Reflection P3&4 AE Graduation Harvest Studio

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Introduction

This reflection paper describes the way how the research from P2 is translated into the design process and the steps that were needed to get to the final result during the periods P3 and P4. It also reflects on other aspects, like how this projects fits into the practice of the design studio Harvest, the scientific relevance of the project, the way the project is embedded in the social context of Parkstad and lastly ethical dilemmas that appeared.

Process P3 & P4

After my P2, I had to still distil what exactly my project was about. All the information was not clearly categorized yet. So my tutor, Anne Snijders, recommended me to make an oversight of the growth of Miscanthus x Giganteus (MxG), the amount of yield and the buildings that were needed at a certain time. This was a tedious process, however the result gave a feeling of comfort and clarity.
Also during a short group presentation of the results of the P2, it became clear that certain aspects of my proposal (location and program) needed a second thought. I noticed it wasn't just me who struggled with having a clear storyline. I think it just takes time to translate the logic of a written paper into a project that is nested in the real world. So I changed my location and found a place that is more in line with my story. Namely the former Willem Sophia minestone pile in Kerkrade near the German border. And the program is purely focussing on the process and growth of Miscanthus.

But then still there is the question of the how and why. I think the method I have chosen, namely to spread the MxG over 'empty' plots of grassland in Parkstad seems legitimate. First of all grasslands only absorbs 3 to 4 tonnes of CO_2 per hectare and MxG absorbs a tenfold. Then the notion of 5.000 ha of grassland makes up a quarter of Parkstads surface area. And what is the function of grassland? In my paper I distinguish 4 types of grassland: industrial sites, alongside infrastructure, empty plots in the urban fabric and grassland meant for livestock. All are more or less vacant and since Parkstad is a shrinking area, these plots of land will not likely be filled in soon.

But these plots are spreaded across Parkstad and are of different seizes. A grid of pixels of 100 by 100 meters is superimposed over Parkstad in North South direction. This grid makes it possible to assign or turn on, pixels at random. But they will still have some coherence, namely seize and direction. So I can imagine that when traveling by car along the Leisure highway (the new ring road), more and more plots of MxG are spotted and the notion of a bigger context might appear. As a reference I looked at two projects: 'The Umbrellas' a project by Christo and 'The Schlosspark' a field of MxG by RMP landscape architects. On my way to Groningen by car, I saw a similar seized square of reed in the landscape and it was rather beautiful and abstract. I can imagine that those pixels of Miscanthus, can fit in the landscape and

are not to dominant nor are they disturbing the landscape. And after a period of twenty years, the pixels will change and make new configurations.

And then there is the question of why. Why would you want to grow MxG , a grass that grows 4 meters high, on such a large scale ? First of all, the fact that one hectare of Miscanthus absorbs 40 tonnes of CO2, is already a good argument in the climate change debate. But of course Miscanthus can serve more purposes. My paper describes how to look for a good ratio between quality and quantity. For instance producing energy (low value) matches a high quantity. The choice for an ethanol factory seems plausible, only if a certain amount of yield can be guaranteed. That is why I come up with a minimum of 100 pixels and thus 100 ha. The lignin that is extracted in this process can be used as precursor for carbon fibre and applied in the car industry. This process is currently under research and sponsored by the EU, because it will make cars considerable lighter and thus more energy efficient. The ethanol will be used for public transport buses, large and heavy vehicles that have difficulties using batteries and serve a communal function. A visit to such a factory (BPF in Delft), where ethanol is made from MxG, gave me an insight in the process of how such a factory actually works.

Then I had to come up with a design for the location for the program I formulated during my P2. I was glad that both architecture and landscape tutors were present during the meetings. Especially in this phase where you go from a large scale (landscape) to a smaller scale (architecture). However to understand how the program needs to be placed in and in relation with a new landscape is not an easy task. I struggled quite a bit to get this clear. Also I noticed that sometimes the opinions of both tutors were different and even contrary at certain times. It is here where I have to take position and choose what serves the project best. I looked into historical references and all projects show a toolbox of axes, sightlines and vista's. So this process was quite time consuming and it kept me from working on a smaller scale, namely the building technology. This lasted until my P3. There I was 'forced' to formulate a few starting points, like what materials and building methods will be used in the project. But also the desire to use the historical typology of the hoeve, which are typical in this area.

