

REFLECTION PAPER

Project title: **Sint Maarten: Construction independence.**

Subtitle: **Rebuilding a resilient community with a circular neighborhood intervention**

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INTRODUCTION

I am fascinated by the circular economy and the reuse of material in architecture, because I think this is my way of contributing to a better future and livable world as a designer. Throughout my master degree, sustainability played a crucial role and studying the urban metabolism had my attention in previous projects already. For my graduation, I wanted to develop myself more into research and design methods touching upon this topic. By coincidence the Sint Maarten came up as a topic at the graduation studio. It grabbed my attention directly as it showed a lot of potential for studying urban metabolism strategies. It had a clear scale, clear system boundaries and it struggled with a linear economy on a systematic scale.

This is why my graduation revolves around the reconstruction activity on Sint Maarten after hurricane Irma September 6th 2017, using an urban metabolism approach. Throughout the project it had been a constant aim to integrate material flows in the research and design process. Essential to my research is creating a systematic overview of the flows of material on the island and understanding the culture behind those flows.

The project aims to find opportunities for architectural interventions that can transform Sint Maartens linear economy to a circular economy by decreasing in and outflows of materials and reusing (building) material locally. It should increase communal resilience during reconstruction after hurricanes. It does so by creating communal material awareness in an informal, self-build community. The project that started out as a recycling hub, but developed to be a adaptable building system that can house multiple programs throughout uncertainties over time.

RESEARCH AND DESIGN

Reflecting upon the outcomes of the research and design, the project looks for a building system that integrates both common waste streams on the island and introduces a cheap low-tech building method. It does so in the act of building and in the program: recycling materials into manageable streams and new products. This project researches an MFA (Material flow analysis) and analyses local needs. In the scientific field these topics tend to stay disconnected. Within the project both topics merge. The project aims to increase communal resilience towards reconstruction after hurricanes though creating communal material awareness in a largely self-build community.

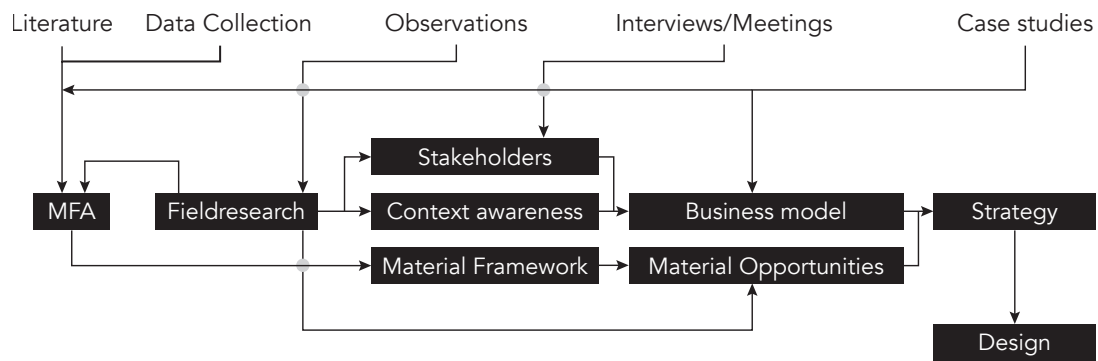


Figure 1: Diagram of methodology

The methodology as set up in the first semester can be found in figure 1. Early on in the process it became apparent that the MFA itself and the paper written about the subject would not suffice to pose all the solutions on an architectural scale. The MFA proved to be a very useful method to analyze the context. It could also be used as a tool to project programmatic solutions on the island. However other methods were needed to come to a meaningful design. The observations, interviews and data collection on fieldtrip provided crucial information to add qualitative input for a design.

To find architectural input the position paper was of aid. This revolved around the question: How can a MFA be linked to the communal appreciation of now valueless materials on Sint Maarten? Analyzing the chosen plot and the needs of its inhabitants gave a firmer position on how to address the problematic in a physical manner, on a neighborhood and building scale. This is comparable to the methods Rural studio uses. They state: "The best way to make real architecture is by letting a building evolve out of the culture and place (Dean, n.d.)."

After the fieldtrip, the research became less systematic and more applied to the needs of the people of Sint Maarten. It made way for case study research, site-specific problem analysis and scenario thinking. Through conducting interviews with (local) stakeholders a clearer image of the material culture developed. During fieldwork with the Red Cross I talked to people in need of a new roof. This made me realize the current building culture was often informal. There is a lack of funds, construction knowledge and government aid. Therefore, the materials and techniques used in the build environment lack the quality needed to function well in the local climate and often failed to withstand hurricanes as well.

This realization became the spine of the project. The researched materials in the MFA needed to support the local needs of the people: a cheap, easy, flexible building method that could facilitate both housing and commercial programs. From this realization came the idea to develop a building system with the researched materials that people could easily adapt to their needs, whether they need a house, office, workshop space or just a canopy to meet and shelter from the sun and rain. In that sense, the systematic approach formulated in the first quarter evolved to a physical system.

Building is an informal process in many of the neighborhoods of Sint Maarten. This made me realize the role of the architect is different here. He needs to become the builder and communicator of the building process. As people on Sint Maarten often construct their own build environment, they act as designers and builders themselves. The ability to understand this process and to convey a design to untrained, illiterate builders is there for very important. The added value here is taking a participatory approach. The designer needs to present very clear, engaging representations of the intended design and building process. Best is that he is physically engaged in building the design as an inspiration to the community and to prove the value of the design.

