A Case Study on the Rabo Carbon Bank using the 'Quintuple Helix' innovation model

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iii. Abstract

The Rabo Carbon Bank (RCB) will act as an intermediary between corporations with net-zero targets and smallholders who have captured CO_2 from the atmosphere using natural carbon sequestration. By leveraging Microsoft's technical expertise on remote sensing, artificial intelligence, and machine learning, RCB aims to provide a globally scalable and transparent solution to climate change while empowering smallholders. It aims to offset 0.5 percent of global CO_2 emissions annually by 2025, requiring 4B trees to be planted by approximately 15M smallholders worldwide. This case study adopted the 'Quintuple Helix' model and draws upon insights from 13 semi-structured interviews. They allowed an in-depth analysis of the bank and explored the research question '*How and to what extent can RCB's eco-innovation contribute to achieving climate change targets?'.* Results show that RCB's ability to scale-up its operations strongly depends on finding an equitable business case for both farmers and RCB, and the degree of innovation required for reliable and cost-effective monitoring. Understanding whether the smallholder is truly interested in such a revised income model also proved to be a key step for potential scale-up. The research has provided valuable insights into the collaborative process and knowledge creation between the actors that were identified by Rabobank.

Keywords: Voluntary carbon market, net-zero, carbon offsetting, smallholders, agroforestry, eco-innovation, remote sensing.

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Abbreviations

ARC – Agroecology Research-Action Collective

BISCI – Brightlands Institute for Supply Chain Innovation

CCX – Chicago climate exchange

CDM – Clean Development Mechanism

CO_2 – Carbon Dioxide

CFS – Committee on World Food Security

COP – Conference of Parties

CSR – Corporate Social Responsibility

EBRD – European Bank for Reconstruction and Development

EC – European Commission

EEA – European Environment Agency

EIB – European Investment Bank

EUAs – EU emissions allowances

EU ETS – European Union Emissions Trading System

FSD – Fair & Smart Data

FTEM – Forest Trends Ecosystem Marketplace

GHG – Green House Gas

ICROA – International Carbon Reduction and Offset Alliance

IDBG – Inter-American Development Bank Group

IPCC – Intergovernmental Panel on Climate Change

IPES-Food – International Panel of Experts on Sustainable Food Systems

JI – Joint Implementation

KP – Kyoto Protocol

LTO – Dutch Agriculture and Horticulture Organisation (Dutch farming entrepreneurs organisation)

LULUCF – Land Use, Land-Use Change and Forestry

MDB – Multilateral Development Bank

MSI – Maastricht Sustainability Institute

MSR – Market Stability Reserve

$MtCO_2e$ – Metric tons of carbon dioxide equivalent

OTC – Over-the-counter

PA – Paris Agreement

QHIM – Quintuple Helix Innovation Model

RCB – Rabo Carbon Bank

REDD – Reduced Emissions from Deforestation and Degradation

SPIs – Science-policy interfaces

SD – Sustainable Development

SDGs – Sustainable Development Goals

TSVCM – Taskforce for Scaling Voluntary Carbon Markets

UM – Maastricht University

UNFCCC – United Nations Framework Convention on Climate Change

VCM – Voluntary Carbon Market

WCED – World Commission on Environment and Development

WEF – World Economic Forum

WRM – World Rainforest Movement

WUR – Wageningen University & Research

Chapter 1: Background

In early 2021, it was announced that Rabobank and Microsoft had joined forces to create an online marketplace for carbon trading called “Rabo Carbon Bank” (RCB). The initiative is based on Rabobank's origins as a farmers’ bank and Microsoft's position as a technology leader (Hoff, 2021).

Microsoft is one of seven Fortune 500 companies committed to all climate initiatives of the PA (Sherman, 2020). The technical officer of Microsoft, Rob Elsinga (personal communication, July 15, 2021), stated that the corporate has been carbon neutral since 2012 and aims to be carbon negative by 2030 and completely eradicate its historic carbon footprint by 2050 (Elsinga, n.d.).

A digital advisor of Microsoft (personal communication, July 15, 2021) pointed out that Microsoft helps setting up the platform but emphasises that it does not wish to be the owner or a supplying party. In fact, this digital advisor stated that Microsoft is a buying party that “wants to remain an objective player in the ecosystem”.

By leveraging Microsoft's technical expertise in remote sensing, artificial intelligence ("AI") and machine learning, RCB aims to provide a globally scalable and transparent solution to climate change while empowering smallholders (Hoff, 2021). In addition, RCB is investigating the possibility of measuring the CO_2 storage capacity of planted trees in real-time (Rabobank, n.d.a; A Digital Advisor of Microsoft & R. Elsinga, personal communication, July 15, 2021).

With at least ten existing pilot projects spread across Africa (e.g., Burundi & Kenya), Asia (e.g., Vietnam), the United States, and the Netherlands, and additional planned pilot projects, RCB wants to capture CO_2 from the atmosphere by improving agricultural practices, especially for smallholders in developing countries. Microsoft is the buyer of the carbon credits resulting from the capture of emissions from these existing pilot projects. (Smal, 2021; Wissink, 2021; J. Van de Mortel, personal communication, July 12, 2021; A Digital Advisor of Microsoft, personal communication, July 15, 2021).

The expected kick-off of the initiative will take place in 2022. RCB will roll out an online platform that can link large corporations – that adopted ambitious carbon reduction strategies but still face some residual emissions – and smallholders – who capture CO_2 from the atmosphere (either in the soil or in trees).

In a press release, Rabobank stated that planting trees alongside crops should allow these smallholders to transform monoculture practices into more regenerative agricultural practices (e.g., agroforestry) (Hoff, 2021). Emma van de Ven (personal communication, August 9, 2021) stated that “traditional agriculture (of the last 20ish years) is monoculture in most cases. So, the two are, broadly speaking, the same”. Jelmer van de Mortel (personal communication, July 12, 2021) stated that RCB rules out

monocultures by making sure that there is always a combination of different crops, at least one of which is a perennial woody plant, which strengthens the business model of smallholders (Hoff, 2021; De Boer & Betlem, 2021; Esselink, 2021).

According to Emma van de Ven (personal communication, July 19, 2021), RCB does "not only focuses on developing projects and launching them, but also on advising customers who want to reduce carbon so that we can offer consumers, but also B2C and B2B, insetting as well as offsetting, the larger package."

The overarching aim of RCB is to offset 0.5 percent of global CO_2 emissions annually by 2025, representing five times Microsoft's plus 500 times Rabobank's emissions. Cumulatively, this would amount to 1 $GtCO_2e$ by 2030, more than five times the annual Dutch GHG emissions. It is estimated that this will require four billion trees to be planted on an area of about 58,000 hectares, equivalent to one-third of Kenya (J. Van de Mortel, personal communication, July 12, 2021; Smal, 2021; Esselink, 2021). Worldwide, RCB aims to involve 50,000 large and medium-sized farmers, and 15 million smallholders in Africa (Esselink, 2021; E. van de Ven, personal communication, July 19, 2021).

RCB's fundamental proposition, 'Acorn,' is specifically aimed at helping smallholders in Africa. According to Emma van de Ven (personal communication, July 19, 2021), 'Strategy Lead' at Acorn, this proposition was created with the aim of "giving small farmers access to the carbon credit market". She stated that "small farmers are the most affected by climate change, but the money from the credit market usually goes to the big project developers because they can be certified and you need to know, for example, how much CO_2 can be stored.

According to the Head of Acorn, Jelmer van de Mortel (personal communication, 12 July 2021), the transition costs for African smallholders are about €500 to €750, based on an average land area of about one hectare. For such smallholders, fruit trees such as mango or cashew nut trees are most beneficial. By selling the fruit yield, these small farmers will have a sustainable and increased source of income when the trees are mature and can no longer store much extra CO_2. This process is visualised in Appendix 5 (Smal, 2021). The cost of planting and maintenance is advanced with an investment from the smallholder. Corporates pay for occurred and future offsetting of CO_2 by trees (Hoff, 2021).

The market value of an African carbon credit is currently around $20 (approx. 16.80 euro (XE, 2021)). RCB charges a fee of approx. 5 to 10 percent for its role as a middleman between corporates aiming to voluntarily offset its emissions and smallholders offering carbon credits. This fee should make the satellite monitoring, certification (i.e., ensuring the amount of sequestered CO_2), and support provided to smallholders participating in the compensation scheme cost-effective (Smal, 2021; E. Van de Ven, personal communication, July 20, 2021).

RCB does not work directly with these smallholders but always through partners. One way is through local traders with whom Rabobank maintains a long-term relationship, partly because it finances them. Emma van de Ven of Rabobank (personal communication, July 19, 2021) stated that "they are bigger players in that market, who have a huge network of smallholders, know a lot about it, and are very familiar with it."

Another more prominent way is through RCB's partner 'on the ground', Solidaridad, whose aim is to help farmers develop a better position. As a 'Program Manager Market Development' at Solidaridad, Han Brouwers (personal communication, July 20, 2021) stated that the support offered to smallholders includes training, i.e., "teaching them how to approach agroforestry". He argued that this training process "is complex, but that is our job, and you need time for that."

According to RCB, the remaining 90 to 95 percent of the carbon credit should generate sufficient income for African smallholders to break even with the investment needed to take the first steps in adapting their monoculture practices to more regenerative practices as proposed by RCB, and thus increase carbon input. Regular operational risks inherent to farming are excluded from these calculations (Smal, 2021; A. van de Koevering, personal communication, 17 June 2021; J. van de Mortel, personal communication, July 12, 2021).

RCB works together with Acorn and Microsoft to reduce these operational risks by ensuring that these smallholders have more harvests and thus yields. According to the Global Head of RCB, Alexander van de Koevering (personal communication, 17 July 2021), agroforestry helps them become more socio-economically independent. For example, if a farmer's mango harvest comes to fail, they will still be able to fall back on their coffee harvest.

With a market share of at least 85 percent and an approximated investment of 30 billion euro, Rabobank is the market leader in loans for Dutch farmers (Zembla, 2021). Recently, the Netherlands has been faced with a 'nitrogen crisis'. The amount of nitrogen in the Netherlands is the second-highest in the EU and more than three times higher than the European average (EEA, 2019).

The Dutch Council of State requested a preliminary ruling at the European Court of Justice (2018) on the policy proposal for permit applications involving nitrogen emissions based on future nitrogen deposition reductions. The European Court of Justice ruled that proposed policies were insufficient to protect Natura 2000 areas from nitrogen pollution. This ruling was subsequently supported by the Council of State, the highest court in the Netherlands (Raad van State, 2019). The ruling had implications for permit applications for at least 18,000 projects, including the construction of houses, roads, and cattle sheds (Rutten, 2019).

Agriculture is the primary source of nitrogen, contributing 46 percent of nitrogen deposition in the Netherlands. Reducing these emissions has turned out to be much harder compared to other sectors, requiring a holistic approach to sustainable agriculture (Erisman, 2021). Besides making their farms more sustainable (organic), farmers were offered the voluntary option of being bought out by the government. To address the Council's resolution, the second biggest party in the Dutch House of Representatives – democratic party 'D66' – together with the Dutch centre-left parties, demand that the livestock population is to be halved in the next cabinet term (Voorhorst, 2021; Verstegen, 2018; Velthof et al., 2016; Van Grinsven et al., 2012).

These developments in the Dutch agriculture sector cause stranded assets risks for Rabobank in the Netherlands, on top of already decreasing margins due to intensification and scaling-up in the Dutch agricultural sector and low-interest rates in general (Van Os & Smidt, 2018; De Boer & Betlem, 2021).

RCB's initiative is presented as a way for Dutch farmers to redirect their business plan and meet the requirements for sustainable agriculture. RCB's support to Dutch farmers in reducing CO_2 emissions and enriching the soil is not only ideological, says RCB CEO Baarsma. Rabobank is looking for alternative business models. Baarsma views the trade in carbon credits as a growth market, stressing the fees that the bank will obtain (De Boer & Betlem, 2021; Esselink, 2021; Van Eekeres, 2021). Therefore, RCB might be of strategic importance for the Bank.

Apart from several interviews included in news articles, not much is known about the Rabo Carbon Bank. Besides the announcement of the CEO, Rabobank (n.d.b) itself devoted only one page to the Rabo Carbon Bank. Academic papers have not yet been explicitly published about this new initiative. Therefore, this research tries to contribute to bridging this knowledge gap.

Chapter 2: Aims and objectives

- To understand RCB and its position within the 'carbon movement';
- To understand the dynamics in the cooperation between the stakeholders of the 'carbon movement';
- To understand the influence of education, economics, the natural environment, the public, and politics on RCB;
- To understand whether RCB's approach can also be applied to the Netherlands;
- To understand if and to what extent RCB can potentially contribute to systemic change within the food value chain, as proposed by Rabobank;

Chapter 3: Research questions

3.1 Main question

How and to what extent can RCB's eco-innovation contribute to achieving climate change targets?

3.2 Sub-questions

What does the proposed cooperation between the stakeholders of the proposed 'carbon movement' look like?

What are the role and added value of the RCB in the proposed 'carbon movement'?

How does the education system affect RCB?

How does the economic system affect RCB?

How does the natural environment affect RCB?

How does the public influence RCB?

How do politics affect RCB?

How will RCB achieve its target of offsetting 0.5 percent of global CO_2 emissions annually by 2025?

Chapter 4: Methodology

This chapter presents the methodology chosen to answer the main question. The motivation for the chosen methodology is explained in the research approach, followed by an explanation of the conducted interview. Lastly, the limitations of the methodology are acknowledged.

4.1 Research Approach

Taking insights from the literature review, a case study approach was adopted to enable an in-depth analysis of the Rabo Carbon Bank. In this approach, a constructivist perspective is taken, which acknowledges that the world is a human construct that cannot be objectively observed (Offermans & Glasbergen, 2017).

According to Patten & Newhart (2018, p.174), case study research is a "powerful method for researchers who want to explain a complex whole and make connections between factors in a real-time, real-life scenario". Therefore, they suggest that not only the case itself but also its context needs focus. Qualitative research is chosen because it can provide insights into a specific context, which has not yet been thoroughly analysed (ibid.). The qualitative nature of the research also matches the explanatory research questions starting with "how" and "what", as listed in chapter 3 (Neuman, 2013).

In addition, it was recognised that interviews are suitable for examining more complex phenomena, such as opinions and experiences (Denscombe, 2014). This feature is relevant when studying the Rabo Carbon Bank collaboration process, which requires understanding the subjective views of various stakeholders across different fields and organisations.

As a result, primary data was collected through thirteen in-depth semi-structured interviews. This semi-structured approach allowed for the development of ideas and extensive discussion of topics raised by the interviewer, resulting in flexible and open conversations with key stakeholders in the field (ibid.).

Moreover, by conducting multiple interviews with diverse stakeholders, recurring themes could be identified and further explored, indicating shared rather than individual ideas among stakeholders (ibid.).

4.2 Interviews

The criteria on which interviewees are selected can affect the credibility of the information (ibid.). Ensuring credibility was aimed for by only interviewing those stakeholders listed by Rabobank's (n.d.b) proposed "carbon movement". An explanation regarding the actors of this movement was provided in the first two interviews conducted with senior executives of RCB.

The relevant stakeholders were approached via e-mail or LinkedIn, or both. If the email address was not available, potential email addresses were tested by trial and error. In contrast, InMail of LinkedIn was used to contact potential interviewees outside of the own LinkedIn network. The purpose of the interview was always mentioned in the correspondence, as was the added value of involving the person in question in the research. In total, 21 emails and 11 LinkedIn messages were send to 28 potential interviewees. These emails included those obtained from snowball sampling, a method considered beneficial when contacting participants who are difficult to contact (Patten & Newhart, 2018).

Consequently, thirteen interviews have covered all stakeholder groups listed in Rabobank's 'carbon movement'. As summed up and motivated in Appendix 1, 11 interviews were conducted one-on-one, and two simultaneously with two interviewees. The interviews lasted between half an hour (5) and an hour (5), with two interviews lasting 45 minutes. This number of interviews does not include two exploratory interviews conducted with a banker and a strategist since they were not referred to in this research. Furthermore, extensive email contact with the interviewee of Acorn (RCB's fundamental proposition) provided crucial supplementary information.

The pandemic made it easier to conduct interviews online, resulting in twelve interviews through Zoom, Microsoft Teams, or Google Meet, while only one interview was conducted face-to-face. All interviews were recorded for transcription purposes with the interviewees' consent, as listed in Appendix 8. Interview questions differed among the different interviewees and are listed in Appendix 7.

4.3 Data analysis

Patten & Newhart (2018) stated that interviews are usually audio recorded and then transcribed, with the resulting text treated as data. Two of the transcripts were checked and corrected by the relevant interviewee to ensure the quality of the provided data, while others were transcribed using the non-verbatim transcription method. The data resulting from the transcripts have been carefully analysed using coding to obtain credible results (ibid.). This process was inductive, as open coding was used to extract concepts from the raw data (Thomas, 2006), and deductive, as colour coding was used to highlight the correct category (Patten & Newhart, 2018). Transcripts were read multiple times, and the coding process was iterative.

Data saturation occurs when interviewees provide answers that fit existing concepts and do not provide new data or variations. Data saturation was only observed in European policies, where two interviewees provided similar information on current policy developments (ibid.).

4.4 Limitations

The importance of this research stems from the lack of available information on RCB. This lack also serves as a significant limitation to the extent to which results could be obtained. The lack of available information was especially true for RCB's Dutch activities, which are still in the start-up phase, making it difficult to compare the Dutch and foreign activities.

Another major limitation of the results is that none of the three RCB interviewees could provide a clear, complete, and concise definition of what exactly "system change" entails, even though it urges its network of stakeholders mentioned within its proposed "carbon movement" to "join [them] and foster cooperation throughout the food value chain to bring about this system change" (Rabobank, n.d.b). Therefore, it was impossible to give an unambiguous answer to the question 'how and to what extent RCB contributes to systemic change in the food value chain'.

The third limitation relates to the Quintuple Helix Innovation Model (QHIM) applied, which was too superficial. A model with clearer formulated factors would have benefited the results of the research. Moreover, scientific knowledge as a basis for knowledge creation did not fit with the foreign operations of RCB, which are instead based on an on-the-ground approach using traditional knowledge. Lastly, the model did not seem to acknowledge power imbalances within and between the different subsystems. Despite attempts to take this into account, an idealised image of knowledge circulation may have arisen.

The fourth limitation relates to lack of time. Since the research was conducted within a thesis process, there was only limited time available to conduct empirical research. Therefore, only 13 interviews were conducted. Especially an interview with WUR would have been beneficial.
In addition, the data resulting from interviews could not be confirmed by a survey, while data saturation was only reached for European policies. Policies and legislation outside Europe were not evaluated.

The final limitation relates to how the interviews were conducted. All interviews were conducted in Dutch and automatically translated with only a minor review. Therefore, there is a risk of misinterpretation of results due to translation errors. Moreover, interviewees may have given different answers if the interview had been conducted in English. Moreover, the interviews were recorded, which may have prevented the interviewees from speaking freely. Two interviewees mentioned this, one of which discussed a partnership that has not yet been officially signed. Therefore, the information obtained from this specific interview may be limited and incomplete.

Nevertheless, as the interviewees were carefully chosen, information was obtained from a wide range of actors, covering all proposed stakeholder groups at least once while aiming for representative results.

Chapter 5: Literature Review

5.1 Introduction

The PA contains the commitment to keeping the global average temperature "to well below 2 °C above pre-industrial levels" in the current century and "persuade efforts to limit the temperature increase to 1.5 °C" (UNFCCC, 2015, p.22). To make this scenario possible, the IPCC stated that atmospheric CO_2 concentrations must peak below "450 ppm" in 2100 (IPCC, 2014).

A significant shift away from fossil fuels is necessary to significantly reduce emissions, including keeping accumulated deposits buried in the soil (Lohmann, 2009; Bayon, Hawn & Hamilton, 2009; WRM, 2020). Facilitating policies and energy efficiency are necessary to perform this transition (Kollmus, Zink & Clifford, 2008). Yet, the PA "does not contain legally binding provisions that require countries to take domestic legal action" (Clémençon, 2016, p.6).

IPCC scholars mainly used market theory and economic models when they developed scenarios to reduce the global average temperature below 2 °C. Some suggested that vast amounts of CO_2 could be removed from the atmosphere through the carbon absorption of trees (Fee, 2019; Nordhaus, 2007; Spash, 2002).

Coase (1960) foresaw a vital role for the market by viewing pollution purely as a production factor, transforming it into well-defined, transferable legal rights (Hepburn, 2007; Bogojević, 2009). To achieve this, different GHGs had to be made equivalent to CO_2. Through these CO_2-equivalent units, emissions from different places and sources could be compared and transferred, allowing the trade of exchangeable units. Gilbertson et al. (2009) argued that by producing CO_2-equivalent units, carbon trading is moving away from tackling climate change itself as its focus is not on halting the drivers of the crisis. Nevertheless, carbon emissions trading has prevailed in climate policy since it appeared at the international level in the Kyoto Protocol (Kollmus et al., 2008; Spash, 2010; Driessen, 2016; Litgow, 2017).

Following Coase's ideas, Stern (2007) framed climate change purely as a market problem or failure by arguing that new markets can repair what existing markets have destroyed. From this perspective, it is "assumed that climate change occurred because no price was put on carbon, with the result that it was not valued when economic decisions were made" (Gilbertson et al., 2009, p.12).

Critics claim that putting a price on carbon will not necessarily prevent pollution, as free market incentives drive it. The ever-increasing carbon emissions, despite many years of talk about carbon reduction, leave critics to doubt that the exact neoliberal market mechanisms that contribute substantially to environmental and climate problems will be part of the solution (Lovell, 2007; Gilbertson et al., 2009; Ball, 2018a; 2018b; Rosenbloom, Markard, Geels & Fuenfschilling, 2020).

Spash (2002; 2016) adds that the shift of the international debate from prevention to mitigation also implies accepting an unspecified amount of human-made climate change.

5.2 Carbon Markets

Carbon markets can be considered highly complex systems because of their constant changes in policies and regulations (UNFCCC, 2013a; Technology Executive Committee, 2011; Kolk & Mulder, 2011). The aim is to allow both companies and governments to meet their emission reduction targets on a low-cost basis. Carbon markets can be divided into two central systems: compliance and voluntary carbon markets (World Bank, 2020; Kabo-Bah & Diji, 2018; Gilbertson et al., 2009).

5.2.1 Compliance Market

The compliance market is the predominant system over the voluntary carbon market. In 2005, the Kyoto Protocol (KP) came into force, and developed countries had to comply with binding reduction targets due to their historical emissions. KP incorporated UNFCCC's aim of mitigating global warming by reducing GHG emissions to "a level that would prevent dangerous anthropogenic interference with the climate system" (UNFCCC, 1992, p.2). With a record carbon price of €33.44 per ton, the global value of the compliance market peaked at €229bn in 2020, corresponding to 10,330 $MtCO_2e$. The market is dominated by the EU ETS, which has a share of roughly 90 percent, representing over 8B EUAs (Refinitiv, 2021).

Clean Development Mechanism (CDM) is the biggest offset scheme under the UN compliance market, as visualised in Appendix 2, followed by Joint Implementation (JI) (World Bank, 2020). In general, CDM literature is strongly contested on the impact of CDM on sustainable development (Hein & Garrelts, 2014; He, Huang, & Tarp, 2014; Olsen, 2007). The extensive literature criticising CDM includes claimed that CDM does not generate clear benefits or may even harm sustainable development (e.g., Smits & Middleton, 2014; Aggarwal, 2014). In addition, the unequal distribution of costs and benefits of CDM practices has been pointed out (e.g., Olsen (2007), and Brohé (2014)), and several cases of human rights abuses have been noted (e.g., Finley-Brook & Thomas (2011), and Schade & Obergassel (2014)).

The KP also contained provisions on land use, land-use change and forestry (LULUCF) practices in developed countries, permitting them to use removals from LULUCF projects in their national emissions reduction targets. However, forestry projects in developing countries were considered too risky in terms of, e.g., permanence and leakage, and thus excluded (La Viña, De Leon & Barrer, 2016).

Despite this exclusion, GHG removals from afforestation and reforestation projects – both of which are related to creating new plantations – have been allowed under CDM. Nevertheless, these projects

have been considered controversial since it was argued that they would offer developed countries a cheap alternative for meeting emission reduction targets (Boyd, Gutierrez & Chang, 2007; Bullock, Childs & Pickens, 2009). Consequently, the threshold for GHG removals from such projects was set at 1 percent of a party's national emissions. Concerns about carbon leakage were one of the obstacles why offset projects related to forest conservation, i.e., avoiding or reducing deforestation and forest degradation, were not covered under the KP (La Viña et al., 2016; Okereke et al., 2007).

However, since deforestation accounts for approx. 18 percent of worldwide GHGs, the Stern (2007) review mentioned reducing deforestation as the "single largest opportunity for cost-effective and immediate reductions of carbon emissions". This caused the rise of REDD (Reducing Emissions from Deforestation and Degradation), an international framework to halt deforestation (Holloway & Giandomenico, 2009).

Furthermore, the Bali Action Plan adopted "policy approaches and positive incentives on issues relating to reducing emissions from deforestation and forest degradation in developing countries; and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries" (UNFCCC, 2009, p.1), commonly known as 'REDD+'.

The appearance of REDD in UN negotiations, and its slow introduction as the primary policy for forested lands and change towards REDD+, allowed the inclusion of forests, plantations, and protected areas in the carbon markets (La Viña & De Leon, 2014; Holloway & Giandomenico, 2009). Article 5 of the Paris Agreement reinforced the implementation and support of REDD+ (UNFCCC, 2015).

5.2.2 Voluntary Carbon Market

The second system is the voluntary carbon market (VCM). VCM is the market that RCB will approach with its proposed platform. VCM is dedicated to non-state actors and based on offset schemes. Transactions within VCM are not subject to compliance (Lang, Blum & Leipold, 2019; Loh & Feng, 2018). An exception to this rule was the Chicago Climate Exchange (CCX), a voluntary cap-and-trade market that operated from 2003 to 2010, requiring members to meet legally binding emission reduction targets. As the first centralised system covering all six greenhouse gases, CCX intermediated 44% of the voluntarily traded CO_2e volume, equalling 700 $MtCO_2e$ (TSVCM, 2020; Gans & Hintermann, 2013).

After CCX, VCM became more complementary to the compliance market. VCM's position makes sense, given the overall transaction volume of the market. Despite nearly tripling emission reduction issuances in 2019 compared to 2016, reaching 142 $MtCO_2e$, the volume is still very marginal compared to the compliance market (Donofrio et al., 2020; ICROA, n.d.). Nevertheless, VCM has a crucial role in encouraging individuals, companies, and organisations to expanse their efforts to curb climate change beyond compliance schemes (Loh & Feng, 2018). Appendix 3 provides a non-exhausting overview of

ongoing initiatives from the perspective of the newly found Taskforce for Scaling Voluntary Carbon Markets, “a private sector-led initiative working to scale an effective and efficient voluntary carbon market to help meet the goals of the Paris Agreement” (TSVCM, 2021).

In line with the PA, an increasing number of countries, companies, and organisations is committing to becoming carbon neutral, also called net-zero. Net-zero is reached when such party offsets its CO_2 emissions with an equivalent of CO_2 reduction elsewhere after reducing what is possible. However, Mytton (2020) pointed out the lack of transparency in the environmental footprint of these parties. Meantime, the demand for voluntary carbon certificates is increasing, resulting in an expected price increase that should generate profits for planned projects (Sherman, 2020; Donofrio et al., 2020; UNFCCC, n.d.; ICROA, n.d.).

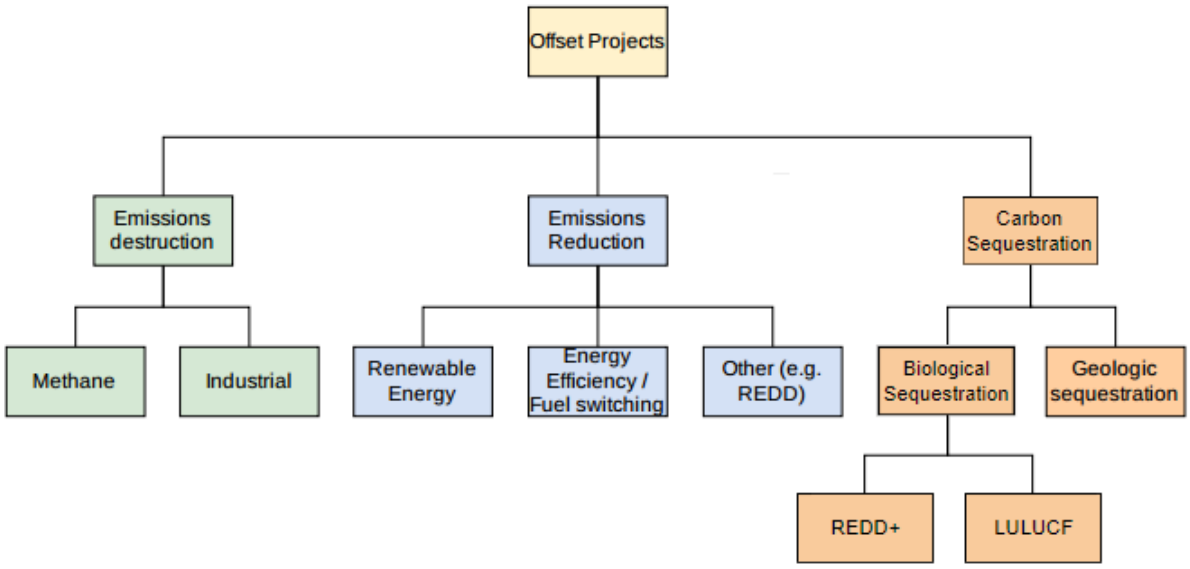
According to TSVCM (2021, p.50), “voluntary carbon offset markets could grow at maximum by approximately 15- fold to 1.5 to 2 $GtCO_2$ of carbon credits per year in 2030 from today, and at maximum by 100-fold to 7 to 13 $GtCO_2$ per year by 2050 from today”.

After the centralized market of CCX shut down, VCM’s transactions have been made “over-the-counter” (OTC) on a deal-to-deal basis (Bayon et al., 2009; TSVCM, 2020). This means there is no “centralized repository for price and volume data” (Donofrio et al., 2020, p.5), which significantly reduces price transparency and transactions. OTC has been dominant in the trading of forestry certificates (Clarke, 2010; Bayon et al., 2009; TSVCM, 2020).

“To deliver carbon neutrality or negativity at the scale needed to achieve the Paris Agreement targets, carbon offsets must not only generate verifiable emission reductions; they must evolve beyond a series of bilateral over-the-counter transactions into a real, functioning market. This means developing a market infrastructure that provides price transparency and liquidity.” (Donofrio et al., 2020, p.8).

According to Bayon et al. (2009), the most common offset projects can be subdivided into emissions destruction, reduction, and sequestration, as visualised in Figure 1.

Figure 1: Categorisation of offset projects



Source: Modified from Bayon et al. (2009)

Emissions destruction deals with the capture and destruction of high-potency GHGs, either from methane or industrial gasses. Emissions reduction is related to renewable energy development, which displaces emissions from traditional fossil-fuel power plants. It also includes energy efficiency projects and others like REDD, in which some of its projects are focused on reducing deforestation and, therefore, emissions (ibid.).

Carbon sequestration deals with "the long-term storage of carbon in plants, soils, geologic formations, and the ocean" (Selin, 2019). Since RCB will focus on biological sequestration projects, these will be closer analysed in the present study.

Biological sequestration comprises the net removal of atmospheric CO_2 by plants and micro-organisms and its storage in vegetative biomass soils. It includes REDD+ projects related to afforestation and reforestation and LULUCF projects (Climate Change Connection, 2016).

Like the compliance market, forestry projects in the voluntary market have been considered somewhat controversial compared to other VCM project types. Criticism is mainly directed to the difficulty of measuring the volume of sequestered CO_2 and the protection against permanence risks. Much is under the REDD-scheme.

5.2.3 Critique on REDD activities

As forestry projects in general, REDD+ activities mainly face problems with leakage, additionality, and permanence. Leakage implies the shifting of deforestation from the area covered by REDD+ activities to another location. Thus, reforesting farmland under the REDD+ project in one place may result in forest clearance for farmland elsewhere (Van Oosterzee, Blignaut & Bradshaw, 2012; Bhullar, 2013; Bayon et al., 2009; Gilbertson et al., 2009; Loh & Feng, 2018).

Additionality is about what would have happened with deforestation levels if REDD+ would not have taken place. It is hard to measure the additionality at the project level despite clear and limited boundaries of operations. At the national level, additionality is even more challenging to determine because of the many variables that coexist, including the anthropogenic and natural drivers of deforestation (Karsenty, 2008; Bhullar, 2013).

At the official introduction of REDD in 2007, an explicit provision was added requiring forests to be threatened by deforestation to prove additionality, i.e., avoided deforestation under REDD+. To be able to measure additionality, a "baseline" is required, i.e., "a level of emissions that would occur in the absence of a forest carbon policy and is used as a reference case for quantifying mitigation performance." (Olander et al., 2009, p.32). How these baselines are determined affects the amount of compensation to be received. Significant fraud has been committed with these baseline data, sometimes resulting in more deforestation. For example, when project managers identified questionable threats to forests. (Olander et al., 2009; Karsenty, Vogel & Castell, 2014; Gifford, 2020).

Furthermore, it is difficult to guarantee the permanence of emission reductions or carbon sequestration achieved through REDD+ activities. Permanence is the ability to ensure "the longevity of a carbon pool and the stability of its stocks" (Skutsch & Trines, 2010, p.3). Forest carbon is considered inherently vulnerable due to the risk of logging and forest fires, which re-releases absorbed carbon. Despite these risks, it is argued that forest fires have been greatly overlooked in REDD+ negotiations. Forest fires are a threat to REDD+ programmes in the tropics. They jeopardise the permanence of carbon offsets. They disrupt regeneration practices and could endanger co-benefits of REDD+, such as biodiversity preservation and poverty mitigation (Barlow et al., 2012; Skutsch & Trines, 2010).

The Warsaw Framework on REDD+ and the Cancún Safeguards established social and environmental criteria that must be met by developing countries undertaking REDD+ activities (UNFCCC, 2013b). They refer to the rights of local and indigenous people, the conservation of forests and biodiversity, and take explicit note of the adoption of the UN Declaration on the Rights of Indigenous Peoples and related international conventions and treaties (Horstmann & Hein, 2017).

However, the Cancun Safeguards – which are supposed to be the primary legal framework to prevent damage – are only based on encouragement from national governments but do not require its application. The UN Declaration on the Rights of Indigenous Peoples is not binding either. Therefore, the prevention of negative impacts is mainly the result of requirements of entities financing REDD+ activities and of the political will and capacity of the host government (Horstmann & Hein, 2017).

REDD+ activities are mainly based on state-owned forests in developing countries. These forests are prone to problems with the security of tenure and uncertain and contested land rights. Various case studies worldwide (e.g., Osborn, 2011; Bulkan, 2016; Dehm, 2016; Schroeder, 2010; Springate-Baginski & Wollenberg, 2010) have shown that communities depending on forests used for REDD+ activities have been frequently denied access to land and forest resources, their livelihoods were reduced with only very little compensation, forms of forest management with shared ownership were undermined, and indigenous conservation values and practices were superseded.

Even though some groups of forest peoples have gained short-term monetary benefits from REDD+ projects, it is argued that such projects have served as "greenwashing cover" for destructive mining activities and the extension of export plantations, and in some instances have led to severe repression or expropriation of whole communities. This implies that governmental agendas sometimes favour extractive activities over environmental protection, which is ultimately incompatible with REDD+ objectives (Trench et al., 2018, p.67; McAfee et al., 2018).

5.3 Rabo Carbon Bank

RCB recognized the trade in carbon credits as a growth market. The carbon price in the EU ETS and its expected doubling by 2030 has been mentioned as a decisive factor (De Boer & Betlem, 2021). A simplified overview of the World Bank's concept of carbon crediting is shown in appendix 4. By offering an online platform for the VCM, RCB aims to bring together the demand and supply side while establishing a transparent and adequate price. By "developing a market infrastructure that provides price transparency and liquidity", RCB would help facilitate carbon trading in the VCM to "evolve beyond a series of bilateral over-the-counter transactions into a real, functioning market", as suggested by FTEM (Donofrio et al., 2020, p.8).

Greenacre, Gross & Speirs (2012, p.31) argue that "eco-innovation requires not only technological change but also institutional change and, hence, that measures of eco-innovation should encompass both technological and institutional factors". Changes in the 'technology system' are "far-reaching changes in technology, affecting several branches of the economy, as well as giving rise to entirely new sectors. They are based on a combination of radical and incremental innovations, together with organisational and managerial innovations affecting more than one or a few firms." (Freeman & Perez,

1988, p.46). “Technology may be interpreted as a type of innovation (often with a technological hardware component), interested in converting science into commercial application and use” (Carayannis & Campbell, 2010, p.45).

Professor René Kemp (personal communication, June 18, 2021) stated that RCB’s combined application of remote sensing, AI, and machine learning could be seen as radical service innovation. This means that the innovation has “a high degree of newness to the firm” and a high degree of newness to the market (Blankestijn, 2016, p.6). René Kemp stated that “[i]f you have to define it, then it is a service that they provide, where elements such as advice also certainly play a role, and other competences are also required”. Blankestijn (2016, p.6) also stated that such innovation has “a significant impact on the firm’s resources, including financial and human resources”.

