: Weekly meetings		
Postive features (Plus)	**Negative features (Minus)**	**Interesting**
Numbers of participants: • It is the same group of participants who are active during the meetings. This create a social connection between this group of participants. Vibe • Positive and friendly vibe between the participants because they are getting to know each other Language • The meeting are organized in Papiamentu. The Spanish people can understand Papiamentu, but it more difficult for them Valuable info • The topic of the meeting is shared in the Whatsapp group, 3 days beforehand • This information is shared with everyone Content • Working together in the garden to help other members in growing plants • This creates a possibility to talk and to get to know each other • Specific information around gardening can be asked at the facilitator or the other members	Vibe • The bench is not being used during the meetings. This is placed to create a social location on the terrain Language • People that don't speak Papiamentu are excluded from the meetings Valuable info • People cannot change the topic of the meeting (Information based on the telephone interviews) • No idea who is going to show up what makes it difficult to see what can be organized • Information in the Whatsapp group makes it clear that the weekly meeting is happening. The participants are not used enough with the weekly gatherings Content • Not every member can be helped during the meeting because the task in their own plot is too complicated • No clear structure of the meetings • No courses or information on gardening is shared with the participants	Number of participants • Around 5 members (17%) are present on the weekly meetings. • People are not available on Thursdays (Information based on the telephone interviews) Vibe • New active participants can feel less included Content • Some participants are looking for guidance in gardening (Information based on the telephone interviews)

Figure 32: Observations of the weekly meetings based on the PMI method (Author, 2022)

4. Action: hosting a group discussion

The focus group was organized to apply the findings on how to set up a community urban agriculture project in the real-world case of "Nos mes por". This happened during the ACTION phase. By establishing this event, the project of "Nos mes por" got influenced and the installment of the social hub got organized, *see figure 33 & 34*. Therefore, this action needs to be observed to learn from the process of creating "Nos mes por".

QUESTIONS/INTERVENTIONS (every question will be asked with what, when and how) WHAT HOW WHEN	**ANSWERS ON 12 april 2022** PRESENT: • BOARD: R. Jacobs, O. Emerenciana • LVV FACILITATOR: S. Lourens • DESIGNER TERRAIN: E. Curiel
• What is the relationship with LVV because they are the providers of the water and land? • What are other systems networks (connections)? • How does this work? • When should this work?	WHAT: • LVV is in charge of the water (grey water, also ground water for in the future) • Ground is part of the government (LVV) • Using equipment from LVV • Using LVV as a source of knowledge and help (this is a pilot project) HOW: • Participants will have to pay for their water directly to the government • Ground is owned by the government, association Nos mes por is responsible for the ground (they don't have to pay for it) • Participants will have to pay a deposit for using the equipment (no rent, to be able to bring the material in good conditions) • This help can be generated trough Saeed Lourens who works for LVV and is connected with this project (Facilitator), people and time is an element of the association WHEN: • This is already happening • Payment of the water will happen in the future (depends on the water treatment plant when they decide to let LVV pay for it)

Figure 33: Part of the overview of the questions and the answers of the focus group with the organization of "Nos mes por" (Author, 12 April 2022)

OBSERVATION: Hosting a group discussion		
Postive features (Plus)	**Negative features (Minus)**	**Interesting**
• The social location was created after the meeting. This was done together with the participants during a weekly meeting	• No clear decisions were made • The board is still going to change, thus the persons involved now are not necessarily going to be connected with the complete process • 1 person from the board was not present (of the 3 persons)	• The existing typology of separate plots next to each other of the project was questioned by the organization • The focus was put on creating a social group instead of only producing vegetables

Figure 34: Observations of hosting a group discussion based on the PMI method (Author, 2022)

5. Action: hosting a workshop with the participants

To find guidelines for the design of urban agriculture, a workshop for the people involved with "Nos mes por" was organized during the Action phase of this research, *see figure 35*. This goal was to apply the strategies to create a successful community garden to the local context of the LVV terrain. This occurrence changed the process of "Nos mes por" because the members were brought together to talk about the future of the project. Therefore, this intervention needs to be reflected upon to create learnings for the future. The observations are described, *see figure 36*.

Figure 35: Workshop with the people of "Nos mes por" (Author, 28 April 2022)

OBSERVATION: Hosting a workshop		
Postive features (Plus)	**Negative features (Minus)**	**Interesting**
• Smaller groups were made what stimulated the group to have discussions with each other • Bringing the members together to talk with each other about the project • The persons that are active in the garden were present during the workshop (who have plots with plants which are growing). Moreover, 1 person that haven't grown anything attended the meeting • Members are allowed to built windbreakers on the sides of their plot. This was not allowed in the beginning	• No extra elements were added to the existing examples in the mind map • Participants found it hard to translate some of the Dutch sentences • The list of priorities was not integrated in another meeting. It felt that the information was forgotten • No changes were made after the workshop • 1 person from the board (from the 3 persons), the designer and the facilitator were present.	• The examples in the strategy map worked as a checklist where the participants could say they would prefer something or not • More information was being said compared with the number of things that were written down (different method of brainstorming is maybe needed) • Integrating the process of making homemade lemonade during the meeting

Figure 36: Observations of hosting a workshop based on the PMI method (Author, 2022)

6. Action: motivating participants through telephone contact

To make "Nos mes por" successful, more active members should be attracted since this leads to a higher participation rate. This is an effective characteristic described by Gulyas and Edmondson (2021). Moreover, this action is part of Phase 2 in the timeline of the set-up process of a community garden *(see Timeline described in figure 19)*. A direct action to achieve this goal was to have telephonic contact with the less present members. By doing this, data on the participants and their motivation was collected while at the same time, the members could be stimulated to participate, *see figure 37 & 38*. Thus, this event influenced the research outcomes. Therefore, a reflection upon it is needed to check whether it can be used in other situations, see CRITICAL REFLECTION II.

Challenges to be active	WHO
• Limited time because he is occupied with building a house, other hobbies • Switched the plot with the social hub, want to start planting this weekend (31 april)	E. • Want to plant together with a colleague • Green vingers, has already experience with planting in NL • Part of his job to support the greenhouse program in Krusada
• Weren't allowed to place a wind breaker, that makes it difficult to start • Want to create protecting from the wind and the sun	P. • 3 plots together from one family • 3 different persons but they are working together • Want to help each other

Figure 37: Answers of the telephone contact with the members (Author, 26 April 2022)

OBSERVATION: Motivating participants through telephone contact		
Postive features (Plus)	**Negative features (Minus)**	**Interesting**
• Only 2 members didn't participate in the interviews • A overview of the various members and their plans, motivation and goals is made	• Information got lost because their was a difference in native language (Dutch and Papiamentu) • One member that was inactive showed up for the workshop • Designer, facilitator and board member were also present and still inactive in their plot • No clear increasement of activity is seen in the plots of the participants who hasn't planted anything	• Some members were not aware of the organizational structure of "Nos mes por" that was made • Some participants were especially looking for this guidance • All the members (with exception of one person), had a clear plan of what he/she want in their plot • Some participants didn't planted anything on their plot because they are still growing it at their house

Figure 38: Observations of the telephone interviews based on the PMI method (Author, 2022)

7. Action: social hub

The second milestone as is shown in the timeline is the creation of a core team of participants. A way to achieve this milestone is by building a social hub in the garden where the members can meet. This will help in giving the terrain multiple functions instead of only producing vegetables (Focus group, personal communication, 12 April 2022).
The decision to install a social hub was made during the group discussion with the organization of "Nos mes por".
This location for this social hub was chosen under the tree on the terrain because it provides shadow and a cooler environment, *see figure 39*. Moreover, a bench was placed to make participants able to sit down (Participants meeting on 14 April 2022). These elements will help in creating a core team of participants. As mentioned in the literature, building a core team is an important step in the Vision sphere of designing urban agriculture (Philips, 2013). The observations of the social hub are visible in *figure 40*.

Figure 39: Installation of the social hub by placing a bench on the terrain during a weekly meeting with the participants (Author, 14 April 2022)

OBSERVATION: Social hub		
Postive features (Plus)	**Negative features (Minus)**	**Interesting**
• Possibility to bring people together during the weekly meetings (start point) • Meeting point when organizing a gathering • The bench is in the shadow from 12:00-19:00 because it is situated under a tree	• Situated far from the entrance • The participants don't use the location outside the meetings *(No members are using the bench when they are working in their own plot)* • Wind is blowing away papers • No protection from the rain because it is located under a tree	• The people that visit the garden daily are also the persons growing the most plants in their plots • There is a small interaction between the members by greeting each other and having a short conversation • On average members are staying for: 31,73 min. *(Without including the weekly meeting: 28,97 min.)*

Figure 40: Observations of the social hub based on the PMI method (Author, 2022)

Outcomes of the Professional practice phase

To summarize, the seven interventions which are influenced by the research process are described in the phase. Six of the actions were influenced by the general research process and one interference was stimulated through the group discussion organized by the researcher. The observations made in this section are used in the next part which describes recommendations for each intervention. The following question was asked in this research phase: *"What are the interventions influenced by this research process, to create a successful and sustainable "Nos mes por"?".*

To answer the sub research question, the interventions are (1) the influence of the researcher, (2) using social media, (3) organizing weekly participants meetings, (4) hosting a workshop with the participants, (5) hosting a group discussion with the organization of "Nos mes por", (6) motivating participants through telephonic contact, and (7) implementing a social hub on the terrain.

4.6. Critical reflection II phase

This step describes the reflection on both the actions performed in "Nos mes por" and the strategies to set up and design community gardens in Bonaire. By doing this, both the action and research aim of this essay was accentuated in the last phase.

4.6.1. Action aim: Reflections on the professional practices

To conclude, the seven interventions are collected to create an overview. The input from the participants is used to make the recommendations adapted towards the local context of "Nos mes por", see ANNEX I.

For each of the actions implemented in this action research, recommendations are visible in *figure 41*. These can be used in the future of "Nos mes por".

To transform the actions on a bigger scale of the project, each intervention is linked with a certain factor of success, *see figure 41.* This is needed to keep on adapting "Nos mes por" to make it successful. Thus, every action is implemented to reach this ambition. Based on that information, it became visible that most of the actions happened in the field of Large-scale. A reason for this could be the personal aim of the agriculture department of Bonaire to increase the number of active members (M. Adriaens, personal communication, 14 March 2022).

Moreover, the recommendations made on the observations from the actions in this research should be used to change the current actions implemented in the process of "Nos mes por".

To stimulate this process, the recommendations are shared digitally with the community of "Nos mes por".

ACTION	Recommendations	Factors of success
SOCIAL MEDIA	1. Create rules on what is allowed in the Whatsapp group. Examples are only positive messages, limit the messages to only relevant information, what type of messages can be shared. 2. Make a separate Whatsapp group to only share the information from the organisation such as events, practical information, rules, changes in "Nos mes por" etc. 3. It is possible to share useful information trough other platforms such as email, Google Drive, Drop box, Microsoft One drive, Facebook group etc. 4. Create a role for someone within the organisation to be in charge of answering technical questions in the Whatsapp group. This should be done in a quick and positive manner. In a later moment, the terrain committee can be responsible for this 5. Decide on one language (Papiamento) to use in the Whatsapp group and to connect Google translate with Whatsapp. In addition, the important messages should be send out in 2 languages being Spanish and Papiumento. 6. Stimulate the members to subscribed to the Facebook group to see the events 7. Use the Facebook group in an efficient way and share stimulating posts which the members would like to attend. Also, use the Facebook group to post background information	Large scale • High participation rate
WEEKLY MEETINGS	1. Organize meetings on other days outside of Thursdays. Meet at least one time a week with the participants 2. Ask participants to put themselves on "Joining "in the Facebook group or respons in the WhatsApp group if they are joining 3. Ask for comments on the topic in the Whatsapp group. The participants can help in finding topics to talk about 4. Promotion and information about the weekly meeting need to be shared 5. Have someone who can speak multiple languages translate during the meetings when needed 6. Let every meeting have the same structure 7. Plan a moment in the meeting, to inform the members of the news from the organization and ask about the problems of the members 8. Create a year planning on when to organize a course/workshop and on what topic 9. Provide a moment during the meeting to ask specific questions about gardening to offer guidance 10. Stimulate this positive vibe between the participants by letting them come together more often 11. Use the social location (bench) to gather and start the meeting	Large scale • High participation rate
SOCIAL HUB	1. The social hub is the meeting point when organizing a gathering. This should be maintained to connect the participants with each other 2. The social hub should be further developed. An official location with protection from the wind, sun, and rain should be designed 3. The participants are staying on average for 30 minutes, thus an interaction tool that requires less than 30 minutes should be developed	Large scale • High participation rate
MOTIVATING PARTICIPANTS THROUGH TELEPHONE CONTACT	1. Telephoning participants can help to motivate them because they are interested in the project and most of them already have a plan of what to do with their plot 2. A clear deadline should be put to let members become active and to motivate the inactive persons 3. When using contact through the telephone, the local language is preferred 4. This personal contact should be used to see the current situation and if needed to choose a new person for a plot. Besides this, it gives the inactive members updates on the project	Large-scale • High participation rate
ROLE OF THE RESEARCHER	1. The researcher should be part of the collaborative research method which works as a push for the project 2. Commitment and enthusiasm for the project from the researcher should be present. This leads to a better understanding and integration in the community 3. The researcher should be part of the process till the complete social change is fulfilled 4. The researcher should be able to speak the local language to get better informed 5. A leading role from the community should be encouraged, and a committed researcher should be involved 6. There should be a possibility to interact with the participants outside the working times to generate a stronger connection. An objective balance should be found.	Large scale • High cultivation rate
GROUP DISCUSSION WITH THE BOARD	1. A meeting with the board to analyse the current situation is useful to create changes (building a social hub) 2. Meetings with the board should be communicated to the participants to keep them updated with the current situation. Conclusions of the meetings can be shared online or during the weekly gatherings 3. The board members of "Nos mes por" should be installed to make official decisions 4. Meetings with the board should be reflective about the current situation of the project 5. The meetings with the board are important, but they should not be organised weekly	Efficient
WORKSHOP WITH THE PARTICIPANTS	1. The workshop on strategies for the project "Nos mes por" should be included early in the project 2. Organize and structure the workshop as a moment to let the participants interact and to keep them updated with the project 3. The information about a workshop should be provided in the local language 4. In the workshop, a clear plan to use the generated information should be mentioned 5. The workshop structure should provide guidance in the thoughts process of the members 6. A general schedule of workshops and their goals should be created 7. The organization should include food/drinks during the workshop to motivate the members. A homemade product can be used to create a link with gardening	Efficient

Figure 41: Overview of the different recommendations for each of the actions and their factors of the success (Author, 2022)

4.6.2. Knowledge aim: Applying the guidelines to the bigger scale of Bonaire and SIDS

Bonaire

The recommendations for the **process** to set up community gardens on the LVV terrain are also applicable in other places in Bonaire. This is due to a unique position LVV has as the knowledge center for agriculture in Bonaire. Therefore, there is no other place available in Bonaire to connect with or to gain experience from, as these are necessary steps in the setup process, *see figure 19 in the ACTION phase*.