Circularity

As broad as the term is, it plays an important role in the project, both in the research and the design process. For me, circularity embodies mainly a set of ideas and tools to improve resource efficiency by mapping and integrating local materials into a design and finding economic opportunities for recycling on a local scale. This mode of thinking is common in Europe, yet very unknown on Sint Maarten. Realizing this, the focus in the project changed from the main goal, towards a strategy to improve the quality of neighborhoods. The program that was intended just to close material loops and create more economic diversification evolved to be more than that. The farm and material hub are clear spinoff programs directly from the MFA. The communal farm converts food waste to fertile soil and grows vegetables. The material hub turns technical material waste streams into local building products or bales that can be shipped efficiently to recycling factories on neighboring islands circularity is of great importance in the design as well. A great deal of the material is locally sourced or recycled. Think of the gabion walls filled with local construction debris, locally harvested wood beams for the timber construction and shingles produced from locally harvested and recycled plastic.

Time and adaptability

Time plays an important role in the project. Through time the program and needs of the community will change. The design should therefore be adaptable to different types of use. This has been an important agenda point that came up during the design process and was often in the back of my mind looking for appropriate design solutions.

RELEVANCE

Studio (architectural engineering) and master program

The studio's focus and field of interest is very much in line with my fascinations. Circularity is a widely discussed topic both in the master program and in the graduation studio. Also, architectural quality and the added value of architecture in the build environment is discussed often. I am very glad that the studio offers specific research guidance in the area of "flows". In the research phase this was of great aid in developing my knowledge on material flows, how to research and implement use of waste into the design process and to analyze and implement systematic interventions.

Architecturally the tutoring had been focused on developing a vision. Central to the tutoring were defining, specifying and conveying rules and the agenda points of the project. This and appropriate use of technology in a different context has been a much-discussed topic throughout the graduation year with both tutors and other students. This helped me to develop my position as a designer in a manner I didn't expect. I think this is very valuable for future projects.

The building technology tutoring allowed me to research and develop the project in a more technical manner. Here sustainability has been a focal point where I was able to develop and study the topic and design in greater detail. On this scale scenarios and thinking in extreme uses enabled me to test whether the building method allowed for the different programs intended.

Scientific transferability

The project stands out in the strong relationship between a systematic, quantitative approach supported with a very qualitative approach in understanding stakeholders, local users and building culture.

Research about the urban metabolism and the critical system thinking behind this are commonly conducted in European contexts and hierarchically organized communities, but are lacking within informally organized communities. Critical systems thinking has set out a variety of methodologies that can be used to promote successful intervention in complex societal problem situations (Jackson, 2001). That's where my project has added value. It combines the systematic research with research methods that generate a local awareness. This makes it more likely that the project will be embraced by the local

people. This method will hopefully generate a project that adds more than only an improved urban metabolism, but also add value for the community.

The professional context and the role of the architect

Resource efficiency is an important topic in the construction sector, where momentarily resources efficiency doesn't mean more than using linear materials in an efficient manner to cut costs. This is not a culture that we can maintain for long.

I see that the urban metabolism approach, resource efficiency and reuse of materials is getting more attention in architectural practice. For example, Rau architecten, Superuse Studios, Studio Marco Vermeulen, SLA and Overtredens W, to name just a few, already dedicate their research and designs fully to the reuse of materials in Dutch contexts. The Material Flow analysis is a universal tool that can be utilized in every context a designer operates in as it is simple and graphically universal. It proves to be valuable to communicate about and to physically improve resource efficiency in construction also in the context of Sint Maarten.

The role of an architect in an informal context is different than in a developed context. In the informal context architects need to use the materials to provide the basic needs of people in the first place. An architect in that sense facilitates the basic conditions to build a stronger community. He needs to become the civilian and conduct research to the needs and capabilities of the community. His design follows their needs and capabilities. He uses his knowledge and skills to facilitate the development of a community and provide its basic needs. Fieldwork with NGO's and cooperating with local partners is in this process is essential. They know the community well. Conducting interviews with the Red Cross and other stakeholders proved to be very valuable to understand how the community lives and builds and how they use materials. The close relationship and corporation we had with the Red Cross was key to outcomes of the design.

Ethical issues

Sint Maarten is a young democracy. In 2010 Sint Maarten has become an independent country. Until today the country has been struggling with political instability and corruption. There is no clear policy on circularity for instance and people in the researched neighborhoods sometimes have a fragile political status and cannot count on governmental support. This project intends to aid the less privileged on the island. As of now the political climate might not support this kind of developments full hearted.

Another issue regarding the political climate was gathering data. This proved to be hard in the current climate as trustable data were sometimes hard to obtain or outdated as the government doesn't gather and share data consistently.

Looking ahead

The final period of the graduation will be used to strengthen the integration of the research with the design. The final stage of the design elaborates the relationship between the place and the buildings. Further focus will be put on how to implement strengths of the building system I developed. In the final stage I want to show how this is of added value to the neighborhood of Sucker Garden.

Also, I want to develop the technical drawings in a way that they can be understood in a universal way. This means that is will develop of the drawings in such a way that the design be built directly from the drawings.