Furthermore, René Kemp (personal communication, June 18, 2021) referred to eco-innovation, which was defined by Kemp & Pearson (2007, p.7) as “the production, assimilation or exploitation of a product, production process, service or management or business method that is novel to the organisation (developing or adopting it) and which results, throughout its life cycle, in a reduction of environmental risk, pollution and other negative impacts of resources use (including energy use) compared to relevant alternatives.” RCB’s innovation may lower the costs of achieving an environmental improvement or result in a more significant environmental gain.

The potential impacts of the initiative of RCB will depend on many factors. René Kemp (personal communication, June 18, 2021) addresses the sensitivity of RCB (e.g., showing empathy) and its ability to deal with different parties (e.g., communicating with NGOs). Furthermore, it will depend on RCB’s ability to deal with issues linked to forestry projects. As mentioned before, these include but are not limited to additionality, permanence, and carbon leakage (Van Oosterzee, Blignaut & Bradshaw, 2012; Bayon et al., 2009; Gilbertson et al., 2009; Loh & Feng, 2018). RCB’s partner Microsoft aims to help in this process by providing technical solutions such as remote sensing, AI, and machine learning (Hoff, 2021). RCB commits to real-time measurement of CO_2 storage capacity of planted trees (Rabobank, n.d.b). More innovation must occur for this to be cost-effective (A. van de Koevering, personal communication, 17 July 2021).

In addition, Rabobank (and therefore also RCB) also face general challenges in the agricultural sector. Climate change will eventually be a decisive factor for long-term food security. Academic figures show that the food system is responsible for 19 to 29 percent of anthropogenic GHGs, 80 to 86 percent of agricultural production. On the contrary, the food value chain is highly influenced by climatic conditions. Research suggests that climate change will significantly affect food production, trade patterns, price developments and farming incomes, while some areas of the world may become

unsuitable for agriculture if the globally averaged temperature rises (Van Berkum, Dengerink & Ruben, 2018; Vermeulen et al., 2012).

Rabobank has openly spoken about its role as a financier of agriculture as it is now (Zembla, 2021). Bas Rüter, Rabobank's Director of Sustainability, stated that "that also means that the problems associated with it are financed by us. As a bank, we share responsibility for the way the system is now." (Zembla, 2021). Alexander van de Koevering (personal communication, 17 July 2021), recognised that the "agribusiness is crucial to bring about that climate change, both on the side of emissions – they are responsible for 26 percent of the emissions – but if you look at the capacity that land could have to absorb CO_2, it can also make an enormous contribution to solving the problem".

Jelmer van de Mortel (personal communication, June 14, 2021) stated that this polluting agricultural sector "must become sustainable, climate-neutral", referring to this process as "systemic change". RCB wants to contribute to this process, but according to Jelmer van de Mortel "there is no single type of solution anymore. The system is a linkage of different systems". According to Emma van de Ven (personal communication, August 9, 2021), "system change is about how we emit, inset, and how we value ecosystem services".

Alexander van de Koevering (personal communication, July 17, 2021) recognised that making the transition from traditional farming practices towards more regenerative practices causes financing challenges. As an example, he mentioned that "when you switch from monoculture to carbon farming or regenerative agriculture, you then need investments for other machines or seeds while you simply get fewer yields from your land in the first years". Situations will improve over the next few years. The Rabo Carbon Bank was founded, among others, to facilitate this transition (A. van de Koevering, personal communication, 17 July 2021).

RCB's CEO Barbara Baarsma mentioned that the activities of RCB are not purely ideological. Even though 90 to 95 percent of carbon credit sales flow back to the farmer, RCB's efforts in this new business model must become profitable in the long run (Smal, 2021; Esselink, 2021).

It should be expected of a bank like Rabobank to have a good understanding of the feasibility and potential profitability of the RCB (J. van de Mortel, personal communication, June 14, 2021), since investing in such a niche "is inherently risky for firms compared to concentrating on existing mainstream customers" (Greenacre et al., 2012, p.23). It may be that RCB will be faced with "a form of system failure where current market mechanisms do not provide sufficient incentives, and where public support can be used to create a more favourable risk/reward environment for the development of niches" (ibid., p.23). This implies the importance of policy support in developing niches, e.g., through "strategic niche management".

With "strategic niche management", niches are managed rather than just promoted. They are created and developed while considering the broader environment in which niches evolve, i.e., recognising that social and institutional factors contribute to strengthening the anchoring of the established technological system (Maréchal, 2007, p.5191).

Kemp & Foxon (2007) identified both direct and indirect benefits for eco-innovating firms to produce eco-innovation. RCB will benefit directly if it can realize the required scaling-up of trade in carbon credits cost-efficiently. Indirectly, it could benefit from a better image, better relations with suppliers, customers and authorities, and enhanced innovation capability due to contacts with knowledge holders. Their innovation may also lead to health and safety benefits and greater worker satisfaction.

“This innovation process concerns, among others, the development of new value propositions, value creation and delivery networks, and value capture mechanisms.” (Velter, Bitzer, Bocken & Kemp, 2020, p.1). It requires a broader network approach and implies that companies interact with a broader group of actors, such as consumers, traders and partners, NGOs, and governments since it “exceeds the organizational boundaries of the focal firm” (ibid.).

Because of its cooperative nature, Rabobank views RCB as part of a broader movement. It acknowledges that the above-mentioned systemic change across the food value chain requires cooperation between global policymakers, regulators, NGOs, scientists, and innovative disruptors (i.e., start-ups that develop and implement hands-on new business models) (Rabobank, n.d.b.; E. van de Ven, personal communication, July 9, 2021).

RCB refers to this cooperation as the “carbon movement”. Alexander van de Koevering (personal communication, June 15, 2021) stated that it is built around the question, “How can we create an environment with major players in the world that allows for healthy market functioning of carbon credits or reduction credits, with the goal of a transition to a more sustainable agriculture?”

Therefore, Rabobank argued that “[w]e must work together to increase trust through transparent accounting and disclosure standards, grow demand for voluntary carbon credits, and build the case to make carbon pricing part of the climate agreement” (Rabobank, n.d.b). Rabobank is therefore leveraging its global network to collectively drive this systemic change across the food value chain (ibid.).

Velter et al. (2020, p.1) pointed out that “the call for engaging with stakeholders is grounded in the expectation that not only are they potentially affected by [the innovation], they also have something to contribute”. Establishing comprehensive interaction with external stakeholders (e.g., as listed in RCB's aforementioned carbon movement) requires additional efforts (ibid.). René Kemp (personal

communication, June 18, 2020) emphasised that parties like Microsoft "have a similar mindset, very managerial, analytical. But with this kind of approach, it is also about empathy and being able to listen to other parties, as well as communicating with development organisations, and local NGOs”.

According to Rabobank, the mentioned system change is fundamental because the effects of climate change threaten predictable growing seasons and farmers' livelihoods. Another reason for the change is the decline of soil health and biodiversity. Lastly, the food value chain faces changes in consumer demands and environmental regulations (Rabobank, n.d.c).

Chapter 6: Theoretical Framework

To be able to answer the questions asked at the end of chapter 2, it is crucial to apply a model or framework that focuses on both the interconnectedness and knowledge exchange among these stakeholders (i.e., those identified by RCB as the “carbon movement”), while promoting a solution for challenges in the food value chain (Rabobank, n.d.b). This requires a transdisciplinary and interdisciplinary framework that aims to promote sustainable development and can be applied within the food value chain, including all relevant stakeholders.

Furthermore, RCB seeks to integrate various aspects of economic, social, and environmental value, going beyond the customer focus of Rabobank's conventional business model to include value creation for a wide range of stakeholders, society, and the natural environment (A. Van de Koevering, personal communication, June 17, 2021; Velter et al., 2020, p.1). These need to be covered by the chosen model.

Although it is necessary to have models that adequately reflect and apply human knowledge systems and learning processes (Helgeson, Van der Linden & Chabay, 2012), “there are hardly any comprehensive models or concepts to answer the "Why", that truly show "How" we can act and learn accordingly, or provide any demonstrative methods, suggestions and examples how we can improve our actions in the present” (Carayannis, Barth & Campbell, 2012, p.1-2).

The ‘Quintuple Helix’ model is an innovation model that addresses existing challenges of climate change by applying knowledge and know-how, while focusing on the societal exchange and transfer of knowledge within five helices. These represent five subsystems, divided into the education system, the economic system, the political system, the media-based and culture-based public, and the natural environment. This is visualised in Figure 2 (Ibid.).

These five subsystems cover both the stakeholders that RCB considers necessary to achieve the systemic change in the food value chain, i.e., global policymakers, regulators, NGOs, scientists, and innovative disruptors, as well as the wide range of stakeholders, society, and the natural environment that it aims to create value for (Rabobank, n.d.b).

Auke Jan Veenstra (personal communication, July 5, 2021), a Climate Specialist at the Dutch Agriculture and Horticulture Organisation (LTO), acknowledged that “there is not so much published" about RCB. For example, it is not yet clear how the cooperation between the above stakeholders will occur, and what this systemic change means for RCB. The QHIM has been applied to fill this knowledge gap, with each subsystem covering another stakeholder group.

As mentioned in section 2.3, Rabobank’s knowledge is limited to banking, and assistance is required for anything outside that realm (E. van de Ven, personal communication, July 27, 2021). Therefore,

Professor René Kemp (personal communication, June 18, 2021) recognised boundary work as a relevant concept for RCB. Boundary work theory examines the specific activities that facilitate dialogue, interaction and coordinated action between the central organisation and other actors, whilst leaving room for involved parties with different views, values, and stakes (Hoppe, 2010; Velter et al., 2020). Velter et al. (2020, p.2) framed boundary work as "a process of exploring, negotiating, disrupting and realigning organizational boundaries". This process is reflected in the result section of chapter 7.

The Quintuple Helix Innovation Model (QHIM) provides an 'interdisciplinary' and 'transdisciplinary' framework that integrates knowledge, know-how and the natural environment system. Through the five subsystems, all conjunctions of knowledge exchange are dealt with to enhance "knowledge-production-based sustainable development" (Ibid., p.6). This allows "a step-by-step model to comprehend the quality-based management of effective development, recover a balance with nature, and allow future generations a life of plurality and diversity on earth." (Ibid., p.2).

Sustainable development is mostly defined as "meeting the needs of the present without compromising the ability of future generations to meet their own needs" by the Brundtland Commission (WCED, 1987), which is also adopted in the QHIM (Carayannis et al., 2012).

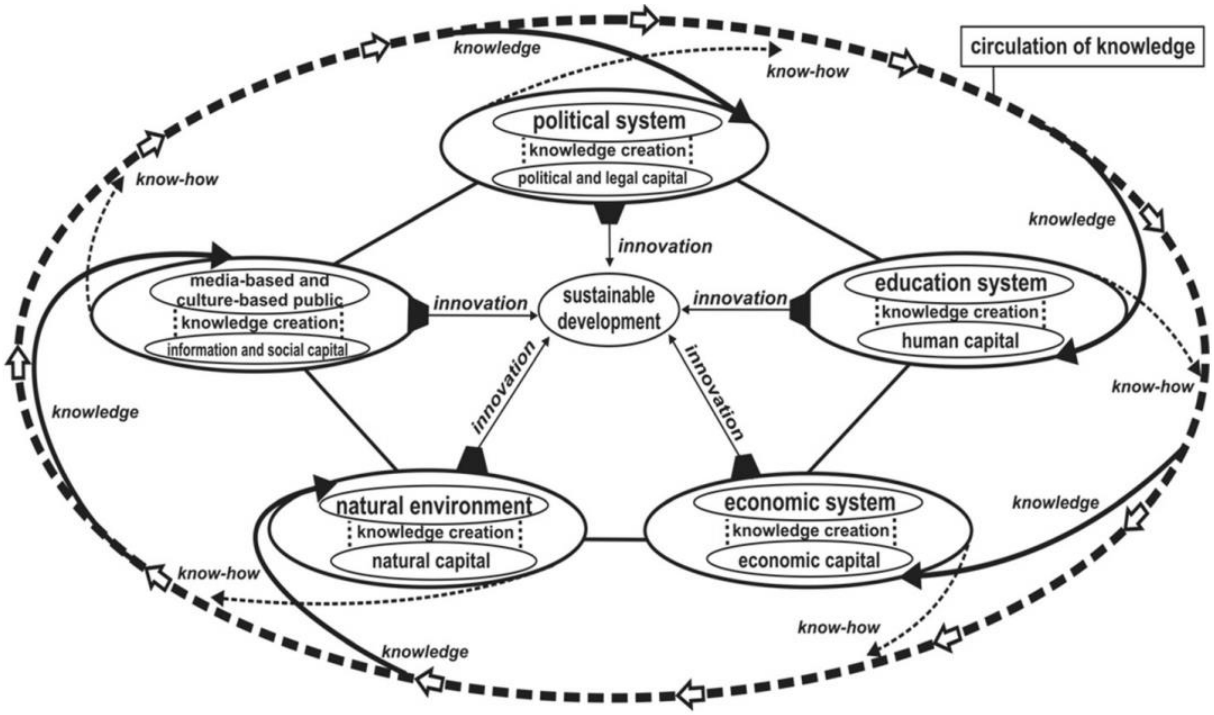
Diepenmaat, Kemp & Velter (2020, p.1) pointed out that "sustainable development requires collective action from stakeholders in the form of system building activities, which in its turn requires societal innovation. Through societal innovation, based on multiple value creation, external costs are being prevented or reduced because of innovation-oriented explorations within a wider frame (a societal improvement perspective), ascertained by the actors."

"The goal and interest of the Quintuple Helix are to include natural environment as a new subsystem for knowledge and innovation models, so that 'nature' becomes established as a central and equivalent component of and for knowledge production and innovation. The natural environment is for the process of knowledge production, and the creation of new innovation is critical because it serves for the preservation, survival, and vitalization of humanity, and the possible making of new green technologies" (Carayannis et al., 2012, p.5). These reasons are also of great importance to the agricultural sector, in which innovation has been an integral part ever since (Kalaitzandonakes, Carayannis, Grigoroudis & Rozakis, 2018).

As mentioned at the beginning of this chapter, the QHIM fulfils the condition of a transdisciplinary and interdisciplinary framework aimed at promoting sustainable development. Through its five subsystems, the model also provides a means to analyse the dynamic system of agricultural innovation and technology transfer, which is relevant for RCB and its role in bringing systemic change across the food value chain (Carayannis et al., 2012; Kalaitzandonakes et al., 2018).

6.1 The five helices of the QHIM complemented by FSA

Figure 2: The circulation of knowledge within the QHIM



Source: Carayannis et al. (2012, p.7)

6.1.1 Education system

Knowledge plays a vital role in formulating an adequate response to the climate challenge. Some go further by saying that there is no doubt that an appropriate response to the challenge of global warming can only be achieved by drawing on the wealth of human knowledge (Carayannis & Campbell, 2010; Bhaskar, Frank, Høyer, Parker & Naess, 2010). As such, the triple helix model (i.e., the forerunner of the QHIM, which focussed solely on the education, economic, and political subsystem) already emphasised the importance of higher education for innovation (Etzkowitz & Leydesdorff, 2000). In a QHIM, it is even seen as the pivot and engine for progress (Carayannis et al., 2012).

The education system is therefore the core of the QHIM, and thus the first subsystem. It refers to "academia", "universities", "higher education systems", and schools. Through the research of knowledge and its dissemination, "human capital" is formed in this subsystem with the help of e.g., students, teachers, scientists, and academic entrepreneurs (ibid., p.5).

The newly generated knowledge serves as input for the corresponding subsystem. It triggers the circulation of the QHIM, as visualised in Figure 2, because it provides for "knowledge creation". This is achieved through the exchange of basic knowledge and new inventions or research results. The output of this knowledge creation is twofold. On one hand, it produces innovation, which is of particular

importance for sustainability. On the other, it adds newly created know-how to the subsystem through knowledge creation (Carayannis & Campbell, 2010; Barth, 2011).

However, the education subsystem of the QHIM does not necessarily acknowledge traditional knowledge for reaching sustainable development. This knowledge has proven to be important when dealing with climate change issues, especially in areas such as Sub-Saharan Africa where most of RCB's pilot projects take place (Wekesa et al., 2015; Rabeil, Newby & Harouna, 2014; E. Van de Ven, personal communication, July 19, 2021). "Traditional knowledge and crop varieties play an important role in the communities' adaptation strategies and innovation responses for food security in the face of climate change" (Wekesa et al., 2017, p.4).

Carayannis et al. (2012) show that when investments in the education subsystem are increased to promote sustainable development in the context of global warming, these investments (as an input in the QHIM) provide new incentives and proposals for this knowledge creation in the education system. Through targeted investment, e.g., new equipment can be acquired, and new positions for scientists and teachers can be created, which leads to more opportunities for research and, ultimately, to a greater output of scientific research. In the cycle of the QHIM, the output generated by human capital for sustainable development serves as input for the economic subsystem. This is visualised in Figure 2 (ibid., p.7).

According to Van Berkum et al. (2018), research and innovation are important drivers for improving the quality and nutritional value of agricultural products. Technical or organisational innovations are also important in achieving a more sustainable food system. This is especially true for the highly innovative Dutch agricultural sector, that is supported by the Wageningen-based knowledge and innovation cluster (Liu, Jongsma, Huang, Dons & Omta, 2015). This is seen as the most important asset for the competitiveness of the Dutch agribusiness (Hoenen, Kolympiris, Wubben & Omta, 2018).

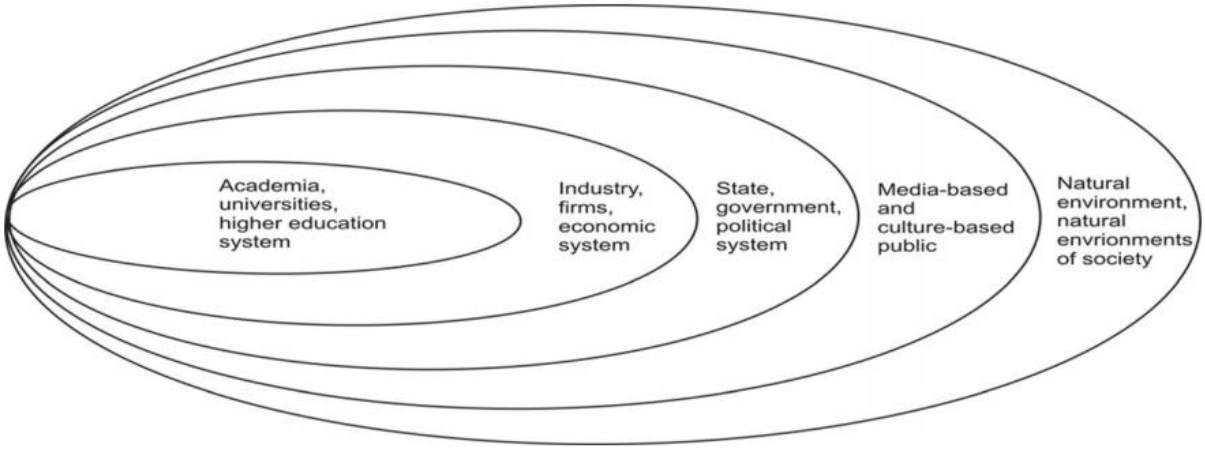
6.1.2 Economic system

The second subsystem is the economic subsystem, which covers industries, businesses, services, and banks, and thus also the Rabo Carbon Bank. It is based on "economic capital", which includes entrepreneurship, machines, products, technology, and money. The inflow of human capital (i.e., knowledge contribution) into the economic system raises the value(s) of the knowledge economy. This can facilitate important production and development options, aimed at realizing sustainable, forward-thinking, and green economies, with the same focus of knowledge creation (ibid., p.5).

In addition to creating new types of jobs and new green products and services, such knowledge creation in the economic subsystem enables new and significant incentives for "green and greener economic growth" (e.g., focussed at reducing CO_2 emissions), and calls for new values (such as carbon

neutral agriculture or regenerative farming). The applied knowledge of economic capital not only contributes to a sustainable economy, but also offers the possibility of a new balance between humans and nature (Barth, 2011, p.9).

Figure 3: Subsystems of the QHIM



Source: Carayannis et al. (2012, p.6)

6.1.3 Natural environment

The renewed sustainability resulting from the economic system in turn serves as a form of knowledge enrichment for the natural environment, the third subsystem in the QHIM cycle (Barth, 2011). This environment is essential for sustainable development and offers "natural capital" to human beings. Among others, this includes biodiversity, plants, and resources (ibid, p.5). The importance of this subsystem is shown in Figure 3, which visualises how the natural environment surrounds all other subsystems of the QHIM.

This additional knowledge flowing from the economical subsystem "mediates" to nature that she will be increasingly protected, because there will be “less exploitation, destruction, pollution, and waste of the environment” (Barth, 2011, p.9). In this way, the natural environment can regenerate itself and enhance its natural capital, while mankind can re-learn from nature (i.e., knowledge creation) (Carayannis et al., 2012, p.8).

Therefore, “the goal of this helix should be to live in balance with nature, to develop regenerative technologies and to use the available, finite resources sustainably and in a sensitive approach.” (ibid., p.8). Natural science disciplines fulfil an important role in forming new green know-how for people. The knowledge that results from this subsystem can ensure greater environmental security and a better living standard for people. In addition, the creation of new environmentally friendly technology can be more effective in reducing CO_2 emissions and help to mitigate climate change (ibid.; Barth, 2011). “The output of the natural environment hence is a green know-how.” (Barth, 2011, p.9).

6.1.4 Media-based and culture-based public

The subsequent subsystem is the media- and culture-based public and comprises two forms of capital. On the one hand, “social capital” is provided by the culture-based public. It is the result of culture and is formed by e.g., traditions and values. On the other hand, “information capital” is provided by means of the media-based public through the media, e.g., the news (Carayannis et al., 2012; Carayannis & Campbell, 2010).

The green know-how provided by the natural environment is complemented here with the “input of new knowledge about nature and a greener lifestyle for the subsystem media-based and culture-based public" (Carayannis et al., 2012, p.8). Communicating and adopting such a green lifestyle are vital in this subsystem. This movement of increasing environmental awareness is exactly the “social capital” that society needs for sustainable development. In this regard, the media-based public is given a new and fundamental function (i.e., forming “information capital”), which is to disseminate this information through the media (ibid.).

“Hence the discipline of journalism comes to know of a new responsibility. Precisely the impulses for new knowledge are the triggers for new innovations and a more sustainable development. The knowledge creation in this subsystem has the task to forward information regarding the citizens´ wishes, needs, problems or contentment, etc. as know-how to politics.” (Barth, 2011, p.9).

In addition to what Carayannis et al. (2012) propose, awareness of power imbalances need to be taken into account when studying this subsystem (Entman, 2010).

6.1.5 Political system

The political system is another essential subsystem since it defines the "will" towards which a nation-state or political union (like the European Union) will move, both today and in the future. In doing so, it formulates, organises, and manages the overall conditions of this nation-state/political union. The knowledge generated by the public (and therefore the respective other subsystems) serves as new input for the political subsystem (Carayannis et al., 2012, p.6). The fundamental debates on this new knowledge in the political realm create the required incentives for knowledge creation (ibid., p.9; Barth, 2011, p.9). Hence, this subsystem holds "political and legal capital” (e.g., concepts, legislation, and politicians), “which makes the Quintuple Helix more effective, higher quality and more sustainable. Consequently, the newly obtained know-how is an output of suggestions, sustainable investments and goals.” (Carayannis et al., 2012, p.6). Barth (2011, p.9) focuses more on democracy by describing the newly developed know-how as the "democratic capital” of a political system.

Following the democratic theory of Abraham Lincoln (1863, quote from Lincoln & Chittenden, 2009/1908, p.133), democracy essentially stands for “government of the people, by the people, and

for the people". Barth (2011, p.5) stated that democracy develops through the (media- and cultural-based) public as "agents whose leading force in a knowledge economy is the knowledge as resource for creating know-how and innovation for a sustainable development in a democracy".

The quality of a democracy thus depends on the above development process (ibid.). However, power imbalances are not particularly acknowledged in the QHIM. Geus (2008) advises that, "[i]f you want to think about politics, think first about power" (ibid., p.97). Geus (2008, p.91) questioned whether "we really all believe that giving people with vastly different powers and resources abstractly 'equal' rights (and duties and 'opportunities') and abstractly 'fair' conditions of interaction will in itself necessarily create a situation that one could reasonably judge to be in any special way evaluatively attractive?"

Nevertheless, the goal of the knowledge creation within this subsystem is building "political and legal capital", which increases the effectiveness of the QHIM, and makes it more sustainable. "Consequently, the newly obtained know-how is an output of suggestions, sustainable investments, and objectives. The new output of knowledge and know-how of the political system leads across the circulation of knowledge back again into the education system, economic system, natural environment, and media-based and culture-based public." (Carayannis et al., 2012, p.9). This is visualised in Figure 3.

Chapter 7: Results

This chapter builds on the results of the thirteen semi-structured in-depth interviews that were conducted with the actors mentioned in appendix 1. As far as possible, the circulation of knowledge as represented in the QHIM has been followed.

7.1 The output of the education system and the input of the economic system

The education system is at the heart of the QHIM, as visualised in Figure 2. It provides sustainable knowledge to the innovation that contributes to sustainable development, as visualised in Figure 2. The same figure shows that the output of knowledge from the education system serves as input for the economic system, which covers the Rabo Carbon Bank. since the importance of the education system is priority here, this subsystem is examined from the perspective of the economic system (Carayannis et al., 2012).

In its proposed “carbon movement”, Rabobank already emphasised the role of scientists to bring systemic change into the food value chain (Rabobank, n.d.b). RCB, and especially Acorn, wanted to open the carbon market for smallholders through remote sensing, assuming that smallholders would be interested in planting trees because of the carbon credit income. Emma van de Ven (personal communication, July 27, 2021) also recognised the role of science in the initial phase. To gain insight in smallholder agroforestry, RCB – and especially Acorn – used reports of e.g., UN, WHO, World Bank, and the World Food Program on smallholders in developing countries, and a significant number of related scientific publications (E. van de Ven, personal communication, July 27, 2021).

Emma van de Ven (personal communication, July 29, 2021) stated that “the education system offers great insights, but from an ivory tower perspective”. She claimed to “have read everything and none of them have the level of empathic knowledge needed to really shape a great value proposition for this target group. […] The education system in that sense failed us, due to its distant and abstract view on the matter.”

Since it was claimed that the education system (and especially the scientific community) was not able to capture the real situation at grassroots level, RCB had to move beyond the academic knowledge taking a ‘on-the-ground’ approach to learn more about the problems faced by smallholders (E. van de Ven, personal communication, July 29, 2021).

Furthermore, Emma van de Ven (personal communication, July 27, 2021) claimed that RCB had to delve very deeply into the reality of relevant smallholders in its initial phase to find out about which problems smallholders were facing, both in the short and long term, and whether they would indeed benefit from agroforestry.

Emma van de Ven (ibid.) mentioned that the following methods were adopted by RCB, Acorn especially, to arrive at these insights:

1. Interviews in roughly 50 farmers through by using all possible communication methods available during the COVID-pandemic. Mostly video calls, sometimes in English and often with translators.
2. Interviews to as many experts as possible (experts by experience, scientists, project developers, etc.).
3. Pilot projects in as many different countries as possible with as many different types of farmers and intermediaries (10+ countries and counting).
4. Collaborations with parties who had already implemented many agroforestry projects and could share their experience and knowledge.

This way, RCB was able to identify many problems that could be linked to land degradation and deforestation. Through the input of this new knowledge (other than the input from the education system), the research focus was specifically targeted towards agroforestry. The decisive input element was that regenerative agriculture would be crucial to tackle the degraded soil issues and low rainfall rates (E. van de Ven, personal communication, July 27, 2021). Especially because agroforestry "strengthens healthy microclimates, and the trees and cover crops protect the soil from degrading and generate (on a larger scale) more rainfall" (E. van de Ven, personal communication, July 29, 2021).

Alexander van de Koevering (personal communication, 17 June 2021) declared that natural carbon sequestration is the only cost-effective way to remove CO_2 from the air, with soil sequestration having the highest potential according to him. On the other hand, Jos Cozijnsen (personal communication, June 18, 2021) about carbon removals from the atmosphere believes that "all sounds very well, but it is very expensive, and it means that you are not going to achieve those other emission reductions".

Besides, many agroforestry details are still unclear to RCB (E. van de Ven, personal communication, July 27, 2021). Jos Cozijnsen (personal communication, June 18, 2021) declared that natural carbon sequestration is "really a struggle with that soil". He questioned himself "how can soil hold more water?" and "how can it hold more carbon?". In the end, he concluded that "these are difficult but super important struggles, because planting on soil can also mean that it is extracting carbon again, that it is extracting water. So, it is not all that easy."

Section 2.3 already mentioned that the innovation process of RCB exceeds its organizational boundaries (Velter et al., 2020, p.1). This is simply because Rabobank's expertise as a bank is limited

to banking (E. van de Ven, personal communication, July 27, 2021). Therefore, assistance is required for anything outside of that realm, as mentioned in chapter 6. However, Emma van de Ven (personal communication, July 19, 2021) claimed that RCB has developed far enough to know what they do not yet know, so that they can seek targeted knowledge and help from research and educational centres (Kruger & Dunning, 1999).

Pilot projects outcomes are discussed with universities like Wageningen University & Research (WUR) or Maastricht University (UM). With WUR, the aim is to draw up research plans based on the initial conclusion of several separate projects in order to quantify the socio-economic impact of participating smallholders. Emma van de Ven (personal communication, June 27, 2021) emphasised that a considerable amount of ground data was needed to understand what could be studied.

Nonetheless, cooperation with WUR and other universities is only one of the ways for RCB to acquire knowledge said Emma van de Ven (personal communication, July 27, 2021). In fact, universities and academies are normally too far away from reality to provide relevant advice. Consequently, it is a prerequisite for RCB's cooperation with scientists that they have experience on the ground. This requirement clarifies which universities RCB, and especially Acorn, prefers to work with, as mentioned in table 1 below. Besides partnerships with the universities that meet these prerequisites, RCB regularly hires experts. When such experts are hired, RCB prefers to cooperate on a more substantial basis.

Emma van de Ven (personal communication, July 29, 2021) mentioned that RCB, and especially Acorn, also works with other universities besides WUR and UM. However, she stressed that "this is not the only way to acquire knowledge, and certainly not the most effective and empathetic".

Moreover, she mentioned that "the collaboration with Wageningen is more public, while other long-term contracts still need to be signed" (E. van de Ven, personal communication, July 29, 2021). To sum up, Acorn has worked with four Dutch universities, one Burundian university, one British university, one Costa Rican university, and two American universities. Table 1 gives an overview of some of these academic collaborations and its purposes, which were specifically mentioned by the interviewees who are stated below the table.

Furthermore, RCB also supplies data. For example, RCB invests significant amounts in soil data and ground measurements of all the trees and shrubs on hundreds of agroforestry plots. This knowledge is shared because it is very valuable for research parties, says Emma van de Ven (personal communication, July 19, 2021). However, she claimed that there has not yet been a university that has been able to help with the advanced remote sensing matters faced by RCB and Microsoft. To train Microsoft's algorithms, hundreds of thousands of trees must be measured manually (A Digital

Advisor of Microsoft, personal communication, July 15, 2021). Emma van de Ven (personal communication, July 29, 2021) explains that this has never been done because it is so "incredibly expensive and there has not been a business case for yet".

Table 1: Academic partnerships*

Partnership	Focus	Example Research Questions
RCB & WUR [1] [2] [3]	Socio-economic impact, measuring living conditions of farmers in Africa [2], based on insights from pilot projects [1] Feedback role [3]	Draw up research plans based on the initial conclusions on how RCB can quantify the impact [1]. How can RCB measure the smallholder's impact? This is called 'payment for ecosystem services', and goes beyond carbon emissions. How can we indicate that there is a positive impact in addition to the carbon emission? What are the side-effects? [2] Generally, WUR always provides RCB with feedback [3]
Rabobank & Delft University of Technology [3]	Student challenges	Explore ground-breaking innovations in agri-food
BISCI: Rabobank, Solidaridad (NGO) & UM (incl. MSI) [1] [2] [4] [5]	Fair & Smart Data, using data from smallholders	Could that not be of value to those farmers? [4] What is the value of the data coming from RCB? Where is value created? What ethical aspects are relevant? [1] How can quality be increased and more standardised? [2] We can say, this farmer generates a lot of data, if we keep it with him, he can build up an alternative income stream or an alternative business model. But is the farmer really waiting for that? These assumptions need to be tested [5]
RCB, Microsoft Research University of Burundi [6]	Agrosystems	Which agrosystems are best to implement?
Rabobank, Microsoft Research & Stanford University, in combination with various university research partners and pilot partners (initial phase) [1]	Value proposition of farmers, and financial incentives	How can you induce positive behaviour so that a farmer does not go and cut down a tree to pay for school fees, for example, but starts to grow something else? Thus, encouraging behaviour. How do these farmers deal with money from day to day?

* This is a non-exhaustive list, mainly because some partnerships were not yet made public by RCB, and could therefore not specifically be addressed (A. van de Koevering, personal communication, July 15, 2021)

[1] Emma van de Ven (personal communication, July 19, 2021)

[2] Jelmer van de Mortel (personal communication, June 14, 2021)

[3] Alexander van de Koevering (personal communication, June 17, 2021)

[4] Ron Cörvers (personal communication, July 2, 2021)

[5] Han Brouwers (personal communication, July 20, 2021)

[6] Digital Advisor Microsoft (personal communication, July 15, 2021)

7.2 The economic system and the output to the natural environment

The economic subsystem focusses on economic capital which, among other things, includes entrepreneurship, technology, and money (Carayannis et al., 2012).

7.2.1 Revenue model

Within the economic subsystem, one topic related to economic capital received special attention by the interviewees. In twelve of the thirteen interviews, the term "revenue model" was mentioned, either in reference to RCB or to the smallholders in Africa and/or the farmers in the Netherlands. The two are interconnected according to Jelmer van de Mortel (personal communication, June 14, 2021). He pinpointed that it is in the bank's nature to always look for new revenue models, especially since the current ones are under pressure due to the low interest rate. He adds that for Rabobank this process is always based on the need to help the farmer in the transition, but emphasises that this also requires a sustainable revenue model for the bank.

Although Alexander van de Koevering (personal communication, June 17, 2021) stated that it is still very early to talk about pilot project results, the first outcomes “are now that many farmers are interested”, and “many corporates want to invest”.

7.2.1.1 General perspective

As mentioned in section 6.1.2 of the theoretical framework, the knowledge creation in the economic subsystem demands new values (Carayannis et al., 2012). Jelmer van de Mortel (personal communication, June 14, 2021) stated that “the carbon bank creates concrete propositions to help the client that have both added value for corporates, because they want to offset some of their emissions, added value for the farmer because he simply gets paid, and added value for Rabobank because we distillate a business model from it”.

However, smallholders may also experience a loss rather than an eventual gain, since the loss of autonomy to grow what they need on their land (due to long-term contracts) could make them dependent on buying more food from markets, repaying interest on original loans, and purchasing fertilisers or other necessities they need (Clay & King, 2019; Professor M. Peeters, personal communication, July 14, 2021). Han Brouwers (personal communication, July 20, 2021) emphasised

the importance of testing the assumptions that have been made, questioning whether the smallholder is waiting for such an alternative business model.

Ron Cörvers (personal communication, July 2, 2021) pointed out that “primarily, of course, they look at the financial economic side, but they do have an eye for social relations, and ultimately, of course, for the environment”. As mentioned in section 2.3, RCB's efforts in this new business model must become profitable in the long run (Smal, 2021; Esselink, 2021).

Jelmer van de Mortel (personal communication, June 14, 2021), however, claimed that the concept of multiple value creation is concretely reflected in this search for new business models because of the focus on sustainable agriculture. He emphasised the importance that RCB assigns to the task of inspiring farmers to change by means of these personalised revenue models. He claimed that, compared to current bank revenue models, RCB’s revenue model gives large portions to farmers. “We try to create those values for the farmer, for the climate and for Rabobank”.

Jos Cozijnsen (personal communication, June 18, 2021) stressed the importance of finding out what the farmers themselves need, whereas René Kemp (personal communication, June 18, 2021) emphasised that partnerships with NGOs are necessary to broaden the scope of the initiative. As a result, Rabobank has entered a partnership with Solidaridad, an NGO that helps farmers develop a better position (H. Brouwers, personal communication, July 20, 2021).

Han Brouwers (ibid.) stated that Solidaridad is a network organisation with branches in 42 countries, divided into six regions with a high degree of autonomy. He believes that this network structure is Solidaridad's strength. In addition, the regions and countries work mainly with local staff, "people who were born, raised and educated there". Han Brouwers adds that there are many agronomists, many of whom studied at Wageningen University Research. "So, it is always local, and we also have field staff, with field offices, serving a certain region. It varies a bit, normally it is training and facilitating parties to build an infrastructure locally." (ibid.).