The **product guidelines** to make a community garden in Bonaire are adapted based on the information of "Nos mes por". Therefore, the case-specific conditions of the LVV terrain are outlined. These are (1) preventing the terrain from flooding during the rainy season and (2) a water pipe connection with the LVV to receive grey water. Moreover, there were seven strategies described as unnecessary by the members of "Nos mes por". Besides this, one strategy added during the workshop is "Create extra space for members who are active". By removing these nine guidelines and adding one, the following list of strategies to design successful community gardens in Bonaire was created, *see figure 42*.

SIDS

There are three geographical regions where SIDS is located: The Caribbeans, the Pacific, and the Atlantic, the Indian Ocean, and the South China Sea (AIS) (The United Nations, n.d.). The areas have three key common characteristics while being in three different regions. The three key characteristics of SIDS are (1) small size, (2) remoteness and isolation, and (3) a maritime environment (UNWTO, n.d.). Diverse challenges are related to these features. These aspects are used to see whether the knowledge of the community gardens on the LVV terrain can be applied to other SIDS. By seeing how the guidelines can contribute to the challenges which relate to the key aspects of SIDS, it is possible to check the strategies for multiple locations.

A. Process: The timeline

To be able to use the **information on the setup process of community** gardens in other locations, the timeline is adapted to more general information. Each of the horizontal connections is compared with the key characteristics of SIDS to check whether they can be applied in other locations, see ANNEX J. Based on that information it became clear that the key characteristics are present in the several guidelines of the setup process. An important difference with the timeline of "Nos mes por" is the collaboration with LVV. To make the findings work in other SIDS, a collaboration with a local agriculture knowledge center should be found.

B. Product: The strategy map

The general findings conducted by the interviews with the experts in Curaçao and the participants of "Mi mes hofitu" can be used as **guidelines for the design** of community gardens in other SIDS, ANNEX K. It is important to mention that the spatial strategies of the LVV terrain are not included in the strategy map. They are decided by the specific climate conditions of the island of Bonaire, and thus they do not apply to all the other SIDS as there are three different geographic regions.
In addition, based on the analysis of the common characteristics of SIDS, the guidelines can be applied to other islands that face the same challenges. A visual representation in the form of a table is created to do the analysis. This generates an immediate overview of the various guidelines and how each fit in one of the SIDS characteristics.
It became visible that most of the guidelines help to solve problems in the 'Remoteness and isolation' category of SIDS. A crucial social challenge related to this aspect is having a sensitive social culture (UNWTO, n.d.). This social focus can be explained by the participatory research approach (PAR) which means that citizen participation is the leading aspect of the research process (Allen, 2020b).

Outcomes of the Critical reflection phase II

To conclude, this research phase presents a response to the sub-question: *"What are recommendations for the implemented actions to make the setup process of "Nos mes por" successful in the future?".* The reflections are visible in *figure 41*. This adds to the action objective of the study by providing guidance and structure for "Nos mes por".
The second question: "How can this PAR research on "Nos mes por" contribute to general knowledge?" can be answered with the timeline and the strategy map. The information from "Nos mes por" is applied to the scale of Bonaire to see how the guidelines can be generalized. Besides this, the findings are tested with the key characteristics of SIDS to analyze how they can be used in a wider context. By doing this, the tools are proven to be used for designing both the process and the product of community gardens.

BONAIRE: Strategies for the 5 factors of success defined by Gulyas & Edmondson (2021)				
Inclusive	**Integrated**	**Safe**	**Large-scale**	**Efficient**
Include a small location to store some equipment (by doing this, every member will have access to tools and equipment to work in their garden)	Integrate the garden in the community by giving the garden multiple functions (food production, education, after-school care, business opportunities)	Prevent food products being stolen by people who are not connected with the garden	Make a location without fences inside the terrain, create an open space	Use agroforestry as a planting method (little energy is needed to create a high food production thus minimal water is needed)
Sell materials and seeds (gardening tools)	Use social media to make the garden an example (create publicity) for others to learn form	Prevent trowing away waste inside the garden because it looks like an empty place	Make a social hub	Create a vision to see what you want as an organization
Everyone need to be the same	Organize a market to sell products from the garden to the people in Bonaire	Use agroforestry (food forest) as a planting method because it creates a natural ecosystem (it uses the rules in nature)	Build a pleasant place to be in	Include experts on the topic of agriculture in the organization to coach participants
Include people with a disability or that cannot come physically	Visit agricultural places on the island (farmers) to exchange ideas and to learn	Use natural products to fight pests instead of using pesticides (for example Neem)	Setup regular (daily) contact between the members trough the telephone or in person	Create protection from the sun by using trees (agroforestry)
Let the project be directed by a local person	Connect the community garden with practical functions in the area (for example a wifi connection)	Built a border fence to stop the problems with loras, iguanas, goats, donkeys	Organise events	Build a wind breaker
Accept everyone's values	Use the money by selling products to have infrastructural changes in and around the garden (for example repairing roads etc.)		Use social media to post pictures from the working days, background information etc. (To make a positive image)	Make a planning for the coming years. By doing this, you can see which food can be harvested in which time
It's a hobby (no obligation to be present during every participants meeting)	Put extra attention to water connections		Organise weekly meetings on Saturdays	Make a brand to have extra employees by selling products in the supermarkets
Find a position for everyone to participate in the project	It is needed to create edible green (not just green, it need to be food)		Educate the members with knowledge on agriculture	Plant products that require less maintenance (herbs, fruit trees etc.)
Make the garden part of the environment so that everyone can receive information (clear routing, outdoor signs etc.)			Dedicate a large area to cultivate to produce vegetables for multiple people	
			Create an extra space for members who are active	
			Create protection from the sun by using trees (agroforestry)	
			Install a parking area	
			Design a clear gateway	

Figure 42: Strategies for the product design of community gardens in Bonaire based on the information from the members of "Nos mes por" and structured by the factors of success by Gulyas & Edmondson (2021) (Author, 2022)

5. DISCUSSION

5. Discussion

The following chapter discusses various elements connected with this research. First, a general interpretation of the findings will be given. Next, the limitations of this thesis will be argued. After that, the implications of the results on society and the scientific impact are described. Besides this, as this part of a scientific master's degree, a reflection of the interdisciplinary approach in this dissertation is needed. Lastly, future research directions found in this thesis are stated.

5.1. Interpretations of the research concerning the theoretical framework

This chapter describes the interpretations of the results to see how this research connects with the theoretical framework. By doing this, the dissertation can reflect on the theories which are used in the theoretical framework. This is done by reflecting upon the findings, the experiences of the PAR research, and how they relate to the theoretical framework that is used and developed during this study. To be able to see the learnings on the various scales they are applied for, the scales of the LVV terrain, Bonaire, and SIDS are used to structure this section. The level of the LVV terrain is combined with the scale of Bonaire because it is a small island which makes the findings comparable with each other. Furthermore, the process and product guidelines are mentioned individually because they both use different frameworks. The process is mostly steered by the Urban design process spheres (Philips, 2013) while the product design is focused on the Conceptual model of successful urban agriculture (Gulyas & Edmondson, 2021).

5.1.1. LVV terrain/Bonaire

Process guidelines

The process strategies of the LVV terrain are different from the theory (mentioned in Chapter 2.2 THEORETICAL FRAMEWORK) of creating community gardens in two elements (1) the three milestones in the process of setting up urban agriculture, and (2) the different order of the phases of Philips (2013).

The timeline with the strategies to set up community gardens on Bonaire is defined by the theoretical framework of Philips (2013).
An extra aspect in the process design of "Nos mes por", is the presence of the **three milestones** namely the link with a facilitator to guide the process, the creation of a core team of participants, and the incorporation of a motivated board. These are defined by the participants of "Nos mes por" as being crucial to setting up a project, but these are not part of the theory of Philips (2013). However, he mentions key-value checks after every phase to test how the set-up process is going. These are moments to include the various actors of the project and to discuss what the current state is (Philips, 2013). Based on this information, it becomes clear that the milestones are elements to gradually build up the social structure of the community. As it is mentioned that realizing community agriculture for a small population such as Bonaire is challenging, an extra focus on the community is needed (Meeting on social challenges in Bonaire, personal communication, 10 March 2022).

Furthermore, the **sequence of the six phases** of Planning, Vision, Synthesis, Integration, Lifecycle, and Outreach is changed in the analysis of "Nos mes por", *see figure 43*. More concretely, the Planning and Vision sphere are joined together into one phase. In this phase, most of the steps of the Vision sphere are integrated with the process of "Nos mes por". A reason for this is the short connection between the various institutions in Bonaire. This makes it easier to adjust policies and foster a community. These two elements are defined in the Planning sphere. After that, the topics of the four different phases Synthesis, Integration, Lifecycle, and Outreach are mixed. For example, the ecology and culture themes of the Synthesis phase are combined with elements of the Integration, Lifecycle, and Outreach phase.

To sum up, this study suggests that the feedback moments should be transformed into milestones to create an active community in an urban agricultural project. During these moments, the various actors of the project should be present. Furthermore, the Planning and Vision spheres are combined into one. The other four phases are linked with each other, and the actions of Philips (2013) are mixed throughout the phases to set up "Nos mes por", *see figure 43*. This adaptation of the theory is based on the analysis of the current project of "Nos mes por" and the participant's opinion on the future.

Product guidelines

There are two big differences between the theoretical framework and the product findings of the PAR study namely (1) the definitions of the ecological aspects to design an urban agriculture project, and (2) the importance of the factors of success.

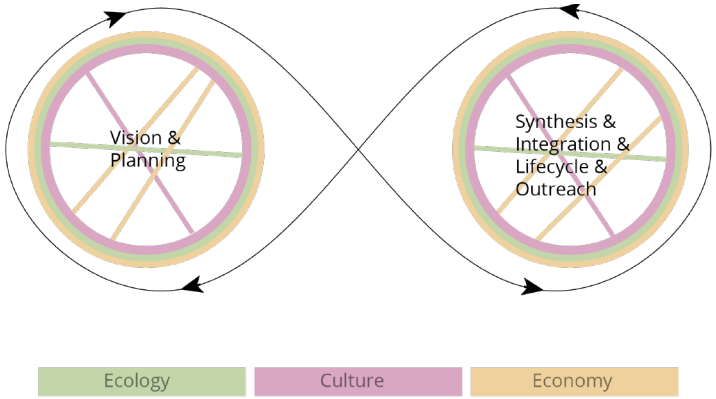


Figure 43: Adaptation of the six phases as they are described by Philips (2013) based on this PAR study (2021) (Author, 2022)

First, to analyze the current design of the LVV terrain, the **ecological aspects** as described by Philips (2013) are used to provide guidance. Based on the analysis of the current situation of the design, it became clear that there is no link between the design of "Nos mes por" and the aspects of (1) vegetation, (2) air quality, and (3) renewable resources. This means that these elements are seen as less important for the design of "Nos mes por" compared with the theory. This is suggested by a different climate and a more rural living situation in Bonaire compared with the theory.

Vegetation which is defined in the theory of Philips (2013) as linked with food production and biodiversity is less present on the island. This is based on the dry tropical climate which makes it difficult to grow plants. Based on the conversations with the participants of "Nos mes por", it became clear that gardening is very time- and effort-consuming in Bonaire due to a need to water the plants daily, a variety of pests, and a warm and tough working environment. Moreover, due to the limited rainwater availability, the cost of water is high. Thus, if you want to spend the time and financial investment to grow anything, planting green that is not eatable is a lost effort and a financial difficulty. This means that a vicious circle is formed between the loss of vegetation and creating a warmer environment. This challenge is currently not addressed by the participants of "Nos mes por".

Secondly, the **air quality** is not mentioned as an issue to consider in the environment of the LVV terrain. Nos mes por" is situated in the more rural area of the island which is free from industrialized sectors. Besides this, it is a small low populated island that has 25% of the island available for on-land food production (van der Geest & Slijkerman, 2019). Moreover, this issue of air quality is not emphasized by any of the interviewed people in Bonaire.

Thirdly, **renewable sources** are described in the theory as using local sustainable materials. Currently, there are limited materials used in the design as the garden exists out of an open field with an outdoor fence, that is divided into individual plots by lines. There is no common building because the tropical climate makes it easier to meet outdoor as the temperature is high and the chances of rain is small. Besides this, the culture in Bonaire is oriented toward the outdoors as described by a member of "Nos mes por" (Personal communication, 18 March 2022). In short, fewer materials are used in the design because there is little need for buildings on the LVV terrain.

Furthermore, the strategy map can be compared with the theory on **factors of success** defined by Gulyas and Edmondson (2021). It can be said that the definitions of each of the factors of success, received a new focus during this study. Firstly, the term **large-scale** focus on having a high participation rate of the members instead of having a large area accessible to cultivate. The latter is less important because there is a lot of free space available on the island due to a low population density. However, increasing the participation rate is more difficult as the population on the island is low. This aspect also received the most strategies out of the five factors of success. Thus, this suggests that the most focus should be put on the Large-scale aspect when designing community gardens. Moreover, during the action study of "Nos mes por", most of the real-life actions that got implemented relate to this determinant of success. Moreover, the aspect of **Inclusiveness** received the second most strategies. This can be explained by the perplexing social structure on the island namely the difference in languages, financial background, etc. This makes it difficult to include everyone (Meeting on social challenges in Bonaire, personal communication, 10 March 2022). Besides this, two strategies to make "Nos mes por" more inclusive were already used when I was present in the project. These are (1) The integration of a temporary board and (2) Hiring a local person to direct the project. This implies putting extra focus on the guidelines of making "Nos mes por" Inclusive.

To conclude, this study suggests that the ecological elements of hydrology, soil, habitat, solar orientation, open space, and climate should be included in the design of urban agriculture projects on the LVV terrain. Vegetation, air quality, and renewable resources are less relevant for this specific project.
Besides this, the guidelines of Large-scale and Inclusiveness should receive the most focus to create a project that makes citizens more self-reliant in Bonaire through food production. For the Scale factor, mostly strategies to increase the participation rate should be developed.

