

Plan Of Action

reNature

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27 januari, 2020



Information

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Start Date: January 13th, 2021

End Date: June 7th, 2021

Writing location: Calandlyceum, Amsterdam

Location commissioning party: **reNature**, Danzigerkade 5, 1013 AP Amsterdam NL

Photo Cover: reNature, Why agroforestry is a promising climate change solution.

Summary

This project is a collaborative effort between students at the Calandlyceum in Amsterdam, and reNature. This project will consist of three phases. The first phase will revolve around preliminary research, the second around generating concepts, and the third around presenting the final product. The final product of this project will be a report regarding ways to utilize regenerative agroforestry in environments that are less fertile than those reNature is currently working in. The report will include research done by the Calandlyceum team and several designs of environments and farms in the Minecraft software.

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Introduction

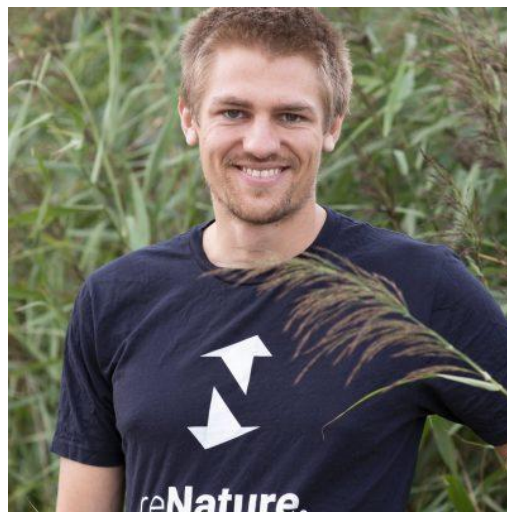
For this project, the team had to find a commissioning party. In the previous project, Maxim Kanon and Robert Mertens were part of a team working for reNature. Since the previous project was a success they were interested in doing a follow-up. Since every project has to be a new team, the teams got switched up and formed a new team consisting of just two people from the old project. They then formed the team with 2 other students.

The team's commissioning party is reNature, a company established in Amsterdam, the Netherlands. They help farmers implement regenerative agroforestry all around the globe. reNature approached the team with the idea to use a real-world farmland as a basemap for a 3-D model on top of which an agroforestry farm will be constructed. This will all be done using the software of Minecraft.

The Commissioning Party

The commissioning party of the Team is reNature. This is a company that supports farmers and corporates in the transition from standard agriculture to Regenerative Agroforestry. Regenerative Agroforestry is a cultivation system that merges trees and agriculture. This makes it so that agriculture doesn't have to compete with nature. It has many benefits for the environment in comparison to a normal monoculture farm. They work with people and organizations all around the globe from Brazil to Indonesia.

Our contact within the company is Waas Thissen the Research Coordinator & European Project Manager of reNature.



Waas Thissen (reNature)

The Assignment

The goal of this project is to provide research detailing how to use regenerative agroforestry in close to all environments so that even in barren environments a green and fertile farm can be created. This research will be supported by models made in the Minecraft software. A basemap from real-life environments will be used to create the terrain. Following that, a template for an agroforestry farm in Minecraft will be made and applied to the created environment. Not only will this research aid reNature, but the models will also serve as a way for reNature to show the world more about agroforestry, and it's beauty.

Preliminary research

What is regenerative agroforestry?

Most people think that forests and agricultural land can only compete. That the increasing need for food with the growing world population comes the destruction of forests. We however disagree. We think that forests and agricultural land can be combined into one, forming agroforestry. That trees, shrubs or bamboos can live alongside crops and or animals on the same plot of land. That this integration will provide us with large amounts of ecological and economic benefits. It will serve as the new alternative way for the production of food, timber, biomass and many other products.

What are the benefits?

Why is the replanting of trees so important? Trees play a valuable role in sustainability. They are important for a lot of things such as cleaning the air and water, providing animals with habitat and of course creating the oxygen we breathe, just to name a few. But what are the benefits for the crops? How could replanting trees in and around farms benefit greater production? The most important is that trees will provide us with a more stable environment for the crops. First, they will help with drought or heavy rainfall by regulating the water cycle. They could for example intercept a part of the rain or help drain the water. Next to that, the trees will help regulate the temperature and winds. And finally, the trees will bring back biodiversity. Beneficial insects could help pollinate the crops or serve as natural pest regulation. All of these factors could and will likely help Farmers end up with higher food quality and increased yields.

Why pick agroforestry over ordinary monoculture?