In collaboration with Solidaridad, RCB (specifically Acorn) is currently running "ten pilots with all kinds of parties on the ground who are all implementing agroforestry models with those smallholder farmers," says Emma van de Ven (personal communication, July 19, 2021). According to her, the goal is to "learn as much as possible [...] about the needs of those farmers, about the value propositions towards the farmers, about the financing needs and so on".

Jos Cozijnsen (personal communication, June 18, 2021) mentioned that it takes at least five or six years before the CO_2 capture starts. Jelmer van de Mortel (personal communication, June 14, 2021) adds that it takes seven years before fruit trees start producing fruit. He acknowledged that this is

challenging for a bank that is used to financing beef cows. In existing business models in arable farming, Rabobank always had to finance only one annual cycle. He stated that “forestry is not really that familiar to us”. Nevertheless, RCB is “going to fill that gap of five, six, seven years” for those smallholders (ibid.). This is done by already compensating the smallholder for the future carbon sequestration of these trees, as visualised in appendix 5. The smallholder earns from the sale of carbon credits while the trees are growing. When they are fully grown, these trees provide income by selling the yields (Smal, 2021).

Moreover, together with the partners of BISCI, as mentioned in Table 1, RCB is experimenting with complementary earning models for smallholders. Recognising 'Fair & Smart Data', Han Brouwers (personal communication, July 20, 2021) says that they are looking at how alternative income streams can be built from the data generated by the farmer. Han Brouwers says that this is currently not yet scientifically substantiated, but emphasises that it is important to validate the assumptions made: "We can say, this farmer generates a lot of data, if we keep it with him, he will build up an alternative income stream, say, or an alternative business model. But is the farmer really waiting for that? All these assumptions have to be tested.” (ibid.).

7.2.1.2 Dutch perspective

For farmers in the Netherlands, the proposition is less clear. Jelmer van de Mortel (personal communication, June 14, 2021) reflects that in economic terms it is relatively more appealing for an African farmer to make the transition than for a Dutch farmer. According to him, this has to do with the "economic rationale". With the current CO_2 prices, it is beneficial for smallholders in Africa to make the transition. For Dutch farmers, prices of a hundred euros per tonne CO_2e are necessary to create an economic incentive, because otherwise they can earn more by using another method.

Wij.land is a foundation working on sustainable agriculture and nature in the Netherlands (Wij.land, n.d.). An employee of Wij.land (personal communication, July 2, 2021) explained that they are a network of farmers. Farmers who do not know how to implement the changes in Dutch agricultural policy can join and ask for help. Wij.land has learned that there is often scepticism among Dutch farmers whether regenerative agriculture is worthwhile. This is illustrated with an example from dairy farming. On one hand, more extensive management leads to lower production, but on the other, it also results in cost savings because no or less artificial feed and fertilisers are used. Farmers ask themselves the following question: “How does that work out on our balance sheet?” (Wij.land, n.d.).

Jos Cozijnsen (personal communication, June 18, 2021) gave a similar example of a farmer who said "I now have half the number of cows, but I no longer have tractors, my soil always stays green, the soil

is healthier, and the cows are healthier. I do have less milk that I sell, but I have the same earnings, because I have fewer expenses."

Wij.land supported looking at regenerative and nature-inclusive farming at a farm level (Miller et al., 2019), because they often have a different revenue model than an intensive farm. Together with other partners, Rabobank is helping Wij.land with a cost-benefit analysis for regenerative agriculture, which should provide insight into whether there is an earnings model for regenerative agriculture in the current market. If that is not the case, Wij.land believes there is a case for rewarding the ecosystem services provided from public funds. If there is, conventional farmers must be shown that there is a future for livestock farming if a regenerative approach is adopted (Wij.land, n.d.).

According to Wij.land, this is a challenging task because it lacks a clear definition of a regenerative farm, and only few farmers have already made the transition to regenerative farming. In addition, Wij.land stated that the methodology to compare factors such as cash flow and balance is ambiguous (ibid.).

Wij.land and Rabobank also work together in other ways that have more focus on carbon trading. Wij.land is Rabobank's Dutch partner for the roll-out of the carbon bank, although the contract has not yet been signed (An employee of Wij.land, personal communication, July 2, 2021). In this collaboration, both parties have started to investigate how carbon can be modulated in the Netherlands. An employee of Wij.land (ibid.) stated that this is "super complicated", but that they "do have the experience and network for it". This employee pointed out that the most important aim is to learn as much as possible.

Farmers who join Wij.land all start with a soil training course, as the foundation is convinced that it all starts with the soil, which "you have to have in good balance" according to an employee of Wij.land (ibid.). Within the portfolio of Wij.land, farmers can make choices as they progress. The employee says that farmers, for example, can experiment with compost or other grazing techniques to ensure that it becomes a naturally better system. As these measures have carbon implications for the land surface, the benefits can be monetised through the Rabo Carbon Bank (ibid.).

The Dutch pilot projects in cooperation with Wij.land are thus not aimed at agroforestry, in contrast to the RCB pilot projects in Africa. One of the reasons is that many zoning plans in the Netherlands state that no trees may be planted on Dutch meadows, because they must maintain an open character, as is typical of the Dutch landscape. As a result, RCB adapts its programme according to the legal context of each country (ibid.).

According to an employee of Wij.land (ibid.), the foundation sees wet cultivation as an interesting option, but stresses that the processes of peat underground are not yet clear. It is assumed that subsidence causes emissions to be too high, requiring the water level of peat to be raised to reduce emissions. By moistening this peat wet cultivation would become possible. According to this person, wet cultivation can be seen as a food forest in a swampy area. Even though cows cannot walk there, other possibilities do arise. An example of an alternative source of income for the farmer through wet cultivation is the yield of cultivated mint and cranberries (ibid.).

Auke Jan Veenstra of LTO (personal communication, July 17, 2021), however, stressed that the Netherlands contains 1.8 million hectares of agricultural land. He argued that it is questionable whether there is a market for the yield of wet cultivation on a large scale, referring to it as a niche. A regular food forest is neither the solution for the same reasons he argues, despite the several social challenges it would address in his opinion: Among others, it improves the soil and increases biodiversity. Moreover, it has the potential to fertilise or keep out undesirable elements.

"But of course, all of this involves a lot of headaches", says Auke Jan Veenstra (ibid.). He emphasises that “farmers are trying to keep their incomes up, as the economy rules”. That is why he asks himself: "What incentive is needed to achieve a systemic shift?” Moving towards certain forms of food forests, agroforestry, or strip farming, involves major conversions of business operations. Besides knowledge, it requires investment. “If you are in the red, you cannot go green, as the saying goes” (ibid.).

When looking at the income position of the farmer, Bart Millenaar (personal communication, July 21, 2021) also stated that "it has to come from several angles if we want to make the translation". Auke Jan Veenstra (personal communication, July 17, 2021) does see the monetary value of a carbon credit “as an important building block that should actually be stackable with other sources of income, so that at the end of the line, the measure taken pays for itself”.

Permanent pasture is one of the possible measures according to him. “When you stop ploughing and leave real grassland for thirty to forty years, a lot of carbon is fixed through the roots, in the soil”. Another possible measure would be a wider rotation of arable crops. Auke Jan Veenstra (ibid.) emphasises that “everything must be aimed at improving the quality of the soil, which is first and foremost to the advantage of the same land user”. Still, new machines are necessary when ploughing has ceased, requiring investments. Auke Jan Veenstra thinks that the Rabobank should be more supportive with these kinds of investments (ibid.).

In addition, Auke Jan Veenstra (ibid.) also refers to the Farm of the Future, “a Dutch initiative in which WUR and Dutch farmers of the future are working together on feasible solutions to the challenges faced by agriculture in the Netherlands” (Farm of the Future, n.d.). At the Farm of the Future, among

other things, strip cultivation is being looked at. Auke Jan Veenstra says that wide soil beds can improve crops, and sees benefits for the interaction between crops, especially in maintaining insect control.

Auke Jan Veenstra (ibid.) sees the innovations that can accelerate these solutions (e.g., robotisation) developing quite rapidly. In addition to counteracting fossil fuel consumption, he stated that these machines are much lighter and can work much faster. Therefore, Auke Jan Veenstra argued that this will bring 'strip farming' or even 'pixel farming' (i.e., blocks of one square metre, or two square metres) within reach. He points out that "the moment you can manage and harvest independently with robotics and GPS and the like, then that paves the way for doing it that way". Nevertheless, he stated that "all the bells and whistles that you attach to it at that moment to do things differently are a direct attack on the earnings model of farmers. That is where the problem lies".

According to Auke Jan Veenstra (ibid.), "the market, the government or another social form should therefore ‘put its money where its mouth is’ to allow the entrepreneur to move in his business operations. That is the crux of the matter in the Netherlands.” He sees a similar situation at the European level. According to him "climate targets are extremely ambitious, but if you do not do anything at the heart of the system, if you only put the screws to the producers, it will not work. The whole system has to be turned upside down." (ibid.).

Auke Jan Veenstra (ibid.) also recognised a difference between Rabobank’s corporate strategy and the local practice. From various meetings with the head office of Rabobank Nederland in Utrecht, he experiences a different mentality than at the local Rabobank. He explains that with people from Rabobank Netherlands "everything is possible, and everything has to be done, then it is all very much about rushing ahead. If it becomes concrete, that is, my neighbour goes to the local Rabobank and says, 'I actually want to build a sustainable stable', then the Rabobank says 'yes, yes, you actually need to grow your herd a bit. You will have to have two milking robots instead of one. Otherwise, we will not be able to arrange the financing.” Auke Jan Veenstra (ibid.) concluded that "in practice, economic laws simply rule, where you just look at a risk profile, where you look at a liquidity flow, at the instalments. They actually say something different than they ideally should!"

Similarly, Smit (2021) pointed out that "it remains to be seen whether the Rabo Carbon Bank is really a solution for the many Dutch farmers who, often with sky-high loans from the [Rabo]bank, are stuck in the rat race of producing a lot for little."

On the other hand, Auke Jan Veenstra (personal communication, July 17, 2021) concluded that Rabobank is also trapped in that economic system. He acknowledges that another source of income must emerge for Rabobank as well, since too little production will not generate enough income. "Well,

if nothing else comes along, Rabobank is not inclined to give that loan, if they don't have the guarantee that it will be repaid on time."

7.2.2 Technology

As mentioned at the start of this chapter, technology is one of the aspects of economic capital (Carayannis et al., 2012). Section 2.3 already stated that “[t]echnology may be interpreted as a type of innovation (often with a technological hardware component), interested in converting science into commercial application and use” (Carayannis & Campbell, 2010, p.45). This section illustrates this process for the Rabo Carbon Bank.

Since Rabobank’s knowledge is limited to banking, assistance is required for anything outside of that realm (E. van de Ven, personal communication, July 27, 2021), as mentioned in section 7.1. That is why it entered the strategic partnership with technology partner Microsoft.

A digital advisor of Microsoft (personal communication, July 15, 2021) stated that, unlike Microsoft's standard products, Microsoft Corp's teams develop products in the sense of solutions. This digital advisor pointed out that these teams first want to fine-tune the developed solutions with a small group of clients who can test the product and give feedback to Microsoft to ensure that it really fits the market's needs. “Once enough iterations have taken place, the product is phased, and introduced to each corporate customer”.

This digital advisor of Microsoft (ibid.) stated that they have a few of these kinds of solutions that are very closely aligned with the Rabo Carbon Bank, especially Acorn. Because of the above approach of Microsoft, Rabobank would have the advantage that they can use the product first, but also that “they have an impact on how the product develops, and have a say in that”. This was important for both Microsoft and Rabobank according to this digital advisor. As a result, both parties decided to build the platform for the Rabo Carbon Bank together via Microsoft Consulting Services (ibid.).

Microsoft wants to create a global system that “brings together the world of nature conservation and the corporate world (which has very clear goals for undoing carbon). [Rabobank is] an incubator in that, where we can test our technology”. Microsoft considered Rabobank "a frontrunner in building such a marketplace", while reiterating that it does not want to be the owner of the marketplace, but the party providing the technology (ibid.).

A digital advisor from Microsoft (ibid.) stated that there are many pieces of land that need to be monitored. This person explained that the traditional method of finding out the carbon sequestration of a tree was to walk around it with a tape measure and measure the 'delta' between two measurements, for example one year. According to this digital consultant, all current certifications are

also based on this manual measurement. "That just takes a lot of time, especially if you have 100,000 trees in a certain area". That is why Microsoft uses remote-sensing technology to find out what the above ground biomass, and below ground biomass is (ibid.).

According to this Digital Advisor of Microsoft (ibid.), the remote-sensing technology used by Microsoft covers both public and private satellite images, but also lidar data. "Lidar data is actually a kind of device that is put on a drone, or on an aeroplane, and it then makes a 3D image of a country. That way you can make a comparison with a lido image from last year", allowing Microsoft to measure the delta. To validate the accuracy of this data, Microsoft also performs a ground validation in the initial phase, both at the beginning and end of the year (ibid.).

Carbon expert Jos Cozijnsen (personal communication, August 3, 2021) stated that the use of remote sensing in forest protection or forest plantation is not new, and that it is already applied within the voluntary carbon market. He also stresses the importance of ground validation, as it is necessary to check what type of tree there is and what its thickness is. He claimed that this cannot be seen from the air, and calls for regular checks.

When asking Microsoft whether there are observed differences between remote-sensing measurements and ground validation, Microsoft's digital advisor (personal communication, July 15, 2021) says, "the official answer is no. It is very important to keep calibrating to see if the plot you assume, say the coordinates you assume for the satellite images, are correct. So, it is just trial and error."

Furthermore, this digital advisor (ibid.) stated that the data from both methods is bundled, and sent to a remote sensing third party. "That third party makes an analysis, it has its own algorithm, and it makes its own analysis based on thousands of factors that are looked at, and from that they make a calculation" concluding the amount of CO_2 that has been sequestered in the relevant area. The digital advisor stated that tests have been run with five different partners to measure which is the most accurate. "Every time, the measurement that is most conservative is taken". In addition, this person stated that Microsoft "simply benefits the most if it is as close to reality as possible. But, in the meantime, the most conservative one is adopted." (ibid.).

Thus, the most conservative outcome of the above tests is used by RCB to calculate how many carbon credits they can offer on their platform. As soon as a buyer is found for the credits, they are immediately created and traded to the company concerned, in this case Microsoft (ibid.).

In addition, the Microsoft product group is working on a casual orbital, called Azure Orbital. Within this solution, Microsoft is working on ground stations. When the satellite flies over these ground stations,

an image is immediately created. This very raw data is directly "ingested" into Azure, Microsoft's cloud. "That ground station immediately translates this into data that is usable in the model." said a Microsoft digital advisor (ibid.). This advisor also stated that "making the algorithm is not that difficult, but figuring out what factors to include is very complex". It requires "very specific Geo-spatial, agricultural, and ecological" knowledge, "which Microsoft does not possess. So, you will always need a third party for that" (ibid.).

7.2.3 Output to the natural environment

The new values called for within this subsystem allowed for "a new output of know-how and innovations by the economic system" (Carayannis et al., 2012, p.7). According to Barth (2011a, p.8), “the economic capital of know-how is in this context sustainability”. He argued that “the output of economic know-how will be a high-quality and sustainable economy, but in fact, the special know-how which the economic system implies now, is probably a new harmony of human beings with nature”.

7.3 Natural environment

As mentioned in section 6.1.3, the above cited additional knowledge flowing from the economical subsystem "mediates" to nature that she will be increasingly protected, because there will be “less exploitation, destruction, pollution, and waste of the environment” (Barth, 2011, p.9). Carayannis et al, 2012, p.8) stated that in this way, the natural environment can regenerate itself and enhance its natural capital that includes biodiversity, plants, and resources (ibid., p.5 & p.8).

7.3.1 General perspective

Jelmer van de Mortel (personal communication, 14 June 2021) mentioned that RCB wants to help farmers develop a sustainable business model in which increasing the quality of their land is key. He stated that RCB’s proposition questions how this quality increase can be achieved. According to him, “quality is about biodiversity, the number of different animals that live there, the number of different plants that are there. The quality of the soil, how much organic carbon is stored in the soil? What nutrients are present in the soil? What nutrients can be found in the soil? These are all things that we have to take into account in the proposition.”

When choosing the type of tree for agroforestry, Emma van de Ven (personal communication, July 19, 2021) explained that much attention is paid to biodiversity to ensure that the ecosystem is balanced. Jelmer van de Mortel (personal communication, 14 June 2020) mentioned that this is important since RCB want to "avoid creating a new problem by solving another one".

Alexander van de Koevering (personal communication, 17 June 2021) claimed that "when the carbon in the soil increases, it becomes healthier on a one-to-one basis, and you can produce more food". As

mentioned before, Emma van de Ven (personal communication, July 29, 2021) stated that agroforestry “strengthens healthy microclimates, and the trees and cover crops protect the soil from degrading and generate (on a larger scale) more rainfall”.

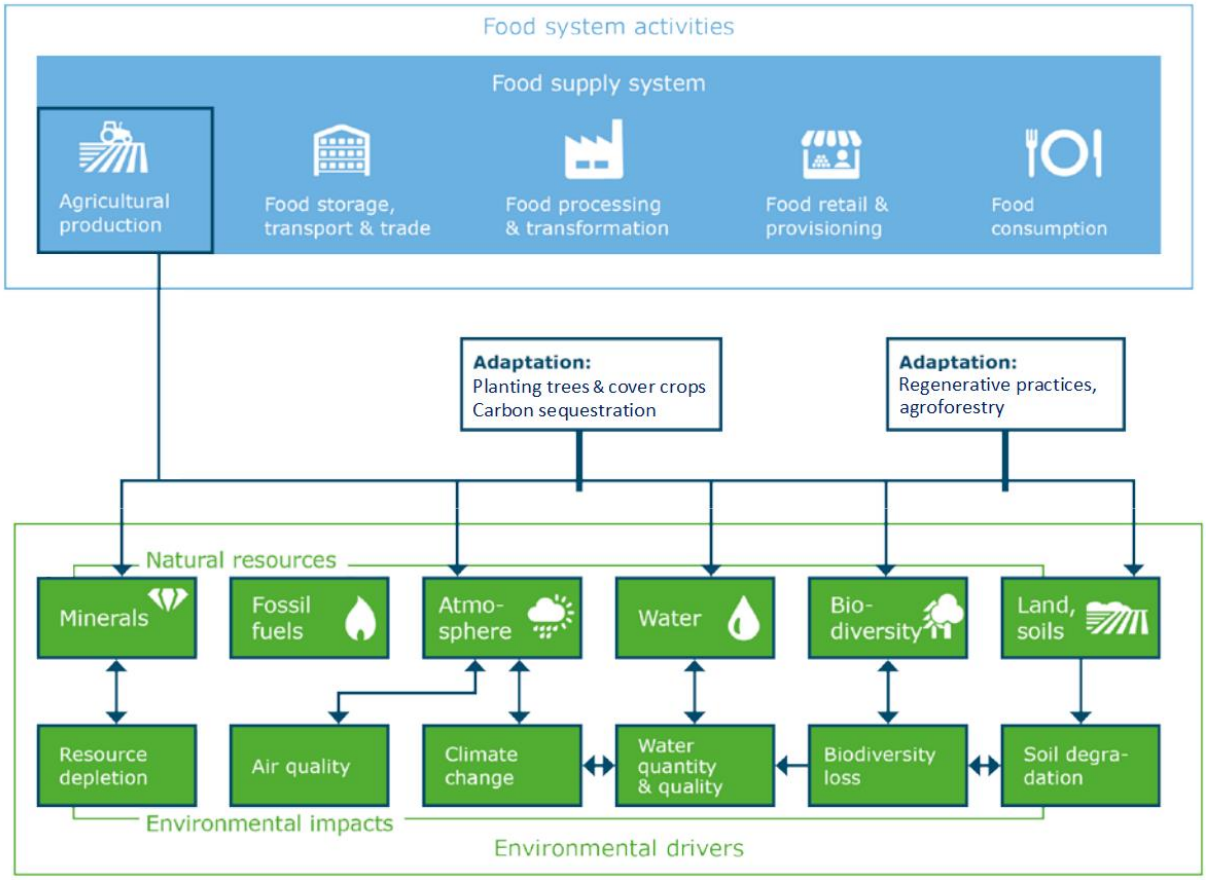
Rabobank (n.d.d.) adds that “[f]arming yields across the board benefit from the positive impact of agroforestry on the quality of the soil; enhanced soil fertility and biodiversity, improved soil water holding capacity, stronger nutrient cycling, as well an improved micro climate; lower air temperature, less solar radiation and less impact of wind speed.”

Regenerative practices also require less fertilisation than intensive monocultures (A. van de Koevering, personal communication, June 17, 2021), thus decreasing both soil degradation and resource depletion. Furthermore, Jelmer van de Mortel (personal communication, 14 June 2021) pointed out that, unlike the intensive agriculture in the Netherlands, African smallholders do not emit much CO_2. "They do not drive on fossil fuel; they do not drive their tractor over the land which causes the land to dry up."

As an example of how RCB can gain “green knowledge”, food system thinking was applied to RCB's pilot projects around the equator, based on the above and further information obtained from the interviews conducted. This was done following the Food System Approach (FSA) of Van Berkel et al. (2018). This approach helps to “illustrate the relationships and possible intervention pathways […] aimed at changes in agricultural production designed to remain within the environmental limits of the system.” (Van Berkel et al., 2018, p.20). Although it is still very early to talk about results according to Alexander van de Koevering (personal communication, June 17, 2021), the possible relationships between the potential impact of RCB's proposed interventions on natural resources (natural capital) are illustrated in Figure 4.

Alexander van de Koevering (ibid.) stated that the “farmers have now started to take measures. It just takes a season before you can actually see the climate impact, season by season. Then we can really calculate the climate impact.” He added that, “although we once made a calculation of what it should yield, we can only really determine that next year.” Nevertheless, Alexander van de Koevering (ibid.) stated “that it will take twenty to twenty-five years to really make the agricultural transition, and we have to be honest: this is not possible for every type of farm, not for every region.”

Figure 4: Food systems thinking around climate change



Source: Modified from Van Berkum et al. (2018)

7.3.2 Dutch perspective

According to Alexander van de Koevering (ibid.), "the real climate change will mainly impact other regions [outside the Netherlands], like the US, Australia, Brazil, New Zealand, simply because there is a lot more [agricultural] land there, and us, ourselves, here in the Netherlands are already using our land super efficiently". However, this does not mean, in his opinion, that "we should not start the transition in the Netherlands as well. But the impact, both in CO_2 and financially, will simply be more limited". Still, Alexander van de Koevering (ibid.) stated that "it is fine if we have to deal with our soil in a different way".

In the Netherlands, the focus is on soil quality as well. RCB's partner in the Netherlands, Wij.land, is convinced that it all starts with the soil, which "you have to have in good balance" according to an employee of Wij.land (personal communication, July 2, 2021). This is supported by Auke Jan Veenstra, who emphasised that "everything must be aimed at improving the quality of the soil, which is first and foremost to the advantage of the same land user" Auke Jan Veenstra (personal communication, July 17, 2021).

As mentioned before, contrary to RCB's pilot projects in Africa, the Dutch pilot projects in cooperation with Wij.land are not focused on agroforestry (among others because of the Dutch Environmental Law). Instead, connected Dutch farmers can make choices in the portfolio of Wij.land as they progress, e.g., experimenting with compost or other grazing techniques to ensure a naturally better system (An employee of Wij.land, personal communication, July 2, 2021).

Moreover, Auke Jan Veenstra (personal communication, July 17, 2021) already addressed a wider rotation of arable crops and permanent pasture as other possible measures that improve the quality of the soil. He stated that “[w]hen you stop ploughing and leave real grassland for thirty to forty years, a lot of carbon is fixed through the roots, in the soil”.

An employee of Wij.land (personal communication, July 2, 2021) pointed out that there is a great diversity of soil types in the Netherlands, including both clay and peat. This employee argued that "peat is a very unique type of soil", as the processes of the peat substrate are not yet clear, as “a great amount of chemical processes take place”. Wij.land’s employee referred to “studies that show that on balance, peat simply emits”. They argued that “if you raise the water level in peat, it oxidises less quickly, so then you also have less CO_2”. However, this person added, there are also studies that which show that “you can raise [the water level] and have less oxidation, but at the same time it will increase the chance of emitting other, more powerful greenhouse gases, such as, I think, methane”. Therefore, this employee of Wij.land (ibid.) concluded that it is “very tricky in the Netherlands, and in any case with carbon potential”.

Besides the challenges that are addressed for RCB within this process, it also shows the importance of academic knowledge circulating from the education subsystem as a basis for RCB’s pilot projects in the Netherlands, and the need for academic consensus on this topic.

As RCB’s the pilot projects in the Netherlands are not yet so advanced, more information is required to apply food system thinking for RCB in the Netherlands and show relationships between the potential impact of RCB's in the Netherlands on natural resources (natural capital), as was done in Figure 4.

7.4 Media-based and culture-based public

As mentioned in section 6.1.4, the green know-how provided by the natural environment is complemented here with the “input of new knowledge about nature and a greener lifestyle for the subsystem media-based and culture-based public" (Carayannis et al., 2012, p.8). Communicating and adopting such a green lifestyle are vital in this subsystem.

In 2018, Rabobank was the winner of the "Liegebeest" (lying beast) election. This election is organised annually by Wakker Dier, an independent foundation that advocates for the animals in the cattle industry. Rabobank was named and shamed for its TV campaign with the slogan 'Growing a better world together' (Wakker Dier, 2018; Buenk, 2021), “pretending to want to make the food sector more sustainable. In reality, they invest in poultry farms, mega-stalls, and fast-food chains” (Wakker Dier, 2018). According to Anne Hilhorst of Wakker Dier (2018) "Growing mega-stalls together does not create a better world”.

7.4.1 Internal perspective

Alexander van de Koevering (personal communication, June 17, 2021) stated that "that criticism is of course justified. We have done a lot to bring more food into the world. Contributing to the hunger problem. But the problem was of course that there was also a climate problem, and we are part of that system, that's just how it is.” This was also acknowledged by Bas Rüter, Rabobank's Director of Sustainability, who openly spoke about Rabobank’s role as financer of agriculture as it is now in the Dutch investigative journalism TV programme Zembla (2021). He stated that: “As a bank, we share responsibility for the way the system is now”, because “the problems associated with it are financed by us” (Zembla, 2021).

In fact, Alexander van de Koevering (personal communication, June 17, 2021) stated that public opinion is very important for RCB, if not the most important subsystem of the QHIM. Nevertheless, he answered the question of whether RCB is an answer to the above-mentioned criticism with: "you could say it is also an answer to public opinion, but I think it would take some time before a tipping point would be reached that changes what we traditionally financed and what we are doing now with the carbon bank. So, our starting point was much more the need from the market than the public opinion."

Emma van de Ven (personal communication, July 19, 2021) stated that “you often see in projects like this, that the money is given to an NGO and the ‘guilt debt’ is paid off by that. That is a pitfall in this kind of projects.” She pointed out that RCB “has less to do with public opinion, about how nice it is what we all do, because it has to make real money”. An employee of Wij.land (personal communication, July 2, 2021) stated that “ultimately, we will always need financing, because [the transition] always goes hand in hand with major investments. If Rabobank could just finance the transition properly for farmers with reasonable conditions, that would certainly speed up the transition.”

Yet Alexander van de Koevering (personal communication, June 17, 2021) viewed public opinion as the main driving force at this moment. “That can be very positive in the sense that we now have to do something, and that all the big corporates are now being forced to proclaim their net-zero strategy by

this social opinion, which works very positively there. It can also be inhibiting in the sense that people very quickly move towards greenwashing. […] Politics, of course, is quite sensitive to this.” (ibid.).

Although Jelmer van de Mortel's (personal communication, June 14, 2021) intrinsic belief is that most parties are past the stage of greenwashing, stating that "we all see what the consequences of climate change (can) be", he is "a bit sceptical. [...] "You see companies that only take partial responsibility." That is why, according to Jelmer van de Mortel, RCB imposes conditions on partnerships to prevent "classic greenwashing".

Alexander van de Koevering (personal communication, June 17, 2021) stated that it is necessary to “motivate the public, but also big corporates”. He points out that “Microsoft is leading the way, they say we are quite willing to take the risk that it is not quite right, as long as we get the transition going.” Alexander van de Koevering (ibid.) mentioned that “there are also quite a few corporates who would like to do this, but of course they do not want to be accused of greenwashing. You need to have quite a bit of knowledge in house to judge whether this is good or not.” He argued that it would of course help “if WWF or a university, or both, say this is really great” (ibid.).

Professor René Kemp (personal communication, June 18, 2021) stated that he sees "great opportunities for RCB to do something other than just carbon compensation. And if Rabobank focuses more on that and is willing to commit to it, then they are actually doing very good things for which they will certainly be appreciated. That also helps their own transformation.”

On the other hand, René Kemp (ibid.) stated that it is "also a bit risky". He pointed out that, "[i]f it is only about carbon reductions, and if there are negative effects for nature, or also for local farmers, then you are actually doing the wrong thing. So, they really will have to execute that very responsibly and profit should not be the main business. Otherwise, you will really lose reputation. Then you also end up with those NGOs turning away, mobilising against this kind of initiative.”

Therefore, Acorn has redefined the concept of carbon credits, said Emma van de Ven (personal communication, July 19, 2021). "To say nature-based removal, ex-post, to start with. Transparency in the origin of those credits. We can offer that through remote sensing, because with remote sensing you can simply see what the year-to-year differences are because you sell them ex-post. These are all fairly revolutionary principles in nature-based removal”, which are visualised in the drawing of Appendix 6.

In fact, Emma van de Ven (personal communication, July 15, 2021) stated that with most carbon credits "it is really debatable whether you achieve anything positive with them". Hence, she stated that "precisely because of this, such PR problems are very difficult when you talk about public opinion". She

gave the example that "if someone with a bad temper writes an article, which is certainly about ninety per cent true, it comes out in a terrible light". Emma van de Ven (personal communication, July 26, 2021) adds that "ninety percent of the carbon market is indeed a disaster. Acorn is that ten percent." She is "very explicit about it": "No, there is no other way to look at what we are doing, it is just very important because otherwise everything will be lumped together like the rest of the ninety percent of carbon credits that are available."

Alexander van de Koevering (personal communication, June 17, 2021) acknowledged that the reliability of RCB's approach "depends on how some big NGOs look at it" [...] It is important that "ultimately NGOs and politicians say, 'this is a good way, this is how you should do it, this is top'." He also pointed out that "NGOs have set standards that you can commit to, but not necessarily. There are also a lot of differences between them." Therefore, Alexander van de Koevering (ibid.) suggested that a "regulatory framework is needed to increase the credibility" of the credits. By means of standards "valid for the whole of Europe", he says, "the reliability of the credits [...] must be guaranteed.

7.4.2 External perspective

7.4.2.1 Corporate critique

Carbon expert Jos Cozijnsen (personal communication, June 18, 2021) said that the Rabobank initiative is "still new, no NGOs have looked at it yet. But they will certainly investigate it, and then there will definitely be problems. It is still an open sheet, I should say, but it will go wrong one day. [...] People just do not accept that a big company like Microsoft does this. Or that Rabo does this."

This also emerges from Oxfam International's report on implication of net-zero climate targets for land and food equity. Oxfam International (2021, p.7) stated that besides its "environmental and social benefits, it is mathematically impossible to plant enough trees to meet the combined net-zero targets announced by governments and corporations, as there is simply not enough land to do this". According to Oxfam International (ibid.), the net-zero targets of "Shell, BP, Total Energies and ENI alone could require an area of land twice the size of the UK". Therefore, it is very likely to Oxfam International (ibid.) that "the explosion in net-zero commitments will fuel a new surge in demand for land, particularly in low- and middle-income countries, which would lead to mass displacement and hunger".

Besides, the criticism against corporate-led food systems is also agreed by many. This became clear this year in the run-up to the UN Food Summit. Van den Berg, Bruil, Kay & Wijnhoud (2021) "doubt that the Food Summit will lead to real solutions". They state that "by working together with the World Economic Forum (WEF) and not with the Committee on World Food Security (CFS) of the UN itself – where farmers' organisations and indigenous peoples participate in policy processes and delegate their

self-elected representatives – the Summit gives large corporations and investors too prominent a seat at the table."

In addition, Van den Berg et al. (2021) stated that “with the direct involvement of the industrialists united in the WEF, Dutch companies such as Unilever and Rabobank will also position themselves in this summit as solvers of the problems they themselves helped to cause. […] As a result, too little attention is paid to the underlying causes of the problems: inequality and market and profit-oriented policies and governance.”

The International Panel of Experts on Sustainable Food Systems (IPES-Food, 2021) withdrew from the UN Summit on Food Systems. because “[c]oncerns raised clearly and consistently by farmers’ organizations, social movements, civil society, Indigenous Peoples, and independent scientists, have yet to be addressed by the organizers of the UN Food Systems Summit. The Summit continues to threaten replacing democratic debate with increasingly unaccountable modes of decision-making. These challenges undermine the work being done in good faith by many actors within the UNFSS process and set a dangerous precedent for the entire UN System.”

According to Fakhri, UN special rapporteur on the right to food, the Food Systems Summit "appears heavily skewed in favour of one type of approach to food systems, namely market-based solutions … it leaves out experimental/traditional knowledge that has the acute effect of excluding indigenous peoples and their knowledge" (Vidal, 2021).

This market-based approach of the UN Food Summit is coming under increased criticism. Van den Berg et al. (2021) oppose the Rabobank positioning itself as the solver of problems that they themselves helped to cause. “At the heart of the issue is the promotion of corporate-led food systems by the United Nations, undermining struggles for food sovereignty and security.” (Singh, 2021).

Jos Cozijnsens (personal communication, June 18, 2021) stated that RCB’s initiative for carbon offsetting “sounds nice for CEOs and at climate summits, but we have to get rid of it. If you talk about smallholders, you also have to approach it in a smallholder way”, i.e., “bottom-up, not top-down”. “They can also sell their products to the market. It is not as if Rabobank is suddenly going to solve everything because of its large scale.”

The People’s Counter-Mobilisation to Transform Corporate Food Systems, representing more than 500 civil society groups with more than 300 million members (ARC, 2021), “is demanding that the UN shifts away from corporate capture and re-grounds itself in individual and collective human rights, and the experiences and knowledge of the peoples most affected. It is also demanding transformation of

corporate food systems and defending democratic public institutions and inclusive multilateralism." (Singh, 2021).

Also, during the official pre-summit, strong voices were raised for alternatives to the corporate system. Jeffery Sachs, Advisor to UN Secretary-General António Guterres on SDGs was "extremely critical of the privatization of food systems" […]. He described privatization as an oppressive mechanism, similar to colonization" (Singh, 2021). These potential issues for RCB were also raised in the interview with Professor Marjan Peeters (personal communication, July 14, 2021).

Van den Berg et al. (2021) stated that solving hunger and malnutrition, and combating climate change and biodiversity loss, is "only possible by making the right political choices". In line with the People's Counter-Mobilisation to Transform Corporate Food Systems, Van den Berg et al. (2021) mentioned that agroecology (e.g., agroforestry), based on practical experience, is one of those choices. In addition, they argued that "the Dutch government must move away from the idea that large companies and a purely technological approach will put an end to hunger in the world. Only by putting the people themselves, their movements, knowledge and solutions at the centre can we, as a society, work towards food systems that are truly fair and sustainable."

7.4.3 Corporate agroforestry critique

The agroforestry according to the People's Counter-Mobilisation to Transform Corporate Food Systems has a different connotation than what RCB is aiming for, referring to the following criticisms.

Capire (2021) stated that "[b]y reducing the complex environmental crisis to climate change, green economy projects aim to create new markets that are included in the logic of speculation and financialization. It's the carbon markets [...], and ecosystem markets established, for example, with payment for environmental services. Investment funds that impact 'climate-smart food systems' are examples of how agriculture is incorporated in the green economy cycle."

According to Capire (2021), "[t]he political battle around food and nature includes exposing how these two different kinds of logic are not compatible: on the one side, sustainability and caring for life; on the other, capital accumulation (including data accumulation as capital). Each is irreconcilable with the other, with completely different concepts of nature."

Capire (2021) acknowledged that apps and sensors are introduced to make farming easier. However, Capire stated "there are corporate tech packages behind them. These technologies are not neutral. They are designed to fragment everything and reduce it to binary data, homogenising and appropriating living things." Therefore, Capire concluded that "[d]atafication aims to make life artificial, accelerate paces disrespecting the time needed for the regeneration of nature, bodies, and caring for what is living. It does so by concealing how much we depend on each other and on nature."

That is why Marjan Peeters (personal communication, July 14, 2021) thinks that "if Rabobank wants to do this carefully, they should also enter into a social discussion. Especially with those parties that are so strongly opposed to it."

7.5 Political system and input from other subsystems

7.5.1 General knowledge input

As mentioned in section 6.1.5, this subsystem defines the "will" towards which politics are moving. The knowledge generated by the public (and therefore the respective other subsystems) serves as new input for the political subsystem (Carayannis et al., 2012, p.6). The required incentives for knowledge creation in the political realm should come from fundamental debates on this new knowledge from other subsystems (ibid., p.9; Barth, 2011, p.9).

Barth (2011, p.5) pointed out that the quality of a democracy depends on “agents whose leading force in a knowledge economy is the knowledge as resource for creating know-how and innovation for a sustainable development in a democracy”, which is heavily constrained by power imbalances between these agents and other interest groups (Geus, 2008). This was demonstrated in the run-up to the UN Food Summit 2021, as mentioned in the last point.