5.1.2. SIDS

On the level of SIDS, there are strategies developed which could be applied outside of Bonaire. These are compared with the three key characteristics of SIDS as they are defined by the United Nations (n.d.) in the CRITICAL REFLECTION II phase.

Process guidelines

Based on the theoretical framework and the link with the key characteristics of SIDS, two differences can be defined: (1) the focus on the three aspects of sustainability to tackle the issues of SIDS, and (2) the attention on the relationship with the local government.

The strategies developed to set up urban agricultural projects in Bonaire help to fight the **three key characteristics of SIDS**, see ANNEX J. Out of the three characteristics, the issue in SIDS that is most mentioned is remoteness and isolation. This element is related to trading problems and having a unique culture (United Nations, n.d.).
The unique culture relates to the social focus of this study and therefore most of the developed strategies help to engage in this 'remoteness and isolation' aspect. More specifically, the social component of sustainability focuses on this key characteristic of SIDS. Particularly, this will be done by including people gradually by first finding a facilitator, after that creating a core group of participants, and end with installing a board. Taking these small steps can help in creating social resilience in a neighborhood by emphasizing a strong connection between the participants. Therefore, these three elements are seen as crucial milestones between the various phases in the process timeline.
The ecology component emphasizes the remoteness and isolation, and maritime environment features of SIDS. The last pillar of sustainability, the economy, focuses on solving the issue of being a small island and the remoteness and isolation of SIDS.

Besides this, the difference between strategies to design community gardens in Bonaire and SIDS is defined by the **connection with a local knowledge center.** During the interviews with the experts in Curaçao, it became clear that a positive relationship is necessary to make urban agricultural projects. This element is different from the theory of 'Urban agriculture process spheres' due to the aspect of being on a small island which creates a unique society (United Nations, n.d.). This means that a close link between the local government and the inhabitant of SIDS is easier to realize than in a location with many citizens.

To conclude, this study implies that by focusing on the three pillars of sustainability the three key issues of SIDS will be dealt with, namely: remoteness and isolation, maritime environment, and being a small island. However, mostly the 'remoteness and isolation' feature of SIDS is improved upon by focusing on the social component. This is emphasized by the three gradual milestones in the setup process of community gardens in SIDS. Besides this, the inclusion of the local government in the process of setting up urban agriculture projects in SIDS is crucial. The local government is seen as an actor with whom a good relationship needs to be built and maintained, during the set-up process. This will help in designing and creating a successful project.

Product guidelines

The guidelines for designing urban agriculture in SIDS conducted in this study can be compared with the theory of Gulyas and Edmondson (2021) and the information of the guidelines for Bonaire. There are differences between the guidelines that are applied to the scale of the LVV terrain and the SIDS. More specifically, two strategies are used for multiple success categories, and thus more prioritized. These are (1) designing an open garden and (2) including a financial stimulant for the members.

Firstly, an important aspect is the accomplishment of the **open garden** to show that you trust the members and that everyone feels welcome. This element is integrated into the Inclusive and Safe factors of success. The term Inclusive is explained in literature as an uneven division of urban agricultural projects in cities based on economic status (Philips, 2013). This makes it more difficult for low-income neighborhoods to have access to local food production. This definition by Gulyas and Edmondson (2021) relates to the design aspect of creating an open garden that everyone can access as mentioned by the experts on Curaçao. By doing this, no person is physically stopped to enter the garden, and thus there is no division between people based on their economic background. However, this component is challenging in Bonaire due to the free-roaming cattle on the island. This openness was already implemented by the participants through the creation of an open garden where the only separation between the plots is accomplished by natural materials like grass. This aspect is extra emphasized during the workshop with the members. More research on this design aspect can help Bonaire to include this acceptance for the various people in society.
Besides this, the design aspect of a garden without fences shows trust between the participants and the organization. This aligns with making a safe

Figure 44: Picture of the community garden on the LVV terrain (Author, April 2022)

space where people are welcome, and no materials are being stolen. This is different from the definition given by Gulyas and Edmondson (2021) which is focused on not contaminating the environment and harming humans and nature. Thus, an extra focus on protecting the products from being stolen is suggested in this dissertation.

Secondly, **financial compensation for the members** of the gardens is specified by the experts on Curaçao to add to both the Scale and Efficiency factors. This adds to the definition by Gulyas and Edmondson (2021) to focus on increasing the participation rate. It was said by the experts of urban agriculture that the installment of a fee will stimulate the members to maintain work in their garden for a longer period. This fee can have various forms namely: a volunteering payment for the people working, receiving free vegetables for the work you performed as a member (Food for Work principle), or by employing a few persons. This is especially useful because the tropical climate, which results in a lack of water and constant heat, makes it hard to work in agriculture. This element is not noticed by the people of "Nos mes por" as crucial to participate.
This can be explained by the contrasting managing approaches of the urban agriculture projects of Curaçao and Bonaire. The first is steered by one person who is the owner of the project, while the activity in Bonaire is defined by various persons who are renting a part of the garden. This suggests that the relationship between the members and the project is different and that may lead to a higher participation rate of the cases in Curaçao compared with Bonaire. Therefore, the guidelines for SIDS hint that one person should have a sense of main 'ownership' for the project and that a financial stimulant for the participants should be included to make the community garden successful. To apply these learnings to the LVV terrain, research on how to include the ownership and payment should be conducted.

In brief, designing an open garden without fences is suggested in this study as a crucial factor for urban agriculture projects in SIDS. This aids to include various citizen groups and shows trust in people to not steal products. Besides this, the project should be managed by one person and financial stimulants for the participants should be installed. This can help to keep the members motivated to work in the garden because the climate makes it hard to perform gardening. This is illustrated in the design of urban agriculture projects in SIDS which are successful. These strategies need to be researched in the context of "Nos mes por" to generate information on how they can be integrated into Bonaire.

5.2. Limitations

As an action research effort, this project comes with limitations. To help draw lessons for Bonaire and elsewhere, I will discuss some key limitations of this study. There are five issues between this study and the research approach being **(1) a limited time and thus no complete PAR research process could be used, (2) the difference between the research aims and the small scale of this study, and (3) the cultural disparity between the researcher and the community which makes it difficult to integrate, (4) the limitation of the PAR approach to emphasize the educational background of the community, (5) conducting a selected analysis of the community garden in Curaçao without visiting the location.**

Limitation in time

An important aspect is a **limitation in time** as the period for the thesis is only five months, which gives a restriction on the length of the study. However, the official end date of a PAR study is flexible as the end goal is to solve the social problem (Walter, 2009). Thus, this would have meant that the thesis would be finished when the community garden on the LVV terrain would have been successful. However, there was not enough time available to make the project completely profitable. In practice, this means that only one research phase of the PAR could be repeated. This was the CRITICAL REFLECTION step. This means that recommendations for the implemented actions could be made, however, the process is not finished. This research circle should preferably be repeated to solve the issue of missing guidance. Therefore, the community garden on the LVV should be further analyzed to see the changes in the future. Moreover, a longer involvement of the researcher in the community would have provided more knowledge and insights that would make the report stronger.

Limitation in scope and scale

Secondly, another constraint of the methodology is the **limited scope and scale**. This means that applying the findings in other locations is more difficult. Based on the hands-on approach, generalizations are difficult to be made (Denscombe, 2010). Mostly, this issue is represented in this study when trying to translate the guidelines of the LVV project to other locations. This step was important because contributing to knowledge about community gardens is the second aim of this thesis. The limitation in the research is dealt with by testing the key characteristics of SIDS with the outcomes of the case on the LVV terrain. However, the key aspects of SIDS don't relate to all the small is-

lands which are part of the SIDS. Therefore, the findings cannot be used in the different islands and further research on SIDS is needed to test whether the guidelines are working for the wide range of SIDS.
Besides this, the specific scope and the participative research approach led to only using one case to engage with as an action researcher. This means that the generated knowledge is depending on the specific community and physical aspects of the LVV terrain. Maybe having other participants in the community would have given other results.
To produce information that can be used in multiple locations, research on other community gardens in SIDS should be conducted to add to the general findings of this thesis. In this way, the information can be compared with each other and general knowledge on social local food initiatives in SIDS can be created.

Cultural difference between the researcher and "Nos mes por"

Thirdly, the **integration of the researcher into the local culture** is a necessary element to conduct PAR (MacDonald, 2012). Besides this, Squires (2009) specifies the importance of mentioning the role of the translator to operate scientific research. This is an important limitation in qualitative research that is often not mentioned in the reports (Squires, 2009). Furthermore, to comply with the PAR approach the researcher should integrate into the local society. However, this aspect was complicated by the difference in culture and language. The local language in Bonaire is the Spanish/Portuguese-based Creola Papiamentu (Dijkhoff & Pereira, 2010). There are two complications present (1) the lack of proficiency of me in this language and (2) the small population using Papiamentu which means that few digital tools exist to use as external translation tools. To be able to perform this research, the official language of Bonaire, which is Dutch, was used as the main communication tool. This discrepancy between the two languages made it difficult to connect with the members as Dutch was not the preferred language. A study by CBS has shown that for 15,4% of the inhabitants in Bonaire, Dutch is the native language (Taal Unie, 2018).
The literature emphasizes that emotional or intellectual conflicts among the researcher such as a language barrier are part of this methodology (Selener, 1997). This resulted in a limitation of results and the interpretation of the data (Selener, 1997). More specifically, some members of "Nos mes por" could not be interviewed as there was no method to communicate. Besides this, the conversation during the workshop and the weekly meetings were in Papiamentu, which meant that the researcher could not observe the discussions. To limit the influence of this language barrier, the important information was translated by employees of LVV who were fluent in both Papiamentu and Dutch.
To solve this problem in the future, a person who can speak the local language should be involved with the project.

Lack of preparation

Moreover, a crucial element to consider in this research methodology is **the need for higher educational backgrounds for the people** who are included in the action. This academic knowledge makes it easier to integrate the members in the analysis phase of the research called STRATEGIC PLANNING. This was more complicated in "Nos mes por" based on the differences in backgrounds of the members. Thus, different results are collected compared with the full integration of the participants of "Nos mes por" (MacDonald, 2012). However, the members were able to provide feedback on the product strategies during the workshop. This resulted in an overview of which guidelines are needed in the design of a community garden in Bonaire and how they would be implemented. The timeline on the process design of urban agriculture is not directly reflected upon by the members of "Nos mes por", but it is based on the learnings from the ongoing process. This means that it is stimulated through the direct learning of what is happening in the process. However, this is not comparable with having the participants perform the data analysis themselves.
In subsequent research, the group of the urban agriculture project should be educated in research methods, or the PAR approach should be adapted to suit the interests of the community. For example, by using data methods that don't require extra knowledge to analyze. By doing so, the participants are more included during the data collection phase. This can lead to more relevant and practical outcomes which are applied to the people and the context of that specific urban agriculture project (MacDonald, 2012). This can change the participatory method in PAR from 'cooperation' to 'collective action' which will contribute to the empowering goal of PAR (Herr & Anderson, 2005).

Selective analysis of the cases in Curaçao

Lastly, the lack of examples of urban agriculture in Bonaire resulted in the search for cases on the other islands. Therefore, the three experts in Curaçao were interviewed by asking both about their factors of success and the structure of the setup of their projects. **Only the information of the experts in Curaçao** on their cases is used and not the information of the participants of these projects. Due to a limitation in time and distance, there were no interviews done with the members. The second reason for not performing case

studies is the difference in social structure on the two islands. Curaçao has a five times bigger population compared to Bonaire. This also creates different social dynamics (Centraal Bureau voor de Statistiek (CBS), 2021). Therefore, the interviews from Curaçao can be seen as experts' views on urban agriculture projects. By testing the guidelines of the experts on "Nos mes por", it was possible to find strategies that are adapted to the local context of Bonaire.
However, it will be useful to analyze the examples in Curaçao by talking with the members to establish a completer image of the community gardens that allow for comparison.

5.3. Implications for research and society/relevant stakeholders

This part describes the implications of this thesis for the research gaps in urban agriculture as described in the section 1.4. SOCIETAL AND SCIENTIFIC RELEVANCE. A separation between research performed on SIDS and studies focused on Bonaire is made to structure the section. First, research conducted on SIDS is described. After that, the focus is put on the literature specific to Bonaire.

The outcomes of this thesis are in line with the existing literature on community urban agriculture by **using previous projects to gather data**. It is mentioned by Iese et al. (2020) that previous programs of community local food production in SIDS should be analyzed. More specifically, an ongoing but inactive project "Mi mes hofitu" in Bonaire is analyzed to see what elements made the project successful. For example, the hierarchy between the board and the members was a reason to make "Mi mes hofitu" inactive. This knowledge is used to compare the current development of the community garden on the LVV terrain. Moreover, the examination of "Mi mes hofitu" has brought awareness to the LVV department to focus on previous programs. This means that by conducting this research, a realization to work together with existing initiatives in Bonaire is gained.
There is also one disagreement between the case of "Mi mes hofitu" and the community garden on the LVV terrain. This is the emphasis on the role of the facilitator. This element was not present in the inactive case of "Mi mes hofitu", but it appears to be a crucial factor to set up "Nos mes por". Thus, this means that previous cases need to be studied to learn from them, but this information is not enough to build efficient projects. This means that changes can happen in new local food initiatives which need to be considered when developing them. This adds the importance of analyzing ongoing projects to the theory of Hickey & Unwin (2020) and Iese et al. (2020), as they state that only previous cases of urban agriculture should be researched.
To keep on **analyzing the ongoing actions of "Nos mes por",** the current participants can take over the role of the researcher to continue creating the community garden. A way to do this is by implementing the eight prioritized strategies which are developed by the members of "Nos mes por", *see figure 25*. The participants were in charge of developing their own guidelines and prioritizing them. Therefore, they can feel more connected with them, which makes it easier to make the members of "Nos mes por" responsible for the continuation of setting up the community garden. The general steps of PAR namely plan, act,

Figure 45: Picture of the community garden on the LVV terrain (Author, April 2022)

observe, and reflect can be used to guide this process (Walter, 2009). Thus, at first, the eight strategies should be researched on how to implement them, then concrete actions should happen, in the end, observations and reflections on the implemented strategies can be performed. This could be a method to continue the creation of "Nos mes por' without the guidance of a researcher.

Furthermore, social resilience in SIDS could be strengthened by focusing on the **social structure of creating a community garden** as this is mentioned by Connel & Lowitt (2020). This is translated in this study by focusing on both social events such as installing weekly meetings, and by building a network of actors and institutions who are active in the agriculture sector. The latter resulted in spreading knowledge on existing projects which could help the design of "Nos mes por" and by joining institutions such as LVV with the people of Trasamé. Thus, this dissertation confirms that enhancing the existing social structures can benefit building social resilience in society.