Agroforestry is more sustainable in comparison to an ordinary monoculture. The removal of trees and replacement with agriculture could lead to severe erosion to an extent that nothing can grow in an environment for years. This will force farmers to keep destroying forests for land which makes it unsustainable in the long run. Replanting the trees would prevent erosion by stopping soil and chemical wash off, so the environment stays rich with nutrients required for the growth of plants. This makes agroforestry a more sustainable option.

Some might still not see agroforestry as a viable approach because of ordinary monoculture's ease of production or earlier payoff. Although these arguments are valid, they only consider the short term. Sustainability is important and agroforestry will provide any form of agriculture such as crops, livestock or both with many benefits in the long run. It has already been successfully implemented all around the world, and we think it's the future of agriculture.

What will the Minecraft designs be?

A minimum total of three Minecraft designs will be made. The first two will be based on locations ReNature is already present in. For example: Brazil, Kenya, Chile, or Malaysia. The final design will be a location ReNature is not yet present in. This design can be based on locations such as: Russia, Saudi-Arabia, or Germany. However in order for us to create a realistic model we need to have access to the real life terrain as a basemap so it can be used for the making of the model. This means that getting the terrain of the environments in which reNature isn't present might be impossible. In that case, we will create a realistic environment ourselves.

What is a basemap?

Basemaps are maps made out of data and imagery. In this imagery you normally see streets, parcels, boundaries (country, county, city boundaries), shaded relief of a digital elevation model, waterways, and aerial or satellite imagery. Each basemap is different depending on the information they want to depict. For example, a basemap about closed hotels would show street names and buildings with labels probably made out of satellite or aerial photos in contrast to a basemap wanting to depict only roads which would probably use a simplistic map type of style without relief and only streets names.

The terrain basemaps will be providing us with a way to import the real world terrain into the virtual environment. Since we want the entire Minecraft map to be based on a real world environment the size of the Minecraft map will be based on that. We expect this to be somewhere around 1 to 2 kilometres squared.

How will the Minecraft designs be made?

Firstly an external program will be used to convert the basemap into something that can be used for the Minecraft map (examples of programs could be WorldPainter and WorldEdit). From this map a spot of land will be selected on which the agroforestry system will be built. For this, we will make a template with all the parts that are present on an agroforestry farm. This is because we can then reuse those parts in every map and even provide anyone who wants to make an agroforestry farm themselves with an easy way of doing so. We will be basing the designs on our research to make them as realistic as possible and to end up with a design that we're proud of.

Program of requirements

The requirements for the research will firstly be that it includes a summary of the environment, whilst explaining the climate and fertility. A summary will be made of at least 3 areas. The research has to include a summary of already existing techniques relating to farming in these environments. Furthermore the research has to include a comparative statement between regenerative agroforestry and the already accepted and used method of agriculture. Finally, the research has to include 3 designs for regenerative agroforestry in these environments.

These designs have their own requirements as well. As described earlier, the designs will be made as realistic as possible. This means that they need to be made using a basemap. Next to that the designs will be based in three different environments. The first two will be based on locations reNature is already present in like Brazil, Kenya, Chile, or Malaysia. And one where they are not such as Russia, Saudi-Arabia, or Germany.

Deliverables

These "subtasks" or "deliverables" are the most important part of your plan of action. They describe the different steps the team has to take to reach their final goal. These deliverables are divided per person, each person has a deliverable for which he/she is responsible. Which person is assigned to which deliverable is worked out in the planning near the end of the document.

1. First Phase

1.1 Plan of action

The first deliverable is to make a plan of action. It contains all the different steps the team has to follow to reach their final product. The plan of action consists of an explanation of the final product the team will deliver and a detailed explanation of all products the team needs to deliver to finalize this project. This plan of action has to follow the [Denknasium.nl](https://denknasium.nl) guidelines for a good POA (Plan Of Action).

1.2 Preliminary Research

As preliminary research, the team will have to garner more knowledge on the subject of regenerative agroforestry. Fortunately, Robert and Maxim have already done some research during their previous project which can be used on top of the research done during this project. These findings will be documented. In this part of the process, the team will also deepen themselves on how to use the software of Minecraft to achieve the goal of the final product. The document will be at least 2 pages. At least one paragraph will be written per Minecraft editing software.

1.3 Program of Requirements

In order for the team to make an actual viable product, it needs to follow the requirements so to make those clear the requirements are worked out in the Program of Requirements. The requirements for the product will be partially discussed with the commissioning party and summarised by the team in the document. The team does this by researching how other related products of the same type are worked out and compile a list of requirements for their own. It is required to cross-examine this program with reNature's needs.

1.4 Brainstorm (*morphological chart*)

The final thing the team needs to do before they can work on the design is to think of possible ideas for the agroforestry farms. The team will use the morphological chart in order to come up with those ideas. To make the morphological chart the team needs to come up with solutions for each part of the “Program of Requirements”.