The UN (n.d.) stated that this Summit should include "principles for governments and other stakeholders seeking to improve their food systems”. However, Agroecology Research-Action Collective (ARC) argued that “from the start, this summit has been deeply compromised by a top-down exclusion of many food systems actors and an impoverished view of whose food system knowledge matters” (ARC, 2021a).

As a result, this group, consisting of independent “researchers, faculty members, and educators who work in agriculture and food systems across disciplines” around the world, wrote an open letter to policy makers (ARC, 2021b). They pointed out that “science-policy interfaces consist of groups of experts who present the latest scientific thinking to governments to support them in making informed policies. They play a crucial role in responding to the challenges of governance around complex issues like food system sustainability, for which the science is often disputed, multidisciplinary, and evolving. Ideally, SPIs recognize that ‘evidence’ comes in multiple forms, rooted in multiple knowledge systems, and that providing scientific advice to governments takes place within an ecosystem of actors with uneven power and legitimacy to have their knowledge brought to shape governance.” (ARC, 2021a).

Therefore, the independent scholars “call on governments and policymakers to […] [s]upport participatory processes that actively and meaningfully include plural perspectives and voices in food system governance. Farmers and other citizens need inclusive, participatory, and safe spaces […] to co-create the knowledge necessary to govern food systems at global, national and local levels.” (ibid.).

This process is an example of the flow of knowledge from the media- and culture-based public, as well as the collective knowledge from the three other subsystems of society, into the political subsystem. Another current example is the Summary for Policymakers, based on the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC). It stated that "[o]bserved increases in well-mixed greenhouse gas (GHG) concentrations since around 1750 are unequivocally caused by humans" IPCC, 2021, p.5). Furthermore, it pointed out that the "proportion of CO_2 emissions taken up by land and ocean carbon sinks is smaller in scenarios with higher cumulative CO_2 emissions." (IPCC, 2021, p.27).

7.5.2 Carbon market

Another example is TSVCM. Jelmer van de Mortel (personal communication, June 14, 2021) stated that the taskforce was one of "many ongoing initiatives in the market to define high quality credits that meet the standard". Alexander van de Koevering, (personal communication, June 15, 2021) mentioned that they are "trying to create a framework with which politicians can make decisions."

Alexander van de Koevering (ibid.) pointed out that a "regulatory framework is needed to increase the credibility" of the credits. By means of standards "valid for the whole of Europe", he says, "the reliability of the credits [...] must be guaranteed". He stated that "we also try to use our influence with the "Timmermansen" of this world", referring to politicians like Frans Timmermans, Vice President of the EC.

Furthermore, according to Jelmer van de Mortel (personal communication, June 14, 2021), "in terms of policy, certainly, the economic incentive is insufficient for those farmers. So, policy can certainly do something with that".

Bart Millenaar (personal communication, July 14, 2021), Policy Advisor Agriculture & Fisheries at the European Parliament, stated that the EU is going to facilitate carbon farming in various ways, which have been investigated by the EC. An operationalisation of case studies has already been published (COWI, Ecologic Institute & IEEP, 2021).

As far as Bart Millenaar (personal communication, 14 July 2021) is acquainted with RCB, "they are running into a lot of things that a lot of similar initiatives are running into, […] [i.e.,] how can we guarantee that the carbon that is stored will be released later? How can we set up a system so that farmers who have already stored a lot in their soil are not disadvantaged? These are not just issues that Rabobank is facing." Moreover, in line with market needs, Bart Millenaar (ibid.) stated that the EU is coming up with a way to "make a central certification system", while acknowledging that voluntary certifications are "part of a stacked income, where farmers get income from different sources".

When harmonising different approaches to carbon farming (e.g., peat bogs with wetlands, agroforestry, soil organic matter, and grasslands), then "a certain distribution key will have to be applied. That is also the politics behind it" stated Bart Millenaar (ibid.). He argued that how to harmonise carbon farming "is the key question", while stressing that "that kind of harmonisation would be very important for the farmer's earnings model." Moreover, because there is a "certain willingness" at the EC to link subsidies in this approach, contributing to a stacked income for the farmer. More information provided when Plan Carbon Farming will be published by the Commission later this year (ibid.).

According to Senior Policy Officer 'Fit-for-55' at the European Commission, Peter van Kemeske (personal communication, June 23, 2021), these developments all relate to the European Council's statement in December 2020, to "radically go for carbon neutrality by 2050, but already by 2030 we want to achieve a decrease of minus fifty-five percent".

To achieve this, Peter van Kemeske (ibid.) mentioned, "transport and buildings will be covered by the ETS". According to him, "it will be a separate ETS, not an extension of the ETS as some say". Furthermore, he pointed out that "what we will do now is tighten the current ETS quite heavily. So, that means that the number of allowances will decrease more and more, the cap will become tighter and tighter. But at the same time there will also be a carbon market for those two big sectors, transport, and buildings."

However, Peter van Kemeske (ibid.) stressed that: "Even then we will not get there, because we will have to take another step". He stated that "the LULUCF sector, land use, land use change, and agroforestry, are what we need if we really want to become carbon neutral in 2050. Because if there are still cows in the meadows, there will always be greenhouse gases". Therefore, he concluded that "we also need trees – three billion trees is the Commission's plan – to remove the greenhouse gases, the CO_2, from the air".

Peter van Kemeske (ibid.) stated that the EC is "moving towards a system where the use and maintenance of trees will generate a return" for farmers, most likely in 2030. "So, we are moving towards a system where you will receive certificates […]. We are going to merge agriculture, which is now part of effort sharing, with LULUCF. We are going to make one instrument out of it. We are also going to set a target, and that target will be climate neutrality."

Furthermore, COP 26 will take place in Glasgow in November this year. This international climate summit is expected to come up with guidelines for 'net-zero', to make sure that companies do not claim too much forest for themselves.

Chapter 8: Discussion

The aim of this research is to better understand RCB and the application of its approach, its position within the 'carbon movement' and the dynamics between the stakeholders, to be able to understand if and to what extent RCB can potentially contribute to systemic change within the food value chain, as proposed by Rabobank. Gaining this final understanding requires answering the following sub-questions first.

What does the proposed cooperation between the stakeholders of the proposed 'carbon movement' look like?

The carbon movement that was proposed by Rabobank consists of global policymakers, regulators, NGOs, scientists, and innovative disruptors. The QHIM was adopted to gain insight in this cooperation, as the subsystems of the model cover all considered stakeholders, while focussing on the circulation of knowledge.

Since Rabobank's knowledge is limited to banking, assistance is needed for everything outside of that realm. On that basis, many partnerships were formulated, with academic partnerships listed in Table 1. However, no overall picture could be obtained, as RCB staff was reluctant to share information on partnerships that had not yet been made public. For example, Wij.land – Rabobank's Dutch partner for the roll-out of the carbon bank – was accidentally identified.

RCB does not work directly with small farmers in its projects, but always through its partners 'on the ground'. In the Netherlands that is Wij.land, and outside the Netherlands partner NGO Solidaridad, and local traders affiliated with Rabobank. The required technology is provided by Microsoft. Finally, RCB tries to use its influence with people like Frans Timmermans, Vice-President of the European Commission.

What is the role and added value of the RCB in the proposed 'carbon movement'?

It was stated that the carbon movement is built around the question 'How can we, together with the major players in the world, create an environment that ensures healthy market forces for carbon credits or reduction credits, with the aim of a transition to a more sustainable agriculture?'

RCB argued that its propositions add value for corporations that want to offset emissions, add value for smallholders/farmers because they simply get paid, and add value for Rabobank because they develop a business model from it. Since scalability has been perceived as important in order to achieve systemic change, Rabobank's resources and network are considered to play a crucial role. Since financing will always be needed in the transition, it is argued that Rabobank could accelerate the transition for farmers on reasonable terms.

However, it was addressed that smallholders may also experience a loss rather than an eventual gain, while corporate responses to solve their own problems have been widely criticised as became clear in the run-up to the UN Food Summit. For this reason, the interviewees stressed the importance of testing assumptions.

How does the education system affect RCB?

The role of scientists was already emphasised in Rabobank's carbon movement. However, based on the results of this research, it can be concluded that most academic knowledge institutes were perceived by RCB as being too far away from reality to be able to give relevant advice. Therefore, knowledge on the ground was identified as a prerequisite for collaboration. Although research results of pilot projects have been discussed with universities meeting this prerequisite, these collaborations were not viewed as the most effective and empathetic by interviewees. Instead, it was stated that RCB prefers to hire experts, seeking substantial cooperation.

Since scientific publications only provide a general perspective, failing to provide the necessary information to capture the real situation on the ground, RCB took a 'on the ground' approach to learn more about the problems faced by smallholders. This way RCB was able to identify many problems that could be linked to land degradation and deforestation, leading to a specific focus on agroforestry.

How does the economic system affect RCB?

RCB is part of the economic realm. It was endorsed by all interviewees from Rabobank that RCB must become profitable in the long run, thus building a viable business case for all parties is vital. Therefore, 12 out of 13 interviewees mentioned the term "revenue model", either with reference to RCB or to the smallholders in Africa and/or the farmers in the Netherlands. RCB claimed that its revenue model gives a large part of the revenue to the farmer. It charges a fee of approx. 5 to 10 percent for its role as a middleman between corporations aiming to voluntarily offset its emissions and smallholders offering carbon credits.

The transition costs for African smallholders are about €500 to €750, based on an average land area of about one hectare. The remaining 90 to 95 percent of the carbon credit should generate sufficient income for these smallholders to break even with the investment needed to take the first steps in adapting towards more regenerative practices. Together with the partners of the FSD spearhead of BISCI, RCB is investigating how it can supplement the income stream based on data provided by the smallholders. However, it was pointed out that it needs to be tested whether farmers are waiting for this.

For the Dutch farmers it is still questionable whether a viable business case exists. Together with other partners, Rabobank is assisting with a cost-benefit analysis for regenerative agriculture, which should provide insight into whether there is an earnings model for regenerative agriculture in the current Dutch market. Unlike RCB's pilot projects in Africa, Dutch pilot projects in cooperation with Wij.land do not focus on agroforestry, e.g., because of Dutch environmental law limitations. Furthermore, these pilot projects are not yet as advanced compared to others, and its potential for scale-up is being questioned.

How does the natural environment affect RCB?

Rabobank acknowledged that its role as a financier of agriculture as it is today contributed to the climate problem. RCB could be seen as a reaction to this, although the revenue model was named as the leading factor. In its propositions, RCB claimed to concentrate on achieving quality improvement of the agricultural land of farmers, including the quality of the soil, the number of plants, and biodiversity.

RCB came to the conclusion that many problems of African smallholders could be linked to land degradation and deforestation. Based on the idea that regenerative agriculture would be crucial for the degraded soils and low rainfall faced by African smallholder farmers, RCB focused on agroforestry. This approach is believed to enhance healthy microclimates, while the trees and cover crops would protect the soil from degradation and generate more rainfall (on a larger scale). Furthermore, it would lead to enhanced soil fertility and biodiversity. Ongoing and planned pilot projects must demonstrate the extent to which this could be achieved by RCB.

Dutch pilot projects also focus on improving soil quality, but are not focused on agroforestry due to legal restrictions. Dutch farmers affiliated to RCB's partner Wij.land can choose between different approaches within Wij.land's portfolio (e.g., experimenting with compost or other grazing techniques), to ensure a naturally better system. The foundation is also experimenting with wet cultivation, but mentioned that the natural processes of peat are difficult to measure, and academic studies were found to be contradictory.

How does the public influence RCB?

The potential impact of public opinion was demonstrated in the naming and shaming of Rabobank by Wakker Dier, an independent foundation that advocates for the animals in the cattle industry. All RCB interviewees stressed the importance of public opinion, knowing that accusations of greenwashing are made quickly and that politicians are quite sensitive to them. On the other hand, it

was stated that public opinion can be very positive in the sense that something must be done, and that it forces all large companies to proclaim their net-zero strategy.

As a result, RCB recognised that the reliability of its approach depends on the perception of RCB by major NGOs. Although RCB has not yet been publicly investigated due to its novelty, Oxfam International's report on the implications of net-zero climate targets for land and food equity may provide a first indication. It acknowledged important social and environmental benefits, but stressed the lack of land to execute all corporate net-zero targets. Oxfam International stressed that the significant increase in such net-zero pledges will trigger a new surge in demand for land, especially in developing countries, leading to mass displacements and hunger.

Other criticism was based on the idea that people do not accept that companies like Microsoft and Rabobank present themselves as the solution to problems that they themselves have helped to create, especially in the light of the market-based approach of the UN Food Summit.

More specifically in relation to agroforestry, it is claimed that datafication is aimed at artificially speeding up the time it takes for nature to regenerate without respecting nature, concealing how much we depend on each other and on nature.

How does the political system affect RCB?

Because of the international character of the agricultural sector, the RCB is mainly affected by EU policies. The EU has announced that it will facilitate carbon farming, but is still investigating how this can be operationalised. In November 2021, the EC will publish Plan Carbon Farming with more information. RCB mentioned that it also tries to influence this process, especially when it comes to setting up a regulatory framework for standards for carbon credits. According to RCB, this would ensure a reliable and credible solution, and it would eliminate a lot of criticism. The upcoming Plan Carbon Farming will also provide more information regarding the harmonisation of different approaches to carbon farming, which is considered crucial for farmer's revenue model.

Another relevant development is the announcement that agriculture, currently part of effort sharing, will be merged with the LULUCF sector. The combination must become carbon neutral in 2050. Moreover, the EC Forest Strategy set the goal of planting 3 billion trees in the EU to compensate for CO_2 emissions. The impact of national legislation in African countries has not been analysed.

How will RCB achieve its target of offsetting 0.5 percent of global CO_2 emissions annually by 2025?

To meet the required offsetting, about four billion trees must be planted by approximately 15 million smallholders worldwide, covering an area of about 58,000 hectares. Currently, there are ten pilot

projects running around the world, with more to follow. Both RCB and pilot partners underlined the importance of learning from these pilots. They must provide insight into i.e., the needs of the farmers, the value propositions for the farmers, and the financing requirements.

Moreover, the results of pilot projects will give an indication of the feasibility of the target. At this stage it is too early to provide meaningful results other than the high interest among both farmers that want to participate, and corporates that want to invest. However, as mentioned in the latest IPCC report, RCB should consider that the share of CO_2 emissions captured by land sinks will be smaller in scenarios with higher cumulative CO_2 emissions.

In any case, scaling up is necessary to achieve RCB's target. However, cost-effective scale-up is still perceived as one of the biggest challenges. This process is also complicated by the fact that each situation requires a different approach. This was shown in the Netherlands, where RCB had to adopt a different approach because of legal restrictions and different soil types. As the pilot projects are still in their start-up phase, it is also difficult to determine their contribution to the RCB's global target. Moreover, it is questionable whether sufficient land will be available in the long term for the required upscaling.

Evaluation of the QHIM

The QHIM proved useful in analysing cross-sectoral cooperation between stakeholders and the way the different subsystems contributed to innovation for SD. Nevertheless, it did not consider power imbalances between the different systems and actors (e.g., lobby).

Furthermore, the QHIM turned out to be more useful when analysing the Dutch context compared to the general (mainly African) context. This can be explained by the fact that knowledge economies like the Netherlands are more focused on knowledge creation from academics. On the other hand, developing countries still rely on traditional knowledge – especially when it comes to agricultural practices. This perspective was not incorporated into the QHIM, whereas the scientific information available was perceived too general, compromising the academic base from which knowledge creation should emerge according to QHIM. Moreover, the model did not seem to acknowledge power imbalances within and between the different subsystems (e.g., in the political realm, or in the media), which can be perceived as rather idealistic.

In general, the QHIM was found to be too superficial, and more clearly formulated factors would have been more useful. Therefore, a different model would be preferred to describe RCB's innovation, e.g., the strategy framework for system building and its system-building activities of Planko, Cramer, Chappin & Hekkert (2016).

Chapter 9: Conclusion & Recommendations

'How and to what extent can RCB's eco-innovation contribute to achieving climate change targets?'

From 2022 onwards, RCB will roll out an online platform that can link large corporations – that adopted net-zero targets but still face some residual emissions – and smallholders – who capture CO_2 from the atmosphere (either in the soil or in trees). To reach the requirement for RCB's overarching goal of offsetting 0.5 percent of global CO_2 emissions annually by 2025, about four billion trees must be planted by approximately 15 million smallholders worldwide.

Since academic knowledge failed to provide the necessary information to capture the real state-of-art situation at the grassroots level, RCB took an 'on-the-ground' approach to study the problems that smallholders were facing. Many problems could be linked to land degradation and deforestation, resulting into a specific focus on agroforestry.

As most RCB's pilot projects around the world were launched last year, they have not yet been able to provide insights about the feasibility of the project targets. In fact, the income generated from carbon credits should help African smallholders cover the investments needed for the first steps towards more regenerative farming practices. In the future, this income might be supplemented with income for data supply. Nevertheless, assumptions regarding the smallholder's willingness to adopt such revised revenue model must be tested as some smallholders may experience a loss rather than an eventual gain.

The Dutch pilot projects are still in the start-up phase. Their focus on wet cultivation, for example, is seen as a niche, which has raised questions about its scaling-up potential and potential contribution to RCB's overarching aim. Besides the pilot projects, Rabobank is also assisting its Dutch partner with a cost-benefit analysis for regenerative agriculture. This which should answer whether regenerative agriculture in the Netherlands can be a viable business case.

Scaling up largely depends on finding an equitable business case for both farmers and RCB, as well as the degree of innovation required for a reliable and cost-effective monitoring. The EU's commitment to facilitate carbon farming in terms of setting standards, harmonisation, and linking subsidies for the farmer would contribute to the business case for European regenerative farming. According to RCB, this would also improve the reliability and credibility of its solution, while eliminating a lot of criticism.

In addition, RCB faces a lack of data about agroforestry and regenerative farming tested in the Netherlands. Since its knowledge is limited to banking, it depends on partners and hired experts for

specific knowledge (e.g., for advanced remote sensing). The question is therefore what consequences this will have on the RCB's objectives in 2025.

In the long term, RCB should also consider that the share of CO_2 emissions captured by land sinks may be smaller in scenarios with higher cumulative CO_2 emissions, as pointed by the latest IPCC report. Another factor that may impact RCB's potential in achieving climate change targets is the availability of land to execute all corporate net-zero targets. This could trigger a new surge in demand for land in developing countries, leading to mass displacements and hunger, the latter being exactly what Rabobank has always tried to avoid.

This thesis aimed to provide an insight into the Rabo Carbon Bank, and its call for collaboration with the stakeholders it identified in its "carbon movement". Future research could investigate the question 'how and to what extend can RCB's eco-innovation contribute to achieving systemic change in the food value chain?'. As a matter of fact, no clear, complete, and concise definition of "system change" was given by RCB.

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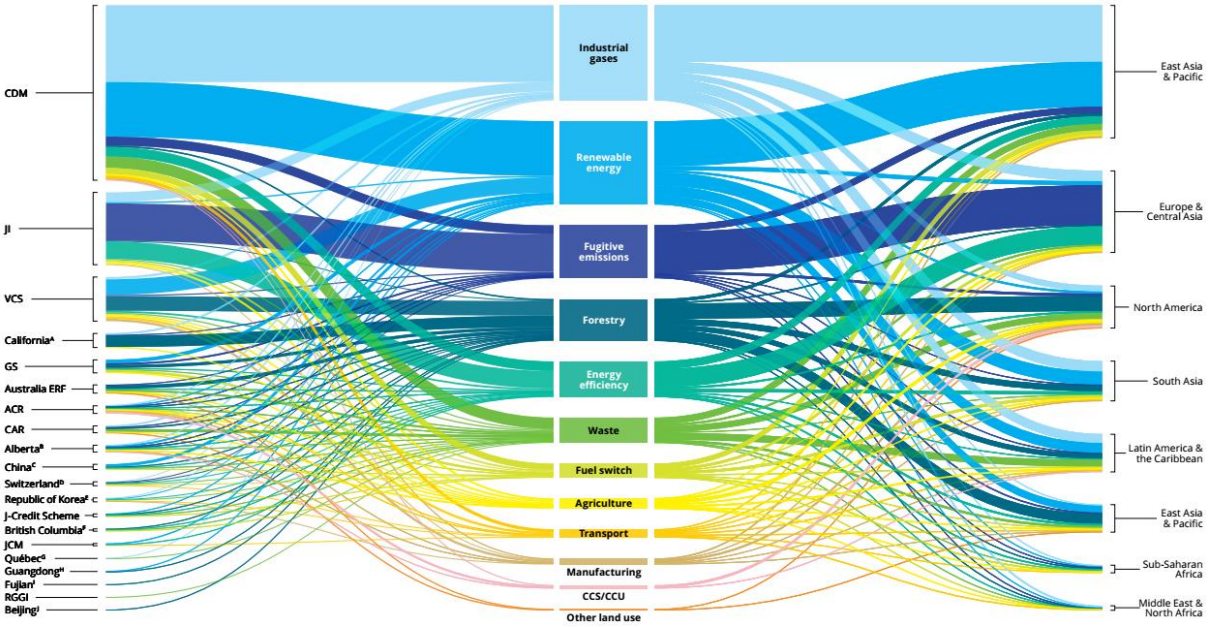
Appendix

Appendix 1: List of interviewees

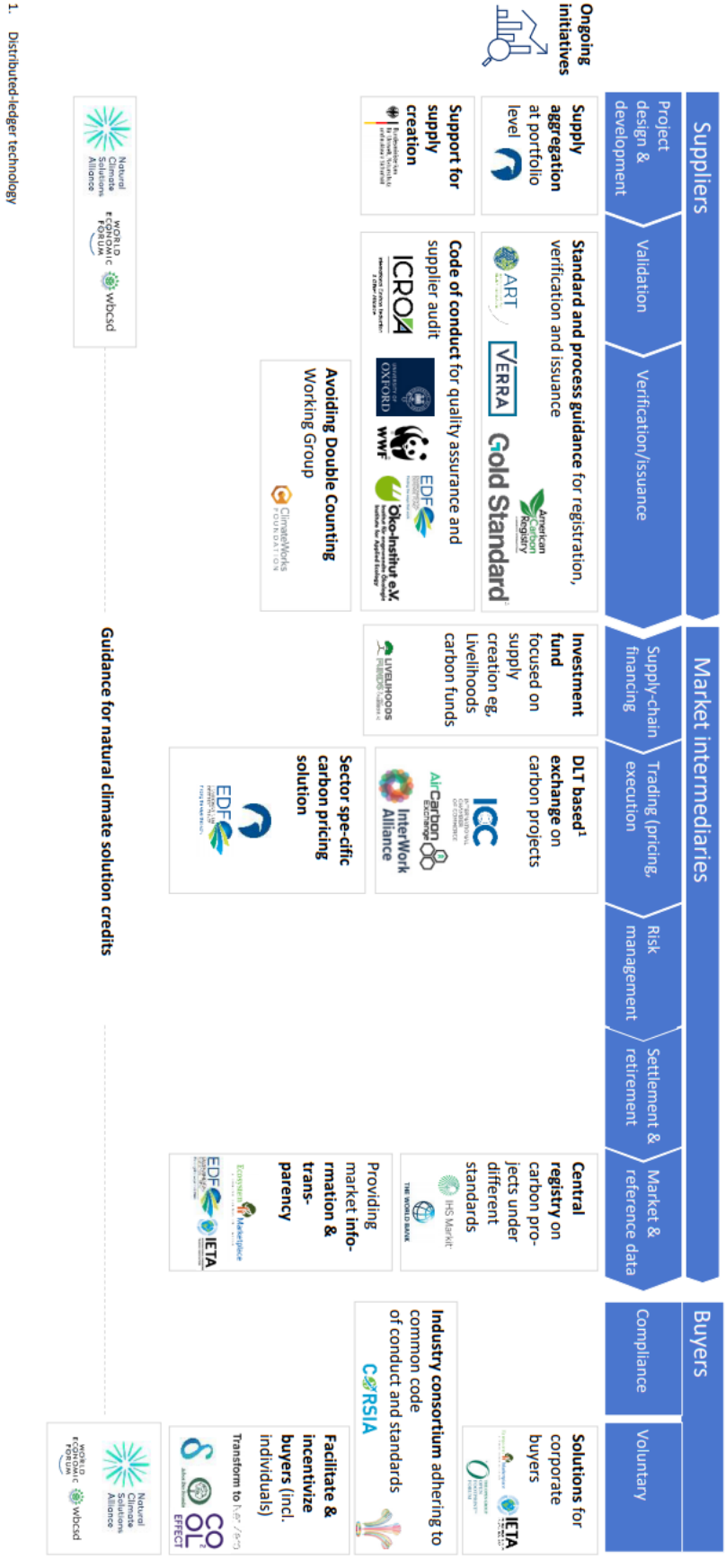
Name	Organisation	Function
Jelmer van de Mortel	RCB	Head of Acorn, RCB's fundamental proposition
Alexander van de Koevering	RCB	Global Head of RCB
René Kemp	UM	Professor innovation for the environment
Jos Cozijnsen	Climate Neutral Group	Carbon Expert
Peter van Kemeske	European Commission	Senior Policy Officer "Fit for 55" European Commission
Anonymous	Wij.land	Employee – Wij.land unofficial partner RCB
Ron Cörvers	Uni Maastricht/BISCI	Contactperson BISCI & Head of MSI
Auke Jan Veenstra/Frank Pijpers	LTO	Climate Specialist/Intern
Marjan Peeters	UM	Professor of Environmental Policy & Law UM
Emma van der Ven	RCB – Proposition Acron	Employee
Han Brouwers	Solidaridad Network	Program Manager Market Development
Bart Millenaar	European Parliament	Policy Advisor agriculture, and environment for Jan Huitema VVD: Member of the European Parliament
Rob Elsinga & Anonymous Digital Advisor	Microsoft	Technical Officer/Data analyst Microsoft as a partner of RCB

Appendix 2: Total credit issuance volumes of the compliance market by sector and region.



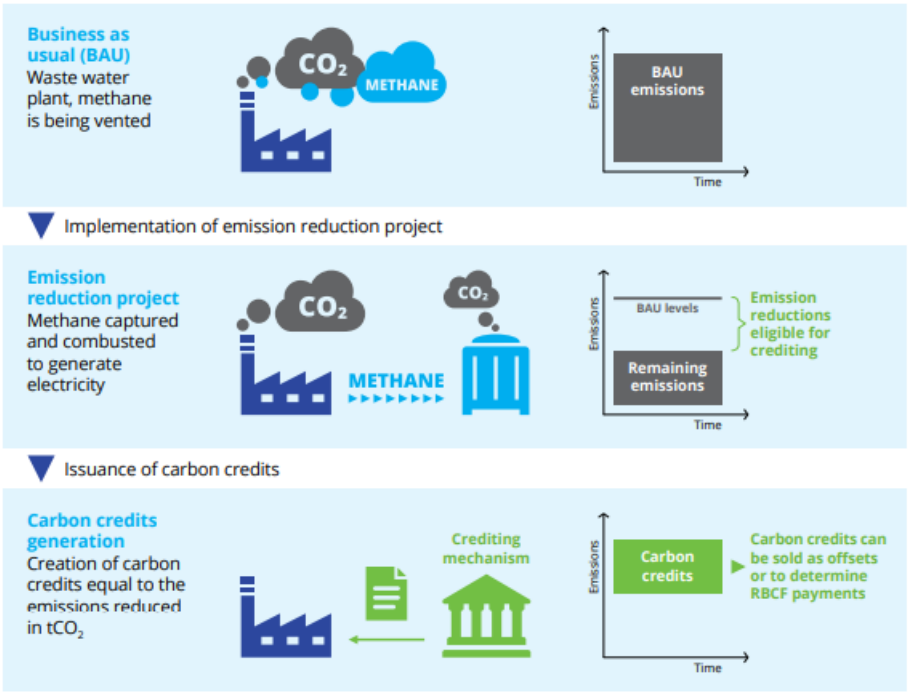
Source: World Bank (2020, p.52)

Appendix 3: Non-exhaustive list of ongoing initiatives in the VCM



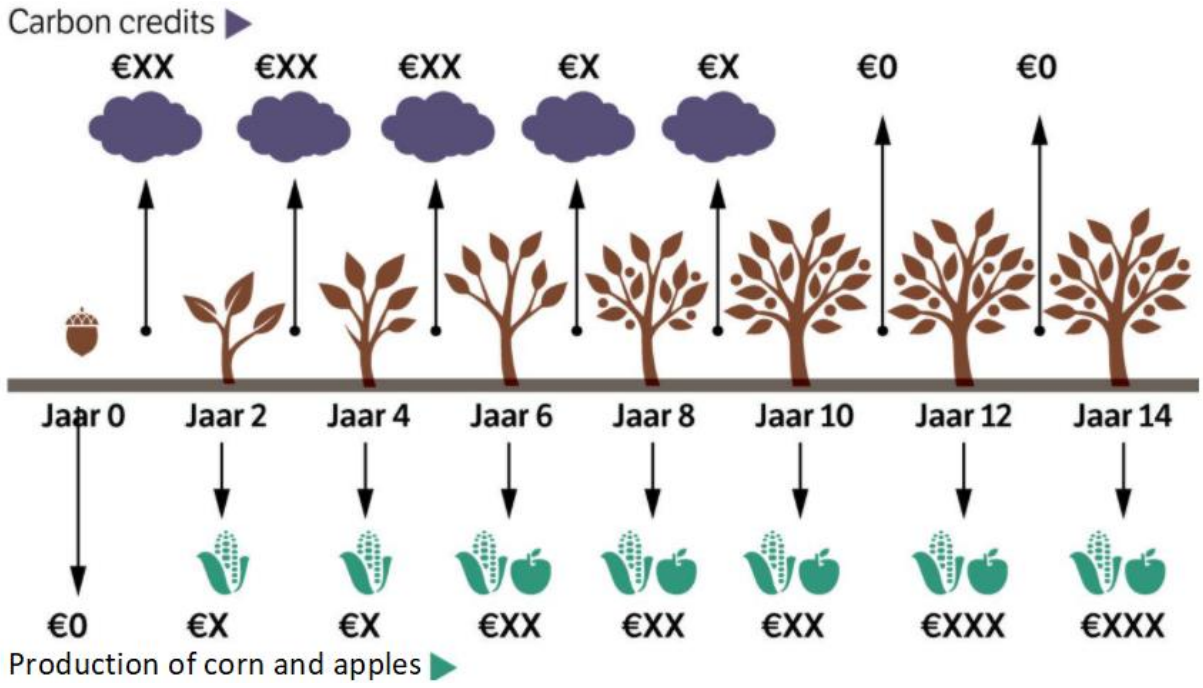
Source: TSVCM (2021, p.37)

Appendix 4: Simplified overview of the concept of carbon crediting



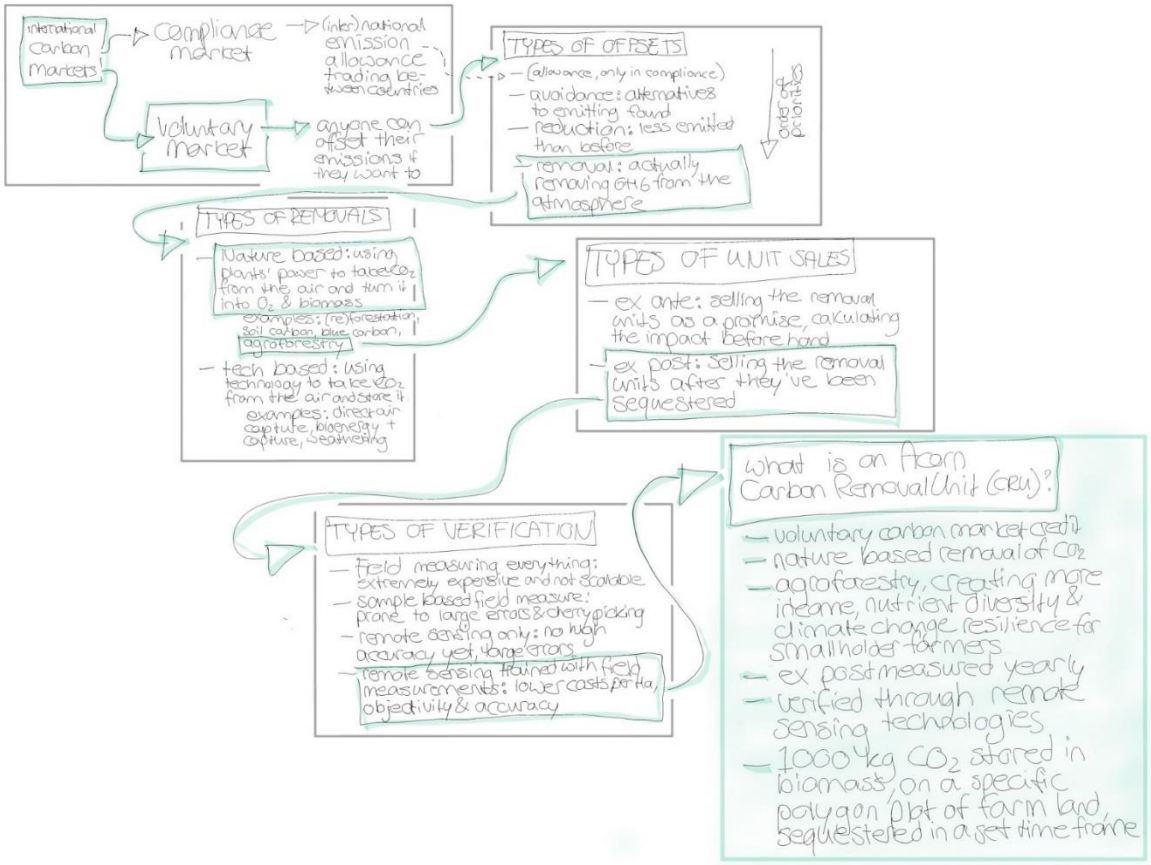
Source: World Bank (2020, p.48)

Appendix 5: Yields for the smallholders in new revenue model



Source: Smal (2021)

Appendix 6: Acorn's redefinition of carbon credits



Source: Emma van de Ven (personal communication, June 26, 2021)

Appendix 7: Automatically translated interview questions

Interview Jelmer van de Mortel, RCB, 14-06-2021

How does Rabobank try to generate credits ?

What is Microsoft's role in the partnership with RCB? They naturally bring in remote sensing , artificial intelligence and machine learning .

It is also mentioned that the RCB should contribute to the required system change in the food value chain. How do you define system change for yourself ?

What does the system ideally look like in which this system change has been implemented?

You already mentioned the possibility for Dutch farmers to be part of the plans you have. I also found an article in which your CEO Barbara Baarsma also mentions this, but that there is still no real idea how Dutch farmers can get involved in the plans you have with the RCB, am I understanding that correctly?

Are there certain initiatives that can help the farmer? Due to the nitrogen problem, some farmers will have to deal with a possible closure, so something will have to change. What role does the Dutch government play in this?

If I understand correctly, these different ways of interpreting the land for Rabobank are therefore not in conflict. It would therefore not matter to Rabo Carbon Bank if houses are built on agricultural land, because Rabobank has an interest in tapping into different markets , so that a long-term vision can be realised.

How can more be used? (increase the importance of a sustainable revenue model)

Which initiatives are running in parallel? Which factors within the Quintuple Helix model are the most important for the RCB?

You just mentioned the interests of society. What interests underlie the RCB?

That is why it is of course important to think about this from the perspective of different disciplines. That corresponds to the 'carbon movement ' that you refer to. There are several parties mentioned. What are the conditions for partnerships with these parties?

Various things are, of course, required from parties in the 'carbon movement ' to realize that system change. What do you need from policy makers or regulatory authorities, for example? Is there currently a policy that supports your initiative in the Netherlands?

What does this collaboration with scientists and universities look like?

Interview Alexander van de Koevering, Global Head of RCB,
17-06-2021

How do you define system change within the RCB?

What is the most common form of criticism? Through the collaboration with Microsoft you have of course already been able to provide an answer to various forms of criticism. Are there any other forms of criticism that you still have to deal with?

To what extent is that feasible (a good set of rules for standarts)? On the other hand, you have the compliance market of the EU ETS, which are bound by very strict regulations. Is the voluntary carbon market still voluntary in this way?

It was also just mentioned that new policy is needed from regulatory authorities. Can I conclude from this that the current policy does nog yet support your vision?

So in that way, suppose it is implemented the way you say, is it also possible to accommodate the RCB's initiative there?

What is the role of RCB within the carbon movement as well as within the food chain?

How is the concept of multiple value creation reflected in the RCB?

How do you deal with the challenge of your own revenue model? Normally, in a general sense, it is of course the case that banks focus on a shorter term. RCB's initiative is of course a long-term commitment. How do you deal with that?

Within countries such as the Netherlands, where so different values apply, I understood from an interview with CEO Barbara Baarsma, that you also look at how you can involve Dutch farmers in the RCB. There are, of course, different challenges in the countries mentioned above. What is your opinion on that? What possibilities do you see?

The yields of planting a mango tree in Africa are relatively higher compared to the Netherlands because of the higher costs involved. In this way, it may be more difficult for farmers to implement that transition, because they cannot earn enough money to afford the transition.