Based on this study, consequences for the **literature on urban agriculture in Bonaire** could be formed. The importance of collaborations with people active in the agriculture sector is found in this study, as this mentioned by Lotz et al. (2020). An exchange of information between farmers with knowledge about the wind issue in Bonaire changed the current design of "Nos mes por" to include windbreakers in the plan.
After researching the issues of "Mi mes hofitu", it became clear that the social problem of hierarchy in the organization was the reason to stop "Mi mes hofitu". This showed that social-political challenges are reasons to stop agricultural projects in Bonaire (University Utrecht, 2020). Therefore, they need to be taken into consideration when designing "Nos mes por".
Moreover, this study has added to the few examples of communal urban agriculture projects in Bonaire as this is explained in the literature (Geest & Slijkerman, 2019a). There are learnings from "Nos mes por" such as the need for a facilitator at the beginning of the process, and the forming of a core team that can be applied in other locations on the island. However, the findings are focused on the first phases of creating community gardens and there is no information on the long term. This is extra challenging because the lack of a long-term vision is an ongoing issue in the society of Bonaire. This means that this aspect should be analyzed in future research.

To conclude, an examination of existing cases of urban agriculture in other islands can be useful to learn from as this is also defined in the literature. However, this information alone is not sufficient to create successful projects, also ongoing initiatives should be analyzed. "Nos mes por" can be future researched by first implementing the eight strategies developed during the workshop, and after that observing and reflecting upon them. By using this method, the role of a researcher would not necessary
Furthermore, this study has confirmed the possibility of enhancing social resilience by focusing on the social structures, the need for collaboration with people who are active in the cultivation sector, and the crucial element of considering the social connection between the participants when starting an organization. These elements fit with the existing research on urban agriculture in Bonaire and SIDS.
Lastly, this dissertation on the LVV terrain can add to the lack of urban agricultural examples, but a further examination of the long-term effects is necessary.

5.4. Reflection on the interdisciplinary in the research

This section is needed to reflect on the interdisciplinary approach of this thesis. Two main interdisciplinary elements are leading to this research: (1) the research methodology which emphasizes the interdisciplinary methodology, and (2) the sustainability approach.

The first aspect is mentioned because the **PAR technique relates to the Living Lab methodology**. The latter is mainly focused on an interdisciplinary way to include actors from different organizations. Likewise, participatory action research shares characteristics with the Living Lab approach. Living labs are built upon the co-creation and experimentation of innovations in a real-life context (Logghe & Schuurman, 2017). Participatory action research can be described to find solutions for a real-world problem and develop theoretical knowledge for the wider scientific world. An important aspect of this method is the involvement of the people in the data collection and the processing (Bacon et al., 2005).

There are two contrasting elements between them as defined by Logghe & Schuurman (2017). These are (1) action research is focused on social research contexts and (2) living labs are mostly used in technology innovation contexts. Moreover, action research is less concerned with co-creation during the research process while living labs include this element throughout the entire process. However, they both fixate on a user-centric approach where the studied objects are central (Logghe & Schuurman, 2017).

In this dissertation, the participatory action research approach is chosen based on the **personal involvement of the researcher in the community**. That is different from the living lab methodology due to the involvement of the researcher in the project itself (Dell'Era & Landoni, 2014). This is also the biggest benefit of participatory action research because it becomes easier to translate the insight into the perspective of the users (Logghe & Schuurman, 2017). Besides this, the involvement of the researcher in the case of "Nos mes por" made it easier to generate findings from the participants themselves. This is essential due to the small scale of the island which leads to a complicated political structure (Meeting on social challenges in Bonaire, personal communication, 10 March 2022). Moreover, the current projects in Bonaire are often led by a Dutch researcher who is only for a limited period working in Bonaire. This results in a low connection between the local people and the project as there is a lack of ownership (S. Bol, personal communication, 23 March 2022). Based on both the difficult relationships with power and the complications with non-locals as project leaders, the involvement of the researcher in the community could help these challenges. This meant that I became a member of "Nos mes por" which included working in the garden, daily talking with the participations, being present during the weekly meetings, etc. This reduced the barrier between me as a non-local researcher and the community which can have led to more personal insights into the society of Bonaire.

As the issues with power structures and the problems with foreign project leaders are present in various sectors in Bonaire, the use of PAR as a methodology should be researched, based by the outcomes of this dissertation.

Furthermore, the interdisciplinary of this research is integrated into the **sustainability focus**. To achieve sustainability, the three pillars should be present in the outcomes of the thesis. This means that the social, ecological, and economic aspects need to be considered (Purvis et al., 2018). The three topics of sustainability were leading in the setup process analysis because they are also used in the theory of Philips (2013). However, two of the three pillars were leading in the research process. These were the social and ecological elements as they were more integrated with this thesis. The financial component was less present in this study because I have more experience with research on social or ecological aspects.

In practice, this means that both people who specialized in the ecological and agricultural issues of the island and persons active in the social organizations in Bonaire were interviewed and consulted. The first group existed out of farmers and people working on the LVV terrain. The other group included persons who had personal organizations or who were active in the social organizational sector like J. Clarenda who owns Echo and S. Bol who was active in WWF. By the combination of the data from the two sectors, it is possible to have a more interdisciplinary approach. The financial sector is examined by emphasizing this element during the focus group with the organization of "Nos mes por". Thus, this pillar is represented in this dissertation, but it is not as thorough as the social and ecological pillars.

Forthcoming research could help to fill in that gap on how the economical component is linked with community gardens.

5.5. Future research directions

Based on the information from the limitations and the interdisciplinary aspect of this thesis, future research directions can be given.

First, it is important to conduct **future research** on the LVV project by being involved in the organization. This will help in future analyses on how to make a thriving community garden in Bonaire. As this thesis could only complete one research circle till the reflection phase, the **future planning and action steps** should be researched and implemented. Moreover, it is indicated in this thesis to include a **local person** who can speak the local language when using a PAR methodology. To continue with the research in a PAR approach, it is central to **incorporate the members in the different phases** like the examination of the data. Therefore, explanations of the research steps before the members are involved or adapting the analysis methods, can help to achieve this.
Secondly, additional investigations on **other community gardens in SIDS** should happen to build more knowledge on urban agriculture. In this research, a separation between the different regions of SIDS can be made to generate more specific data. For example, a platform to make and share the data between the different islands can promote the sharing of knowledge.
Thirdly, the **current community gardens in Curaçao** could be explored. By doing this, it is important to emphasize the inclusion of the participants and their opinions on the project. This will make it possible to form a more equal and complete overview of the examples by focusing on the organization and the participants of the community gardens.

Based on the interdisciplinary aspect of this research, two future research directions can be provided. The first one is focusing on using **participatory action research as a methodology** in projects on small islands such as Bonaire. This means that social change is created while at the same time more general learning is collected. This could support the society of Bonaire in a more direct way instead of only collecting information.
Besides this, further research is needed to establish the **connection with the financial aspect of urban agriculture projects**. This is needed as this study mostly focuses on the social and ecological pillars of sustainability.

To summarize, future research should focus on the continuation of an analysis of the LVV project while using a local person for this. For example, a member of "Nos mes por" could be responsible to lead this process by following the PAR approach to first plan actions, observe them, and later reflect upon them. Besides this, more research on community gardens in SIDS should be conducted where the participants are included in the process. To do so, different methods on how to include the participants in the data analysis phase should be researched. Moreover, a general examination of the urban agriculture projects in Curaçao with a focus on the analysis of the participants should be established.
Furthermore, research on the use of PAR as a methodology in projects in Bonaire should be conducted combined with an examination of the financial aspect of designing community gardens. This can help to start and analyze other projects on the island.

6. CONCLUSION

6. CONCLUSION

The chapter provides an answer to the research question by combining the results of the separate sub-research questions. By doing this, a general answer can be given. As explained in the research objective of this thesis two aims need to be answered. The first one is to provide a social change in the community "Nos mes por" by implementing actions while working together with the participants. The second objective is to find strategies to set up and design community gardens in Bonaire. The latter is done by using the project on the LVV terrain as a case to gather learnings for other locations in Bonaire and to apply them on a wider scale. The last section explains more information between the theoretical framework and the findings of this study.

As it is described at the beginning of this research, the general problem of **local food products and healthy diets in Bonaire** is motivating this thesis (Verweije et al., 2021). Moreover, the local government shows an increased interest in this topic, but there is a lack of examples and knowledge in Bonaire. This led to the research objective of studying and spreading knowledge on the setting up and designing successful and sustainable communal urban agriculture projects in Bonaire. The local government wants to create more self-reliant citizens who are eating and producing their own fruit and vegetables Adriaens & Loozen, 2021). This means that the success of "Nos mes por" is defined by the members themselves.
To achieve these objectives, I was involved with a case on the **LVV terrain called "Nos mes por"** and by using the PAR methodology I was able to conduct applied research.
This translated to the following main research question: ***"What are strategies to set up and design a sustainable urban agriculture community practice on the LVV terrain, that is successful in Bonaire by using participatory action research?"***

6.1. Action aim: Answering the research question of LVV

The first sub-research question that should receive an answer is *"What are real-world actions that should be used in "Nos mes por" to make it sustainable and successful in Bonaire?".* To answer this research question, **eight guidelines** are developed. They guide both the process and product of community gardens on the LVV terrain intending to make it more successful. There are five strategies needed in the process design of community gardens namely (1) include social organizations, (2) organize a course about food value and processing, (3) have a brainstorming session with the members, and (4) prevent a hierarchy in the organization, and (5) sell materials with a discount for the members of "Nos mes por". Furthermore, there are three product strategies. The terrain should be (1) made accessible by designing a clear sliding gate and parking, (2) a green infrastructure should be installed with windbreakers and by placing greystone on the walking paths, and (3) agroforestry should be chosen to build a resilient ecology on the terrain.

However, as the main goal of PAR is to **create social change** in a community, this aspect needs to be addressed. This study was focused on providing structure and guidance to design the process and the product of the community garden by including the participants in the research. By doing this, the members of "Nos mes por" contributed to this study by collectively developing guidelines to make their project successful. These strategies are used to steer the process of setting up the community garden. By doing this, the members of "Nos mes por" gained experience and knowledge in the process of building a community garden in Bonaire (Gregory & Peters, 2018). This means that change is implemented in the community of "Nos mes por".
Furthermore, by including the participant in the process, the main problem in making the project successful was identified. This was the lack of guidance and structure in the process. This resulted in providing strategies that led to actions for the current project on the LVV terrain. In the end, there are seven real-world actions which are implemented when I was involved in "Nos mes por". By doing this, it was possible to change the ongoing process to incorporate what were found to be success factors of creating a community garden.
These guidelines are defined and implemented by the local people of Bonaire. By doing this, creating self-reliant citizens could be stimulated by letting the locals lead the research for "Nos mes por". This contribution adds to the success criteria of the Bonerian government to create self-reliant, healthy inhabitants who are eating and producing fruit and vegetables.

6.2. Knowledge aim: Strategies that can be used in the set-up of community gardens in other locations in Bonaire

By creating this information for the project on the LVV terrain, general requirements to design community gardens in Bonaire could be developed. This is focused on answering the second sub-research question: *"How can the findings of the analysis of the community garden on the LVV terrain be translated*

to other locations in Bonaire, to generate knowledge on local food initiatives?".
This resulted in the formation of **two tools for the process and product design** of community gardens in Bonaire. These are a timeline with several steps to steer the set-up process and a strategy map to design communal urban agriculture projects on the island, *see figures 15 & 28*.
A **timeline with five different steps** is developed to steer the process of creating urban agriculture projects. The main takeaway for the process is the three important actions: (1) first hire a facilitator to steer the process, (2) after that a core team of participants should be formed, and (3) lastly a motivated board should be installed to make decisions, see figure 15. These three milestones are developed by the members of "Nos mes por" to gradually build a community by taking various small steps. This is defined by the participants of this study as a crucial element to make a successful agricultural project.
Moreover, the process strategies can be applied in SIDS because the developed guidelines for Bonaire are working on a more general level. However, they should be applied and tested in SIDS to see how the guidelines would work in real-life.

For the product design of community gardens on the island, **a strategy map with guidelines in five categories** could be formed. The main results show that strategies of the Scale category are prioritized, *see figure 28*. These will help to increase the number of participants in a community garden. The increment of active members is defined by the people of "Nos mes por" as a crucial element to build a working project.
There are also more **spatial-oriented guidelines** for the local conditions in Bonaire which are only using natural materials to fight pests, creating accessibility by installing a parking area and designing a clear gateway, and building a windbreaker to stop the negative effects of the wind. These are necessary when designing in Bonaire. This information needs to be used when the local government wants to create community gardens in other locations in Bonaire. Besides this, these guidelines are developed with help of people with agricultural experience in Bonaire. This collaboration with experts is mentioned in Phase 3 of the process guidelines to set up a community garden in Bonaire, *see figure 15.*

To sum up, there are specific guidelines to set up community gardens in Bonaire which can be tested in the future. Besides this, there are strategies focused on the Large-scale, Efficiency, Safety, Integration, and Inclusion aspect when designing successful urban agriculture projects in Bonaire.

6.3. Findings on the theoretical framework

By using this research methodology, I used existing theories to structure and guide this study. By doing so, I was able to reflect upon this literature by seeing how my findings contribute to or adapt it. This information is useful to investigate how the findings of this study can be used elsewhere or for future research.

First, this study suggests for **Bonaire**, that the feedback moments defined in the approach of Philips (2013) should be transformed into **milestones** to set up a society in a community garden. During these moments, the various actors of the project should be present.
Furthermore, the **Planning and Vision spheres** of the urban agriculture design spheres, are combined into one. Thus, the steps to create a policy framework and the step to define the visions and mission of the urban agriculture project are linked. A reason for this could be the small scale of the island, which means that fewer people need to be consulted.
Moreover, this study suggests that the **ecological elements** of vegetation, air quality, and renewable resources are less relevant to being examined. They are less present on the island due to the tropical climate and the high percentage of rural areas.
Besides this, the guidelines for **Large-scale and Inclusiveness** should receive the most focus as they are defined by the members of "Nos mes por". The first aspect is important to create more active participants in the community garden. This is difficult as the population size is rather small in Bonaire. Besides this, including everyone in the garden should be emphasized because Bonaire has a rather complicated social structure. Thus, more focus on how to let different persons participate is needed.