Guidelines on making a morphological chart will be taken from:

http://wikid.io.tudelft.nl/WikID/index.php/Morphological_chart

2. Second Phase

2.1 Concepts (*combination of chart*)

The solutions made up for each part of the “Program of Requirements” will be combined into the best possible total solutions which will be chosen in the next step. These combinations will be made carefully since not every partial solution works with one another. Once these combinations are made the team needs to choose which one they will work on with. This will be done in the next step using the Harris-profile.

2.2 Concept Selection (*Harris profile*)

The Harris profile is a point-based graphic that represents the strengths and weaknesses of the partial solutions. This point-based graphic will be used to determine which idea is the best of them. This is a key element in choosing what our Minecraft template will look like and making sure it's the best solution for our problem/requirements. Guidelines on making a Harris profile will be taken from:

http://wikid.io.tudelft.nl/WikID/index.php/Harris_profile

2.3 Design

A minimum total of three Minecraft designs will be made. The first two will be based on locations reNature is already present in. For example Brazil, Kenya, Chile, or Malaysia. The final design will be a location reNature is not yet present in. This design can be based on locations such as Russia, Saudi-Arabia, or Germany. However, in order for us to create a realistic model we need to have access to the real-life terrain as a base map, so it can be used for the making of the model. The size of the designs will depend on the area of the base map. A set of instructions will also be included to describe how to replicate the techniques used in the production of the Minecraft designs.

2.4 Research

A report on ways to farm in the chosen environments, each part consisting of:

- A summary of the environment, explaining the climate, and fertility.
- A summary of already existing techniques relating to farming in these environments.
- A comparative statement between regenerative agroforestry and the already accepted method of agriculture.

3. Final Phase

3.1 Final product

The final product will be a document describing how agroforestry can be adapted to at least 3 different environments. These descriptions will be provided with images from the different models.

3.2 Final report

As the final part of the project, the team makes a final report describing the entire project including all the deliverables and the final product. This document will function as a summary of the project, so the commissioning party can easily read back on the process or the final product of the project.

3.3 Final presentation

At the end of the project, the team gives a final presentation to the commissioning party in which they tell them in detail what the final product has become and how it works. They then will then provide them with the final report (before or after the presentation). The team will try and have this presentation at the commissioning party's headquarters if this isn't possible due to corona measures or other technical difficulties the presentation will be held online.

Process en Completion

The team will update the contact on a weekly basis and check the mail frequently. This helps with keeping the commissioning party up to date and with staying alert for any changes. Within the team, Maxim is in charge of the contact. He has been assigned the role of communications manager which makes him responsible for all the contact. The contact will be logged, so the team can follow along. The weekly updates will also ask any questions or requests the team has for reNature or to answer any questions they've asked. The project will be rounded off with a final presentation that will be held with the commissioning party locally if possible. If not, it will be held online. At the end of the project, the team will provide reNature with a final report in which the process and final product of our entire project are described. They will then decide on a review.

Planning

For this project the team has a planning that is listed below. This planning is made so that everyone knows what he/she should work on for every specific period. It lists all the deliverables, their deadlines and those responsible for them. The requirements for each of the deliverables are listed previously in this document. A more in-depth schedule can be found by visiting the source under the table.

Deliverable	Deadline	Responsible
1.1	9-3-2021	Arik
1.2	10-3-2021	Maxim: Agro-F Robert: MC
1.3	17-3-2021	Jasper
1.4	17-3-2021	Arik
2.1	19-3-2021	Maxim
2.2	24-3-2021	Jasper
2.3	9-4-2021	Robert
2.4	9-4-2021	Arik
3.1	TBD	Arik
3.2	TBD	Robert

Planning from:

https://docs.google.com/spreadsheets/d/1_2czZFPUVdbFfwB4-z55k_P0w1AL9ClkhzBU7ylwwwU/edit?usp=sharing

Sources

1. Morphological charts:

Morphological chart - WikID, the Industrial Design Engineering wiki. (z.d.). WikiD.

Consulted on 12th of March 2021, from

http://wikid.io.tudelft.nl/WikID/index.php/Morphological_chart

2. Harris profiles:

Harris profile - WikID, the Industrial Design Engineering wiki. (z.d.). WikiD.

Consulted on the 12th of March 2021, from

http://wikid.io.tudelft.nl/WikID/index.php/Harris_profile

3. Plan of Action guidelines:

PVA en Planning - beschrijving en voorbeeld. (z.d.). Denknasium.

Consulted on the 10th of March 2021, from

<https://docs.google.com/document/d/1tdvviFZthXnMzukkbleZzPPkKM0mxq1Vg2QrxW21WFU/edit>