To what extent should a Dutch farmer also be compensated? It can therefore be said that the value of that credit should be sufficient, but of course investments must also be made that are not recouped overnight, you as a bank know all about that, of course. In what ways is that possible? And what role does the government play?

Going back to the stakeholders you work with, and the model I use to analyse your initiative, the ' Quintuple Helix' model. Which of the model's subsystems is most important to you?

It was already stated earlier that policymakers are also expected to do the same. What is the role of Dutch politics for your RCB?

You have of course also indicated through the 'carbon movement ' that you need certain partners. Which partnerships do you currently have and what are the conditions for doing business with these partners?

So in that way are you also trying to get a certain amount of lobbying that you're trying to practice on such players?

Another model that is complementary to the quintuple helix model is the food approach system that I use at Wageningen University. How can it be applied to the RCB?

If I understand correctly, Microsoft has already implemented several innovations that can be used, but there are still certain issues that are not yet solved, where innovation is still required?

Are there any partners within that educational subsystem, for example universities, with whom you collaborate to realize such innovation?

How are those partnerships shaped?

Is that also necessary to motivate the public, or to show them that it is indeed supported and therefore does not fall under the greenwashing that is often mentioned?

Reputation is of course also very important to Rabobank. The image of Rabobank has of course been criticized at times. Is the RCB a follow-up to this to show that Rabobank has taken a different path? Is this a follow-up to a transition that has been made within Rabobank to be more committed and to show the public what is going on? At the end of the day, of course, the money invested by the people themselves is still crucial.

It is of course an innovation that you have implemented, so there is still little information that shows that this method actually works, various pilot projects have of course also been carried out. Are there any results that support what you intend to do?

Anyway, back to the scope of the Netherlands. There are, of course, several things at play at the moment. In addition to the nitrogen problem, the options for building houses on agricultural land are of course also considered. For the RCB project, interests could sometimes collide. How do you see this development for farmers in the Netherlands and your initiative? It will of course be a battle on the ground, because that is simply scarce in the Netherlands.

From a vision of the future, the train of thought that you have used with this RCB, what does the system look like – if the aforementioned system change has been implemented – what does the system look like ideally?

You just mentioned 5 years but I don't know which timeframe should be applied to make this feasible in this way?

Interview René Kemp, 18-06-2021

How would you describe RCB's innovation?

You can't suddenly let it go.

Tell us more about the pilot projects that are being used to create multiple value creation. The problems caused by that neoliberalist thinking, this is a kind of sequel to that, to take a different path. Of course also for the viability of Rabobank itself.

The model that I have applied is therefore the Quintuple Helix model. The perspective of boundary work naturally fits in well with this. Are there any other things that need to be added, for example certain indicators that need to be taken into account?

Those are indeed deeper issues to consider.

I have also heard that they are looking at European level to see how they can integrate this into the market, and there are certain, they also heard that it will become part of the EU ETS, even though it is not the voluntary but the compliance market is. But still, to accommodate the agricredits there, the EU also wants to go in that direction.

It was indeed mentioned that there are certain risks with the choices that are made. I also read in an article of yours that " eco-innovation crucially depends on an overall assessments of risks ". There are, of course, several risks. Those assessments, do they somewhat correspond to the model that I am going to apply for the analysis of the RCB?

How can you check a project that is still in a start-up phase to gain insight into it and see whether their assumptions are correct?

Yes. One of the nice partnerships they have is with BISCI of Maastricht University, the Fair & Smart Data. That is also part of MSI I understand.

Maybe one last question. In the NRC piece, Rabobank actually states that every bank should become a carbon bank to meet the demand from companies to offset emissions. What do you think of such a statement?

Interview Jos Cozijnsen , Carbon Expert, 18-06-2021

What are the market developments in the voluntary carbon market that could affect RCB?

What was that initiative called in England?

Back to that voluntary carbon market, first there were many different initiatives, but now everything seems to be focused on trees, so carbon sequestration . Is that assumption correct?

There have of course been various criticisms of the voluntary carbon market, most notably the difficulty of measuring volume, and protection against risks related to sustainability. In addition, critics have pointed out that forestry projects are naturally prone to carbon leakage , as the conversion from agriculture to forestry in one place can lead to the felling of forests elsewhere. How has voluntary carbon market dealt with this criticism?

That is indeed one of the things that Rabobank does through the collaboration with Microsoft. Microsoft supplies so-called remote sensing , artificial intelligence and machine learning to gain insight, in real time, from how many trees are still standing, so how much carbon is offset. One advantage is that using this technique and the satellites they use smallholders can involve that actually previously were irrelevant to leave part to make such projects. What is your view on this? Can the above criticism be met with this?

They also combine it with tests on the ground, of course. Pilot projects are now taking place that should provide insights. Although I have heard that these measurements are currently not profitable enough to do it on a large scale. Innovation is certainly still needed to be able to apply it on a large scale.

So basically, if I understand correctly, because there are so many farmers involved, and every land is of course different, it's very difficult to get representative data about the possibilities that this initiative offers .

So a major challenge is how can you properly map out that farmer's specific situation in order to respond to the needs that this specific farmer has?

One of the concepts that I presented to Rabobank is multiple value creation , in which there is therefore a balance between the revenue model and what it yields to the farmer, also in a social sense. When I heard the words of the Global Head of the RCB, their entire approach was certainly focused on really creating value for the farmers there, and not just – they say so of course – about their own revenue model, but that there is certainly We are looking at how that farmer's situation can really be changed. Not only through income, but also through other means. But indeed, given that so many smallholders are involved, it is indeed not possible to get a representative picture of this. Unless so much is invested in manpower, but I really don't think so. It's all about scaling up.

So the choice of the type of tree also plays an important role in this?

In fact, it is also outlined that the main idea of the initiative is that trees are planted that also have a certain yield. In the first few years money is then made from the carbon offsetting that the tree

grows. After X number of years, when that tree no longer offsets extra carbon - that's how they see it - I think it takes much longer before real carbon is offset , but you know that much better. If that is no longer the case, then fruits are harvested, for example mango trees are often mentioned. They must then ensure that the farmer continues to maintain a sustainable yield over the years. How do you view this application?

What does the bell curve say? So it takes 5 or 6 years before the full carbon offsetting is achieved or?

In fact, Rabobank states, unlike other parties, that it is normal that there is a party that wants to offset carbon, and then a party is chosen that will take care of this. But Rabobank wants to do it in such a way that carbon offset is already in place. So they actually state that through the pilot projects they sell to Microsoft, that is, after X number of years, and I'm talking about less than those 6 years, that carbon has already been offset . But if I understand correctly, the whole process only starts then. So actually they are anticipating what they are going to realize much later.

How does it work with obtaining those carbon certificates? Because what does such a carbon certificate stand for? Some time in the future that offsetting will take place?

Yes, so companies that actually claim we have so many carbon certificates, and with that we are carbon neutral , in a real sense that is not true, so it is actually much later that they can make such claims.

One of the things I also encountered in the voluntary market were the problems with over- the- counter transactions, where transparency was actually lacking, and especially the price that had to be paid. In what sense do you think that Rabobank's initiative to really set up a market for it can remove problems?

And the impact that then has on the price, because you are saying that the demand is only increasing, and the supply is lagging, and parties like Microsoft are ruining the market, what effect could that have on the price? Normally that causes the price to explode.

So the claim that Rabobank made in the NRC, that every bank should become a carbon bank in order to meet the needs of companies, you do not recognize that at all?

So actually they are crossing their boundary a bit in that sense when they make such statements?

So basically, if I ask you whether the Rabobank initiative is a solution for companies to achieve net zero CO_2, then?

Going back to the EU ETS, in conversation yesterday with the global head of the carbon bank, it was also mentioned that reports came from Europe that the agricultural sector would also be included in the EU ETS. That is all future music, but that way, possibly, those certificates from Rabobank would also be accommodated in it. I was wondering what you think the implications of that might be.

So basically, if I understand correctly, because there are so many farmers involved, and every land is of course different, it's very difficult to get representative data about the possibilities that this initiative offers .

Furthermore, policy has of course already been mentioned, I have already seen you that you also have experience within national and international climate policy. What opportunities does this climate policy offer for the Rabo Carbon Bank?

Your website also contains a piece about CO_2 compensation in the chain of your product. Rabobank also has the aspiration to contribute to systemic change in the food value chain through this initiative . Are there still things they should take into account if they really want to carry out such aspirations?

One of the things I also look at in my thesis is the possibility for the Rabo Carbon Bank in the Netherlands. There are of course various problems in agriculture concerning nitrogen for example. That leaves several farmers hanging over their heads that they may have to close. Since Rabobank has traditionally been a farmers' loan bank, and they still finance 90 percent of the farmers in the Netherlands, they naturally have a great interest in this. So I want to explore what possibilities there are. I don't know if you also have a view on that?

Yes, they are really looking for a different revenue model.

What I also learned in an earlier interview with the RCB is that it is very difficult to suddenly switch to a different revenue model. Farmers have, of course, they're actually compulsive in what they've always been doing, because deviating from that norm, from mass production so to speak, just means they don't have enough yields. To take a new path, of course, investments are needed that will not be recouped tomorrow. Then of course the question is: Is it feasible for a farmer to take this path? And what does it take to make sure that it works?

Where is the boundary between regional and where business as usual is still applied?

In addition, of course you always have a fight for land in the Netherlands. Now it was also in the newspaper that it is being looked at whether it is not possible to build on agricultural land.

Well, there is of course a battle for the ground, and that could also have implications for the RCB for the execution of their project. What do you think is best for the soil? There is, of course, much available, and changes need to be made.

You keep coming back to the need to guarantee democratic decision-making. Is it possible to achieve this through political means?

Politics is of course also accompanied by lobbying. Hence my question whether it is possible, because through the political route you will always have to deal with a certain amount of lobbying. For example, the RCB has also looked into the possibilities with the Ministry of Agriculture. They are therefore perhaps a lot stronger in getting things accomplished in politics.

I also believe that it was in Zembla, and otherwise in Tegenlicht, recently it was also about the lobby of LTO in Brussels, which, even though it is known, is still taking place. Actually in your face, because nothing is actually done about it. That power is just so great from those different agencies.

European policy was also discussed. I also have an interview next week in Brussels at the European Commission with a senior policy officer on climate policy. I wondered which issues would be relevant to mention there.

I saw the B- Corp certificate on your website . This gave me the question: How can certifications like this be important for an initiative like the RCB? I am mainly talking about certain certificates with regard to carbon certificates. So a certain certificate that indicates that they meet the highest standard.

Interview Peter van Kemeske , Senior Policy Officer 'Fit-for-55', European Commission , 23-06-2021

Of course I had already forwarded the subject, which is the Rabo Carbon Bank. That is a very new initiative, some even say it is a revolutionary development in the field of carbon market. So on the one hand, Rabobank brings parties that want to become carbon neutral , bringing them together with parties that issue certificates. That can also be small farmers, smallholders. It is a collaboration between Rabobank and Microsoft, and in this way Microsoft can ensure that it is monitored how many trees have been planted and how much carbon has been offset, so that smaller farmers can also participate. These parties are therefore brought together by means of this carbon bank. Rabobank itself says that every bank should become a carbon bank to meet the demand. First of all, I'm curious what you think about that statement?

I had also heard that agriculture may also come under the ETS. I don't know to what extent that is the case?

By effort sharing do you mean that all parties must take responsibility for achieving those objectives?

The Nationally Determined Contributions ?

Does that also correspond somewhat with the CBDR principle of the Paris Agreement? The Common but Differentiated Responsibilities .

So if I understand correctly, if this is the idea of the EU, then this initiative is complementary to it. Because Rabobank has traditionally been a cooperative lending bank, especially for farmers, so they still finance ninety percent of Dutch farmers. In the Netherlands you also have the problem with nitrogen and the like, and because of that many farmers will also have to deal with a possible closure, so they will have to change their business model anyway.

And if this is the future, Rabobank's initiative will actually fit in perfectly with that, to partly replace traditional agriculture, that current agriculture, with a kind of agroforestry , in which normal agriculture is also planted with trees.

At the same time, Europe wants to become carbon neutral , has all kinds of climate objectives, but those two do not match. So agricultural policy is definitely not on the way to greening . What does that have to do with?

To get there, the farmer has to be met.

Because of course investments have to be made that will not be earned back overnight. What possibilities are there at the moment for this within the EU?

Is that already happening? Because I often read that nothing really happens with those funds from the EU ETS.

If we then continued to say that agriculture is already included in this, it is always a difficult theme in compliance.

Suppose that in the long run that agriculture is accommodated in the EU ETS

He will of course not be accommodated, but of course a separate …

That would then remain the responsibility of the countries?

That is of course still in the future, but it is not like these two sectors that are now going to become part of the EU ETS in what way, that is very different from what will happen with agriculture?

Indeed, these are also the examples cited in the voluntary carbon market, those problems with cutting down trees, but also problems with forest fires, which happens just as well in Europe, which of course also has an impact on these lands. Those are the major complexes that the sector has to deal with. So the EU will certainly have to deal with that when the time comes.

Will it be burned then? Because of course you can no longer make products from it.

My professor of International Environmental Law also said that the Paris Agreement article, if I'm not mistaken it is also about those NDCs I mentioned earlier, it's interesting to know what the view is on the use of the article, especially in view of the new legislation that is coming from the EU. The article is therefore about those NDCs of parties to the Paris Agreement, and also whether they are used in that new EU legislation.

In the end it will come out.

Another part of the Paris Agreement where I actually lost hope a bit was the definition of a forest that was kept. And that definition, my thesis supervisor works for the World Rainforest Movement , and that organization has released a report that that definition that's being used actually perpetuates monoculture forestry as well. So those paper plantations, those pulp mills, they can just plant those trees, eucalyptus and the like, and still meet those Paris goals. Then I wonder 'which definition of a forest is used within the EU? Is that the same one used in the Paris Agreement?

But the impact is of course very large, because in that way, not only the forests are important, but also the biodiversity. Because if you have a monoculture, there is of course no real biodiversity.

So there's actually a lot of different things that contribute to the demand of those forestry credits , shall I say, increase.

I would like to show the model that I use for the thesis, which is the ' quintuple helix' model. The first variant of the model was mainly based on the political, educational and economic subsystem. After that, the media- based and culture- based subsystem was added, and in fact the natural subsystem is everything overarching, which can also be seen here. All those different players in those subsystems provide knowledge, and together this leads to sustainable development. In this way I actually analyse Rabobank's initiative to see how this innovation comes about. And you see, politics is of course a very important system, but of course it stands together with all the other parties.

If you look at it this way, the way the EU approaches it, how are you in contact with those other parties? Of course such a Rabobank that is then part of the economic system, educationally, the universities that are part of it. What does it look like for you in a nutshell?

Yes, media- based , that is also mainly how the public reacts to it.

With this collaboration, one of the things that is also very important to me, is the boundary between the different parties. Everyone has his or her role, and that boundary is of course in between. It's a bit flexible, but everyone has their role. I wonder, what does this cooperation look like from the EU with those parties?

Yes, it may be hard to explain. Everyone has their role, so to speak. When a university collaborates with the EU… that line here, it just continues, but somewhere that line stops, and somewhere there is the boundary between those two parties. It is very interesting to see how, how I must be good to

explain ?, how that dynamic like, how it works. What that collaboration looks like. Of course you as part of the EU need that innovation. Do you then knock on the door of those universities, or what does that process look like?

So they are actually very flexible in that regard?

I had another question, because it was just said that those two different pillars are very important, but I was actually wondering what the role of the European Commission is, because actually, normally it is only about trade, because you have the internal market, but in agriculture it may be something else. I had also interviewed a carbon expert who said 'actually the European Commission is putting on a little too big pants. Actually, it's not their role at all to deal with things like this as an EU ETS, because that doesn't really fit in there. A Commission is also not politically controlled, so I was actually wondering what your view is on that?

As a final substantive question, many companies now naturally want to become carbon neutral, which is voluntary. In that new climate legislation, to what extent are companies being driven, or perhaps forced, to move towards that carbon neutrality in the future ?

In this way you can actually conclude that that way that innovation is simply achieved, because it simply forces the market to do so. That is very clear.

Interview Wij.Land , responsible person for RCB collaboration , 02-07-2021

First of all I was very curious how the collaboration came about?

What is your view on the Rabo Carbon Bank insofar as you are currently involved in it? Perhaps it is useful to first get a glimpse of the exact role you fulfil in that collaboration.

That was indeed a very critical interview in which he had to deal with some tough questions. Very interesting to see how they deal with that indeed. Could you tell us something more about what you as Wij.Land actually do?

Which specific questions has Rabobank asked you exactly?

The Rabobank initiative is of course primarily focused on farmers in Africa. There are, of course, other challenges, etc. than in the Netherlands. What challenges do you see for this Rabobank project in the Netherlands?

When it comes to peat, I believe that the founder of Wij.Land also worked for Commonland . I believe they also have a project in the Netherlands that is about peat landscapes. Are these also examples of initiatives that could fall under the Rabo Carbon Bank?

That explains. I do not know what kind of vision you have regarding the Rabo Carbon Bank when it comes to which possible projects can take place. Rabo Carbon Bank's pilot projects in Africa are therefore about planting mango trees, or other trees that provide different value once planned. So not just the carbon storage of the trees themselves. So that a sustainable revenue model can be realized for the farmer. I don't know if you already have thoughts about what that revenue model could look like in the Netherlands?

So you just mentioned that no trees can be planted because of the agricultural policy in the Netherlands, also regarding the zoning plan. Are there any other implications of Dutch policy that could complicate any Rabo Carbon Bank projects?

You say that this is one of the conditions for participating in Rabobank's pilot projects in the Netherlands. What does that look like? Are there already several projects in the pipeline, or has it all just started?

It is of course quite an intensive change for the farmer to change his earnings model so drastically. Often there are still certain investments that have not yet been recouped. Or investments have to be made that cannot be recouped overnight. Is it profitable for a farmer to apply such measures? Or are there certain subventions from the government to help farmers with this?

Of course, in the context of the nitrogen problem, farmers have also been given the opportunity to opt for closure. I believe there were allowances for that too. However, the measure has not ensured that enough farmers have closed. To what extent do you see the willingness of the farmer to participate in this?

It's good to see how this collaboration, that dynamic, works. You yourself mentioned that we actually need to move from large-scale to small-scale. You also said just now that the parties that are needed for this, so actually the parties that are not yet participating in it, are actually the parties that it is all about. Normally it is also the case that it just keeps getting bigger, bigger and bigger. Do you see opportunities to involve those farmers in one way or another?

A fair price is always a tricky one indeed. You also mentioned the interview of the gentleman who is responsible for sustainability within Rabobank. Of course you got a slightly different picture of Rabobank there, that it is actually still very difficult if you are financed by Rabobank to claim a sustainability loan, for example. Of course the Rabo Carbon Bank, with what you just mentioned … that is a bit at odds with each other. How did you react when you saw that interview?

I also wonder how you enter into cooperation with farmers. Do they knock on your door, or is it the other way around, that you actively approach those farmers?

I assume that one of your goals is to help farmers in that transition, but in fact those farmers only come knocking if they want to actively start working with that transition themselves.

I was wondering with which other parties you collaborate within this Rabo Carbon Bank project?

I also wondered, I would also like to talk to the government about the things you just mentioned, various subventions and such . Do you perhaps have a contact person within the government that I could contact?

Then I had one more question about those pilot projects: What objectives have you set yourself at Wij.Land with regard to these projects?

Interview Ron Cürvers , contact person BISCI, Maastricht University, 02-07-2021

How did the partnership come about?

What kind of NGO is it exactly?

Do you know whether Rabobank already had a collaboration with Solidaridad ?

My thesis is also specifically about the Rabo Carbon Bank, which I am researching. I analyse that using the quintuple helix model, to see how it works. Of course you need different parties to achieve such an innovation. I am therefore very curious about the role Rabobank plays in this collaboration. Is that purely a financing role? Or do they also have another function?

Just to stick to those terms. To what extent is what you do boundary work ? And to what extent is BISCI a boundary organization?

Of course I learned in the SSPS course that there are different levels of boundary work . One of the levels is the white circle, where people really work on a project basis. Is that the level of boundary work that is also reflected within BISCI?

Have there been negotiations about where that limit should be?

Yes, and those parties therefore connect.

One of Rabobank's interests in this project is about the use of that data for those farmers, because they want to enter a market that is still developing in different ways, in order to improve the quality and standardize it more. That is actually their interest within your project of FSD. How is that feasible? What time frame do you think is associated with that?

One of the things is that Rabobank has embarked on a new path through this Rabo Carbon Bank, that they are doing things differently than they have always done, especially with the pilot projects they are doing. There is also a need to measure this, because they themselves do not yet know very well whether this works. Rene Kemp also said that it is quite a revolutionary innovation that they have done, so they are still researching it a bit themselves. That is why there is a need to gain insight into that data, in order to be able to improve and standardize the quality in the long term. But if I understand correctly, it will take a few years before those projects can be worked in that way?

What challenges do you still see in the Rabobank project in the field of Fair and Smart Data? One of the things that Jelmer already mentioned was the privacy of farmers when their data are

used, that is also one of the issues that, if all goes well, has been submitted to you.

Also a bit more general about this Rabobank project, I don't know to what extent you are familiar with it. But I am also curious about the vision you have about the project they have set up through the Rabo Carbon Bank.

The Rabobank itself says, I also presented them with the concept of multiple value creation, and I also saw that the concept of the triple bottom line is central to you, they propose to do this in this way, they also propose a different revenue model for that farmer. And that in addition to a financial gain, this also has a social benefit. They also do not claim to keep the entire profit with themselves, but mainly keep it with that farmer. It remains to be seen whether that is the case, of course, but they themselves state that the multiple value creation is indeed in balance. Well, of course it remains to be seen.

Rabobank argues that every bank should become a carbon bank to keep up with the demand from companies that want to become carbon neutral. What do you think of such a statement?

Incidentally, I had one more substantive question about BISCI. I was wondering whether the policy of the Dutch government is still influencing your work at BISCI in one way or another, and whether policy officers are involved in the project?

Interview questions 11-08-2021

Interview LTO – Auke Jan Veenstra & Frank Pijpers, 05-07-2021

Frank had just explained his role (graduation intern carbon farming). What is your position Auke Jan?

Because this Rabobank initiative is so new, it is also seen as a revolutionary innovation, very little is actually known about Rabobank's specific approach. Of course, carbon farming is not new in itself, but it is in the way Rabobank wants to put it in a bank form. In my thesis I mainly analyse the initiative, and I do that on the basis of the ' quintuple helix' model. That is actually a model based on five subsystems. First of all, it was the educational, economic and political subsystem. Later, the media and culture- based subsystem was added. The fifth subsystem is the natural subsystem that actually covers everything. Within that I research the innovation. It cannot, of course, be achieved alone. This requires universities, among other things, but also the government, and also interest groups such as LTO. Hence my interest in talking to you.

To what extent are you aware of the Rabo Carbon Bank? And what is your view on the initiative?

Which action plan is that?

So for that voluntary market?

So the question is what would be the added value of such a Rabobank platform, if it could also be regulated by the market itself?

Indeed, you also mentioned that for that change Dutch farmers need to make an investment. They have of course also borrowed money from the bank in which they have invested in scaling up, larger stables, more animals, etc. Of course that goes against the other regulations that say 'the livestock has to go down', and then you could looking at such initiatives. Well, that investment has not yet paid for itself. What is the feasibility for those farmers to participate in such an initiative? Is it attainable?

And from the government, can that farmer also claim certain subventions, is he compensated in a certain way to achieve this?

I have a few other initiatives that I'm curious about how you view them. A Backlight documentary also discussed what the future of farming will look like. Innovation is it very important, and also looked at how using robots can ensure that there would be no agriculture strips needed. The head of the vegetarian butcher also mentioned that if all that is implemented, it can also be ensured that you could go to a food forest, where drones could reap the benefits. Is that also a possibility that contributes to that? So what kind of project could be for Rabobank in the future?

Again that part of financing. That is of course a frequently mentioned problem, I think it was also discussed at Zembla, that many farmers cannot get a green loan to implement measures. How do you see that as a trade association? Will those farmers be given the opportunity, if they want to, to get financing for this?

Indeed. Rabobank also has a partnership with Wij.Land . I also interviewed them, and I also asked them 'what are possible alternatives for Rabobank in the Netherlands?', and actually the pilot projects they are currently doing, mainly with wet cultivation. That is actually a kind of food forest, yet in line with the reduction of the livestock, so that you flood the land instead, and that therefore other cultivation is possible, and therefore, for example, mint or cranberry would be grown. could be. In this way, a sustainable revenue model could be rolled out. Is that something you think farmers would be open to?

Indeed, time will tell what is possible there. You, of course, represent all farmers, both the progressive farmers and the farmers who prefer to stick to business-as- usual . What is the average mindset of the farmer? It has of course also been shown before, even when it was discussed from

the EU that there would be a reduction in livestock, that this was sensitive to the farmer in the Netherlands, in which you also took a position. How do you see the trend at the Dutch farmer? Do they want to move towards sustainability?

And what else can the government do? Temporary subventions and the like have already been mentioned, of course, but are there any other options?

Are there still parties with whom you collaborate intensively when it comes to these kinds of themes?

Interview Marjan Peeters, 14-07-2021

Not familiar with RCB, so brief explanation given.

I'm curious how you look at it from a legal perspective .

No I do not know if the Rabobank Project meets the Kyoto Protocal with conditions on the host. It is indeed interesting to find out if they do.

So that responsibility also rests with Rabobank itself if no agreements are actually made about this.

That is certainly a good question to ask. In my research I have indeed come to the same conclusion that for comparable projects, for example the REDD+, that standards do apply there, but then a reference is often made anyway when it comes to e.g. Indiginous people or the local population ... there are of course certain articles that are used for this, such as the European Human Rights. That is complex in this case.

Yes, exactly. Within the EU ETS there were also certain forms of criticism, and one of the problems is carbon leakage , which is of course a common problem in all forestry projects. How do you think that relates to the initiative that the RCB is planning? How can Rabobank deal with this in these projects? By carbon leakage in this case I mean the following: Suppose a forest is planted somewhere, whereby agricultural land is used to plant forest, so that this does not lead to the felling of trees elsewhere, because agricultural land is still available there. use. That is a different kind of carbon leakage than in the EU ETS.

With the RCB projects it can of course be said that the farmers were not already planning to do so. So in that respect Rabobank's projects are above the norm. So I don't know to what extent additionality is covered by that, or whether it goes further than just thinking that way.

Rabobank is also planning to launch this initiative in the Netherlands, and then of course they will have to deal with such things. I don't know if there is anything else under Dutch law to take into account?

Actually, it wouldn't really make sense, because yes, those credits are of course sold to a corporate that may be outside Europe, and then a country like the Netherlands can … that is also a certain form of double counting . In my opinion it wouldn't make sense.

Yes. The course also discussed that setting a price on carbon does not necessarily mean that the company itself actually reduces emissions. What do you think the effectiveness of the RCB could be?

Yes indeed. One of those administrative costs is monitoring. That is also why Rabobank has teamed up with Microsoft. They say, they do have the tools, but only those are not cost-effective yet, so innovation really needs to take place to make that cost-effective. And therefore also interesting to … those costs really have to come down in order to be profitable for the project itself.

In the long run, yes. What Rabobank intends is to charge a 5 to 10 percent commission. They always emphasize that they really want to focus on the farmer. Of course, this does not immediately yield a profit, but in the long term this is a revenue model that must become cost-effective and ultimately profitable. In any case, profitability is not directly the focus.

Yes, Rabobank actually wants to sell those credits to parties that are currently not covered by such an EU ETS.

Yes, for example. Microsoft itself therefore takes the credit for the pilot projects that are currently taking place. So they are also interested in that.

American jurisdiction (for Microsoft) seems to me, that's where their headquarters are.

Yes, and in addition, Jos Cozijnsen , that carbon expert, also mentioned the problem that those credits should remain in the sector. There are also a lot of emissions and the like in agriculture, and credits are actually needed, also with the EU's thinking to bring it all together, so both the LULUCF and agriculture, to make it carbon neutral in 2035. But in this way, if you give those credits away to other parties, you do not keep them in the sector, and it is therefore not possible to compensate for that in that way.

So those forms of colonialism you mention relate to the North vs. South dynamics that are often cited?

Indeed, I have also discussed this with Ron Cörvers , because he is the contact person for BISCI, which is an initiative also within SBE, which therefore looks at Fair & Smart Data. That is, of course, an important theme here. He also states that the farmers can have the data, but not the infrastructure to do something with that data. And the large parties do have those, of course, which means that the balance of power is not in balance anyway. It must be checked whether they can earn something from it in a certain way, with the data they have. That is one of the things they are involved in in any case, and Rabobank is also part of that initiative of BISCI, is one of the partners in it.

Interview Rob Elsinga & Data Analyst from Microsoft , 15-07-2021

First of all, I am very curious about how the collaboration came about. I couldn't find much information about that on your site besides Rob's article.

What is your role within Microsoft and this project?

That is indeed the general objective that applies within Microsoft. Are there any specific objectives linked to this initiative from Microsoft?

So in that sense it is not just a pilot project for Rabobank to see whether what the Rabo Carbon Bank has come up with, or whether it works; but also to look for your own products, to see if it just has the desired effect that you expected from the product?

You just mentioned a few criteria, but what do those criteria have to meet for Microsoft?

So those co-benefits, so to speak, are they also very important to you?

What does the collaboration look like with universities to obtain the necessary knowledge needed for the products you make? You mentioned cutting-edge products that you are also testing through this project…

And how do those kinds of collaborations come about? Is that that you put out a certain order for a certain university, or?

Rob you just mentioned that the regulations for future innovations are very important. I also wondered in the context of the Rabo Carbon Bank, the technology you have to use for this, what does the regulatory framework look like at the moment?

Because which contribution from Rabobank is very important to you that you do not have yourself, why did you enter into this collaboration and not work with such a government in Colombia, for example?

I do not know if you still want to add something?

Yes, indeed, what the added value is for Microsoft, because Rob just said that you can also work independently with a party such as the Colombian government.

You've said a few times that you're bringing that technology. Which specific technology does it concern?

The Rabobank site also states that remote sensing, artificial intelligence and machine learning are being used . Could you explain exactly how that works for this project?

And what are the criteria that are currently being used for this, which are already clear?

Yes, because you said, it is very difficult to determine which criteria to include. Which criteria are already clear that should be taken into account in any case?

And are there any results between the data from the satellites and the traditional method used?

In the past, of course, it was only measured by pulling a cord around a tree and then you knew it. Of course you are now using a very revolutionary approach to that, but you are still checking to see if that produces equal results. I'm actually curious if there are any differences found, or if it might lead to the same results.

Bright. You said the traditional method was indeed to pull such a ribbon around a tree, do you also take soil samples to look… Of course carbon can be offset through trees, but also through adjustments in the ground. Are those also things that can be measured in this way?

Bright. You said the traditional method was indeed to pull such a ribbon around a tree, do you also take soil samples to look… Of course carbon can be offset through trees, but also through adjustments in the ground. Are those also things that can be measured in this way?

Earlier I had a conversation with Jelmer van de Mortel of the Rabobank, and he told me that the site also stated that remote sensing was being used , but that that was actually not correct. But, actually I can conclude from your story that you do use that remote sensing a lot ?

Okay , clear. Rob, you just said yourself that you're a little further away from it. What is your vision of the Rabo Carbon Bank?

Eveline, I was also curious how revolutionary is the innovation that you apply through the Rabo Carbon Bank? Is it a revolutionary innovation , or how do you characterize it yourself?

Because the technologies you use for this are already in this way, and especially by using those different methods together, has that already been applied together, perhaps by other parties? Or is that really a whole new way of working?

That is indeed one of the challenges of making it cost-effective. Are there any other major challenges you face in this project?

I don't know if you ran into any specific problems in this project?

As a last question, you just mentioned all the stakeholders that you had got those on board. What collaborations are there actually? First of all, of course, you work together with Rabobank. Are there any other important parties you collaborate with in this project?

Interview Emma van de Ven, 19-07-2021

First of all, it is useful to know exactly what your role is at the Rabo Carbon Bank?

Is it the same or a broader concept than the Carbon Bank?

But the same people work for Acorn as for the Rabo Carbon Bank, or is that not always the case?

Does it also lead to complications because there are differences between them?

What is the greater purpose of Acorn ? Rabo Carbon Bank has its own specific goals that it wants to achieve in 2025, for example.

If you read the latest articles, the ambitions were the objectives linked to the Rabo Carbon Bank. But if I understand you correctly, that is the objective of project Acorn and for the Rabo Carbon Bank when those projects are ready, new objectives will be vented from them.

So there are many agreements and the Carbon Bank is part of project Acorn ?

Oh I thought Acorn was a bit bigger and had been around longer?

What has been your role and what is your role now? You said you were kind of in between at first.

Propositions, is that one of the propositions that Rabobank puts forward to help farmers and to give advice or something similar?

What timeframe are you talking about that there were only 2 people present?

Could you tell me how many people are working on it now?

And at the Rabo Carbon Bank? You're saying that's actually the bigger picture?

Can you tell us something about the expertise that the Rabo Carbon Bank itself has? What do they engage external parties for?

You say that Carbon Banking is more consumer-oriented, while the product being created is intended for corporates. Can you explain a little bit what the importance of focusing on consumers is?

If I go on holiday now and I want to convert those emissions, can I use the Rabo Carbon Bank in the future?

I'm researching it now (RCB). Before that I was already familiar with the EU ETS, how it works. So I did get to know a little more about it. Are you targeting specific aspects of it?

The way in which I analyse the Rabobank Carbon Bank is through the Quintuple Helix model. I don't know if you are familiar with that? It is a model that works on the basis of 5 subsystems. Initially this included the university: the education subsystem. Government and the Economic Subsystem. Later, 2 other subsystems were added. Media and culture based public. The natural environment that encompasses everything. You see a dynamic emerging, actually a development of knowledge. One subsystem develops knowledge that flows into the next subsystem. In this way, all subsystems

contribute to innovation that takes place. The public is an important factor in this. Not only as a consumer, but also how they view the initiative of the Rabo Carbon Bank. I'm also curious about the importance you attach to it. At some point, the public will like it. The public has often thought things through about all Rabobank's activities. You are now working more and more with, you are also focusing more and more on these kinds of projects. What importance do you attach to that subsystem, which includes the public and also the cultural value that the public has?

It does indeed provide insight into how you look at this and how you deal with it with consumers. Another important aspect of this model is the collaboration with the educational subsystem, for example your collaboration with Maastricht University on BISCI. I'm curious how this collaboration came about.

What was your goal with this collaboration?

MSI is our Maastricht Sustainability Institute

It is interesting with the model that I use, because it also focuses very specifically on the exchange of knowledge. Could you tell us how things are between those parties? Because you are now really researching that R&D, how is the dynamic of that knowledge exchange?

You indicated that because it is not yet so clear what the knowledge is, you look at the expertise of all parties. Can you name the parties? Can you say what the research group that is there consists of?

In addition to Fair & Smart Data, are there other specific research groups within the Rabo Carbon Bank?

How did the collaboration with Wij.Land come about in the Netherlands? And are there other similar collaborations in The Netherlands?

Wij.Land originated from Commonland , it has written an approche how to create landscape restoration in 3 zones in 25 years. Weiland is an executive of commonland . I heard that they are in the Netherlands, there you have a different business plan than in Africa, because the soil is different and such. In the Netherlands they are looking at how they can contribute to the Carbon Bank. Barbara Baarsma indicates that they would like to involve Dutch farmers in the project, but that she did not yet have a clear idea of how they could do this. Weiland is one of the parties to investigate this.

You already mentioned the remote sensing technologies yourself, and that you also have to take samples from the ground. In a conversation with Microsoft, I gained insight into how this works. They have also said that to check that remote sensing data they also use the traditional usages. Measuring the size of a tree with a cord.

That was two people from Microsoft, a digital advisor and someone who had written an article for Carbon Bank, who was less involved. So the digital advisor said that to check the data, they also use the traditional measurement methods. Measure the circumference of a tree from the ground. She also said that it is possible to measure (by means of remote sensing) what the carbon storage is in the ground. I was wondering whether to check those figures for soil carbon you also do those soil samples independently to check whether those data are correct.

So you say that innovation is needed to gain insight into that. Are there also things that your colleagues are investigating? Or has that question been posed to universities? How do you try to understand that?

How large should the scale be to make this cost-effective?

I am also curious how you came to Africa with the farmers. Were these already farmers who were already customers or how did you approach them to become part of this project?

So that was also a basis from which this initiative came about? That you saw from the market that those farmers really have an interest in this in addition to the co-benefits that they already receive anyway. Is the production of a product just hugely important? [Connection dropped] What I actually want to know is that these contact parties indicate that this is also the need of the market? And to what extent has that been the basis from which this initiative arose. Several things have of course come together, for example that the corporates need credits , but this is a different form.

And those smallholders , for example the cocoa farmers you involved in this. Any other important crops for smallholders ?

Okay , I have one final question: You said there are ten pilot projects, including in the Netherlands and the US. Which countries does it concern exactly?

And specifically in Africa, you already mentioned Kenya, a country with which you have a lot of cooperation. So I assume that is also one of the countries where the pilot projects are taking place?

What is the biggest challenge for Carbon Bank?

Or maybe for Acorn if that's easier.