Secondly, this dissertation has focused on the scale of **SIDS**. By doing so, the study implies that an emphasis on the **three pillars of sustainability** in setting up community gardens can help to tackle the key challenges of SIDS. However, by using the provided strategies, mostly the 'remoteness and isolation' feature of SIDS will be solved. This key characteristic of SIDS leads to having a unique social culture as the island is a community on its own. Therefore, a focus is put on the social aspects of setting up a community garden in SIDS by including the three social milestones (finding a facilitator, creating a core group of participants, and installing a board).
Besides this, the **inclusion of the local government** in the process of setting up urban agriculture projects in SIDS is crucial. The local government is seen

as an actor with whom a good relationship needs to be built and maintained, during the set-up process. This will help in designing and creating a successful project.

Lastly, designing an **open garden without fences** is suggested in this study to be crucial for urban agriculture projects in SIDS. This helps to include various citizen groups and show trust in people. Besides this, the project should be managed by one person and **financial motivation** for the participants could be installed. The latter can help to keep the members motivated to work in the garden because SIDS has complicated climates and environments to work in the agriculture sector. For example, the tropical climate makes it difficult to receive enough water and it creates a warm environment to work in. Besides this, receiving equipment is challenging because the materials need to be imported and islands have a limited population which makes the number of available and interested people smaller.

The implementation of these two strategies needs to be researched in the context of "Nos mes por" to generate information on how they also can be integrated into Bonaire.

7. REFERENCES

7. REFERENCES

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8. APPENDIX

ANNEX A: The Urban Agriculture Design Process Spheres of Philips (2013)

6 spheres in the process:

1. Planning & advocacy
- Creating an urban agriculture policy framework
- Harnessing sustainable planning methodologies
- Setting foundation for community advocacy

FEEDBACK:
- Planning evaluation with the team and stakeholders

2. Vision
- Setting the vision narrative (identifying the mission, goals, and objectives)
- Identifying the urban agriculture design typology
- Framework for establishing feedback loops

FEEDBACK:
- Impartial vision evaluation with the team and stakeholders
- Testing the proposed system strategies for the selected typology

3. Synthesis
- Site and community systems resource evaluation
- Conceptualization of the vision or idea into physical form
- Developing the preliminary urban agriculture business plan to provide a roadmap for development

FEEDBACK:
- Impartial synthesis evaluation with the team and stakeholders
- Data synthesis evaluation

4. Systems integration
- Developing the design and ecosystems components
- Exploring new technologies
- Evolution of the systems integration into final design output
- Systems integration should verify connections to the community and city-wide systems

FEEDBACK:
- Impartial systems integration with the team and stakeholders
- Retesting the systemwide connections

5. Lifecycle choices
- Future management infrastructure framework for maintenance and operations
- Lifecycle budget and phasing opportunities
- Finalizing the urban agriculture business plan

FEEDBACK:
- Value check for the transition from team to stakeholders
- Lifecycle choices should be finalized with stakeholders
- Funds should be monitored

6. Outreach & advocacy
- Developing, marketing, and maintaining the brand
- Expanding the outreach from grassroots to mainstream education

FEEDBACK:
- Last final check the project is meeting its vision, budget and funding mechanism sustainable, outreach being achieved, systems connections and integration design, achieving the sustainability lifecycle goals

ANNEX B: Data storage and Ethical considerations

B.1. Data storage and availability

The data of this thesis such as the observations, and field notes, are added in the appendix of this paper. The relevant images and tables are integrated with the main structure of this report. This makes it easier to refer to them when discussing the findings.

The data is collected by using the digital platform called MIRO. Using an online tool like Miro, to share knowledge makes it easier to let others integrate with the data findings (Nedre, 2020). Moreover, it is a tool where both visualization and text can be easily shared while keeping an overview of the data.

Lastly, personal data such as the transcripts of the interviews are not visible in the appendix. This is done to protect the personal information of the interviewees. The more specific information such as the transcripts, can be accessed by asking request from the author.

B.2. Ethical considerations

As described by Bhandari (2021), various ethical considerations need to be made when performing research. These are explained in the following section to better understand how is dealt with each of the factors in the research process of PAR. The five elements to consider are (1) Voluntary participation, (2) Informed consent, (3) Anonymity and Confidentiality, (4) Potential for harm, and (5) Results in communication. The PAR approach has influenced how the ethical considerations are integrated into the research.

Voluntary participation

The people of "Nos mes por" were free to participate in the research actions being the focus group and the workshop. In practice, this means that the people were stimulated to join the activities, but no obligation was asked. This resulted in almost the same group of people showing up in these activities and thus this group decided the content for the design of "Nos mes por". This led to limited outcomes because not all the members of the project were involved. However, this freedom to join and leave the study at any moment is necessary to create equal relationships and interactions (Lofman et al., 2004). This element is extra critical when using a PAR approach because the goal of this methodology is to create social change for the oppressed and vulnerable groups (MacDonald, 2012). Thus, every member needs to be included and need to be able to express their thoughts.

Informed consent

This is seen as the most important element to protect the participants when performing participatory action research (Lofman et al., 2004). Informed consent relates to the process of informing the participants about the study's benefits, risks, funding, and institutional approval (Bhandari, 2021). This element is not formally asked in a written manner before starting the research process. This is explained by Lofman et al. (2004) that informed consent can be overpowered when the awareness of being involved in research can create bias and when the risks of being a studied object are small. To conduct valuable data and to have the least influence possible, informed consent in a verbal manner was asked from the participants. To do this appropriately, open communication about the research aspect of each step is necessary (Denscombe, 2010). This means that the participants were informed about the reasons to conduct the data before hosting the interviews, focus groups, workshops, etc. Moreover, trying to integrate as an equal member of the community while having the role of the researcher, is necessary to use the PAR methodology. This will increase the trust between the studied people and the researcher, which will result in more reliable outcomes (Selener, 1997). Thus, the barrier between the researcher and the group of "Nos mes por" should be kept natural. By asking for informed consent verbally, it is easier to keep that informal relationship.

Anonymity and Confidentiality

The literature has shown that respecting confidentiality and anonymity in PAR is complicated because of the participation aspect (Lofman et al., 2004). First, the interviews conducted from external sources during the Research phase are recorded by asking for consent from the interviewee. This gives the possibility to use the data in this report. Secondly, in this research certain elements are used to respect the participants of "Nos mes por". Based on the researcher's participation and the mixed methods to collect data from the members of the "Nos mes por" project, confidentiality is integrated into the actions of the research. To respect the confidentially of the participants, no personal information such as age, gender, last name, or address is asked. By doing this, it is more difficult to relate the data from each member back to the person.

Besides this, the names of the interviewed people in this report are made into abbreviations to respect confidentially.

Moreover, the results from the workshop and the group discussion are combined instead of mentioning the answers from each participant. By doing this, the specific responses cannot be traced back to a certain person.

Besides this, the freedom to provide feedback or comments was accentuated

during the research process Lastly, the findings are shared in an online environment which makes it possible for the participants to easily consult the data. They were free to give comments on the retrieved data.

Potential for harm

To reduce the potential harm to the research participants, it is important to consider the possible effects before starting the research (Bhandari, 2021). To limit the effect, the value of change for a person and the confrontation of the members of "Nos mes por" was emphasized. For example, to analyze the motivation of the people who were less present in the research telephone interviews were conducted. This was performed a few days before organizing the interactive workshop. By doing this, it was possible to call the people both to invite them to the workshop and to collect information on their motivation to be less active in "Nos mes por". This made it less confronting for the participants to talk about their lack of activity in the community garden on the LVV terrain.
Moreover, the researcher was involved in the various activities of "Nos mes por". Therefore, it was possible to communicate results and create personal connections with the members throughout the research process. This made it easier for the researcher to be aware of the emotional side of the studied objectives.
Lastly, the results of the workshop and the group discussion were immediately shared in the WhatsApp group to give every member access to the data. This gave the possibility for the members to give comments when certain data was harming someone.

Results communication

The results of the research are communicated scientifically in this report. There is a focus put to make the findings reliable and credible as this is necessary for scientific research (Bhandari, 2021).
Moreover, to easily communicate the findings with the people of "Nos mes por", a Google Drive is made on 25 May 2022. This helped to show the recommendations and strategies for "Nos mes por" to develop a successful community garden.

To recap, the five elements of ethical considerations are integrated into this thesis. The most important factor to protect the participants in PAR research is to explain in each research method why the research is performed. This is a way to create informed consent in PAR research (Lofman et al., 2004). In addition, the members of "Nos mes por" could leave the research at any moment and they were not forced to join the activities. Besides this, the confidentially of the studied objects is kept by removing personal data like age, and by presenting conclusions of the findings to make it difficult to see the personal input of each person. Moreover, the data is shared throughout the research process to provide opportunities for the studied objects to give feedback on the collected data. This makes it possible to let the people of "Nos mes por" indicate when they are harmed. Last, of all, the findings are shared in an online environment to make it possible to show and use the guidelines for a successful "Nos mes por".

ANNEX C: Overview of the people interviewed who are connected with agriculture in Bonaire

Name	Profession (connection with community urban agriculture)	Governmental/Private initiative	Current activity	Date of interview
O. Emerenciana	• Organiser of weekly local market • Local farmer with the personal mision to stimulate the agricultural sector in Bonaire • Part of the Trasamé project • President of "Nos mes por" (involved from the beginning in the project)	Private	• Market is still active • Still the current president of "Nos mes por" • Trasamé is not active anymore	16 and 26 March 2022
B. Clarenda	• President of Mi mes hofitu what is an inactive gardening club in Bonaire (weekly meetings to talk about the gardens of the members)	Private	• Not active anymore (officially still existing)	15 March 2022
S. Bol	• Part of the Trasamé project as member of WWF	Private	• Not active anymore	22 March 2022
J. Clarenda	• Director of Echo what is an organisation that takes care of regrowing trees in Bonaire (reforestation project) • Part of the Trasamé project • Started a food forest, but didn't continue with it	Private	• Still active in Echo • Trasamé is not active anymore	17 March 2022
D. Christiaans	• Director of Mangazine di Rei what is place to restore the culture of Bonaire • Started with creating a food forest	Private	• Still active • Trasamé is not active anymore • Food forest is still active	10 March 2022
N. Emerenciana	• President of Kriabon what is the farming coöperation in Bonaire	Private	• Still the president of Kriabon	• Interview could not be organised
Aletta	• Owner of Aletta's Goat Farm which produces goat cheese, yoghurt and milk • Started a food forest, but didn't continue with it	Private	• Still the owner of Aletta's Goat farm	• Interview could not be organised
R. Emers	• Starter of "Mi mes hofitu" • Former director of LVV	Governmental	• Not active anymore	17 March 2022
M. Adriaens	• Director of LVV • Involved in the "Greenhouses in neighbourhoods" project which is a part of the "Program vegetables and fruit" • Involve in "Nos mes por" as head of LVV	Governmental	• Still active in LVV	14 March 2022
R. de Palm	• Member of SZW (social affairs and welfare) • Involved in the "Greenhouses in neighbourhoods" project which is a part of the "Program vegetables and fruit"	Governmental	• Still active in SZW	25 March 2022
S. Loozen	• Member of SZW (social affairs and welfare) • Involved in the "Greenhouses in neighbourhoods" project which is a part of the "Program vegetables and fruit"	Governmental	• Currently inactive in SZW	• Interview could not be organised
N. Oleana	• Member of OCW (Education, culture and science) • Involved in the "Greenhouses in neighbourhoods" project which is a part of the "Program vegetables and fruit"	Governmental	• Still active in OCW	18 March 2022
Trasamé (Boneiru Duradero) • S. Bol • O. Emerenciana • J. Clarenda • D. Christiaans	• The goal was to make connections between social active persons (facilitators) in Bonaire to work more together • Making it easier to set up projects in the future by learning from each other	Private	• Trasamé project was organised in 2021 and is not active anymore	Separate interviews were organized

ANNEX D: Overview of the interview questions with the experts of Curaçao and the people of "Mi mes hofitu"

TOPIC	QUESTIONS	WHY
Background (Based on Albrecht & Wiek, 2021)	• Can you tell me who you are and what you do in your professional career? • Can you tell me more about the community urban agriculture project you are in charge of in Curaçao • Can you tell me something about…? 1. Location 2. Size of the plot 3. Staff 4. Management 5. Year 6. Ownership (who, what is the influence of the government) • What is included in the project and how are these elements part of the project? - What are the general purpose(s) of the community garden? - Which parties are involved in this goal? (Government, commercial party, non-profit organizations, etc.)	GOAL: general information about the project in order to compare the various methods from the 3 experts
Process method (Based on the Urban Agriculture Design Process Spheres of Philips (2013))	• Can you describe the methods you have used to set up this community urban agriculture projects on Curaçao? • Can you tell me more about the different steps you took to create the final result? • How is the project currently working?	GOAL: find information about the process method they have used to set up their community urban agriculture practice
Spatial characteristics of the product	• How does the end result look? • How did the method you explained before, influence the end result of the community urban agriculture plot (spatially)?	GOAL: find the influence of the process method on the spatial end result
Success factors (Based on the factors of success in urban agriculture from Gulyas & Edmondson (2021))	• What is successful community urban agriculture for you? • These are commonly used characteristics to describe success in urban farming. Do your own criteria match this? Why/why not? *(Large-scale, inclusive, efficient, inclusive, integrated)* • What would you do to arrive at the following success factors in social urban agriculture? • Which success factors have you achieved in the social urban agriculture project in Curaçao that you mentioned earlier? - What did you do to achieve those success factors during the setting up of this community project? What steps did you use for this? - What did you do with the spatial design to realize this feature(s)?	GOAL: what are the success factors and how are they achieved
Closing	• How would you describe your ideal/perfect community urban agriculture local food initiative in Curaçao?	GOAL: to find missing elements in the methods explained before
Project failures and successes (Extra question in interviews with people of "Mi mes hofitu")	• What are the reasons why the Mi mes Hofitu project has been stopped? • Why is the project not moving forward now? • What are the successes (positive points) of Mi mes Hofitu? • What are elements that had to be done differently in Mi mes Hofitu (negative points)?	GOAL: find failures and successes of Mi mes Hofitu (LEARNINGS)

ANNEX E: Results Analysis of the strategies of “Mi mes hofitu”

Analysis of the last four phases during the focus group with the organization of "Nos mes por"

SPHERE	THEME	SUBJECT WHY (is this important)	CURRENT STATUS	QUESTIONS/INTERVENTIONS (every question will be asked with WHAT, WHEN and HOW)
SYNTHESIS	ECOLOGY	Systems integration	• Part of the water treatment connection of the LVV • Connection with the green infrastructure of LVV terrain	• What is the relationship with LVV because they are the providers of the water and land? • What are other systems networks (connections)? • How does this work? • When should this work?
		Ecosystem resource evaluation	• Possibility to be connected with ground water (Lourens, 21 mar 2022) • The soil contains a lot of water because it has been an old dam so there is a change of floods in the rain season (Emer, April 2022). • Wind is problem on the terrain because it makes the terrain dry.	• What are possibilities for natural problems (water, wind, solar) which are affecting the terrain? • How would this work? • When would this be implemented?