Aspect 1 *the relationship between research and design.*

The research is all about MxG , how to implement it in the urban landscape of Parkstad and then it discusses the possibilities of the material. The design has to represent this research in many ways. The chosen plot of 15 ha acts as a showcase where visitors and can experience the different stages of growth and the processing of the MxG. It is a place where the rhizomes for the MxG are grown before they are spreaded across Parkstad. There are also production and research fields. A factory processes MxG into ethanol via steam explosion. Then the other program is supportive and related to MxG as well, like a lab, greenhouse, info centre and auditorium. MxG is a simple natural product with little maintenance needed that can grow just about everywhere. The design represents this in terms of materiality and construction.

Aspect 2 *the relationship between your graduation (project) topic, the studio topic (if applicable), your master track (A,U,BT,LA,MBE), and your master programme (MSc AUBS).*

My projects' topic of energy crop MxG fits in with the harvest studio, because the words says it already, you can harvest it. Therefor I integrated the MxG in the buildings as building material as much is possible and therefor keeping the flows of materials as short as possible. Since this studio is a collaboration between landscape and architecture, it enabled me to develop a wide view on Parkstad. But an architecture student is not necessarily trained to look at a broad scale. To envision the pixels or plots of 1ha in the landscape was something that was not really clear and thus not convincing during my P2 presentation. This is something I kept in the back of my mind, while continuing with my project.

Then on an even wider perspective, this project should of course represent the things I have learned along the way at the TU Delft. But it is of course not only about the input, but how I as a person have processed it and how I can apply it.

Aspect 3 *Elaboration on research method and approach chosen by the student in relation to the graduation studio methodical line of inquiry, reflecting thereby upon the scientific relevance of the work.*

There is quite a lot of documentation about MxGs. WUR provides a decent amount of information on their site, which is mainly meant for farmers. And there are also lots of other articles to be found, but still mainly about where and how to grow the grass. However to refine the MxG, or to actually do something with it, is a bit more fenced off. This is because these processes are only recently developed (ethanol) or still under development (carbon fibre) and are picked up by companies who would rather keep the information for themselves.

My project does not contribute in this sense to the scientific debate. The only relevance lies in the combination and application of the information. It might help other similar regions providing in their energy need, which have to deal with shrinkage or where space is not that scarce.

Aspect 4 *Elaboration on the relationship between the graduation project and the wider social, professional and scientific framework, touching upon the transferability of the project results.*

On a wider social framework there is however something interesting in my approach of spreaded plots of MxG. The square pixels are indifferent and just looking for space. However the many plots of grassland in Parkstad have different owners and in order to succeed different parties have to come and work together. The owners of the industrial sites, the local government, the farmers and the inhabitants of Parkstad. It is a shared program, just like climate change is a shared problem. The visible plots of MxGs will also lead to an awareness of energy consumption. All fuel in the last decades came from far (besides gas from Groningen) and the supply seemed

therefor endless. In fact just like the 'underground' mining of coals… it seems endless but then all of a sudden the mine is empty.

Aspect 5 *Discuss the ethical issues and dilemmas you may have encountered in (i) doing the research, (ii, if applicable) elaborating the design and (iii) potential applications of the results in practice.*

There are a few ethical dilemmas I encountered during my research. First of all the debate using farmland for energy crops. Then there is the fact that ethanol used in buses still produces CO2. And a factory produces waste streams and some smoke – steam mainly.
So in my paper I write that farmland, i.e. land for livestock, can be used for growing Miscanthus. I mention several reasons, one of them is the low amount of CO2 uptake of grassland, but also the fact that livestock produces methane (which is 25x times more beneficial to global warming) and need a lot of energy to grow. Due to new legislation livestock might diminish and thus the land becomes available.
Then the fact that buses using ethanol will emit CO2. Well, cars can run on batteries driven for instance by PV cells. But for heavier vehicles, like buses, it is not efficient to ride on batteries. A fuel like ethanol is needed and current diesel engines are easy to convert.