Interview Han Brouwers Solidaridad , 20-07-2021

So I came to you through Ron Cörvers . It's nice to see that you are also collaborating in this way. Perhaps you could first tell us a bit more about Solidaridad ?

Actually only through the information Ron had provided in the interview, so he had given an introduction there, but not really.

Hence the Spanish name?

But this is indeed an example that fits in with the RCB, how they want to help farmers in Africa, also through agroforestry . How did this collaboration with the RCB, and with Rabobank came about?

Are financial loans also something that is also relevant at the RCB

You already mentioned before the collaboration with the Rabo Carbon Bank, there are still some challenges. So what are the specific challenges?

Do you have people on the ground who provide those trainings?

financial literacy . That starts with very basic training, how do you handle money? Then you are really

Yesterday I had an interview with Emma van der Ven of Rabobank (Acorn), who is also involved in BISCI. She also told me how they are in contact with those farmers, which is actually through traders . So there are also different parties in between. In addition, you also say that you have the networks. So those are basically the different ways you, as different parties involved in the RCB, interact with those smallholders. So through you it is through those networks, and through Rabobank it is through the traders and then back to the smallholders ?

In this project of the RCB it is therefore complementary that there are different ways in which that smallholder can be reached, and that there are also people on the ground through you to be in contact, to provide those training courses. That's really where you two find each other.

Is there anything else within that dynamic that is important in terms of input from you as different parties in that collaboration?

That is of course also one of the reasons why Rabobank has teamed up with Microsoft for the RCB. They also use different satellites, of course, both public and private. You already mentioned the Dutch space agency, I don't know whether it is also an important player for Rabobank?

So the traders in that case?

And for this project with Maastricht University, what was your objective?

But the possibility is there (that farmers have no way out).

Let's hope so.

That carbon tax, that's not the same for the due diligence plans that the EU had announced, is it?

But is it really the case that such a carbon tax will be levied on products from outside the EU?

Are there any other relevant parties involved in BISCI?

One last substantive question, because in the beginning there was also talk about that systemic change that is necessary, which was actually your previous five-year vision. The RCB has also indicated that they want to contribute to systemic change in the food value chain, also through their network, or carbon movement. What do you think is the added value of the RCB in bringing about this system change?

Rabobank had also claimed in an interview that, in order to meet the demand in the market, every bank should actually become a carbon bank. What is your view on that statement?

Interview Bart Millenaar , European Parliament, 21-07-2021

So my thesis is really concerned with carbon farming. I have seen various cases, including from the Commission in particular. One of those things is the 'Farm to Fork ', in which the Commission had thus indicated that it wanted to promote carbon farming as a new green business model, thus also a new source of income based on the climate benefits it thus provides. In addition, it was also announced that there would be an action plan for the circular economy, in which a kind of regulatory framework would be developed for the certification of carbon farming based on some kind of control mechanism. That should be ready sometime at the end of 2021. Is there anything relevant about that already?

So everything is known. Is there perhaps something relevant that could at least be of interest to the RCB?

I also read that the EU also finances pilot projects. Do you have an idea what kind of financing that is? And whether Rabobank might also be able to make use of this?

Bright. Of course, the 'Fit-for-55' has now also been launched, a comprehensive story that has emerged from that. Are you aware of whether there are still interesting things in it for carbon farming ?

LULUCF + agriculture climate neutral by 2035 . I had indeed received it.

You mentioned it just now, but then there is of course a problem that arises, and that is, on the one hand, you already indicated that agriculture is currently not covered by the EU ETS. If that were the case, then those credits would remain in that sector. So what you have with an initiative like RCB, that the farmer generates credits and therefore sells them. But as already said, it actually has high emissions itself, especially if you look at the nitrogen problem in the Netherlands. Actually by selling those credits his own emissions are not covered. And actually, you already indicate with that LULUCF, that those forests should actually also compensate for agriculture. But actually by selling those credits you lose that added value, right? So I wonder how that can be realized with such initiatives now, and the perspective of neutrality in 2035.

Yes, and of course the well-known problem of double counting . Suppose the Netherlands has to have a certain … wants to have a 49% reduction by 2030, and those farmers in the Netherlands will also supply projects under the RCB mechanism, and supply those credits , and parties from outside the Netherlands buy those credits , then you naturally have that there are it is said that farmers have done that, and does that not fall under the 49%? Those are challenges, of course.

There are of course many different certification systems. I have also heard that in 2022 or 2023 the Commission really wants to look specifically at those voluntary market certification schemes. And I think it's about guaranteeing a uniform certification system for one certificate, produced anywhere, compared to another certificate produced elsewhere. Is that correct, that assumption?

One of the issues with that, in my view, I had also talked to a carbon expert about several projects. He actually indicated that every project is actually different, and that many different factors are important in determining the price that is asked. And a so-called 'beautiful project', where the highest standards are really worked, so that has a different price than say a normal project. So I'm very curious how that can be cast in a universal certificate.

I also had a specific question about a report released from the Court of Auditors, which basically, rips of the European agricultural policy. Especially since Europe naturally wants to become carbon neutral on the one hand , but it is actually stated that European agricultural policy is actually absolutely not on the way to becoming carbon neutral . I was actually curious if that had any effect on the EP.

Finally, I'm curious about your view on the quote from the RCB, and that was actually to answer the question of corporates in particular , should every bank become a carbon bank. What do you think of that?

Finally, I was also interested in the forest strategy that was also launched by the EU. I don't know if you remember anything about that?

Everything is of course important that as many trees as possible are planted in this initiative, so it will certainly contribute. Clear, many thanks Bart! It's good to see what's going on at the moment, where it's going, where we still need to take steps, and also to see that the same things are going on at the EU as at the RCB. Indeed, they run into the same problem. So you see that there are indeed some steps that need to be taken, things need to be researched, and of course look forward to seeing what the policy will bring.

Appendix 8: Automatically translated transcripts

Interview Jelmer van de Mortel, RCB, 14-06-2021

How does Rabobank try to generate credits?

We ourselves try to generate credits with small farmers in developing countries. We want to do this in a very responsible way. That is why we are working with Wageningen University to see how we can measure the impact of those farmers, and that goes beyond just the carbon impact, which they call the 'payment for ecosystem services'. How can we indicate that there is a positive impact in addition to CO_2 emissions?

We also work together with BISCI, part of Maastricht University. There are three spareheads, and one is about Fair & Smart Data. It's about using the farmers' data. So we are actually trying in various ways to see how we can increase quality and standardize in a market that is still developing.

What is Microsoft's role in the partnership with RCB? Of course they bring in remote sensing, artificial intelligence and machine learning.

Microsoft actually helped build the platform here, and has been a bit of a supplier. And Microsoft International has said we will buy your credits if they meet our standards.

It is also mentioned that the RCB should contribute to the required system change in the food value chain. How do you define system change for yourself?

We also say that this sector must also become more sustainable, it must also become CO_2 neutral. So what interventions can we commit? So for example agroforestry, or doing other things differently, for example by not plowing. Or by crops, so if you have annual crops, apply another crop when it is fallow.

What does the system ideally look like in which this system change has been implemented?

I don't think there is one type of solution anymore in this day and age . The system is a link between different systems . In the Netherlands we have too much agricultural land, too much actually. So you will see a bit of a decline in that. You can also diversify it a bit . This is possible if a farmer who normally only has arable farming would also apply forestry by planting trees.

The system of which we, also as Rabobank, have been a part, based on the idea that we will never go hungry again. It's been very successful, because we're the second largest exporter in the world, but we're totally blown away. Yet in the world 9 billion people need to be fed, thirty percent more than today approximately. In the meantime, many sectors have indicated that they are moving to bio-based. So instead of fossil fuel they are looking for vegetable input. So the need is increasing to get something from the country, while the restrictions are also becoming much stricter.

You already mentioned the possibility for Dutch farmers to be part of the plans you have. I also found an article in which your CEO Barbara Baarsma also mentions this, but that there is still no real idea how Dutch farmers can get involved in the plans you have with the RCB, do I understand that correctly?

Yes and no. The problems I have just outlined are, to a very large extent, all for the bank's customer. And we want to help that side of the bank with the transition . So that farmer can earn 15 to 20 percent more, because Microsoft says we pay 20 euros per credit. And if such a farmer has ten credits, and $ 200 gets compared to his annual salary of $ 1,000, then we are in an economic ration ee l 'yes fine' . Then you get the flywheel going, but a Dutch farmer to 4,000 euros per hectare can earn, and that ten hectares, which is a. The transition to agroforestry not do that (which has the most CO_2 storage prevention), and proceeds after that is much less. Look, we see the prices in the EU ETS market rise, from 5 to 10 to more than 15, but you do need prices of 100 euros if there is to be an economic incentive for Dutch farmers.

If you are realistic, you should also tell that farmer that his own carbon footprint needs to be examined, so how much he emits and how much he injects. So it is quite strange to say that the farmer gets money for what he has put in .

Are there certain initiatives that can help the farmer? Due to the nitrogen problem, some farmers will have to deal with a possible closure, so something will have to change. What role does the Dutch government play in this?

There have been buy-back programmes, especially in the livestock sector. The farmer should actually be helped with a new revenue model . For that you actually have to look three steps further. If you look at the Netherlands, there is a large housing shortage. Shift from city to countryside. For example , different revenue models have to be devised.

As a bank, we are used to financing beef cows. In arable farming, it has always been annual cycles, so we always only had to fund an annual cycle. We are not really familiar with agroforestry. As a bank, you would think that before those trees yield money, we would be 10 years later. We are 7 years later before fruit trees start to produce fruit. As a bank, we understand that, we have models underneath. We are going to fill that gap of those five, six, seven years for you. As a bank, we should do even more with this, in addition to all kinds of other revenue models, and that also lies in developing other markets.

At Maastricht University, for example, they are also examining whether beets can be used in DSM's processes. If at some point you start developing markets in this area, and you combine that with political considerations . In this way, a sustainable revenue model can be developed for the long term.

If I understand correctly, these different ways of interpreting the land for Rabobank are therefore not in conflict. It would therefore not matter to Rabo Carbon Bank if houses are built on agricultural land, because Rabobank has an interest in tapping into different markets, so that a long-term vision can be realised.

Perhaps then more diversification should take place . So that there is not only livestock farming, that there are no longer any pigs that we are going to raise, but that is, for example, agroforestry. Because of the agroforestry there is also a piece of nature, and also a piece of production for industry. That way you can move towards a very sustainable model.

For houses you can cut down nature , or you have to put them on agricultural land. Yes, I'd say there isn't much left.

As a bank, we are always looking for new sustainable revenue models. Always based on the need to help that farmer in the transition. This therefore requires a sustainable revenue model for the bank.

How can more be used? (Increase the importance)

Existing farmers from all over the world are seeing pressure from climate change. More drought, water problems etc. So just from a risk perspective that we want to help existing farmers, there should already be a need . In addition, also with regard to the earnings models, because these are under pressure for the bank due to the low interest rates. That is why more attention must be paid to the entire width of the sofa.

Which initiatives are running in parallel? Which factors within the Quintuple Helix model are the most important for the RCB?

We are also working with consumers in the Netherlands to reduce these CO_2 emissions, which is part of the carbon bank.

Which factors within the Quintuple Helix model are the most important for the RCB?

Nature is very important . Nature also has an economic value, in addition to the fact that it is still difficult to quantify. We want to help those farmers with a more sustainable business model . What is a more sustainable business model, that is if the quality of that soil increases. How does that quality increase? Quality is about biodiversity, number of different animals that live there, number of different plants that are there. The quality of the soil, how much organic carbon is stored in the soil? What nutrients are in the soil? These are all things that we include in the proposition. If you would only do it on CO_2 you would get a very poor proposition with wrong incentives. Biodiversity is very important to prevent that by solving a problem you do not create a new problem.

A system can therefore have unexpected side effects. You want to protect yourself from that as much as possible.

That is why it is of course important to think about this from the perspective of different disciplines. That corresponds to the 'carbon movement' that you refer to. There are several parties mentioned. What are the conditions for partnerships with these parties?

Preventing the classic greenwashing . You see companies that only take partial responsibility.

Various things are, of course, required from parties in the 'carbon movement' to realize that system change. What do you need from policy makers or regulatory authorities, for example? Is there currently a policy that supports your initiative in the Netherlands?

In terms of policy, certainly, the economic incentive is insufficient for those farmers. So policy can certainly do something about that. On the other hand, there is also a very large market development. Then you can see how you can stimulate that as a government. In itself, various initiatives have been set up in recent years, such as the catering fund and invest NL. So policy officers are one of them, other market parties that are capable of developing that market themselves also have a share in it .

What does this collaboration with scientists and universities look like?

In addition to the initiatives I already mentioned, the collaboration with Wageningen is dominated by measuring the living conditions of farmers in Africa. We can start applying agroforestry, but if it disrupts the whole market and people lose their jobs because normally there was only a very large market for grain, and that market collapses, or the price skyrockets and there is nothing below it, that are unintended side effects that we want to be aware of .

Interview Alexander van de Koevering, Global Head of RCB, 17-06-2021

How do you define system change within the RCB?

The big challenge we face as a world is that we have to double food production to feed the growing world population. At the same time, the emissions of the sector, but also broader, must at least be halved, but preferably even more . That's the starting point. If you look at climate change, the CO_2

levels in the atmosphere naturally rise sharply. In removing CO_2 from the air, the IPCC and many others say there is only one cost-effective way, and that is nature. Nature stores CO_2 in biomass.

The one with the greatest potential is 'soil sequestration', or carbon uptake in the soil. Actually, the agri sector is crucial to achieve that climate change, both on the side of emissions (they are responsible for 26% of the emissions, of course with a good goal: world food production), but if you look at the capacity that land could have to absorb CO_2, it can also make an enormous contribution to solving the climate. Some scientists say it's carbon negative, so it can become a carbon sink instead of an emission. That is of course very interesting. When the carbon increases in the soil it becomes healthier, 1:1, and you can produce more food.

If all that is so fantastic, you might be wondering " why isn't it happening today ?" This has to do with helping the sector to make the transition , because the moment you move from the current industrial way of working, f.i. monoculture with a lot of pesticide use, to carbon farming or regenerative farming, you need both investments (other machines, other seeds) and you simply have less returns from your land in the first few years. It gets better after a few years, but less so in the first few years. That's why the carbon bank is on Earth. We have developed a number of propositions that are aimed at reduction, or aimed at carbon credit. In any case, they are both aimed at ensuring that the farmer has a new revenue model , and that it helps in the transition to more sustainability.

What is that system around it? What you see now is that there is a lot of scientific discussion about the 'voluntary [carbon] market'. The consequence is that we do nothing. That's actually the biggest problem, that we don't start. So, we have to start today. We don't know exactly, but we know that the general line is just right. At the same time, we have to work with governments, in an EU, in a US , with large NGOs, with large corporates that have money , work together on a set of regulations, a framework, within which this piece (reduction/removal of carbon and shaping it into credit) becomes possible. It is possible today, but it has been criticized. You can remove a lot of that criticism by simply coming up with the requirements that a credit must meet .

What is the most common form of criticism? Through the collaboration with Microsoft you have of course already been able to provide an answer to various forms of criticism. Are there any other forms of criticism that you still have to deal with?

It's nature, it can't be completely planned. Most of the criticism is that the reduction, the removal of CO_2 from the air, has really take place. That's really what it's all about. You have to find as many answers to that as possible. Also, how long is that effect? If you allow carbon to be stored in the soil, and you plow again a year later, a lot of that carbon is released again. So you shouldn't plow. So the discussion is, how permanent is it? That's where all the criticism comes in.

It was also just mentioned that new policy is needed from regulatory authorities. Can I conclude from this that the current policy does not yet support your vision?

There is actually very little policy, it is the voluntary carbon market. In particular, NGOs have set standards to which you can commit, but not necessarily. There are also many differences between them. That is why we say that that regulatory framework is necessary to increase that credibility. The reliability of the credits must therefore be guaranteed, by means of a set of rules, a framework, which is valid for the whole of Europe, for example .

To what extent is that feasible? On the other hand, you have the compliance market of the EU ETS, which are bound by very strict regulations. Is the voluntary carbon market still voluntary in this way?

The ETS is for the heaviest polluters, about 400 companies in the Netherlands. If you assume that we have 80,000 companies, 79,600 are not. And ETS is actually really a penalty. You will be punished if you produce too much. So I see more of a framework for me, so what a credit must meet, the requirement, you can call it a credit , than mandatory regulations like in such an ETS . I think that would help immensely.

You also see that Europe is now working with 'agri credits', so what we are doing. The first will probably be released in 2023. They also want to see if you can use that in the ETS theme.

So in that way, suppose it is implemented the way you say, is it also possible to accommodate the RCB's initiative there?

Yes, because I think you then have a kind of framework of, you have to stay within this. It would help us immensely as we are now trying to meet the very highest standards that currently apply. But some requirements are immediately so high that it immediately excludes many farmers. Or farmers who, for example, did very well, who already took a lot of measures last year, they do not qualify for such a credit, because the measures you have taken in the past are excluded. In fact, the larger funds that have not yet done anything would benefit from this. Those kinds of dilemmas are there. If there were a clear framework it would help us enormously in the sense of, this is the bar, we have to get over that. In this way we also provide a reliable solution .

What is the role of RCB within the carbon movement as well as within the food chain?

The 'carbon movement' really addresses that eco-question: 'How can we create an environment with major players in the world that ensures healthy market functioning of carbon credits or reduction credits, with the aim of a transition to a more sustainable agriculture.

The carbon bank creates concrete propositions with which we can help customers that have added value for corporates, because they want to compensate part of their emissions, added value for the farmer because he is simply paid, and added value for Rabobank because we are there to analyze a business model .

How is the concept of multiple value creation reflected in the RCB?

Multiplicity is concretely reflected in the business model because of the focus on sustainable agriculture . What is also important to us is that a new revenue model is created for that farmer, so that they are really inspired to change. Even if you look at the current earnings models of banks, and the earnings model of the carbon bank, I can say that we award a large part of the earnings to the farmer, not so much ourselves. So we try to create those values for the farmer, for the climate and for Rabobank .

How do you deal with the challenge of your own revenue model? Normally, in a general sense, it is of course the case that banks focus on a shorter term. RCB's initiative is of course a long-term commitment. How do you deal with that?

What is of course a tension is that we have been financing the agri sector for a hundred years. There's been a very long time when we thought it was a good idea to go into industrial farming so that we could produce as much food as possible to feed the world. That in itself is of course a very good idea. Gradually we (the world) found out that it also led to more CO_2 emissions, that more pesticides were needed, so that it had negative effects on the climate. We care about that, because we naturally also want to help agriculture into the next century. The dilemma is this, that on the one hand you still have a portfolio from the past that made industrial agriculture possible, and at the

same time you want to make the transition to more sustainable agriculture . Rabobank is of the opinion, and that is an important one, that we should not say: 'you are not allowed to come in, because you are not sustainable', but that we should say 'you can come in, but we do want to make agreements about how to go to sustainable environment.

Within countries such as the Netherlands, where so different values apply, I understood from an interview with CEO Barbara Baarsma, that you also look at how you can involve Dutch farmers in the RCB. There are, of course, different challenges in the countries mentioned above. What is your opinion on that? What possibilities do you see?

What we see is that Dutch farmers are very interested in this model , looking for sustainable ways of farming. What you see in the Netherlands of course , and sometimes we forget that, we have incredibly innovative agriculture . Can you imagine that we sometimes produce 100x more per acer than other countries, for example America. And that CO_2 emissions are relatively low . What you see in the Netherlands is that it helps that they are paid a little. I also see a real drive to do good for the climate . There are also many farmers who have already taken many measures.

The yields of planting a mango tree in Africa are relatively higher compared to the Netherlands because of the higher costs involved. In this way, it may be more difficult for farmers to implement that transition, because they cannot earn enough money to afford the transition.

Very good question. What we are doing in Africa, together with Acorn and Microsoft, is to make that farmer more resilient, in other words to help them become more socio-economically independent. We do this by ensuring that he can have more harvests and thus yields, so that if he fails a harvest (eg the mango) he still has the coffee left. If you do that, so-called agroforestry , then of course a lot of CO_2 is absorbed, which we valorize by using up credits that Microsoft buys . The socio-economic perspective of that farmer is very important there. If you look in the Netherlands, your assumption is correct, such a credit is much less impactful financially for such a farmer than in Africa.

If a few measures are implemented in Africa, for example that you no longer start plowing but take grain, or take coffee crops, then the carbon in the soil increases, and we measure that . We reward this by selling a credit to a corporate. That is (in Africa? 24:32) for the first measures you have to take as a farmer, that is enough to cover the costs. So that first step can be taken by a farmer, but we need to explore further where that price should go. The price of a Dutch credit, by the way, is higher. You have to imagine that an African credit is around 20 dollars, while a Dutch credit is around 45 to 50 dollars. So there is a higher price, that has to do with this . But you can also say, suppose that the net is not cost-effective, then a Dutch farmer may still find it interesting to do the transition, but in Africa that is absolutely out of the question.

To what extent should a Dutch farmer also be compensated? It can therefore be said that the value of that credit should be sufficient, but of course investments must also be made that are not recouped overnight, you as a bank know all about that, of course. In what ways is that possible? And what role does the government play in realizing this compensation?

That is a good example of what the EU is now going to look at more closely, we can still use certain subventions, I believe it's called CAP, to shape this first transition. So suppose you have to switch from a diesel agri machine, and you have to switch to a hydrogen or electric machine, which are of course huge investments. We are now really looking at the measures that have the greatest effect with the least possible investment, which are cost-effective. So these are measures that you can take relatively easily with relatively low costs, so that you can compensate quite well with such a credit.

Going back to the stakeholders you work with, and the model I use to analyse your initiative, the 'Quintuple Helix' model. Which of the model's subsystems is most important to you?

The part learning: how do you educate the world around you, I think that is a nice insight. I find it quite difficult to say which is the most important, because it all influences each other so much. If I had to put it this way now, I would almost say social opinion. I think it's the most important at the moment. That can be very positive in the sense that we have to do something now, and that all large corporates are now being forced to proclaim their net zero strategy by that social opinion, there it works very positively. It can also be inhibitory in the sense that people move very quickly towards greenwashing. I see a lot of articles appearing, also in respectable newspapers, where greenwashing is discussed, and it is complex, but that they have not really been able to get the core out.

I think that opinion drives forward on the one hand, from we have to go green, we have to do something, corporates have to get to work, but also what can be inhibiting when it comes to are we doing well enough ? Politics is of course quite sensitive to that.

It was already stated earlier that policymakers are also expected to do the same. What is the role of Dutch politics for your RCB?

The agri sector is of course very international, especially EU policy. Dutch politics, we've talked a few times with the ministry of agriculture, but what's important (I don't know how to put it nicely), but what you notice is that in the Netherlands, politics think very quickly in terms like 'can we punish the agri sector for the fact that they emit a certain amount of CO_2?' and thereby effect a transition. Punishment in the sense that you have to pay a fine, or you have to buy rights, or you have to reduce your livestock .

I think it would be very good if Dutch politicians supported that. So not to punish the sector, but to create a mechanism whereby the farmer can really tighten up his entrepreneurship again. That often goes wrong, you also saw that with the nitrogen discussion, also with the subsequent demonstrations. In it you saw that that farmer no longer has the feeling that he can farm himself, but that someone else somewhere in The Hague determines, you have to do this. I would grant that to Dutch politicians if they could facilitate that. But frankly, the real policy on agri is of course made in Europe.

Of course you have also indicated through the 'carbon movement' that you need certain partners. Which partnerships do you currently have and what are the conditions for doing business with these partners?

Then you should think of large NGOs , then you can probably already think of one or more, in the Netherlands there are a few very large ones that we work with . Then you should also think of network clubs , such as the World Economic Forum, where we have a very close party. Microsoft is one of them, but of course there are many more. for example you have the task force voluntary market , led by McKinsy. They also try to create a framework within which politicians can make decisions. In addition, of course, and that is not a partnership, we also try to use our influence with the Timmermans of this world.

So in that way are you also trying to get a certain amount of lobbying that you're trying to practice on such players?

Yes.

Another model that is complementary to the quintuple helix model is the food approach system that I use at Wageningen University. How can it be applied to the RCB?

How reliably (that depends on how some large NGOs view it) and cost-effectively can you establish that reduction of CO_2 or carbon in nature. Actually, if you peel it off completely, that's the gist. If you talk about cost-effective way, it really is about developing new technology and innovations, think of remote sensing for example in the ground which is carbon. That's one. Two, it's about developing models with which we can measure that. You have to imagine, if you take a sample in the ground, and you do that every few meters, then the reliability is high, but of course it is not reliable. So you're going to get combinations of technologies, for example modelling or remote sensing and/or other forms of measurement, so those innovations are important. And, ultimately NGOs and politicians who say this is a good way, that's the way to do it, this is great.

If I understand correctly, Microsoft has already implemented several innovations that can be used, but there are still certain issues that are not yet solved, where innovation is still required?

Well what you see is, we can measure it, but it's not cost effective yet. We will have to develop further in order to be able to bring it at a price that is interesting to be able to do it on a large scale .

Are there any partners within that educational subsystem, for example universities, with whom you collaborate to realize such innovation?

Of course. We work with several universities. The WUR in Wageningen, of course, but also universities in America with which we develop this together.

How are those partnerships shaped?

In the case of Wageningen, we are developing a protocol for this area for Europe and for the US. In Europe, two people from Wageningen are involved in the feedback role. So they always indicate what they think of things. So that's the way it's set up.

Together with Delft University, we organize challenges in which we get students to think about issues. So it's those two roles for now. In the end you would also want some kind of 'okay sticker' to appear on it as this is science-based approved.

Is that also necessary to motivate the public, or to show them that it is indeed supported and therefore does not fall under the greenwashing that is often mentioned?

Yes. I think the public, but certainly also large corporates . If WWF or a university or both say this is really great, that helps of course .

Reputation is of course also very important to Rabobank. The image of Rabobank has of course been criticized at times. Is the RCB a follow-up to this to show that Rabobank has taken a different path? Is this a follow-up to a transition that has been made within Rabobank to be more committed and to show the public what is going on? At the end of the day, of course, the money invested by the people themselves is still crucial.

That criticism is, of course, justified. We've done a lot to bring about more food in the world. Contribute to the hunger problem. But the problem, of course, was that there was also a climate problem, and we are part of that system, it's just that. And this what we're doing now is for us much more of a driver from the market demand, both from corporates who say they want to help in that transition, and to have something to claim, and from farmers who say 'I see there is something in this but I don't know how to start or how to pay', that was actually much more

the start . And you could say that's also a response to public opinion, but I think it would be a while before a tipping point is reached between what we've traditionally financed and what we're doing now with the carbon bank. But our starting point was much more the need from the market than public opinion.

It is of course an innovation that you have implemented, so there is still little information that shows that this method actually works, various pilot projects have of course also been carried out. Are there any results that support what you intend to do?

That is still very early. We once made a calculation of what it should yield, but we can only really determine that next year.

Anyway, back to the scope of the Netherlands. There are, of course, several things at play at the moment. In addition to the nitrogen problem, the options for building houses on agricultural land are of course also considered. For the RCB project, interests could sometimes collide. How do you see this development for farmers in the Netherlands and your initiative? It will of course be a battle on the ground, because that is simply scarce in the Netherlands.

we should also use the transition in the Netherlands. But the impact, both in CO_2 and financially, will simply be more limited. If we had to deal with our land in a different way, that's fine.

From a vision of the future, the train of thought that you have used with this RCB, what does the system look like – if the aforementioned system change has been implemented – what does the system look like ideally?

Ideally, every farmer would apply regenerative farming, which means that a farmer farms in a way that does not damage his environment, to CO_2. And then we have a system where carbon credits per se are no longer needed, but where RCB can help bring that knowledge together, to advise farmers which practices given a region, given a given measure, given what it has already done, they can do the best for the next 5 years. This is what it would look like in my basic image. Then we no longer have the proposition on the credits, but then we have much more insight into what the farmer can apply in practice to farm even better .

You just mentioned 5 years but I don't know which timeframe should be applied to make this feasible in this way?

If you really want to go through the agricultural transition, and we have to be honest , not for every type of farm, not for every region this could be, but you are 20-25 years further on for a system that has lasted 70 years , so just after the second world war, that whole industrial agriculture, we are not going to change that in 10 years. You can compare it a bit with when we went from coal to gas, you just don't do that in a few years. What is important, and that is why we must also start now, is that we really have to learn from the pilots that we are doing now , and become increasingly smarter about it, and also see better and better what is the best thing for a farmer to do. What is important to a farmer, he simply wants to see it work.

Interview René Kemp, 18-06-2021

How would you describe RCB's innovation?

The internal market is not something abstract, there are players, there are practices, there is a certain primary logic . There are new partnerships, so it's pretty radical in those respects. It also differs from the existing one, including how they decide on projects and players, it really is a new market .

I think Myrte Velter's work on boundary work is relevant in this regard. Because she says, there are four kinds of obligational boundaries, identity, competences, activities and dependency relationships. So you can see all of that. What is a link with sustainability science if those farmers are helped to farm better, and if there are also those benefits, so that it is a bit broader. Look she (Raboank and NGOs)

are of course also quite good at impact finance, this is of course also an impact finance project that must be profitable , but which can of course also be a learning project for the bank to become more social itself. And they want that too, but it's always very difficult to get off the ground, especially if you've actually completely gone along with that neoliberal thinking. Attendance at the London Stock Exchange, and with the necessary…

You can't suddenly let it go.

No, so the core of the problem is always that you have to have a different revenue model. And that's not something you just have, and internally there is usually also some skepticism. Even if they want it at the top, it is still not that easy to achieve. I would also make an inventory of the struggles here. I don't think it's that interesting what you call it exactly. It's actually quite a radical … it's quite an essentially different service. If you have to interpret it anyway, then it is a service they provide, in which elements such as advice will certainly play a role, and other competencies are also required. boundary work

Tell us more about the pilot projects that are being used to create multiple value creation. The problems caused by that neoliberalist thinking, this is a kind of sequel to that, to take a different path. Of course also for the viability of Rabobank itself.

Yes, those are all motivations that are different. Indeed, motivations to become more social, but also to develop other revenue models. For them, it is therefore not just a matter of creating another revenue model , but also a learning project , to actually socialize the entire bank. And then you also have to set it up as a learning project. Then you must also have learning questions, strategic questions about which you want to learn.

The model that I have applied is therefore the Quintuple Helix model. The perspective of boundary work naturally fits in well with this. Are there any other things that need to be added, for example certain indicators that need to be taken into account?

Well, Quintuple Helix model is actually a collaborative project that is clearly cross-sectoral, and where the parties also have different perspectives for improvement, and different yes eyes that are primary, that you're trying to serve. That is quite radical. So institutional changes will also be needed in the case of standards in that measurement. Or how to deal with continence's such as fires. Then you can say that it is not culpable, or it is culpable if they set it on fire themselves.

Those are indeed deeper issues to consider.

Yes, coincidentally last night I wrote a small piece about multiple value creation , just nice and easy in Dutch.

That would be nice.

I'm working on a piece of Platform 31 about the economy after corona. I have been asked to write something about sustainability transitions.

Incidentally, I think the RCB is a very nice initiative. It can turn out very well, but it can also turn out to be a failure. It depends a bit on how sensitive they are, and to what extent they can interact with quite a few other parties. Microsoft is still quite easy, because it is a party with the same kind of mindset. Very managerial, analytical approach. But this kind of thing is also about empathy , and that you can listen to other parties as well, and also communication with development agencies, and local NGOs or NGOs here. That is quite a task. But there are great opportunities to make it something other than just carbon compensation. And if Rabobank focuses a little more on that and wants to focus on that, then they actually do very nice things that they will certainly be appreciated for. That also helps their own transformation.

I have also heard that they are looking at European level to see how they can integrate this into the market, and there are certain, they also heard that it will become part of the EU ETS, even though it is not the voluntary but the compliance market is. But still, to accommodate the agricredits there, the EU also wants to go in that direction.

But that is also risky. If it only concerns carbon reductions, and if there are negative effects for nature and little, or also for local farmers, then you are actually doing it wrong. So they're going to have to do that really responsibly and profit shouldn't be the main motivator. Otherwise you get really lost reputation though . Then you also give that NGOs turn away, mobilize against these kinds of initiatives, while there are actually quite a few opportunities . Now Rabobank is not a bad bank at all in my eyes. They have a history of, of course, a cooperative past. They took a wrong turn once. But it is difficult despite that organizational structure, they will not have that pressure from shareholders, at least as I understand it it is not in the hands of shareholders. I find that very interesting, and I also see it contributing to transitions, including the transition to a more just social society .

It was indeed mentioned that there are certain risks with the choices that are made. I also read in an article of yours that “eco-innovation crucially depends on an overall assessments of risks”. There are, of course, several risks. Those assessments, do they somewhat correspond to the model that I am going to apply for the analysis of the RCB?

Well, I don't know, but we primarily mean environmental lifecycle assessment, where you also look at nature change and, well, waste, what happens in the waste phase. You can do some calculations based on that, but I think the assessment here should be a bit broader . So you should not only look at ecological parameters . You also want it to contribute to a better income, especially for farmers . Also so that they … there are also elements of justice , f.e. through a higher income that they would otherwise get. There may also be elements that help those farmers to become more productive, but not at the expense of nature.

How can you check a project that is still in a start-up phase to gain insight into it and see whether their assumptions are correct?

Yes, I think you can use that boundary work framework very well to actually name the difficulties. You can also ask those people if they have thought of that, and how they deal with it.

Yes. One of the nice partnerships they have is with BISCI of Maastricht University, the Fair & Smart Data. That is also part of MSI I understand.

Yeah, they may have partially funded that too huh? Yes, because they had some financing from Rabobank.

Maybe one last question. In the NRC piece, Rabobank actually states that every bank should become a carbon bank to meet the demand from companies to offset emissions. What do you think of such a statement?

Well, it's banks that have to reinvent themselves. That is quite something. Then you have a lot of internal struggle so to speak. You need new work and frames of mind. We know from the literature that incrumbunts are not very well equipped for their own transformations, but you can see that they also have transformation possibilities. That also in that sector, or that world, you really have people who are the change agents, and who step on the brakes. That's something you can expect. John Vin has written good things about this, he has recently been published on how incumbrance may be part of transformation processes, f.e. Environmental policy and plannin g

Interview Jos Cozijnsen, Carbon Expert, 18-06-2021

What are the market developments in the voluntary carbon market that could affect RCB?

The developments are enormous, because more and more companies feel responsible for the climate and are doing something about it. Reducing part of our own emissions, and part of using emissions trading for this. That is part of your own responsibility . The only thing that played around is that a new semi-mandatory market was added, and that is CORSIA. CORSIA is a mandatory offset market, but it can use the same carbon credits, but they have to be taken from a register.

The voluntary market has also taken a bit of a hit because of corona, people fly less, fewer emissions, so the demand did decrease, but the interest has not decreased . There is a lot of interest, perhaps also because of corona, because people do want to take that responsibility . Well, where are we now, we're kind of looking at the price discount implementation. The voluntary market is going to play a very important role, either carbon credits that correspondily adjust, as it were, for the mandatory market, so then it goes out of the national register, or mandatory market for a country like Switzerland and Peru, or goes to CORSIA, there it also with a registry. The rest, as I point out, the voluntary market helps countries achieve their own goals. So, a group project in Ethiopia, I may use that as a tourist or as a small business as compensation, but those credits stay in Ethiopia, they continue to help achieve the goal there. So in that sense you see that the voluntary market is becoming increasingly important to achieve the national targets.

Then there 's the big task force . The UK has asked a number of bankers to set up a task force to see how we can scale up that voluntary market. And, the sustainable development goals are also very important. So you don't just have to do CO_2 things, but also for the local population, gender, etc.

What was that initiative called in England?

It is being led by the IIF, Rabobank is also involved in that task force.

Back to that voluntary carbon market, first there were many different initiatives, but now everything seems to be focused on trees, so carbon sequestration. Is that assumption correct?

No, I'm not in it that way. On the same subject, it seems that what the politicians say, or what the press writes , is the truth . But that's really nonsense. Everyone just talks to each other. For the climate problem, it really doesn't matter whether it's a tree you plant or whether you save emissions in shipping, it doesn't matter. We have to be removals, get them out of the atmosphere'. That all sounds nice and nice, but it is all very expensive, and that means that you will not realize all the other emission reductions, while the voluntary market can play a role in this. So I'd say just leave everything open, leave it to the developer, leave it to companies. So I'm not into it that way, I don't see any arrangement in it, nor is there any order of what you should do sooner or

later. I'm a little more relaxed about it. I understand that Rabobank then wants to run after those removals, but it's not all better or worse, because soon we will have a lot of removals, but we will continue to have emissions. That doesn't help the climate either. With the climate it is really about the total picture, otherwise flexibility as much as possible .

There have of course been various criticisms of the voluntary carbon market, most notably the difficulty of measuring volume, and protection against risks related to sustainability. In addition, critics have pointed out that forestry projects are naturally prone to carbon leakage, as the conversion from agriculture to forestry in one place can lead to the felling of forests elsewhere. How has voluntary carbon market dealt with this criticism?