	CULTURE	Local and regional benefits	• On the LVV terrain, use of materials
			• Providing food for the inhabitants of Bonaire
				• What can this project attribute to the Bonaire food system?
				  • What are benefits for the local community?
				• How can this project attribute to the Bonaire food system?
				• When can this project attribute to the Bonaire food system?
				  • Market, selling products?
				  • Relationships made with companies, institutions?

		Social outcomes for vibrant foodshed	Social building on the terrain (assiocation decided this and the participants agreed)	• What are the plans around the social building on the terrain? • Starting with building something under the tree? (shaduw is already there, cleaning the plot talking with Ewaldus) • How would this work? • When will this be implemented?
	ECONOMY	Business roadmap	$10 a month per participants to rent the place (Statutes Association, 2022)	• Do you have a business plan (long term planning of financial plans of the organisation, possibilities to receive funding over the long term). • If so, how does it look? • How will this work? • When will this be implemented?
		Financial resource evaluation	MIssing element Funding for water from LVV (is free to use)	$10 dollar each month per participant. • What it the purpose of the money? • Why $10 dollar per month? • How is the money invested?
		Budget scenarios	MIssing element	• Do you have budget scenarios (possible outcomes in the future?). If so how do they look? • How will this work? • When will this be decided?
INTEGRATION	ECOLOGY	Ecoliteracy and stewardship	Missing element Organizing courses about gardening is written in the bylaws	What do you think of teaching Ecoliteracy (the ability to understand the natural systems that makes life on earth possible). (Courses on natural systems for the general population) • How would this work? • When will the be implemented?

		Ecosystem renewable outcomes	Missing element	• What are possibilities to create renewable energy? How can everything be reused in the future?
				  • Solar
				  • Wind
				  • Soil
				  • Water
				  • Plants
				• How would you do this?
				• When would you do this?

		Create systems network	Part of the vegetable infrastructure on the LVV terrain (water is fixed in March)	• SAME QUESTION AS IN SYNTHESIS: • What is the relationship with LVV because they are the providers of the water and land? • What are other systems networks (connections)? • How does this work? • When should this work?

	CULTURE	Social outcomes for vibrant food sheds	Social building on the terrain (assiocation decided this and the participants agreed)	• SAME QUESTION AS IN SYNTHESIS:
				  • What are the plans around the social building on the terrain?
				  • What are other possible social outcomes?
				  • How will this work?
				  • When will this be implemented?

		Community accessibility	• Accessible parking, entrance, • Free access to the plots • The car can only be parked on the parking outside the plots • Access from the participants moslty, • Not situated in a neighbourhood, relatively far from the centre of Kralendijk	Design made to have cars inside the plots? --> The paths are made too small for a car due to a lack of space when building the plots • What are other ways of transport such as wheelbarrows? • How can this work? • When could this work?

		Connecting local and regional benefits	Products are made for the participants themselves (self-sufficiency for the inhabitants of Bonaire)
			Organizing markets
				• SAMES QUESTION AS IN SYNTHESIS:
				• What can this project attribute to the Bonaire food system?
				• How can this project attribute to the Bonaire food system?
				• When can this project attribute to the Bonaire food system?
				  • Market, selling products?
				  • Relationships made with companies, institutions?

	ECONOMY	Food security	Is there a compensation when the food doesn't work. This can be a stimulation for people to keep on growing food and not to give up (Sharon Bol, march 2022). Motivation to keep going is needed (Sharon Bol, march 2022)	• Do you have a compensation when growing food doesn't work? (motivation, possibility to get extra help). If so, how does it work? • What are possibilities? • How could this be done? • When would this be done?

		Identify budget scenarios	Missing element	• SAME QUESTION AS IN SYNTHESIS:
				  • Do you have budget scenarios (possible outcomes in the future?). If so how do they look?
				  • How will this work?
				  • When will this be decided?

		Synergies with local economy	Goal is now to focus on making participants self-sufficient.	• How can this project be integrated within the local economy? (Is this allowed because the goal is to only produce for yourself?) • How would this work? • When would this be done?

Analysis of the last four phases during the focus group with the organization of "Nos mes por"

SPHERE	THEME	SUBJECT WHY (is this important)	CURRENT STATUS	QUESTIONS/INTERVENTIONS (every question will be asked with what, when and how)
LIFECYCLE	ECOLOGY	Building resilient ecologies	Gardening in an ecological way is needed. This is described in the bylaws of the association.	• What do you mean with an ecological method to garden? • How will this be communicated with the participants? • When would this be done?
		Maintaining systems network	Missing element LVV is the provider of water and land	• SAME QUESTION AS IN INTEGRATION:
	CULTURE	Expanding communication network	• Creating a magazine is written in the bylaws. • There is an agricultural app which is programmed already (pilot version). It isn't being used at the moment. • Using Whatsapp and Facebook	• What would the magazine be? • How will the magazine work? (digital?) • When will it be implemented?

		Healthy and vibrant community benefits	• Organizing courses about gardening
			• Organizing markets
			• Organising excursions
			• Stimulating communication between participants
			• Creating associations
			• Supporting to create business plans
			• Buying seeds and other gardening equipment
			• (Statues of 3 march association Nos mes por)
				• What are the activities mentioned in the bylaws?
				• How would these activities work?
				• Mentioned in the bylaws:
				  • Organizing courses about gardening
				  • Organizing markets
				  • Organizing excursions
				  • Stimulating communication between participants
				  • Creating associations
				  • Supporting to create business plans
				  • Buying seeds and other gardening equipment

		Community accessibility to food network	Connection with LVV terrain which is part of the local food network (producing vegetables, selling materials)	• SAME QUESTION AS IN SYNTHESIS
				• What can this project attribute to the Bonaire food system?
				  • What are benefits for the local community?
				• How can this project attribute to the Bonaire food system?
				• When can this project attribute to the Bonaire food system?
				  • Market, selling products?
				  • Relationships made with companies, institutions?

	ECONOMY	Creating systems network and operating plan	Decision to find new people when participants haven't planted anything between 17/03/2022 and 17/05/2022.
			Missing element of making an operating plan.
				• What are the plans around creating an operating plan?
				  • What is the rule of swapping people after 2 months when nothing has happend on their plot. How will this rule be controlled?
				  • There are now 5 plots free. How will these be filled?
				• How would this work?
				• When would this work?

		Developing synergies with local business	Possibility to sell products on the LVV terrain (they already sell products as well) Possibility to work together with Bonaire Daily Fresh restaurant	• What are the possibilities to work together with LVV and with Bonaire Daily Fresh? • How would this work? • When would this happen?
		Identify lifecycle opportunities	Missing element	• What are possible effects of this project in the future on the Bonearian economy? • How would this work? • When would this work?
		Food shed job creation	• Volunteering positions of the board • Position of Saeed who gets payed by LVV (the government) • Other possibilities?	• What are possible (green) jobs created through this project? (board, facilitator position?) • How will this work? • When would this work?

OUTREACH	ECOLOGY	Regenerative site strategies	• Plants are part of the assocation when leaving, leave the ground clean when stopping the renting contract
			• Rules about producing plants and pesticides need to be taken into account as this is mentioned in the bylaws.
				• What do you mean with the rule around leaving the plot clean when leaving?
				  • How would this work?
				  • When would this work?
				• What are the rules around producing plants and pesticides?
				  • How will this be communicated?
				  • When will this be implemented?

		Ecoliteracy and stewardship	Missing element	• SAME QUESTION AS IN INTEGRATION: What do you think of teaching Ecoliteracy (the ability to understand the natural systems that makes life on earth possible). (Courses on natural systems for the general population) • How would this work? • When will the be implemented?
	CULTURE	Building relationships	• Every week meeting to work together (on Thursdays) in the garden, to give a course or to talk about experiences • Working together in one plot to start creating something on the field (all the participants can help in that one specific plot) (Lourens, 29 mar 2022)	• What are possibilities to build relationships? (Thursdays meetings, social hub, other possibilities, obligation to be present, advice from people with more experience) • How would this work? • When would this work?
		Fostering community resilience	• Weekly meeting on Thursdays to let participants meet • Separate committee are mentioned in the bylaws.	There is a terrain committee mentioned in the bylaws. • What should it be? • How should it look? • When should it work?

		Advocacy	• House rules will be written by experience (Participants meeting 1, 17 march 2022)
			• Permission need to be asked for elements such as greenhouses and fences (wind stoppers) as this is mentioned in the bylaws
				• What permission is needed to place greenhouses, shelters, fences etc. on the plots?
				  • How would this work?
				  • When would this work?
				• What are the house rules?
				  • How will they be made?
				  • When will they be made?

	ECONOMY	Developing economic incentives	• Making the participants self-sufficient (Board meeting 1, 14 mar 2022) • Missing element	• What do you think about developing economic incentives (participants who are selling products need to pay less rent, providing prices, volunteering fees etc)? • How would this work as part of the organization? • When would this work?
		Green job training	Connection with program Groenten en Fruit (part is to educate students about agriculture to increase the number of people working the agricultural sector)	• What is the connection between Program Groente en Fruit and Nos mes por? (Greenhouses in the neighbourhood, organising courses) • How would this work? • When would this be implemented?
		Creating opportunities for education and outreach	Connection with program Groenten en Fruit (part is to educate students about agriculture)	• SAME QUESTION AS GREEN JOB TRAINING: • What is the connection between Program Groente en Fruit and Nos mes por? (Greenhouses in the neighbourhood) • How would this work? • When would this be implemented?

ANNEX F: Overview of the workshop structure

Using the guidelines as examples made it possible to support the participants in the design process. This was done by using a mindmap as a template to let the participants fill in their ideas. As it is researched, designing with people without a background in design needs these illustrations to guide the design process (Boeijen et al., 2014). It was important to let the participants write down their thoughts as this is an element of the brainwriting method. This means that ideas are developed by building upon each other ideas (Boeijen et al, 2014), Moreover, the participants were asked to prioritize the most important strategy in each of the five categories.

TIME	TOPIC	TOOLS
10 min.	Icebreaker: Everyone can introduce each themselves by saying their prename and their favorite vegetable/fruit	
10 min.	Introduction to the workshop and explanation of the task and planning of the workshop. Provide an example of the task. The 4 rules will be explained and showed on the whiteboard	Whiteboard to show the complete mind map and the 4 rules
5 min.	Separation in smaller groups with a minimum of 3 persons and maximum 5 in one group	Each group gets their own color of pencils, participants will move to the table
5 x 10 min.	Each group gets 10 minutes to add to the examples on the mind maps. Every 10 minutes the groups will move to the next factor of success and write down elements. This will be done by using brainwriting where the participants can build on the ideas of the previous group.	5 separate parts of the mind map will be glued to a table to be able to write on it.
10 min.	Break where people can get home made awa di Lemonchi (lemon water)	Water cooler, ice blocks, lemon, mint, cups, sugar, water
15 min.	Every participant gets the chance to use one sticker in each of the 5 stickers of success to mark the most important guideline for them (most fitting for Nos mes por). At the same time the participants can read the guidelines and the examples written down by the other groups	5 factors of success which are filled with examples from the participants
15 min.	This time is needed to see which guideline the most stickers got in each of the factors. In each of the 5 factors, the 3 most chosen guidelines will be written down on the whiteboard and discussed.	5 factors of success which are filled with examples from the participants, whiteboard
5 min.	Closing down and possibility for the participants to use soil to plant one seed in their cup. Moment to receive feedback from the participants on the workshop.	Cups, soil, seeds

