

Summary of my Nuffield experience.

My Nuffield experience began in the fall of 2017. I received my Nuffield Scholarship in November 2017 for my research on the Peat meadow problems in the West part of the Netherlands (The Green Heart). My research question was: Is it possible to maintain a good revenue model for the agricultural sector within the peat pasture areas of the Netherlands? Also, how to stop the decline of the peat soil, and thereby reduce CO₂ emissions?

On one of my visits to the Northern Island of New Zealand, I noticed that the decline of the peat areas were not perceived as a problem. For example, last year there was a big flood which effected three farms and killed almost 1200 cows. This flood was mainly caused by the decline of the peat soil. At this moment the government does not want to take action because they do not see decline of peat soil as a structural problem. Also in Indonesia, in which its capital city Jakarta (more than 17 million inhabitants) sinks up to 20 centimetres a year, the solution they come up with is moving the capital and the government to another part of Indonesia. It is too expensive and too risky to invest in Jakarta to be a secure capital city for the government. In North Carolina (USA) the peat land has fallen to such an extent, the government advises farmers to relocate. They regard these areas as not safe when water levels keep rising.

These are three examples in which landowners, government and other stakeholders do not take proper action against the declining of the (peat) soil. Fortunately there are also examples of farmers, professors, researchers and other organisations which have ideas and solutions to manage the problems of the peat areas.

For example, in Australia I have spoken to a cattle farmer who showed me two interesting things on his farm. First of all, he leads the water that comes from the mountains into a system. He uses this system to reduce the speed of the water which flows over his land. As a result the sediments remain on his farm land; another consequence is less flushing in the Great Barrier Reef. Second, He grows Brachiaria grasses; one of the qualities of this type of grass is that it grows easily on wetlands and it also gives good yields.

After my travels I have been able to acquire some good ideas to research further on this subject in the Netherlands.

1. Brachiaria grasses.

In addition to crops such as cattail and cranberries, the Brachiaria is a good alternative, because this grass can grow on land with a very high groundwater level. The Brachiaria is adapted to an environment with a very high moisture level. A disadvantage of this grass is, it cannot be cut for silage because of the high groundwater level. A good opportunity is grazing cows on this land. Especially in the western peat land areas of the Netherlands, this is a very interesting way of landscape management. A problem is the low frost tolerance level of the Brachiaria. The challenge is to find a breeding company which wants to invest in a Brachiaria with a higher frost tolerance. Last fall I asked Agrifirm (the largest sales company of grass seeds in the Netherlands) whether it is possible to breed such a Brachiaria.

2. Pivots.

Another good idea is keeping grasslands wet continuously with the use of pivots (or drip sprinkling). At this moment a lot of Dutch farmers invest in under water infiltration. Pivots are an alternative for under water infiltration. One of the advantages is the top layer of the soil can also be kept wet.

Especially in summer you achieve a more moist soil and the degradation of organic material will slow down. As a result the CO₂ emissions will reduce. This idea could be further researched at the VIC (peat meadow research centre) in Zegveld.

3. Fish farm.

It is also possible to start a completely different business model: for example a fish farm. In the peat areas every agricultural property consists of 10 to 15 percent of water. For most farmers this is just a cost item. A fish, crab or mussels farm belongs to the possibilities. The water boards are not excited about this idea because they want full control over the waterways. I have already made agreements about the maintenance of the ditches on my farm. Previously the water board kept all maintenance under its own management. The next step is to come to an agreement for economic activities in the ditches. I recommend the water boards to be more flexible and have an open mind to new ideas for using these ditches for economic activities. I am convinced that cooperating with the water boards will work because we already see a good development when it comes to flexible water levels against subsidence.

4. Growing protein.

Another opportunity is to grow your own protein on the water. Duckweed, for example, grows fast and gives good yields. The quality of the protein can be compared with rapeseed meal. It could be interesting to use duckweed instead of soy/rapeseed meal in the ration for (dairy) cows. I have already done some trials on my farm, and the cows eat duckweed very well. It is a time-consuming activity to extract and dry all the duckweed, so there should be a good and affordable solution for harvesting and drying duckweed. I therefore call on mechanization companies to develop a machine in cooperation with farmers that can harvest duckweed easily and at low cost.

5. Use Sediments.

Sediments float in rivers. This sediment can be used to mix through and cover up the peat land areas. The Netherlands are a river delta. This means a lot of sediment comes from abroad into our country. After we built dykes to protect us against water, the use of sediment also disappeared. A professor (Lee Burras) from the Agriculture University of Ames (Iowa USA) does not understand why we do not use this advantage for our peat soil problems. He is convinced that if you add clay particles to the top layer of the peat soil there will be less degradation of the organic matter. This results in less decline and less CO₂ emission. Some research is already done in The Netherlands by the Louis Bolk institute and the peat meadow innovation centre in Zegveld. I would recommend to continue this research and do some trials in cooperation with the water boards to find out what the sediments can achieve in the peat areas.

6. Chinampas.

The last option I want to discuss are the Chinampas or “floating gardens”. This is a system which has existed since the time of the Aztec in Mexico (1200-1521). It is a labour intensive system that uses reeds and willows to create gardens on the shores of the river. These produce all kinds of products like fruit, vegetables, flowers, fish, grain, nuts and seeds. It could be possible to design a system like the Chinampas in Mexico with modern technology. At the moment there is a growing trend of people wanting to grow their own food, for example there are more and more foodbunches in The Netherlands. A Chinampa can have a similar function. At the moment I am in consultation with Commonland to see what possibilities a Chinampa can offer our farm. Commonland is on a mission to transform landscapes into thriving ecosystems.

In respond to my research question I recommend the following: in my opinion the most perspective is gained in utilizing the surface of the water by, for example, growing your own protein or starting a fish farm. I already experimented with duckweed in the past and I will continue with more experiments in 2020. Last year the water board built a new water pump station on my land. Now it is easier to collect duckweed so I did a proposal for the next two years to maintain the waterways and collect duckweed. At first the water board was sceptical, but now they are more enthusiastic. Our goal is to collect duckweed and maintain the water canals in 2020/2021 for the water board in our polder, in return we will get a compensation for this effort.

On my farm I will also research what possibilities a Chinampa can offer us in the future. Last October 2019 we already had a meeting with some people from Commonland and the Louis Bolk Institute on how to design a “*Dutch Chinampa*”. These meetings will continue in the near future. This Dutch Chinampa will not be accomplished within a couple of months. To ensure this project is a success we will need the help of the water boards, the VIC, the cooperation from our government and a lot of money. As a result I agreed with Commonland and the Louis Bolk Institute to do a feasibility study in 2020 for the design of a Dutch Chinampa on my farm.

In addition I have taken some steps with the peat meadow research centre in Zegveld (VIC). I have already spoken with researchers of the centre about my peat soil experiences around the world. I recommended them to put more effort in keeping the peat soil wet and to find solutions to come to a way of earning money with the water channels farmers own. We agreed to have a meeting in the near future on how to help each other with new projects in the future.

In conclusion, I am convinced there are still a lot of young and innovative farmers who want to be part of a transition to a sustainable way of farming in the peat soil areas. With this transition we can achieve a part of the goals to reduce CO₂ emissions and the decline of soil.

I want to thank Nuffield, the province of Utrecht (sponsor) and FrieslandCampina (sponsor). With the help of these organizations I had the opportunity to travel around the world. During my travels I could meet and speak to farmers, companies and other interesting organizations, which led to an increase of my network and knowledge about the agricultural sector worldwide.

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