You used to have a project, and now you have more of a jurisdiction approach, a national approach. A few things have been learned from that. First, an agroforestry project is considered. A country should actually have a REDD strategy, how much forest is there in your country. What are the drivers? How are you going to counter that? Then you can sponsor projects in it, but it is part of the total picture . This prevents you from getting carbon leakage within your country. Then there is VERA, which has a separate standard and it is called CCB, which means that in addition to the CO_2 calculations, it is checked whether communities are involved, what about biodiversity? How do we measure that ? Old standard also does this via sustainable development goals, old standard automatically looks at the SDG goals, which is checked . In addition, it is also very important that the VERA has set up some kind of buffer, so all projects contribute a certain percentage to the buffer, which is not distributed, precisely to ensure that if there is still a fire somewhere, it can be used. compensated. So that's a good lesson.

There is also international carbon leakage, but I find it less relevant. Look, you can say you should only do it if all countries participate, but of course that won't work. You have to smoke them out, the more countries that participate, the better. That's how I feel about it, because look, sometimes there is, of course, replacement of forest that agriculture comes somewhere else, but you can't always prove that. So, when will it be that perfect world you want? It is important to keep monitoring !

That is indeed also one of the things that Rabobank does through the collaboration with Microsoft. Microsoft provides so-called remote sensing, artificial intelligence and machine learning to gain insight, in real time, from how many trees are still standing, so how much carbon is offset. An advantage is also that this technique and the satellites they use can also involve smallholders who were not actually relevant before to be part of such projects. What is your view on this? Can the above criticism be met with this?

No, because Earth observation does not directly lead to the number offsetting. You cannot see how much carbon has been captured via satellites. You can't see through the woods. You don't know what kind of tree it is, so you have to combine it with samples, measurements on the ground . Second, smallholders who are somewhere in the plot, but not directly involved yet. Smallholders need more support on the ground. With crop protection. What do the farmers themselves need? So you can't say that directly, I don't think so, they must have discussed that with those smallholders. So it's over the heads, I think it's too easy said . So, Earth observation alone is not enough to measure CO_2 . It is right over the heads of the smallholders. It's an addition, isn't it, that you see a forest disappearing somewhere? How's the growth going? You can learn from here goes well there's just not good . So as a combination, and that has been done before, such as in Peru where forest protection is checked with sonor in combination with monitoring on the ground. So that combination is not new, and it is also better, it already works there. It is nothing new.

They also combine it with tests on the ground, of course. Pilot projects are now taking place that should provide insights. Although I have heard that these measurements are currently not profitable enough to do it on a large scale. Innovation is certainly still needed to be able to apply it on a large scale.

What we don't have yet is accepted models, maybe "Rock Sea" that can help. We also don't know exactly how many samples you need? How often? And which samples? Because the bottom is very erratic, there are many influences, so you really have to check that carefully, and that is still quite expensive compared to what it yields. So Rabo doesn't have a simple way of doing that at all. When they say 'we're going to do it all simple', I just don't trust that. That is not possible. So larger scale does not always yield great success.

So basically, if I understand correctly, because there are so many farmers involved, and every land is of course different, it's very difficult to get representative data about the possibilities that this initiative offers .

Yes that's right. So you really have to look at what can be improved on that particular farmer's land, they need quite a bit of input to make their soil healthier. Maybe it's group fertilization, maybe it's shrubs, maybe he has some livestock on the side, because of course he has to survive. Look, farmers don't just live on coffee, you have to combine that. So then you see more agroforestry, which means a lot more detail work. You have to look closely, regenerative farming is much better for the smallholders than large-scale sponsoring through money. I'd rather approach it bottom-up, not top-down. That 's the risk .

So a major challenge is how can you properly map out that farmer's specific situation in order to respond to the needs that this specific farmer has?

Yes, that will go wrong. Look, it's still new, no NGOs have looked at it yet. But they will certainly look into it, and then there will certainly be problems. It's still an open sheet, I'll just say, but that will really go wrong. If you don't really get people involved… People just can't stand a big company like Microsoft doing this. Or that Rabo does this .

One of the concepts that I presented to Rabobank is multiple value creation, in which there is therefore a balance between the revenue model and what it yields to the farmer, also in a social sense. When I heard the words of the Global Head of the RCB, their entire approach was certainly focused on really creating value for the farmers there, and not just – they say so of course – about their own revenue model, but that there is certainly We are looking at how that farmer's situation can really be changed. Not only through income, but also through other means. But indeed, given that so many smallholders are involved, it is indeed not possible to get a representative picture of this. Unless so much is invested in manpower, but I really don't think so. It's all about scaling up.

Yes, so they should actually say, such an agro municipality, which should actually be public property. That countries, or the RvO (Rijksdienst voor Ondernemend Nederland) or something like that, that they can map out the situation with the forests and planting trees, that is useful as a check, but that is not of much use to individual farmers yet. naturally. It is very important that you get a revenue model, and a holistic approach given that I do of course, but then go start from there. We are also working on green nature, to promote agriculture with regenerative nature, it's just super difficult, it's really a struggle with that soil. How will that soil hold more water in the future? How will it retain more carbon? Those are difficult struggles, but super important, because planting a soil can also mean that it extracts carbon again, that it extracts water. So it's not all that easy .

So the choice of the type of tree also plays an important role in this?

That's very important yes. So you should actually look at that ecosystem around the farm, where is the space? Where is the need? One tree helps the other tree less, maybe you should start with green trees first, because they may also need them somewhere. The easiest is of course shade trees with coffee, which is still fairly easy. That is doable, because then you plant a tree here and there, it fits exactly there, but a farm also needs revitalization of the coffee farm, because otherwise it will cut down too much forest to be able to plant other coffee. So it still requires something. In Ghana I also know a few forest protection projects, and there the cocoa plantations really get help with crop protection. Or, for example, in the methods of planting and revitalizing cocoa. Then there is also less tendency to cut forests, because you earn more from your own farm. That in itself is not new, but the underlying input I have not really seen here.

In fact, it is also outlined that the main idea of the initiative is that trees are planted that also have a certain yield. In the first few years, money is then earned from the carbon offsetting that the tree grows. After X number of years, when that tree no longer offsets extra carbon – that's how they see it – I think it takes much longer before real carbon is offset, but you know that much better. If that is no longer the case, then fruits are harvested, for example mango trees are often mentioned. They must then ensure that the farmer continues to maintain a sustainable yield over the years. How do you view this application?

Yes , of course you have to plant trees that benefit the farmer. If that is mango, or other nuts, but you're right, that CO_2 fixation also takes a while, you only have that after 5 or 6 years. You can take an average, but you also have a bell curve in that.

What does that bell curve say? So it takes 5 or 6 years before the full carbon offsetting is achieved or?

No, then it will only begin, and then it will continue for a long time, 10 years or more. But it will take a while before it really starts to absorb carbon .

In fact, Rabobank states, unlike other parties, that it is normal that there is a party that wants to offset carbon, and then a party is chosen that will take care of this. But Rabobank wants to do it in such a way that carbon offset is already in place. So they actually state that through those pilot projects that they sell to Microsoft, that is, after X number of years, and I'm talking about less than those 6 years, that carbon has already been offset. But if I understand correctly, the whole process only starts then. So actually they are anticipating what they are going to realize much later.

Yeah, so that's a bit of a turn around, look what I think they mean is, the first five years we pay, and after that you have mangoes. But that means Microsoft pays for those years for offsetting , but it only starts running. So probably they will validate after 5 or 6 years, then parties that check trees with samples etc., only then can they say 'the last year so much has been recorded', but then things start to run a bit. Set up the payment in a different way than the CO_2 storage .

How does it work with obtaining those carbon certificates? Because what does such a carbon certificate stand for? Some time in the future that offsetting will take place?

No, ex post. So after six years you can show something cumulative, and then you know how it goes in the coming years. But you only get the certificates ex-post .

Yes, so companies that actually claim we have so many carbon certificates, and with that we are carbon neutral, in a real sense that is not true, so it is actually much later that they can make such claims.

Yes, the certificates that we buy and sell are based on already recorded CO_2, or already reduced CO_2. That's why they're in trouble with that farmer, they're going to pay him in the beginning, but then it's more like a future achievement. After that, the farmer gets mangoes, in fact you should say that the farmer is also paid for the CO_2, because he ensures that that CO_2 continues to be stored. It's a bit simple, but it turns out to be a kind of construction.

One of the things I also encountered in the voluntary market were the problems with over-the-counter transactions, where transparency was actually lacking, and especially the price that had to be paid. In what sense do you think Rabobank's initiative to really set up a market for it can remove problems?

I think Rabobank only wants to solve its own problem, because the prices are simply kept up to date. Traders are asked what did you buy, for how much. There is simply not a liquid trade, because you only buy it once, and then you usually compensate with that. You are not going to hold on for very long, because then the project is from the past, and you want it to be recent. Over-the-counter, perhaps there comes a platf orm where is traded, but prices are unclear, but that is because the projects are so different, because the quality is so important .

So you should actually keep the voluntary market free for beautiful projects that deliver extra . And when it comes to CO_2 targets, you have to come up with something else. That is why I also think that Rabobank will meddle in far too many things. It is precisely in the CO_2 market, or actually in any other market, that you have to keep the tasks separate . Everyone has their own function. You have individual projects, you have platforms, you have validators, you have buyers etc. That should kept apart are as to control, in order to independently hold . I'm just afraid that Microsoft wants to buy all those credits for the future and will ruin the market. While many well-intentioned projects, which are now also reducing, can't even get credits because Microsoft bought them from Rabobank. So, it's getting too big, it's getting megalomaniac , you already have the World Bank doing some good projects already. Please don't imitate that. Also, don't do too many tasks now, because people just don't trust it, and it's not necessary. Nice vision huh.

And the impact that then has on the price, because you are saying that the demand is only increasing, and the supply is lagging, and parties like Microsoft are ruining the market, what effect could that have on the price? Normally that causes the price to explode.

Yeah, I don't know which way it's going. Of course Microsoft has a lot of money, you know that. They may be willing to pay very high prices. Maybe it should, but it's not up to Microsoft to decide that. Let that develop itself in that market, you need a track record, what does such a project represent . You rightly said that there is discussion about is the project real? What could go wrong? So first you need a track record, then the price will go up automatically. On the contrary, you tend to have a tendency that, if you get a platform with a lot of volume, that the prices will go down, that is also a risk. We don't know which way it's going, I'd say bank stay where you are. We don't need Rabobank to do everything at all, I actually want to oppose that, in terms of content.

So the claim that Rabobank made in the NRC, that every bank should become a carbon bank in order to meet the needs of companies, you do not recognize that at all?

No, I think that's a little weird. The European Commission now has a bit of a dominant role in this. You should actually put those rights in a carbon bank, and then look every year to see what is needed? More or less, and they do the auctions, they can also give investments to countries in Europe, which is actually a bit taken apart because now you have that European Investment Bank, which invest as a group, and you have the Market Stability Reserve. That is actually the jar with which the Commission determines each year what is circulating on the market, which in itself works well. You could actually say that there is a European Carbon Bank, so there are two separate branches, the EIB, which also auctions emission rights from that pot, and the MSR, so you actually have a carbon bank function. Well, then of course you have the EMA, the European Banks, they are also busy with it. They have to do with interest and the like. But that's enough, that's public, then it's good. Because it is also political, what policy is needed? =So every bank has a carbon bank, I think that's a bit strange, I mean it's up to the politicians to determine the policy, that has to be implemented. Wouldn't it be strange that the banks suddenly decide what you and I should do ? So you go to the bank, but you only get a mortgage if you insulate your house better. Look at it, that's what banks do. I think that's weird. It is fine if there are regulations that new construction should have at least as much insulation, that is good. So I don't want courts , nice pun for a bank by the way.

So actually they are crossing their boundary a bit in that sense when they make such statements?

Yes, I think so, and of course it's being pushed by NGOs, and the politics is going along nicely, and the media is going along nicely .

So basically, if I ask you whether the Rabobank initiative is a solution for companies to achieve net zero CO_2, then?

No not necessary. Because that's what we do with the climate neutral group, for example. I work with the carbon neutral group. We help to create an emissions strategy. We look around to see if companies can compensate something, well then we ask what kind of project do you want to do, for what price? Then we go looking. It is well served with that. Rabo will soon be doing it for half the money, that's great fun… Look, a bank is a bank, we do climate projects, we understand that. So, it would be a bit of a robbery as experts in this field, because Rabobank makes it all easier, but what makes it easier? Because you have to do it. So no, I'm not that into it. I look at it with suspicion. I think it is important that European agreements are made, democratic decisions. That 's much more important .

Going back to the EU ETS, in conversation yesterday with the global head of the carbon bank, it was also mentioned that reports came from Europe that the agricultural sector would also be included in the EU ETS. That is all future music, but that way, if necessary, those certificates from Rabobank would also be accommodated there. I was wondering what you think the implications of that might be.

Rabobank is talking about its own projects, which is nice, but okay.
That ETS is a cap and trade system, you have a cost budget, which is slowly being phased out, that is for the industrial sector. The committee will come up with plans in July to expand it, perhaps to include shipping, perhaps to include built-up areas, but that will probably start with a separate budget anyway to learn 'how does that work there?' I don't see that happening in agriculture for the time being. So, agriculture could be involved on a project basis, f.e. voluntary . That can be a proximate for later, because now, if you have a manure fermenter, you can get carbon credits, and in 10 years manure fermentation may be mandatory. So then it could be ETS. So it is possible in itself, a carbon budget for all farmers, but then you have to distribute the cost budget . It would be possible in itself, but there are many non-trade gases, methane which makes it more difficult, NTO that soil,

those are not reductions but deductions. It's quite difficult to get it out of the system. So we can better involve them on a project basis. That's probably what the carbon bank means. Those projects that are currently still voluntary could best be linked to the ETS in the future, that is quite possible. I'm also in favour of that. That companies that have an obligation, oil companies, energy companies, that they can buy carbon credits from farmers to meet that obligation. That could well be. Then I would prefer that international credits can also be linked. Forest protection, in the end I also hope that this will be linked later. It is not the case that agriculture then falls under emissions trading, but that those voluntary credits can then be used for the mandatory market. At some point it will happen I hope.

The biggest advantage that Rabobank has in this is that there will be a standard of quality. Rabobank says they want to meet, or comply with, the highest standards of quality. Such a change, if it is accommodated therein, then anyone can meet that standard. That would be a good development for them.

Well, you have the voluntary market, and the mandatory market. The Commission is now going to interfere a little with the voluntary market. That's a bit weird isn't it. There are already standards, there is the VN-0042 from VERA, which works great for agriculture. The problem is in it, how do you do sampling, how do you do models? The Commission cannot give a hammer on that at all, because it does not understand that at all. The voluntary market, there the standards are all based on science, a lot is published. Wageningen is working on that. It's just complicated, and it doesn't get any easier when the Commission thinks something is good or bad.

I also mentioned briefly about the Commission, which wants to get some sort of standard for approving a certain methodology, or something like that. But that farmer can then sell it to the market. I find that quite strange, if the government decides what is good in that market and then sells it to that market. That's a bit of a weird hybrid system. Then the committee will behave a bit like VERA, cold standard, so what happens now ?

Europe now also sees that this voluntary market can help to achieve those goals. And if that farmer gets money from someone else, suppose all those farmers get money from Microsoft in Europe, then Europe will achieve the goals with it, that's the idea. But then you also have to be sure that we as Europe can count that or not. I understand that need, but it's not like that, we participate and you just have to get money from Microsoft. A little double. Also take a look at the GLB, the new cap that is coming. This will free up money that the Common Agricultural Policy can also distribute. Europe is also coming up with money to stimulate carbon farming. So that's why they already want regulations on what exactly is carbon farming? So that the financing is correct . Well, then you also have to make that financing enough so that it can also be paid off. Not that carbon credits are also sold to the market, because it's not quite double counting, but it does look a bit like it, doesn't it? And, what we're just stuck with, there's always a difference between the top-down based national goals, and the projects. So we can do our best to come up with very good standards for projects, but then you never know exactly what that will reduce on a national scale, that's just very difficult.

Rabobank therefore wants to join forces, with the Commission, with Microsoft, and the farmer, and the market, then they will all do it. That's nice, but we need democracy for that.]

Furthermore, policy has of course already been mentioned, I have already seen you that you also have experience within national and international climate policy. What opportunities does this climate policy offer for the Rabo Carbon Bank?

They must, however, limit themselves to their role. So, look, if they give farmers financing, they should say, if you're going to go green or make it more sustainable, you have to pay less or something. A climate mortgage, for example, where you have to pay less for your mortgage if you innovate more. Although all financing is commercial, it is not philanthropy. So just as we do not want to leave climate policy to the market, we also do not want to leave this to Rabobank. Then it no longer fits within democratic control and climate policy.

Your website also contains a piece about CO_2 compensation in the chain of your product. Rabobank also has the aspiration to contribute to systemic change in the food value chain through this initiative. Are there still things they should take into account if they really want to carry out such aspirations?

Yes, because at that moment you keep the CO_2 value in the chain. So then you don't sell it to the market , to Microsoft, but then it stays in that chain. And that's what we try to do. Because for the dairy we work for, Arla's climate-neutral milk, that is now partially compensated by offsets. But Arla is also willing to pay for if those farmers start taking value, because then it remains with the farmer. Then you keep the value in the chain, but you also keep the reductions in the chain. Rabobank has actually lost that a bit , because you have Microsoft, which has nothing to do with farmers at all. And those farmers may be selling mangos, but I don't think Rabo is in that either. Actually, you should have a soft drink company that buys mangoes, I name it hey.

One of the things I also look at in my thesis is the possibility for the Rabo Carbon Bank in the Netherlands. There are of course various problems in agriculture concerning nitrogen for example. That leaves several farmers hanging over their heads that they may have to close. Since Rabobank has traditionally been a farmers' loan bank, and they still finance 90 percent of the farmers in the Netherlands, they naturally have a great interest in this. So I want to explore what possibilities there are. I don't know if you also have a view on that?

Yes, of course, because the farmer can contribute to lowering the nitrogen position, using less fertilizer, keeping the soil green, green manures, the trees, agroforestry, all of which helps to reduce nitrogen emissions. So, sure. This manure fermentation also leads to less manure spreading. This also leads to less nitrogen. So it can certainly be combined with each other .

Yes, they are really looking for a different revenue model.

Yes, of course you have to pay more for the products. It would actually be nice, because what we actually need is to produce less, but with a better quality. Then you will also see less waste. Then the soil also has more quality. I think it's so beautiful, that was last week at Zembla, it was about farmers. There was a farmer, and he said 'I now have half the number of cows, but I don't have any tractors anymore, my soil will always remain green, the soil is healthier, the cows are healthier. I have less milk to sell, but I have the same earnings because I have less expenses. That's super fun. I get super excited about such a model .

What I also learned in an earlier interview with the RCB is that it is very difficult to suddenly switch to a different revenue model. Farmers have, of course, they're actually compulsive in what they've always been doing, because deviating from that norm, from mass production so to speak, just means they don't have enough yields. To take a new path, of course, investments are needed that will not be recouped tomorrow. Then of course the question is: Is it feasible for a farmer to take this path? And what does it take to make sure that it works?

That is why I found it so interesting that the proposal of nature and the environment, I believe from Wageningen, to make a regional division. That you are already switching to more natural alternatives here, and that you are storing there on a larger scale. Then you can at least slowly achieve a change.

Where is the boundary between regional and where business as usual is still applied?

Well, at ports you can have more glasshouse agriculture, and around nature you have much more natural agriculture. So you have to say that you have to get the pig farms from nature, and they can best be done at transport points such as ports, there are quite a bit of that .

In addition, of course you always have a fight for land in the Netherlands. Now it was also in the newspaper that it is being looked at whether it is not possible to build on agricultural land.

Nice and expensive.

Well, there is of course a battle for the ground, and that could also have implications for the RCB for the execution of their project. What do you think is best for the soil? There is, of course, much available, and changes need to be made.

Super interesting. I think there is also a need for democratic decision-making . Look, farmland is worth a lot. If you want to convert that into forest, or nature-intensive agriculture, then you almost have to arrange it differently, that's not allowed, that's agricultural land! So there is already a subvention to convert agricultural land near nature reserves into nature. There is a subvention for that, because that makes it worth less .

You keep coming back to the need to guarantee democratic decision-making. Is it possible to achieve this through political means?

Yes, of course, we all decide where we are going to spend which land on, and how much agriculture do we want? Of course there are rights, you can't just buy people out, but you can decide democratically how you are going to make that possible? Where does that money go then? I certainly think so .

Politics is of course also accompanied by lobbying. Hence my question whether it is possible, because through the political route you will always have to deal with a certain amount of lobbying. For example, the RCB has also looked into the possibilities with the Ministry of Agriculture. They are therefore perhaps a lot stronger in getting things accomplished in politics.

I don't know, politics will have to decide, because we're not going to reach things through lobbying anymore. You will meet yourself there once in a while, that is all transparent. Everything is measured, everything is so well known these days, so transparent, via social media and the like. It is no longer possible for a committee to decide things, or for an LNV with a certain lobby. For me it is very different, I see nature lobby, environmental lobby, business lobby. That all comes into play, and that's all fine.

I also believe that this was in Zembla, and otherwise in Tegenlicht, recently it was also about the lobby of LTO in Brussels, which, although it is known, is still taking place. Actually in your face, because nothing is actually done about it. That power is just so great from those different agencies.

I don't quite agree with that. You may not agree, you may be against farmers, or against transporting meat around the world, but if you still achieve the CO_2 targets with that... So there it goes in the end , I look more at the outcome, they are good. Ultimately, the European Parliament will check it. Whatever you see, the European Parliament finds very different things than national

parliaments. What should you focus on now? I have no idea, because I also see that NGOs lobby the Commissioner a lot. He has the media behind him again . I think the checks and balances are all pretty spread out.

European policy was also discussed. I also have an interview next week in Brussels at the European Commission with a senior policy officer on climate policy. I wondered which issues would be relevant to mention there.

Now a question about policy integration .

I had one more question. I saw the B-Corp certificate on your website. This gave me the question: How can certifications like this be important for an initiative like the RCB? I am mainly talking about certain certificates with regard to carbon certificates. So a certain certificate that indicates that they meet the highest standard.

Yes, that is, for example, gold standard. Ficius. These are their own standards, because it is a voluntary market. We are members of ICROA. B-Corp is actually the wrong one, which is for corporations. You should actually look at ICROA, the International Carbon Offsetting Organization, and they determine which standards they can endorse. He then looks at that more. So Rabobank simply has to use accepted standards. Do not certify with your own standards. That's a bit redundant, I don't think it's that efficient.

We have to stick to our goals. Because eventually the public will have an opinion about it. They're probably thinking 'anything green is good' right now, but beware! Because you're starting now, but you're getting scrumptized just as hard as any other club. It is very good to pay close attention to that !

Interview Peter van Kemeske, Senior Policy Officer 'Fit-for-55', European Commission , 23-06-2021

Of course I had already forwarded the subject , that is the Rabo Carbon Bank. That is a very new initiative, some even say it is a revolutionary development in the field of carbon market. So on the one hand, Rabobank brings parties that want to become carbon neutral, bringing them together with parties that issue certificates. That can also be small farmers, smallholders. It is a collaboration between Rabobank and Microsoft, and in this way Microsoft can ensure that it is monitored how many trees have been planted and how much carbon has been offset, so that smaller farmers can also participate. These parties are therefore brought together by means of this carbon bank. Rabobank itself says that every bank should become a carbon bank to meet the demand. First of all, I'm curious what you think about that statement?

Here I can really make the link with the broader framework, because it is directly linked to the 'Fit for 2050' program. Actually it is linked to the European Council decision in December [2020], to say we're radical for which carbon neutrality by 2050, but in 2030 we actually want reduce fifty-five percent. I had those negotiations a few years ago at around minus 40%. That was very difficult then. When you see those numbers, you really say 'this is really a huge effort to get to minus fifty-five' . The big difference with the minus forty is that the industry has done a very large part of the heavy lifting through the ETS system, but if you want to go to minus fifty-five, and certainly if you want to go to carbon neutrality, then you and I also have to make an effort .

Everything that has to do with sustainability will get a boost because one of the plans that you have probably already read a bit about is that we also want to bring transport and buildings under the ETS. It will be a separate ETS, not an extension of the ETS as some say. Some say we're going to bring

everything under that ETS, but that's in the future. What we will do now is tighten up the current ETS quite heavily. So that means that the number of allowances will decrease more and more, the cap is getting stricter and stricter. But at the same time, there is also a carbon market for those two major sectors, transport and buildings . The LULUCF sector, land use, land use change, and agroforestry, we will need if we really want to become carbon neutral in 2050. Because if there are still cows on the pastures, there will always be greenhouse gasses. So we also need trees have three billion trees is the Commission's plan to greenhouse gasses, the CO_2, from the air to catch . That means that small farmers, for example, should also do their thing. If you look at a tree now, when will it make money? If you cut him down . But a tree by itself is not worth anything. We are of course moving towards a system, and that is not yet immediate, that is probably in 2030 that we will take that step, we will go to a system in which the use and maintenance of that tree, of trees,
will yield some benefits . So you go to a system where you will get certificates, even if you make a positive contribution to a capture. So that means that there will be income for farmers, that there will be a business model, that there will be income .

And what will certainly be included is the example of agriculture, the management of your land in general will play a very important role, less in 2030, but certainly in 2050, because you need those sectors.

The big step that is being taken now is to apply the carbon price to the entire economy, if you look at that. Not only energy production and the large industry that now falls under the ETS, but also Maritime is now brought under the ETS, and then transport in general, road transport in particular .

I had also heard that agriculture may also come under the ETS. I don't know to what extent that is the case?

If you're going to put that under this system, you have two options: Either the current system is going to be very weakened, because you're getting too many allowances in it, and then the market is going to do its job, and then they're going to go down the whole ambition level of ETS downward pull .

Also, what can happen, and what will happen in part is that you get such high prices , suddenly, in the transport sector, and in your buildings, with a pretty big impact on poorer families, because they lose their budget… they just spend a lot more money on heating for example, a larger part of their family budget actually goes to heating. So you actually get a shock, a social shock in your system.

By effort sharing do you mean that all parties must take responsibility for achieving those objectives?

You actually have … if you now look at our climate architecture, you have three major pillars: the ETS, pure market forces, you have the effort sharing, and you have the LULUCF. Effort sharing is where each country gets a target.

The Nationally Determined Contributions?

Yes, that is in an international context. So each Member State, hence effort sharing, has the effort you have to make in the sectors that fall outside the sectors, so the ratio is about 50/50 or 60/40. Belgium will have to do more, Germany will have to do a little more, is richer and therefore has more opportunities to invest in insulation of buildings and so on. Bulgaria and Romania have to do much less.

Does that also correspond somewhat with the CBDR principle of the Paris Agreement? The Common but Differentiated Responsibilities.

It's about the same principle. We have one common target, and that will be minus forty, or minus fifty-five soon, but to say 'we all make the same effort' we have said based on models, 'the effort is shared'. We have looked at what options do you actually have as a Member State to take measures in those sectors that do not fall under the market: we are going to combine agriculture, which now falls under the effort sharing, with LULUCF , how do you actually use your land? should do, we will make one instrument out of it. We will therefore set a target there, and that target will be climate neutrality . And to really get that carbon neutrality, you have agriculture and forests that compensate each other . That is actually the future, but in that system you do need those certificates to farmers, or other players, who say we are really going to plant forests here, or we are really going to do the soil differently, to really reward it. To give them some credit. So they can then start trading. In that sense, I think everything is aimed at getting a market, isn't it .

So if I understand correctly, if this is the idea of the EU, then this initiative is complementary to it. Because Rabobank has traditionally been a cooperative lending bank, especially for farmers, so they still finance ninety percent of Dutch farmers. In the Netherlands you also have the problem with nitrogen and the like and because of that many farmers will also have to deal with a possible closure, so they will have to change their business model anyway.

Absolute.

And if this is the future, Rabobank's initiative will actually fit in perfectly with that, to partly replace traditional agriculture, that current agriculture, with a kind of agroforestry, in which normal agriculture is also planted with trees.

Yes, trees are planted, but other efforts are also made, because ultimately the evolution in agriculture does not stand still. There are lots of new ways you can reduce your cows' emissions. There is now a lot of experimentation with alternative food for cows, for example, so that there are fewer emissions, but also the use of pesticides, in fact everything that causes greenhouse gas emissions, there is a huge revolution going on. Sure , if you can't somehow reward the farmer for that, then he has no incentive either. And the example that I like very much to give is of the tree that only yields money when you cut it down, that is of course not the way forward. You need those farmers… part of that is of course in the budget, and the reform of the European agricultural policy, which does not go far enough at all. I do not know if the report have seen from the Court of Auditors from the day before? Maybe this topic interesting to see, but actually makes it to the European Agricultural firewood . The European Court of Auditors is actually an independent institution that examines whether European money is being spent well. And what they have now done is actually a very large part of the European money goes to agriculture. At the same time, Europe wants to become carbon neutral, has all kinds of climate objectives, but those two do not match. So agricultural policy is definitely not on the way to greening.

What does that have to do with?

Yes, I think you still have way too many exceptions, meat production. So in that sense you notice that the lobby is very hard. In part, that lack of sustainability is built into many of those business models. Farmers produce meat, farmers produce milk, the way they produce, I think that's a very interesting discussion . Small farmers They are gone. Now you have those mega stables, where thousands of pigs are raised in one place. That is a business model where you will never achieve climate neutrality with that business model, so that has to change.

To get there, the farmer has to be met.

Yes

Because of course investments have to be made that will not be earned back overnight. What possibilities are there at the moment for this within the EU?

For that you would have to look at the reforms that are going on in the financing of the European agricultural policy , where the focus is shifting very seriously to … there is actually a kind of conditionality built in. The new European agricultural policy, it is almost complete. The support for European agriculture is reduced , and within that package, within that budget, because you also have a lot of other priorities, digitization is now a big priority where funds have to go as well. But what you have within the agricultural budget is a very clear shift to greening. Farmers will actually only receive resources if they can also demonstrate that they are also doing things that are in favour of nature conservation, or that meet the climate agenda. And everywhere in Europe you have that threshold of thirty percent of budgets to go to climate action . That is 'the mainstreaming of climate in our European budget' . That also applies to agriculture. So the money that Europe gives to farmers must be climate compatible . So that means that it will be very difficult to get funding for agricultural practices that actually go against that. Transition is necessary. But at the same time you also know that a lot of people work in the coal mines in Poland. And in the Netherlands, Belgium, France and so on in the agricultural sector . So you're going to have to supervise that to some extent, and that's part of the financing that Europe provides, and that we will also get part of those ETS revenues . Because income at three euros per ton, or income at eighty, one hundred euros per ton is a huge difference, so you get much more income as Europe, or as a national government. As Europe, we say, focus that income you get on actually social policy. Social policy can be, people in lower incomes who really suffer are those CO_2 higher price, but also farmers, who lose their jobs because they work in an industry where in fact no more future is . So basically that social transition is there. A large part of this also comes from the European budget.

Is that already happening? Because I often read that nothing really happens with those funds from the EU ETS.

I'm not an agricultural specialist so I don't know if any revenue is being used for that kind of thing, I honestly don't think so. But what many of those ETS funds are used for is for those coal mines, or carbon intensive industries. In agriculture, it's actually a bit different, but I think there's a lot of support for farmers who want to make the transition. It's a good question actually.

If we then continued to say that agriculture is already included in this, it is always a difficult theme in compliance.

I'm going to interrupt you, because when you say accommodated, what do you mean?

Suppose that in the long run that agriculture is accommodated in the EU ETS

That's not the intention.

He will of course not be accommodated, but of course a separate …

No, neither, that's why I interrupt you for a moment. You will have an ETS have electricity and industry as now, the existing ETS since 2005. You have a new ETS transport and buildings, and also you have a new system, let it system call , agriculture stations, etc. , but which is not subject to the market mechanism, so it is separate from the ETS. It depends on government policy. So governments will have to say 'we are going to do everything possible to help farmers become more climate-friendly'.

That would then remain the responsibility of the countries?

Yes

That is of course still in the future, but it is not like these two sectors that are now going to become part of the EU ETS in what way, that is very different from what will happen with agriculture?

At the moment that is now ... there will be quite a lot of discussion about it, that also needs to be looked at. The reason we're not doing it right away, that we're not going to put everything into our proposals, is because we as Europe have relatively little experience of how things like this will work . I give a very stupid example, do you have an agricultural background?

No.

But suppose you are a farmer, and you say 'I like that, that support, if I'm going to put some trees here and so on, I'm going to put a small bush here', then you will of course get the support. But then you say 'and now I'm going to be very smart huh, I'm just going to cut things back here, and sell the wood', how are you going to check things like that?

That was indeed my question.

We're not quite there yet. At present, it is envisaged that it will be done through legislative measures, Member State by Member State.

Indeed, these are also the examples cited in the voluntary carbon market, those problems with cutting down trees, but also problems with forest fires, which happens just as well in Europe, which of course also has an impact on these lands. Those are the major complexes that the sector has to deal with. So the EU will certainly have to deal with that when the time comes.

We can already see it, a good example is the Czech Republic, a few days ago I had a conversation with the French, who said that they were facing a huge spike in emissions because they are confronted with forest fires, but also with diseases. There are a lot of forest diseases right now. A kind of tree pest, which actually means that large areas of forest are lost. You then have to start cutting that down, that's all you can do, and then you see that carbon is released .

Will it be burned then? Because of course you can no longer make products from it.

That is usually incinerated. If you get rid of the trees you have no capture, then you will no longer extract CO_2 from the air. If you burn them you will of course put in even more . These are all things that are quite technical. That is why we say that we are not yet ready to actually arrange this properly. So there is still quite a bit of technical preparatory work to do that.

My professor of International Environmental Law also said that the Paris Agreement article, if I'm not mistaken it is also about those NDCs I mentioned earlier, it's interesting to know what the view is on the use of the article, especially in view of the new legislation coming from the EU.

What exactly do you mean by that?

The article is therefore about those NDCs of parties to the Paris Agreement, and also whether they are used in the new EU legislation.

But those NDCs, those are targets per Member State, aren't they?

As far as Europe is concerned, it's a bit different, isn't it? Instead of every European member state going to Paris with its own target, we have said as Europe 'we are going to arrange that as Europe,

and as Europe we are going to decide to go to minus forty by 2030'. We actually gave that to Paris, to the UN. Our NDC is minus forty percent.

In the end it will come out.

Yes, actually it's a paradox that a bottom-up process of Paris, internationally, we actually do top-down. We went to the UN at minus forty percent, with the stocktaking we said we are going to minus fifty-five. So in Glasgow, the EU has minus fifty-five percent.

Another part of the Paris Agreement where I actually lost hope a bit was the definition of a forest that was kept. And that definition, my thesis supervisor works for the World Rainforest Movement, and that organization has released a report that that definition that's being used is actually maintaining monoculture forestry. So those paper plantations, those pulp mills, they can just plant those trees, eucalyptus and the like, and still meet those Paris goals. Then I wonder 'which definition of a forest is used within the EU? Is that the same one used in the Paris Agreement?

Yes, good question. You should have forwarded me that question, it's a bit technical. It's a little farther from what I'm doing.

But the impact is of course very large, because in that way, not only the forests are important, but also the biodiversity. Because if you have a monoculture, there is of course no real biodiversity.

Frankly, I'd be surprised if that were the case. We set the ambition quite high, but the answer to your question will probably be that we will start production maybe July 14, maybe a few weeks later. That's a forestry strategy . I don't know if you've been following the discussions around climate law. Europe now has a climate law, a European climate law that is on April 21, which is very important for this discussion, which was approved on April 21, a provisional agreement , which will be approved in Parliament this week. In the end we said minus fifty-five percent that is a political decision, but now, for the first time, we have also put that into a European law . And there have been months of negotiations, especially what the parliament has said is 'we have to look completely differently at how we use the LULUCF sector. How we use our forests, and a definition of a forest comes with that. And the link with biodiversity is there, is actually completely there. There will always be some play, we call that flexibility , but you should not exaggerate with that, because we do not want too little effort to be made around ... it is actually the other way around. Yes it is reversed. It can go both ways, but for this story it's the other way around. Member States are actually forced to roll out a fully-fledged forest policy, while in the past they could say 'if we don't achieve the forest targets, we can use a little surplus for that', which is becoming very difficult now .

It also works in the reverse direction. You can still use forestry credits to miss your target. If you don't meet the target, say minus 40 percent, you can use forestry credits, but that's actually encouraged. Because the more effort you make in the field of forestry, the more attractive it actually becomes to achieve the target that is much higher . So instead of everywhere cars from getting the streets too, and everywhere build bike paths, which might be more expensive, we actually allow Member States to do a little more in the field of forestry and land management, perhaps cheaper is. Everything I say now will be partly in the forest strategy , and that is a matter of two or three weeks. Mid-July, but it could be because the 'Fit for 55' package is so immense, it really is an immense package. The impact assessments alone are around 30,000 pages.

So there's actually a lot of different things that contribute to the demand of those forestry credits, shall I say, increase.

Yes, there are some … in the legislation now, you will see on July 14, you will see that, actually because of that climate law, there is pressure to do more in the field of forest management and making agriculture more sustainable. Certainly if it then becomes one system, and you say 'you have to be climate neutral'. We can say we are going to plant a lot of trees, or we say we are going to put a lot of trees, but at the same time we are going to try to reduce agricultural emissions. As long as only a EXECO is .