ANNEX G1: Analysis of the strategies of the experts of Curaçao

PROCESS (Find information about the process method they have used to set up their community urban agriculture practice, Urban Agriculture Design Process Spheres of Philips (2013))	PRODUCT (Find the influence of the process method on the spatial end results with visualization)	SUCCESS FACTORS (What are the success factors and how are they achieved, based on factors of success in urban agriculture from Gulyas & Edmondson (2021))	SUCCESS FACTORS (Characteristics during the process and by realizing the product to create success)	IDEAL/PERFECT SOCIAL LOCAL FOOD INITATIVES (Find missing elements in the methods explained before)	TIPS FOR BONAIRE (Advice from the experts on the context of Bonaire, based on their own experience while visiting Bonaire)
Method and techniques: • Syntropic agroforestry: This is a combination of trees and vegetables which work together in the form of a forest. It is growing trees in a polyculture what makes it an element of the bigger theoretical approach called permaculture. (Noosa forest retreat, 2020) • Hydroponics: growing food and plants without soil that uses supplying the plant nutrients trough water. The right mix of nutrients is chosen for each specific plant. (Philips, 2013) • Raised beds (Intensive agriculture): Intensive method using raised beds where seeds are planted in all directions used for a more two-dimensional method. (Markham, 2010) **Organizational:** Everything is planted in 1/2 days together with a group of volunteers Information sessions to inform the participants what the plan is • These moments are designed to inform and motivate people • The theory of the technique is explained trough learning by doing (Visser: taught concepts during the work days and provided a certificate for that) Whatsapp group is made to connect the people interested in the project (Eman, march 2022) • Facebook group is used as a social media campaign (Visser & Eman, march 2022) **Differences in maintenance of the gardens:** **1. VISSER:** Food for work principle (more working leads to receiving more harvesting) • One weekly participants working day on Saturday • Presence of initiator is needed to have participants show up • Volunteering fee is paid to the workers Positive image in social media (pictures from the working days, background information etc.) Open forest without fences • Process food to create a financial income to pay the volunteering fees (for example Moringa) • Low media attention with no mention of being free to take products (to stop stealing food) • --> Visser doesn't live in the neighborhood • --> Food production possible for 3 persons **2. EMAN:** Fruit and vegetables are used in food packets for the neighborhood • One monthly working day on Saturday Whatsapp group is not intensively used (sending a few pictures) Three employees are working in the garden every Tuesday (getting payed) • 2 volunteers are watering the plants every Tuesday (friends of the neighborhood) • --> Eman lives in the neighborhood • --> Food production possible for 50 families monthly by the combination of food forest, hydroponics and raised beds	1. Social location • A place where participants can sit down • Out of the shadow, but not indoors (under a tree or roof) • Integrated in the garden (in the center or behind the garden, thus walking through the garden is needed) 2. Open gardens • Everyone is welcome. No fences are placed (abundance) • Part of the environment • Natural routing trough the plot (Visser, march 2022) • In between two houses (Eman, march 2022) • Using a board (sign) to connect the environment with events (the working days for the volunteers) 3. Small location to store some equipment • Not all the equipment is stored because they are afraid of stealing equipments 4. Syntropic farming (food forest) • Provides a cool and closed environment because of the planting method • Closed environment helps to let participants feel connected with the garden (it's their garden)	**1. Large-scale** LAND SURFACE • 1 ha is needed to produce vegetables (this is possible in rural area's, in the city center it is more complicated) • Changing the perception of inhabitants, showing it is possible. This will result in more projects starting in the future in Curaçao PARTICIPATION • Volunteering fee (pay young adults a little more, train/educate them --> providing a course) • Maintain enthusiasm 1. Give enthusiasm space in the beginning, but set realistic goals 2. It's not easy, it's a work on the long term 3. Fully engage, take disappointments into account 4. --> Organize follow-ups (questions hours, return day with pictures) • Celebrate success 1. Its a process of growing and harvesting **2. Efficient** SYNTROPIC FARMING • Minimum energy results in a high number of production (watering once every week) • Planning of vegetable first and then fruit later --> you always have food Increase the VOLUNTEERING FEE to have more production • Selling products in the supermarkets (making a brand) --> creating workers for the garden (employees) WORKING WITH AI (daily measurements replace them with a sensor), saving time **3. Inclusive** People need to be POSITIVE about it, you need goodwill from the participants • Find a position for everyone to participate in the project (1 or 2 people can break the project) Include people with a DISABILITY, or that cannot come physically • If you work, you receive a token to get a discount in the shop (people are working for others) • Structural harvest: tasks that can be done at home (washing, processing) --> create economic developments for the neighborhood **4. Integrated** WATER • Syntropic farming is a method to store water in the soil • Collect rainwater SOCIAL ASPECTS • Multiple functions (food production, education, after-school care, business opportunities) • Government added mailboxes to receive mail, wifi installation **5. Safe** • Open garden to show that you trust people • Trowing away waste because it looks like an empty place --> Naming and shaming (social control) • Syntropic agroforestry is a method that is not contaminated for humans or nature	**1. Process** Educate people on how to maintain the food forest (learn people about gardening and food) • Infinitely patient and keep on explaining things • Put attention towards people that want to learn Make a planning for the coming years • Slow and fast growing vegetables and fruits Creating a vision to see what you want • Maintenance (the biggest time effort after the beginning) Syntropic agroforestry (method) Find funding (being independent) to be able to maintain the garden Socially and openly accessible (publicity) • Make it possible to learn from it • Abundance Being a local person • Speaking the language and culture • Talk with the people on a daily basis (casual talks) Leaving people in their value • Let them see their myths by educating them • They are part of a group and valued, everyone contributes • Create social control (everyone cares about the project) **2. Product** Freely accessible (part of the city, abundance (producing enough to feed everyone)) • Everyone is welcome Swimming pool to catch rainwater Design of the map was done to create awareness around the project Syntropic agroforestry has a simple design that isn't sexy Access of amenities (water) is useful • Real storage place (for larger tools)	**1. Process:** ECOLOGICAL • Regenerative: able to feed people (building up elements) • Holistic part of urban design • Water management integrated in the neighborhood • Collecting grey and rainwater • Creating edible green ECONOMICAL • Recognition of the government • Being more confident about the project, less pleasing people • Infrastructure is made (both for the workers as the harvests) • Money can be used for infrastructural changes (repairing roads etc.) • Circular economy inside the neighborhood CULTURAL • Being careful with complaints of participants **2. Product:** VISUAL DESIGN Fence • Let the workers feel they are doing something that cannot be taken away PLEASANT PLACE • Fun to do • Fresh oasis in the city (away from the heat) because of the big number of plants which provides cooling	**Tips for Bonaire:** Method syntropic farming (fruit) combined with hydroponics (vegetables) • Water supply • Dedicated piece of land • Closed environment (not completely) • Make it clear where people are working for Wind and dry is more extreme in Bonaire compared with Curaçao • Shelter or biomass is planted to counteract the wind Whole biodiversity needs to be taken into account • Biomass flower for the bees • Holding extra water in the soil (Extra attention towards this) • In the garden and around it Clear options for biological pesticides • Comes in the groundwater and destroys fauna and flora • Bad for the coral reefs (land influences the water) Find funding to start the project. This is needed to start the project Start with a small team (core team)

ANNEX G2 : Results Analysis of the strategies of "Mi mes hofitu"

WHO (The role in Mi mes hofitu and the personal engagement)	PROCESS of starting Mi mes hofitu (Find information about the process of creating Mi mes hofitu, the set-up of Mi mes hofitu)	FRAMEWORK URBAN DESIGN SPHERES (Integration of the 3 sustainability themes)	SUCCESS FACTORS (Find success factors of participants and what is needed to achieve them)	PRODUCT (Analyzing the way of working of the association, find the influence of the spatial design)	PROJECT FAILURES AND SUCCESSES (Find failures and successes of Mi mes Hofitu (LEARNINGS))
Common characteristics: • The interviewed people all had experience with planting before joining Mi mes hofitu • The passion to grow plants is the biggest motivation to join Mi mes hofitu • Relationship between the interviewees	**The first months of Mi mes hofitu** In the beginning a course was organized to learn the basics of agriculture • This group could share this information with the new participants (creating a basic knowledge of agriculture in Bonaire) • Experts where present to educate the participants (one person with an agricultural background and one with an educational (teacher) Weekly meetings where the participants could come together to talk about practical and technical aspects of planting • The participants received their own greenhouses (for free) to start planting in their garden • Combined with house visits (monthly) to receive personal advise It was a natural process to have more members (people from Rincon showed interests) • The number of members exploded when they heard about Mi mes hofitu (high number of motivated people) First board with a president, treasurer, secretary • Everyone knew their specific role and what to do • Started in the garden of Maria with 5 participants all connected with Maria Koeks, motivated people who were already planting in their own gardens **Funding** Buying seeds and materials from LVV • Selling these products at the members to create a financial budget for the association --> Be able to buy new seeds and materials for the members Social neighborhood association in Rincon was asked for funding (partly governmental) • Easy access to ask for materials • Funds • Received the greenhouses from this social organization **Goal of Mi mes hofitu** Make Bonaire less vulnerable to imports • Produce own fruits and vegetables as a society by working together • Everyone knows each other in Rincon (social community already present because it is a village) • Trade products between the people (one person paprika, another tomatoes) The goal was to start planting with local people • Learn about the old techniques of planting	**Ecological** • Recycling is possible in Bonaire, but it isn't commonly used yet **Culture** • All the official contact in Mi mes hofitu went trough the president (Gracia) • She was the connection between the association and Rocky (expert of LVV) • Meetings were planned throughout the previous meetings (informal contact, no planning ahead for months was needed) • It was a fixed day and time each week • Contact with other people active in the agricultural world were made trough meeting people on the island in an informal way (it is a small island) • Constant contact with each other outside of meetings by going to each other houses to help out in the garden **Economical** Paying a membership fee • To pay products and materials as Mi mes hofitu (seeds, soil, materials) for the participants • Drinks during the meetings (sometimes) Funding from other association of the Netherlands to buy materials for Mi mes hofitu	**Necessities to create successful organizations (EXTERNAL CONDITIONS):** Goodwill from the members • People who can do something (want to be included) Perseverance to start this type of organization Everyone need to be the same (no hierarchy) • Don't feel smarter than the others People who have a background in writing project files to receive funding • Receiving funding is not easy in Bonaire Start with giving courses at children to educate them about agriculture Continuity within the organization (This is a general problem in Bonaire) • Local people need to be able to have higher positions in companies (don't let these positions be taking away by Dutch people) • Fitting work opportunities for everyone need to be created to make people feel connected with their works. Coaching is needed to create this	**General activities** Weekly meetings (Location) First: organized under a tree of Maria Koeks house • Later under a tree in another members house • Being able to see how the garden is working from that specific person where the meeting is held • Last location: Moved to a location behind the museum in Rincon • Outdoor location under a tree because everyone can visit this (open and cool environment because it is covered). Bonairians are people from nature In 2020, Mi mes hofitu received a piece of land from the government • Possible to host meetings and to plant together **Content** Sitting in a circle • Talking about what the members are growing in their own gardens • Showing the harvest of the members • Possibility to sell/trade these products Conversations between every member to ask questions (in a smaller group) • Participants helped each other out with giving tips and sharing information No obligation to be present each week (it was voluntary, a hobby) Talking about the personal situations **At the members homes** Participants received a free greenhouse Visitations of Rocky when they had questions (personal help) Working together by sharing time • Goat feces of the person who own these animals can be used a fertilizer in members greenhouses • Asking for help and power when you have less strength (gender) **Other activities** Harvesting festival together with LVV for the youth. Connection with Rincon • Organizing a market to sell products from Mi mes hofitu to people in Rincon Selling materials and seeds (gardening tools) • Receiving a discount to buy materials by paying membership fee Sometimes going to visit agricultural places in Bonaire (farmers)	**Failures** Too fast growth of Mi mes hofitu because of extra free greenhouses (selected not so motivated people) The implementation of the new board (they let go of the existing structure) • They were looking for power (not the correct motivation) • Hierarchy (board feels better than participants) • Obligation to be present during every meeting (not a hobby anymore) • Not listing to the members and their ideas (problem with power, not being able to express your ideas) Shared agriculture location available for Mi mes hofitu (allotment gardens): • More difficult to walk to one location instead of growing food in your own garden (participants are older than 60+) • People in Bonaire already have ground around their house to grow food **Successes** Monthly check up from Rocky Emers during the weekly meetings (check-ups) The initial goal was to provide knowledge about agriculture what makes to project continue without an association There was a friendly vibe between the participants (it was fun) • They are friends and family from each other because the association became bigger by inviting friends of members and Rincon is a village where everyone knows each other Every member was equal. No separation between board members and normal members. Everyone could talk during the meetings • Feeling useful to help others with agriculture (Making the life of some members easier by helping them save money) Working together to stimulate each other to keep going • Regular contact between the members trough the telephone or in person • It was a group of people of whom you could learn from because you had contact with each other • Doing everything together (LVV workers, participants, board) • Motivation and enthusiasm to keep continue growing plants **Future necessary implementations** Having the possibility to ask small questions about agriculture to experts (lack of coaching people throughout the process of agriculture) Experts in agriculture need to be present to provide information to guide participants Having a friendly and pleasant group of members • Creating a good social environment (it's all about the people)

ANNEX H : Spatial (ecological) analysis of the terrain of "Nos mes por"

Environmental topics by Philips (2013)	General information for agriculture in Bonaire	Information about the agriculture situation on the LVV terrain	Current design challenges in the community garden of the LVV terrain
Hydrology	Irrigation is needed, because there is not enough rainwater to grow vegetables without giving extra water (Lotz, Debrot, Neijenhuis, Stanghellini, et al., 2020)	G**rey water** can be given. This is cleaned wastewater from the clean water plant which is located on the LVV terrain (Lotz, Debrot, Neijenhuis, Stanghellini, et al., 2020) • Water usage for vegetables: cleaned grey water is used to grown vegetables (Lotz, Debrot, Neijenhuis, Stanghellini, et al., 2020) • Not allowed to be used with leafy vegetables such as spinazie, amsoi, warmoes, sla, selderij, radijs, watermeloen and onion. Only vegetables you cook are allowed to be irrigated with this water (Openbaar Lichaam Bonaire, 2014) • If being used, you can only use it with a drip system because direct contact between the food and the water is not allowed (Openbaar Lichaam Bonaire, 2014)	Currently, there is a water connection with the grey water reservoir of LVV • But there no working pump during the weekend. This means that there is no certainty that water is available
		Ground water from the well can be used (M. Adriaens, personal communication, 21 mar 2022) • Ground water is often too salty to grow vegetables through the high evaporation and transpiration out of the soil (Lotz, Debrot, Neijenhuis, Stanghellini, et al., 2020) • Ground water in this well has a salt level of 2000 mg/k. This is at the border of being too high, but there is no knowledge on the long term effect (M. Adriaens 21 mar 2022).	This element is not present in the current design of "Nos mes por"
	There is on average a low amount of rain. The rain season is from September till January 550 mm a year and 371 mm of water is collected during the rain season. • There are high differences between maxima and minima. • This makes it difficult to predict how much rain and where the rain will fall (Dienst ruimtelijke (Openbaar Lichaam Bonaire, 2014)	**Rainwater** can be used to grow vegetables on the island (Lotz, Debrot, Neijenhuis, Stanghellini, et al., 2020) • There is little infrastructure to collect rainwater in Bonaire (Lotz, Debrot, Neijenhuis, Stanghellini, et al., 2020)	This element is not present in the current design of "Nos mes por"
Soil	The soil exists out of limestone deposits which are formed by corals (limestones) (Openbaar Lichaam, 2014)	The community garden on the LVV terrain is located on an old dam	The location on the old dam will results in problems with a water captivating soil. • This is especially dramatic during the rain period because the terrain is going to flood (B. Emer, personal communication, 07 April 2022)
Vegetation	There are possibility to grow vegetables that require less water. However, there is no convincing research about this topic conducted (Lotz, Debrot, Neijenhuis, Stanghellini, et al., 2020)		
	Creating salt resistent vegetables which can survive on brackish water is being researched in Bonaire (Lotz, Debrot, Neijenhuis, Stanghellini, et al., 2020) • There is a recent project about this on Bonaire. This is creating "ijskruid" and Aloë Vera (de Jong, 2019)		
	Growing food in greenhouses is a present solution (Lotz, Debrot, Neijenhuis, Stanghellini, et al., 2020) • There are vegetables which are complicated to grow inside a greenhouse, but it is possible to grow them. Examples are tomatos, kousenband, pepper (van Almenkerk & Wayaká Advies, 2018) • There are easy to grow vegetables inside a greenhouse. Examples are Okra, Spinach, Snijbiet, Tajerblad, Paksoi, Rucola (van Almenkerk & Wayaká Advies, 2018)	There are 2 greenhouses ordered for the community garden on the LVV terrain • 2 x 1000 m^2 will be implemented on the terrain in the future (M. Adriaens, personal communication, 1 April 2022)	This element is not present in the current design of "Nos mes por"
	Growing food by using hydroponics is a present solution (Lotz, Debrot, Neijenhuis, Stanghellini, et al., 2020)		

Habitat	Insects and pests are eating the vegetables (van der Geest & Slijkerman, 2019b)	Pesticides are sold and used in the garden of the LVV terrain • The products are at chosen based on the least dangerous impact for the nature. This means that they are based on biological products and they need to dissolve after 3 days or less (M. Adriaens, personal communication, 4 April 2022) • Pesticides are commonly used in Bonaire. This is bad for the coral reefs (C. Eman, personal communication, 31 March 2022)	Pest are widely present in Bonaire and they are also used on the LVV terrains (M. Adriaens, personal communication, 4 April 2022)
	Free roaming goats, donkeys, iguanas are eating vegetables (van der Geest & Slijkerman, 2019b)	Fence is needed to stop the animals from entering the community garden on the LVV terrain (van der Geest & Slijkerman, 2019b) • The fence is built on 9 October 2022 • Growing vegetables in a greenhouse is possible and already happening in other gardens on the LVV terrain (van der Geest & Slijkerman, 2019b)	There are problems with loras, iguanas, goats, donkeys that eat the food • A fence is built to stop this problem with the free roaming animals
Air quality	There is a constant trade wind of 6-7 m/s from the (N)east in Bonaire (Openbaar Lichaam Bonaire, 2014). • There is no data available on the effect of this wind on the air quality		
Solar orientation	The sun goes from E till W (Worlddata, n.d.) • The annual average value of solar irradiance is 2125 [kWh/m2] in Bonaire (Sun et al., 2016) • Due to the tropical climate, there is no seasonal fluctuation in the topic of solar irradiance. Thus, there are no real seasons in Bonaire (Sun et al., 2016) • There on average 12 hours of sun during a day (Worlddata, n.d.)	Shadow hall can protect people against the sun • The goal is to implement 2 x 1000 m^2 shadow halls on the terrain in the future (M. Adriaens, personal communication, 1 April 2022)	There is no shadow on the terrain. Only 2 plots have shadow during the day • This creates a warm environment to work
Renewable resources	There is a project about FreshWaterMill water for desalination of water by using hydraulic energy for the east side of the island. This is located by Washikemba and Punta Blanku (Lotz, Debrot, Neijenhuis, Stanghellini, et al., 2020)		
	There are 3 materials which are used in often and naturally produced in Bonaire (Booi, 2015). These are: • Wood (clink with the Indian's ancestors) • Limestone • Cactus		
Open space	25% of the surface in Bonaire is suitable to grow food (van der Geest & Slijkerman, 2019b)	The community garden is a part of the LVV terrain. • Connected with the vegetable gardens of LVV • There is a connection with water treatment plant which is located on the LVV terrain • The community garden is surrounded by open nature	There is no clear parking available for the members of "Nos mes por". This makes it difficult for the participants to visit the community garden (Meeting with board and participants, personal communication, 17 March 2022)
	Fences are needed to stop the animals from cultivated pieces of land (van der Geest & Slijkerman, 2019b)	There is currently a fence built to stop the free roaming animals from entering the garden. Thus, the community garden is not an open terrain	There is no clear gateway made to open the fence (Meeting with board and participants, personal communication, 17 March 2022)
Climate	Dry tropical climate with alternating dry and wet seasons The average temp 27,5°C (KNMI - Caribisch Nederland, n.d.)		
	On average there is little rain in Bonaire • Average rain: 550 mm/year (KNMI - Caribisch Nederland, n.d.) • Dry season: February till June (KNMI - Caribisch Nederland, n.d.) • Rain season: September til January (KNMI - Caribisch Nederland, n.d.)		
	Erosion is a problem in Bonaire • 9 months per year a strong wind is present in Bonaire. • This results in problems in areas with no greenery because less vegetation leads to less infiltration capacity. • This makes the soil vulnerable for water erosion (Openbaar Lichaam Bonaire, 2014)	Dike around the community garden is too low to stop the wind (S. Lourens, personal communication, 14 March 2022)	Participants are building own palisade to stop the wind. This is not allowed based on the House rules of “Nos mes por”

ANNEX I: Outcomes of the reflection session with the participants of “Nos mes por”

ACTION	OBSERVATION (PMI method) from the participants		
	Positive features (Plus)	**Negative features (minus)**	**Interesting**
Role of the researcher (me)	• Advantage for the organisation by the enthusiasm • It works as a push for the group • It is good for the project • Really good • The researcher is really good		
Social media	• It is motivating • This is a good idea to stay in contact with each other • This is really good • This good for communication • Really good • Good		• Email is a way to share documents
Weekly meeting	• It is good to do this weekly to be able to see each other each week • This is easier to share information and events happening on the terrain • This is necessary • This is needed to make progress		• Keep on improving the weekly meetings
Group discussion with the board	• This is a way to stay updated with the current elements happening • This is necessary • This is way to highlight solutions for problems	• There has only been one workshop the persons knows off. He was not connected with another meeting	• This is not needed to be organised every week
Workshop with the participants	• Inspiring • This is a method to stay updated with the current information • This is very good • This is good and there are many points to learn from • The information received could have been used earlier because it is valuable information		• More of these workshops are needed • Workshop should be organised more frequently
Motivating participants trough telephone contact	• Motivating • It is better as more people are planting • It is good. This is a way to continue if people don't show up • Choose new persons if the persons are inactive	• You have to put a deadline for each plot, to give the persons on the waiting list also a change	• Ask about the motivation of the people to be inactive
Social hub	• Excellent. This create solidarity. It brings the group together • It is good to come together in a social way • Good	• The current social hub can be better. The group is waiting for the official location to be made	

ANNEX J: Comparison with the key characteristics of SIDS and the guidelines in the process timeline

Connection with the key characteristics of SIDS	Phases	Phase 0 First steps	MILESTONE	Phase 1 First month	MILESTONE	Phase 2 Within 2 months
Remoteness and isolation (trading problems while having an unique biodiversity and culture) • Different small steps are used to reach the goal of including people in the project in a gradually way. This can be explained by using more phases in a process to provide more opportunities to adapt elements. • This is useful to do because a sensitive culture can be easier disturbed.	Culture (society)	Use social media to connect members and to share information	Hire a facilitator to guide the process	Make a social hub to create a core team of members	Create a core team of participants	Contact motivated participants to create a magazine
Remoteness and isolation (trading problems while having an unique biodiversity and culture) • Extra guidance is needed to support everyone in the society. This is crucial because the islands are isolated what means the society is small and easily affected				Provide guidance around gardening		Create alternative ways of transport on the terrain (provide help)
Remoteness and isolation (trading problems while having an unique biodiversity and culture) • Making an organisational structure can help to create a working project. The remoteness makes it difficult to learn from existing cases. Therefore, making a clear guidance and organisation can help		Create an organizational structure and rules		Continuously create and adapt the house rules → Make overview of participant's plans		Instal a terrain committee
Remoteness and isolation (trading problems while having an unique biodiversity and culture) • It is crucial to bring the different people together in the society by organising events. The society is rather small and sensitive what makes it more important to create a good relationship between the members by including everyone		Organize weekly meetings to connect the participants with each other		Increase the number of meetings with members		Make a complete board with motivated and available people → Organize a general assembly to discuss plans
Maritime environment (touristic benefits while being vulnerable to climate change) • The SIDS are seen a places located in water-stressed locations and the high risk of climate change will be particularly affected by this (Gheuens et al., 2019). A focus on the water system in the first phase can be useful to think about the water-scarcity	Ecology (environment)	Built an independent water system		Maintain the water connection with LVV (collaboration)		Create a plan for renewable energy on the terrain
Remoteness and isolation (trading problems while having an unique biodiversity and culture) • The unique biodiversity makes it crucial to create a garden typology that is suitable for the location and the needs of the participants		Define the typology based on the needs of the participants → Adapt the design based on execution of the plan		Encourage the facilitator from LVV with agricultural knowledge to provide support		
Maritime environment (touristic benefits while being vulnerable to climate change) • The high vulnerability to climate change, makes it important to provide information and guidance for the members to prevent harming the environment		Focus on promoting gardening as an amateur		Give information on planting in a natural way (ecosystem)		
Small island (impact on resources and a low economic diversity) • It is useful to stimulate the members to create companies because this will help in creating more economic diversity	Economy	Provide possibilities to start a business on the plot		Stimulate own food production → Harvest can be sold trough LVV		
Small island (impact on resources and a low economic diversity) • The company garden can be used as a financial opportunity to create profits by including payed jobs. This will create more diversity in the economy.		Pay a facilitator to steer the project		Make a year planning → Organize events to work in the garden		Make an operating plan → Motivate members to be active trough personal contact
Remoteness and isolation (trading problems while having an unique biodiversity and culture) • The isolation makes it difficult to trade elements because the other places to sell are only reachable by water or air. Therefore, it is central to built an own finance budget to be less depending on others		Install a monthly fee to create a financial budget		Sustain the relationship with the government		Find funding

ANNEX K: Comparison with the key characteristics of SIDS and the guidelines in the strategy map

Key Characteristics of SIDS and the process strategies

Success factor (Gulyas & Edmondson, 2021)	**Small island (impact on resources and a low economic diversity)**	**Remoteness and isolation (trading problems while having an unique biodiversity and culture)**		**Maritime environment (touristic benefits wile being vulnerable to climate change)**
Inclusive	Include a small location to store some equipment (by doing this, every member will have access to tools and equipment to work in their garden) • This is even more valuable knowing that resources are more expensive and difficult to get	Make open gardens (spatially) without fences • This is needed to integrate the inhabitants in the project as the island is isolation and thus many people know each other	Accept everyone's values • The unique culture makes it more important to accept everyone	Make the garden part of the environment so that everyone can receive information (clear routing, outdoor signs etc.) • This can provide touristic benefits for the people connected with the community garden
	Sell materials and seeds (gardening tools) • The difficulty to receive resources makes it more complicated to get materials and seeds	Everyone need to be the same • Respecting everyone is a remote island is important in a SIDS because the social connections are more sensitive and they have bigger influences on society	It's a hobby (no obligation to be present during every participants meeting) • Its an unique and sensitive society what makes it more difficult to force people	
	Create abundance so that everyone feels welcome (create enough food for every participant) • Based on the limitation in resources, it is critical to be able to include everyone	Include people with a disability or that cannot come physically • The people with a disability are more standing out in a smaller society and therefore more attention is needed to include them	Find a position for everyone to participate in the project • The remote culture makes it critical to let everyone participate in the project in a fitting role	
		Let the project be directed by a local person • The unique culture is often influenced with an colonial background what creates a separation between local and non-locals		
Integrated	The garden has multiple functions and is therefore integrated in the community (food production, education, after-school care, business opportunities) • The garden should have multiple functions as the available space is limited because it is a small island	Use social media to make the garden an example (create publicity) for others to learn form • The isolation from the world makes it more difficult to gain knowledge. This can help in spreading this information easier		Put extra attention to water connections • This is a challenge because the islands are located with salt water around them what is not drinkable
	Connection with practical functions in the area is needed (for example a wifi connection) • The garden should have multiple functions as the available space is limited because it is a small island	Organise a market to sell products from the garden to the people in Bonaire • This should be done to make the islands more self sufficiency and thus less vulnerable to trading		It is needed to create edible green (not just green, it need to be food) • Climate change is affecting these islands and therefore focus should be on producing as much food as possible
	Money that will be generated through selling the products can be used for infrastructural changes in the garden (for example repairing roads etc.) • There is little economic diversity therefore this project should create direct financial benefits	Visit agricultural places on the island (farmers) to exchange ideas and to learn • This isolation from the world makes it more important to learn from direct resources on the island		
	Create a circular economy inside the garden (economy inside the garden, nothing goes to waste) • There is little economic diversity therefore this project should create direct financial benefits			
Safe				Prevent trowing away waste inside the garden because it looks like an empty place • Trowing way waste should be prevented to help to fight climate change
		Design an open garden to show that you trust people • This trust is crucial to be accepted in the community		Use agroforestry (food forest) as a planting method because it creates a natural ecosystem (it uses the rules in nature) • This planting method can help in protecting this maritime environment and should not negatively influence climate change
		Prevent food products being stolen by people who are not connected with the garden • As trading problems are common, more people suffer from lack food		
Large-scale	Dedicate a large area to cultivate to produce vegetables for multiple people • This is crucial as the islands are more depending on trading to receive food	Make a location without fences inside the terrain, create an open space • This is needed to integrate the inhabitants in the project as the island is isolation and thus many people know each other. This can help to have let more people participate in the project	Organise events • This is way to connect inhabitants by putting focus on bringing them together. This valuable to create a social location	
	Include a payment (volunteer's allowance, employment ect.) • This can help to provide more economic diversity in SIDS	Make a social hub • This can help to have more people participate in the project as this more complicated in a place with a sensitive culture	Use social media to post pictures from the working days, background information etc. (To make a positive image) • This is way to connect inhabitants by putting focus on bringing them together.	
		Build a pleasant place to be in • This can help to be included in the unique and isolated culture in each of the islands	Organise weekly meetings on Saturdays • This can make it easier to connect the people on the island as the society is small and sensitive	
		Setup regular (daily) contact between the members trough the telephone or in person • This element is easier in a isolated place such as a SIDS and this can help to bring people together	Educate the members with knowledge on agriculture • The remoteness makes it more difficult to gain knowledge from other places	
Efficient	Implement a high volunteering fee to have more production • This will help to create more economic diversity in SIDS	Use agroforestry (little energy is needed to create a high food production thus minimal water is needed) • This makes it easier to produce vegetables and fruit in SIDS and help to fight the trading problems	Use plant products that require less maintenance (herbs, fruit trees etc.) • This makes it easier to produce vegetables and fruit in SIDS and help to fight the trading problems	Protection from the sun by using trees (agroforestry) • The climate makes the working conditions more extreme to work in and thus providing shadow can make it better to work
	Make a brand to have extra employees by selling products in the supermarkets • This will help to create more economic diversity in SIDS	Create a vision to see what you want as organisation • This can provide help with the uniqueness culture of the island by seeing what fits the local inhabitants		Work with AI (daily measurements replace them with a sensor) • This will it easier to work with changing factors of the climate
		Include experts on the topic of agriculture in the organisation to coach participants • This is essential as the island is isolated and thus it is more difficult the spread information		Make a planning for the coming years. By doing this, you can see which food can be harvested in which time • This can help to think about the future conditions and how they will influence producing food