We have the problem in Europe that our forests are getting old . As you get older you are less productive. An older forest will remove less CO_2 from the air. A young forest sucks CO_2 out of the air. An older forest does that much less, but you can compensate for this through forest management . Our forests are aging enormously. If you manage it in such a way that you will indeed cut down some, but immediately aforestation, so immediately planting young trees, which have to grow for a while, of course, then you can increase the potential of your forest. So those are all things that are greatly reinforced , especially by that climate law . So there are really incentives.

I would like to show the model that I use for the thesis, and that is the 'quintuple helix' model. The first variant of the model was mainly based on the political, educational and economic subsystem. After that, the media-based and culture-based subsystem was added, and in fact the natural subsystem is everything overarching, which can also be seen here. All those different players in those subsystems provide knowledge, and together this leads to sustainable development. In this way I actually analyse Rabobank's initiative to see how this innovation comes about. And you see, politics is of course a very important system, but of course it stands together with all the other parties.

Absolute.

If you look at it this way, the way the EU approaches it, how are you in contact with those other parties? Of course such a Rabobank that is then part of the economic system, educationally, the universities that are part of it. What does it look like for you in a nutshell?

It looks very similar , only we don't call it 'quintuple helix', but you actually need everything. There is of course a lot of contact with the universities, research institutes, everything that has to do with innovation speaks for itself . We know very well that we will never achieve that climate neutrality if the technology does not accelerate, so we need that technology . One of the big pillars, perhaps a little less relevant here, is the entire hydrogen revolution, so hydrogen.

More on the level of the Commission, by the way we also have a part of the income from the ETS is also used for an innovation fund, which supports a lot of projects. The main ones are actually CCS and hydrogen, so Carbon Capture and Strogage . You have media-based here?

Yes, media-based, that is also mainly how the public reacts to it.

Oh yeah. A surprising thing to me is how Timmermans communicates about our diet. Timmermans is very clear about that, we have to eat differently. There will be no other way. You should actually have that kind of communication, of 'replace your way of life, take the bicycle a bit more, use public transport a bit more', that support remains incredibly important. So you do need the media for that .

With this collaboration, one of the things that is also very important to me, is the boundary between the different parties. Everyone has his or her role, and that boundary is of course in between. It's a bit flexible, but everyone has their role. I wonder, what does this cooperation look like from the EU with those parties?

If your question is actually whether we bring those parties together?

Yes, it might be hard to explain. Everyone has their role, so to speak. When a university collaborates with the EU… that line here, it just continues, but somewhere that line stops, and somewhere there is the boundary between those two parties. It is very interesting to see how that, how should I explain that properly? What that collaboration looks like. Of course you as part of the EU need that innovation. Do you then knock on the door of those universities, or what does that process look like?

The most important role, I think that the European Union has an important role in two areas, apart from raising awareness, I would certainly not underestimate that. Our main role is regulation, legislation, which has an impact on all those other domains in one way or another. And secondly, financing, which are actually the two most important pillars. We create the legislative framework within which a great deal of national flexibility remains, but also local flexibility .

So they are actually very flexible in that regard?

Yes, regulations, very important. And then, of course, financing, and that's where this cooperation comes into play very concretely, because we very regularly launch calls, or calls for projects where typically universities, or universities a little less, because they are more often the applied centre's within the universities.

If we now say 'hydrogen is going to be extremely important', you actually see that those universities, to get that European funding, 'let's do a project around that, and then let's recruit people who can work on it'. So it's going very strong, maybe pretty top-down. Because we set our agenda with financing and regulations . When you say the media, and the stakeholders and so on, the first thing that comes to mind is consumer organizations that very often come to us and say 'if you are considering this legislation, consider an impact on ... '. Or you have the NGOs, you have a lot of players from those different ... certainly also from the research institutes, who say 'Europe, it is good that you are focusing on that, but why not also bet on that sector, on that sector' . In this way it is a bit of an interaction, but the driving force is still out of those two domains do i k . But it remains the case that everyone continues to have their own role. That is inevitable.

I had another question, because it was just said that those two different pillars are very important, but I was actually wondering what the role of the European Commission is, because actually, normally it is only about trade, because you have the internal market, but in agriculture it may be something else. I had also interviewed a carbon expert who said 'actually the European Commission is putting on a little too big pants. Actually, it's not their role at all to deal with things like this as an EU ETS, because that doesn't really fit in there. A Commission is also not politically controlled, so I was actually wondering what your view is on that?

I absolutely do not agree with that, it won't surprise you, because you, yes I would not really know what the alternative is. So you get twenty-eight or twenty-nine national ETS systems. That is completely absurd of course.

As a final substantive question, many companies now naturally want to become carbon neutral, which is voluntary. In that new climate legislation, to what extent are companies being driven, or perhaps forced, to move towards that carbon neutrality in the future?

Yes, the biggest driver there is again our ETS system. Companies will see … to make it very concrete: If you are a company manager, and you see I pay three euros per tonne of CO_2 that I emit. If it goes to eighty or a hundred euros, you say 'this is really going to be unaffordable. So, R&D department, just go the extra mile. We'll give you a lot of money to make sure those emissions really go down' .

In this way you can actually conclude that that way that innovation is simply achieved, because it simply forces the market to do so. That is very clear.

Yes, that is the uniqueness of the European system, and the reform that we are going to propose in June will do a lot more on that market mechanism. I saw that you looked a little surprised when companies come knocking on our door to say 'we need to do more'. It really is, and that's because they feel the pressure from the rest of the world. We've seen where that leads: We don't have battery capacity in Europe, and that's partly due to this. So we've missed a lot of boats, and what we're trying not to miss now is hydrogen, but Japan is miles ahead of us there. It is actually companies that push us that are much more active as a result.

Interview Wij.Land, responsible person for RCB collaboration, 02-07-2021

First of all I was very curious how the collaboration came about ?

The collaboration came about before I worked at Wij.Land. I'm not very aware of that. What I know is that Rabobank is developing the carbon bank, and that they have rolled out something internationally, but that they were also looking to roll out something within the Netherlands. They were actually looking for a Dutch partner for that, and that's how they came to us. I believe that's how it went.

What is your view on the Rabo Carbon Bank insofar as you are currently involved in it? Perhaps it is useful to first get a glimpse of the exact role you fulfil in that collaboration.

I am a project leader in the sustainable earning project, which basically means that I work on all kinds of projects that generate new business models or income sources for the farmer. Rabobank is therefore one of those projects. Yes, my vision of the Rabo Carbon Bank. Look, I think we should have seen it coming. I think it's really cool that Rabobank is now one of the first to set up this. It fits in with their vision actually. You have probably seen Bas Rüter's interview in Zembla. He is responsible for the sustainability strategy within Rabobank.

That was indeed a very critical interview in which he had to deal with some tough questions. Very interesting to see how they deal with that indeed. Could you tell us a bit more about what you as Wij.Land actually do?

We are actually a foundation, a network of farmers. These farmers come to us to join us. They say 'I feel I'm in a bind. In Dutch agricultural policy I know that things have to change, but I don't really know how, can you help me?' So these farmers join us, and they all start with a soil course. We are convinced that it all starts at the bottom, you have to have that in balance. Actually, they already underway within our portfolio choices of: I would like to experiment with compost, or would like to experiment with other grazing techniques to ensure that a more natural system is . Within our program they can also knock on the door when there is money to be made with what they do. For example, spreading manure above ground, applying compost, these naturally also have carbon implications for the land. They can then, in this case, capitalize on that profit through Rabobank.

Which specific questions has Rabobank asked you exactly?

What we know more about than Rabobank is professional, we actually started researching together: how can we modulate carbon? That's super complicated. We also have the experience and network for it. That is where we can contribute.

The Rabobank initiative is of course primarily focused on farmers in Africa. There are, of course, other challenges, etc. than in the Netherlands. What challenges do you see for this Rabobank project in the Netherlands?

In the Netherlands we have a whole diversity of soil types. These are both clay and peat. Peat is a very unique type of soil. 1 : We do not yet know the processes of peat underground . A lot of chemical processes happen. There are studies that show that on balance peat simply emits. So the question is, it is said that if you raise the water level in peat, it oxidizes less quickly, so you also have less CO_2. But there are also studies that say, you can increase it and have less oxidation, but at the same time that increases the chance of emitting other, stronger greenhouse gases, such as, I thought, methane . So that is something very difficult in the Netherlands, and with carbon potential at all . That is not necessarily for Rabobank.

When it comes to peat, I believe that the founder of Wij.Land also worked for Commonland. I believe they also have a project in the Netherlands that deals with peat landscapes. Are these also examples of initiatives that could fall under the Rabo Carbon Bank?

Well, we are part of Commonland. So, Commonland is a large international organization, which has implementing partners in a few countries. And we are an executive partner of Commonland.

That explains. I don't know what kind of vision you have about the Rabo Carbon Bank when it comes to what possible projects can take place. Rabo Carbon Bank's pilot projects in Africa are therefore about planting mango trees, or other trees that provide different value once planned. So not just the carbon storage of the trees themselves. So that a sustainable revenue model can be realized for the farmer. I don't know if you already have thoughts about what that revenue model could look like in the Netherlands?

Yes, that is difficult. If we had that answer, our job would have been very easy. What we see is that in the Netherlands we have to move to a smaller livestock. That is already in a lot of government plans. That is to the extent that we need fewer farmers, but farmers should simply smaller be . There are several ways they can do that. To what extent they can manage their land. Where they plant mango trees in Africa, so actually the agroforesty, with which they can store carbon, this is currently less applicable in the Netherlands. That is the extent, for example, because in many plans is that there should be no trees planted in countries. Because they must keep an open character, which is a typical character of the Dutch landscape. So there are other ways we look at how we can approach the landscape in a different way. An interesting one is wet cultivation. To reduce the emissions from peat are we saying that we should close one draw, so the water must be raised. That under-draining actually causes it to emit too much. So if we raise, and go far one draw, you can also get wet crop use .

Wet cultivation is therefore actually a food forest in a swampy area. Mint, cranberries, etc. That would be an alternative source of income. If you water the land, the cows can no longer walk on it, they will destroy everything. But you can use it in a different way.

So you just mentioned that no trees can be planted because of the agricultural policy in the Netherlands, also regarding the zoning plan. Are there any other implications of Dutch policy that could complicate any Rabo Carbon Bank projects?

No, I don't think so much. Dutch projects within Rabobank, where we also take very different measures than planting trees on a large scale . Agroforestry is simply not an option in the Dutch program of the Rabo Carbon Bank to be rewarded for it. So they do in Africa. With us in the

Netherlands we say 'You can participate in the Rabobank pilot the moment you start making herb-rich grassland, for example , that is allowed'. Or you are going to use solid manure, spread it above ground. These are all measures that can be taken within the current regulations and that farmers can then use. In this way, Rabobank adapts the program to every country, to every legal context, so to speak .

You say that this is one of the conditions for participating in Rabobank's pilot projects in the Netherlands. What does that look like? Are there already several projects in the pipeline, or has it all just started?

We're still busy. It is a three year project .

It is of course quite an intensive change for the farmer to change his earnings model so drastically. Often there are still certain investments that have not yet been recouped. Or investments have to be made that cannot be recouped overnight. Is it profitable for a farmer to apply such measures? Or are there certain subventions from the government to help farmers with this?

In principle, the farmer can claim a lot of subsidies, also from the province and from the nature clubs in the Netherlands. There are various grants. You can look at the A N LB, since farmers can actually packets get , then k stringing them a wader package they sign up for it. Then they receive a subsidy for that many hectares, so that they can indeed help meadow birds there .

Of course, in the context of the nitrogen problem, farmers have also been given the opportunity to opt for closure. I believe there were allowances for that too. However, the measure has not ensured that enough farmers have closed. To what extent do you see the willingness of the farmer to participate in this?

Well, I think there's a whole spectrum of different farmers. There are farmers who are hugely ahead, but there are also farmers who just feel very constrained. We mainly work with the forerunners and farmers who already realize that something has to change, but don't know how. Buy-out mainly takes place among farmers who are close to a nature reserve, near a Natura 2000 area. We do have those, but they haven't had people knocking on their doors yet – as far as I know.

What we also see a lot is that many of the farmers also try to work together. With Natuurmonumenten, or with Staatsbosbeheer. So that they get a piece of land under management, which means that it is and remains natural, but when it has to be mowed, that the farmer does that and can take the yield with him.

It's good to see how this collaboration, that dynamic, works. You yourself mentioned that we actually need to move from large-scale to small-scale. You also said just now that the parties that are needed for this, so actually the parties that are not yet participating in it, are actually the parties that it is all about. Normally it is also the case that it just keeps getting bigger, bigger and bigger. Do you see opportunities to involve those farmers in one way or another?

Sure! The large scale is actually because 1: he gets very little for his milk. The marginal yield of that milk is still just a little bit more than the marginal cost, but not that much more, just a little bit more. So that's the incentive for more cows, more intensiverin g, to earn a living have to , because it involves the income for the family. So if you then have to extensify, which means the same amount of land but fewer cows, on balance you also have less milk yield . We actually say, we want to see how we can add more value to the milk . And we actually do that in three ways; reducing input costs by adding value to the revenue model (such as short chains or diversification) and by valuing

ecosystem services. Ultimately, we are not really paying the true price for milk, where costs (in the broadest sense of the word) are internalized. The farmer also provides many ecosystem services. A farmer creates biodiversity, CO_2 storage, water retention, a lot of things with his land. And that is also what we say about 'we want to see that implemented in the price of milk.

A fair price is always a tricky one indeed. You also mentioned the interview of the gentleman who is responsible for sustainability within Rabobank. Of course you got a slightly different picture of Rabobank there, that it is actually still very difficult if you are financed by Rabobank to claim a sustainability loan, for example. Of course the Rabo Carbon Bank, with what you just mentioned … that is a bit at odds with each other. How did you react when you saw that interview?

It did stir up some controversy to be quite honest. It is of course a bank that has acknowledged through that interview also has dirty hands, so to speak. At the same time, I also think it is very clever to say that as a company, that you realize that. And that you can also make it different according to your own insight. Ultimately, we will always need financing, because it always involves major investments, new stables, purchase of land. It's the way. So if Rabobank can properly finance the transition for farmers with reasonable conditions, that would certainly accelerate the transition.

I also wonder how you enter into cooperation with farmers. Do they knock on your door, or is it the other way around, that you actively approach those farmers?

No, they actually knock on our door . We help them, but their financing, and all their private affairs, we don't interfere at all.

I assume that one of your goals is to help farmers in that transition, but in fact those farmers only come knocking if they want to actively start working with that transition themselves.

Depends, some farmers are, and some farmers are really still in the beginning. We also help them by looking at where we can get that funding from. Are there government programs you can qualify for? We can then help them with that application. But in principle the farmer always remains the owner of his own plans. We can help them if they want to, but we're not going to push them.

I was wondering with which other parties you collaborate within this Rabo Carbon Bank project?

We have no other partners we work with. We have a collaboration with each other, but Rabobank also works with X number of other parties. Unfortunately I can't tell you about that, then you will really have to talk to someone from the RCB.

I also wondered, I would also like to talk to the government about the things you just mentioned, various subventions and such. Do you perhaps have a contact person within the government that I could contact?

The trouble with government is that it's super spread out. There are people at RvO, there are also people at LNV. I personally don't have a direct contact over there. But you can find everything about these subsidies on the internet anyway. You can also look at the LNV transition fund, which was presented in April. In it, the government, together with a few other parties, created a fund to finance transitions for farmers who want to apply for it, so to speak. You should be able to find the rest of those grants online .

Then I had one more question about those pilot projects: What objectives have you set yourself at Wij.Land with regard to these projects?

With regard to the Rabobank project? To learn! Wij.Land is a learning organization, so learning is always central to us. That is for the network as well as for ourselves. As I said, we actually want to learn more about carbon models on peat, learn which measures capture more carbon, how carbon valorisation actually works, how carbon trading actually works.

That's a very good approach!

Interview Ron Cürvers , contact person BISCI, Maastricht University, 02-07-2021

How did the partnership come about?

The so-called spareheads call has been set up within the SBE faculty. A threefold goal of the university has been seen. One is to do more transdisciplinary research. The faculty is currently very internally and disciplinary oriented. They would like to be more interdisciplinary, which we have been doing at MSI for some time. That's one. The second is that they have also stated in their strategy that we want to conduct more socially relevant research .

When we were forming that consortium for FSD call, we already had Solidaridad, the large NGO that wanted to participate, and Rabobank from the start.

What kind of NGO is it exactly?

Solidaridad is mainly on the side of developing countries, and with sustainability, with Max Havelaar and so on. They're really in that corner. You have, say, the smallholders in the developing countries, with coffee and cocoa, etc. Can't we help them a little to increase their livelihoods? One of the well-known way is through certification . In the long run, and that applies to all large companies and chains, you also have to take the CO_2 of your suppliers and customers into account. At a certain point, this CO_2 registration must not only apply to the products in our own country, but it must also be returned to the suppliers. The idea that we are now a little note to his is playing, you would not even those CO_2 registration which data are held, or which must also come from farmers. Wouldn't that have value for those farmers?

Do you know whether Rabobank already had a collaboration with Solidaridad?

Yes, I think so, at least those people sitting at the table already knew each other anyway. For us they were new partners.

My thesis is also specifically about the Rabo Carbon Bank, which I am researching. I analyse that using the quintuple helix model, to see how it works. Of course you need different parties to achieve such an innovation. I am therefore very curious about the role Rabobank plays in this collaboration. Is that purely a financing role? Or do they also have another function?

No, it's like that, and then I'll talk a little bit about the management of the project, the whole governance of the project. Rabobank is there, Solidaridad is there, and we all said we all make a small entry contribution, so basically it's free. For MSI we said we deliver one day a week. I said we can't just free up staff that isn't covered. But everyone does something, and then you already have a small pool of manpower. On top of that, a coordinator. But there are no major financial obligations. The idea is that this collaboration will eventually lead to an expertise group that can respond to or, in particular companies' needs, say 'Can't you even figure that out ?' . It's slow compared to when you think with like-minded people. But in the end I think you will make progress and start working meaningfully . We call this line of work, or co-creation , there are you already familiar with.

Just to stick to those terms. To what extent is what you do boundary work? And to what extent is BISCI a boundary organization?

I think BISCI wants to be that in itself. BISCI is formally part of the university. They are in Venlo. But they are very much looking for cooperation with the business community. But at the same time they are also improving contacts within UM, specifically within SBE with various departments . A bit intermediate, because we actually find both sides interesting, and can serve to a certain extent. What you often see is that the need that politicians or companies have, that people who are really on the other side, they can't do anything with that, because those questions are not properly translated, I have experienced that so often . I think that's what they try to do at BISCI, too, to take on that role.

Of course I learned at the SSPS course that there are different levels of boundary work. One of the levels is the white circles, where people really work on a project basis. Is that the level of boundary work that is also reflected within BISCI?

Yes, at the moment we are really still at project level. The organizational structure around that is already in place to some extent, but it is still very fragile. At the moment I still see it very much at project, at program level. Not that you say you have a boundary organization there and that knows how to do it, that will take some time.

Have there been negotiations about where that limit should be?

I discussed it with Astrid. That is also something that the Faculty Board finds interesting. Look, what you're actually noticing right now are two main lines. A main line of the organization has been established, that is a coordinator and a steering group, and a few small projects have already been appointed to get started. It is organizationally clear, and substantively clear, or is it clear? With that fair and smart data there are a number of questions, or subprojects, and we have to address them . Of course everyone has interests. University, I may be a bit simple about that sometimes, but the only thing we can do is develop knowledge. Of course we don't do any more.

Yes, and those parties therefore connect.

Yes, and those parties connect. That's what I mean by shielding that boundary. We can best provide knowledge, we can best move a bit where you actually enter the territory of that other person. As a farmer, you should actually set up a cooperative. Or as a lawmaker you should actually enact a law. We may make a suggestion, but it actually comes on the plate of the other person out .

One of Rabobank's interests in this project is about the use of that data for those farmers, because they want to enter a market that is still developing in different ways, in order to improve the quality and standardize it more. That is actually their interest within your project of FSD. How is that feasible? What time frame do you think is associated with that?

We are now in year one. Between now and December there are so-called sprint projects. These are all very small projects, in which different clubs work together, for example Solidaridad and MSI. Some expect a lot from it, I actually expect a lot less from it.

You then try and guide a certain intervention, and study it, say to say does that work yes or no? Or can it work? Parties such as Solidaridad and Rabobank would play an important role in this, because they have good contacts. Farmers say 'we've always done it this way'. Would you, as a group of small farmers, be prepared to work in a different way under certain conditions for the next one or two years? You need other parties for that, Unilever must then participate, for example, one of the big boys. Because of course you have a monopoly on that.

One of the things is that Rabobank has embarked on a new path through this Rabo Carbon Bank, that they are doing things differently than they have always done, especially with the pilot projects they are doing. There is also a need to measure this, because they themselves do not yet know very well whether this works. Rene Kemp also said that it is quite a revolutionary innovation that they have done, so they are still researching it a bit themselves. That is why there is a need to gain insight into that data, in order to be able to improve and standardize the quality in the long term. But if I understand correctly, it will take a few years before those projects can be worked in that way?

It's also what we do, it may seem big, but on the whole scale on the scale of ..., there may be a few people working on it, well-meaning I'll say, but all in a fraction of their work. They are more like pilots to test out innovative things.

One also feels a bit of the hot breath of the sustainability problems. On the one hand, that sustainability side is a bit compelling, especially with climate change, so we have to do something. People see data a bit as an opportunity to do those things, that cannot be changed all at once, but we can discover things. Our philosophy is actually, and BISCI is also on that, suppose we have researched something, and we have some ideas, then we just go to Unilever, to start the conversation! Like, 'how can we justify that in the chain there is so little profit on that side, and so much profit on that side?, explain that'! You may think 'a CEO is not sensitive to that, but that remains to be seen. Sometimes that is very persistent, but sometimes you do see a movement .

What challenges do you still see in the Rabobank project in the field of Fair and Smart Data? One of the things that Jelmer already mentioned was the privacy of farmers when their data are used, that is also one of the issues that, if all goes well, has been submitted to you.

Yes that will come. Privacy is of course an important issue with data . But also, we've talked about that before, but nobody has a picture of it yet: it may be that through these kinds of projects, by managing and streamlining data more, etc., it is possible that you can strengthen the position of the farmers in this way, but it can also be counterproductive if you have set up a management system for the benefit of the large multinationals. I don't know either that those farmers don't have the capacity or the organizational capacity to keep that with them, or that they can't legally secure it… There's a serious risk in that .

Which also plays a role with us, but Solidaridad has to think about that first, because they are really thinking about that, what is actually fair ?

Also a bit more general about this Rabobank project, I don't know to what extent you are familiar with it. But I am also curious about the vision you have regarding the project they have set up through the Rabo Carbon Bank.

I'm not very familiar with that, in that project.

The Rabobank itself says, I also presented them with the concept of multiple value creation, and I also saw that the concept of the triple bottom line is central to you, they propose to do this in this way,they also propose a different revenue model for that farmer. And that in addition to a financial gain, this also has a social benefit. They also do not claim to keep the entire profit with themselves, but mainly keep it with that farmer. It remains to be seen whether that is the case, of course, but they themselves state that the multiple value creation is indeed in balance. Well, of course it remains to be seen.

No, that's what they actually said . Primarily, of course, they look at the financial and economic side, but they do have an eye for social relations, and ultimately of course also for the environment .

Rabobank argues that every bank should become a carbon bank to keep up with the demand from companies that want to become carbon neutral. What do you think of such a statement?

The banking world is of course very long, maybe still is, I don't know that world very well, but my impression is that they have been very conservative, very conservative. And they do not have as good an eye on what role they could play socially seen . I know it's changing a bit.

ASN Bank and Triodos Bank are, of course, banks that have been focusing on sustainability for a long time, but the large traditional banks such as ING and ABN AMRO are all still in the old waters, I would say. They should actually take responsibility by saying 'we will optimally support that transition to sustainability', by providing loans and such things. If it does not meet certain requirements, then 'go to another bank, we can no longer cooperate with that'. Rabobank is one of the parties that wants to take the lead, in fact the entire financial sector has to move in that direction. After all, it is the oil in the economy that is the financial sector, which is extremely important .

Incidentally, I had one more substantive question about BISCI. I was wondering whether the policy of the Dutch government is still influencing your work at BISCI in one way or another, and whether policy officers are involved in the project?

No for example, with high-ranking people in companies that matter, or perhaps with the Ministry of Foreign Affairs or Economic Affairs, I name just one. Shouldn't you even be talking about 'we have ideas about how you can change the situation in such a way that you can contribute to the climate problem, tackle development issues a bit, help people in developing countries further, and also make that chain a bit more stable. . We'll have to see if they're open to that.

Interview LTO – Auke Jan Veenstra & Frank Pijpers , 05-07-2021

Frank had just explained his role (graduation internal carbon farming). What is your position Auke Jan?

A: Frank may want to say a little more, but let me first state my role. I am a policy advisor climate & energy. Carbon farming also comes into play in that role. At that level I know a thing or two about it. What is really nice is that Frank can also dive specifically into this theme, which comes from Europe. That makes a nice combination in this way. Would you like to add something in advance Frank?

F: Yes, maybe a little more about your research purpose. Could you also tell us something about that?

Because this Rabobank initiative is so new, it is also seen as a revolutionary innovation, very little is actually known about Rabobank's specific approach. Of course, carbon farming is not new in itself, but it is in the way Rabobank wants to put it in a bank form. In my thesis I mainly analyse the initiative, and I do that on the basis of the 'quintuple helix' model. That is actually a model based on five subsystems. First of all, it was the educational, economic and political subsystem. Later, the media and culture-based subsystem was added. The fifth subsystem is the natural subsystem that actually covers everything. Within that I research the innovation. It cannot, of course, be achieved alone. This requires universities, among other things, but also the government, and also interest groups such as LTO. Hence my interest in talking to you.

To what extent are you aware of the Rabo Carbon Bank? And what is your view on the initiative?

A: First of all I have to say, we are globally aware, but maybe I should start a little differently. Carbon farming is not new, but it is something that has recently come into the picture again, in the last place

also because of the wind that blows in Brussels, I should say. Brussels naturally wants to make the EU the first climate neutral continent.

In my view there are actually two things at play. One is how we as countries actually do our climate accounting. I always say, that's a very flat bookkeeping. A country is divided into different sectors. This concerns the absolute emission of greenhouse gases. The sum of these is what a country does. As a member state of the EU, the Netherlands supplies, so they have the EU as an addition, clear . What applies here is that there is a very strict separation between emission and fixation in one place, because we are terrified of double counting . So strict separation is important. Carbon sequestration that is in what is now called LULUCF, in fact for the Netherlands I always call it land and forestry .

What you see in the Netherlands, for example, the Dutch situation is that there has been a club for a long time called the National Carbon Market , as a so-called Green Deal of the Netherlands, that the government sometimes offers with a policy change or room for experimentation, sometimes with money, usually not. but… It's trying to push business. For example, we also have a lot of peat meadows in the Netherlands. There is mainly in the north of the Netherlands, and there is therefore a methodology under which determines how much is being detained? And when will it be one carbon certificate for peat? The name says it all, it can offer farmers therefore an additional euro of income it generated . Of course they have to do something for that, for example taking certain soil measures.

So you are gradually seeing that the system how it now seems to arise in the Netherlands is that there is in fact already a national certification body, so the National Carbon Market Foundation. It is increasingly working on the basis of methodology documents, method documents say, official plans of measures . Which is now coming, there has also been an open consultation about that, that is permanent grassland. If you don't plow grass, but really leave grassland for thirty to forty years, a lot of carbon is captured via the roots, via the soil.

I see that development, and then Rabobank came alongside, of course with a huge marketing budget, able to put it on stage very well. We also see parties like Monsanto and Bayer saying, 'Hey arable farmer, we want your carbon certificates. Look, here we have a good soil conditioner. That tends a bit to forced shopping .

Dutch land users who can therefore produce CO_2 certificates. You should also bear in mind that there are all kinds of measures involved. More soil improvers, different crop routes, other crops , so there are quite a few measures that also require a pre-investment . It stands or falls if that voluntary market is there. So that's on top of legislation. If the EU ETS comes into existence, the business case will be lost. Then that's gone.

The EU will launch plans for 'Fit for 55' next week . What will the market for those carbon certificates be like if, from the demand side, a great many companies are going to fall under some form of emission trading systems?

F: From Europe it all has to get going a bit. Of course they are looking at how can we stimulate this? But the real plan of 'how do we stimulate carbon farming?' still needs to get off the ground a bit. At the end of the year they will come up with an action plan for this.

Which action plan is that?

F: I think it's called Plan carbon farming, very simple actually. It is expected at the end of the year. Now all those 'Fit for 55' regulations are already in place, so it's a bit of a wait to see what will

come of that. There seems to be some certainty, but what that will happen for carbon farming from Europe is still a bit uncertain .

A: What the European Commission is mainly looking for is a great opportunity. Countries such as the Netherlands also need to have large performances. It is indicated from science, from Wageningen University, that for mineral soils, so arable areas, that if you do your best then about one megaton can be recorded extra. Compared to now, very roughly. I'm not talking about ten or twenty, but one megaton, and then you really have to do a lot. Then something really has to be done. Climate smarter forest management, extra forest, then there will also be a plus. I also expect in peat meadows, because it is also a target task, to allow roughly one megaton less to escape there. All in all three, four, maybe five megatons , but then I'm quite enthusiastic I think, you could capture even more in the Netherlands . In Europe, where land is simply still scarce and you could really take bigger steps with those dust levels with other agricultural practices, for example permanent grassland, or other crop cultivation. The same that the European Commission has indicated, that they have an eye for the different allocation options, geographical advantages and disadvantages of regions. I also have the idea that they might consider the revenue model that may exist for farmers, how they can shape it.

Frank rightly says that a proposal will follow at the end of this year. I also believe that they have already indicated that they want to look very specifically at those certification schemes in 2022, 2023, then we will be a while further. I see the whole market more or less now, I'm exaggerating a bit now, exploding with all kinds of trading platforms, where I group the supply under. CAS, where you have a bit of a wild west have . I suspect that the European Commission is mainly looking at this, how can we at least get a uniform quality system from one certificate, produced anywhere, that is equivalent to a certificate produced somewhere else.

So for that voluntary market?

A: Yes, but that doesn't change the fact that a huge number of trading platforms are now emerging. Specifically to Rabobank, I must also be honest'. But what they say is 'we are a bank, we are already used to spending money on one side and collecting it on the other. We can do that very well with carbon'. I can well imagine that. I think they are absolutely right about that. Slightly different way of doing this, but the system is of course the same with cash, with euros .

So the question is what would be the added value of such a Rabobank platform, if it could also be regulated by the market itself?

A: Now we produce quite a lot of green electricity and windmills and solar panels, etc., all of that is sold to the NUONs and the Essents and I know what. But what people don't realize is that they also sell their GVO with it. So it's not worth a shit, maybe three or five euros per thousand kilowatts. You don't have to do it for your revenue model. But what happens now, the former NUON buys all those kinds of quantities, a few thousand kilowatts here and there, they put it all in one basket, and then it suddenly becomes a considerable amount of GVOs. He goes to Norway and says, gosh don't you want to drive green on electricity? Then we have a nice deal here. So then you actually see that from the single point of view, then nothing happens, but together… Rabobank can then make a proposition, possibly, it is still a bit of a future, they can then make a proposition for, for example, a large mobility party, or a small industry party as long as they are not in the emissions trading systems, I think that is a good opportunity to get a deal. The synergy of these, one plus one equals three, which would be a plus to be .

Indeed, you also mentioned that for that chance Dutch farmers need to make an investment. They have of course also borrowed money from the bank in which they have invested in scaling up, larger stables, more animals, etc. Of course that goes against the other regulations that say 'the livestock has to go down', and then you could looking at such initiatives. Well, that investment has not yet paid for itself. What is the feasibility for those farmers to participate in such an initiative? Is it attainable?

A: I said it once just now. It will not be a manageable route for every farmer. Short term and economic pursuit, vs. Long term and sustainable effect . So the effort and costs involved for measures to get started which ultimately also for long-term care that you have a good base, which guarantees a good passage of water, so a good waterbed, including is climate-adaptive, which can also ensure a healthier crop, and also a higher-quality crop, these are all called positive consequences for the long run. The step is somewhat to put funding in the short term under those measures that need to be taken now. A bank could also play a role in this, although a bank normally finances real investments, which we are mainly talking about here, especially if we continue to focus on land use, yes then you are actually talking about management measures. Then there are actually other things that get in the way. When you say that more carbon needs to get into the soil, you should feed that. Then you should actually add more soil improvers, compost, manure, those are the most important . So actually our beautiful Dutch middle policy, also in fertilizer legislation, has a completely different approach, which tries to prevent over-fertilization from taking place. Well, that kind of action does get in the way, because farmers then immediately run into their maximum standard that they can use in the soil. So you see there that not all in the right direction is really central to the bottom set . A bank in itself does not immediately change anything, but for example, another example: If you do not plow, you also need other equipment that you can get to work. Then you are indeed talking about investments, a bank is indeed involved in that, they can support those kinds of things a little more.

And from the government, can that farmer also claim certain subventions, is he compensated in a certain way to achieve this?

A: What you mainly see is that the Dutch government refers to the Common Agricultural Policy (CAP). If you, as a farmer, want to receive GLB premiums, you must meet certain basic quality standards. The foundation must be in order. But on top of that you have another system, a kind of cafeteria system, which is called the Ecoschemes. 'So but wait, I can also take this measure and make sure that this and that happens, then another + will be put on that premium, so to speak. Extra effort, I'll just say extra legal, which can also be paid extra. The same actually applies to that. If you were to reason only on the basis of those CAP premiums, that would be an increase of a few tens per hectare . So you can predict the outcome, if I take a serious measure for that, then it is about five hundred euros per hectare. That's not proportional. But if you also can use that flow, so this building block, and the carbon credits, and an interest discount at the bank, just to name a few for increasing biodiversity, because that's what happens when you treat the ground like this. We are also searching for earning, you have the building blocks, and then you get a scenario that should make it interesting enough for the land user to have to for that measure go .

A: It is interesting what the European Commission is doing there, because in my opinion it is balancing a bit on a thin chord. On the one hand, they will of course tighten the reins, targets for renewable energy, and also for climate, and for land use, etc. And on the other hand, they want to try to take the positive route, f.e. via a stimulating set of instruments, f.e. carbon farmers. That means that you have to keep that additional, so there is a field of tension somewhere that I don't quite understand how that will land.

I have a few other initiatives that I'm curious about how you view them. A Backlight documentary also discussed what the future of farming will look like. Innovation is very important in this respect, and we are also looking at how you can use robots to ensure that strip farming is no longer necessary. The head of the vegetarian butcher also mentioned that if all that is implemented, it can also be ensured that you could go to a food forest, where drones could reap the benefits. Is that also a possibility that contributes to that? So what kind of project could be for Rabobank in the future?

A: Yes, why not? But I'll say that, I think it's realistic to expect that… Look if you're all… Where do I start? A food forest is not the solution, let me start with that. That will be fine for niches. Of course it meets a whole number of social issues, doesn't it, your soil benefits from it, and biodiversity, of course, is increased. A food forest also has insight into that, if it is good that what it contains reinforces each other, a fertilization, or just to keep unwanted elements out, you can do that very well. If you make the transition to what we still call 'regular agriculture', f.e. open cultivation, you will of course see large boxes with the same thing. There needs to be proper research there, for example in the farm of the future at Wageningen University, where they are looking at, for example, strip cultivation. The idea of doing something good for the soil, because we are going to work with broad beds of the soil and can improve the crops, but also the interaction between crops, which can also lead to benefits. In particular, the animal fighting to sustain say but .

As long as that economy is in power, let's say, not to mention that we have very open borders in the Netherlands, many of our products are exported, the vast majority to neighboring countries. But then you actually see… what incentive should be there if there is to be a system shift? If the sales market really acts differently . Consumers also let the euro lead. Then you have a certain system , because when you go to certain forms of food forest, or agroforestry, or strip cultivation, you are in fact talking about major conversions of business operations. Of course, this requires knowledge, but also investments. If you're red, you can't go green, we sometimes say. So it's all a bit intertwined, and I certainly see potential Etienne in what you're referring to robotization. I can see that happening quite hard now. An additional advantage is also to prevent fossil fuel consumption. All the bells and whistles that you are currently attaching to do things differently, that means a direct attack on the earning model of the farmers . That's where the problem lies. If we cannot adapt that, and whether it comes from the market , whether it comes from the government, or another social form , we will have to compromise to enable the entrepreneur to move in his business operations. That is the crux of the matter in the Netherlands . I think it's the same story at European level. Climate targets are extremely ambitious , but if you don't do anything at the heart of the system, if you only tighten the thumbscrews on the producer side, that's not going to work. The whole system has to be turned upside down.

Again that part of financing. That is of course a frequently mentioned problem, I think it was also discussed at Zembla, that many farmers cannot get a green loan to implement measures. How do you see that as a trade association? Will those farmers be given the opportunity, if they want to, to get financing for this?

Rabo people from Rabobank Nederland, I should say from Utrecht they actually say something different than they should ideally say! Only, of course it has to be financed. So, of course, Rabobank is also trapped in that system. I certainly don't support the Rabo, but I think it is an observation. If it doesn't create another source of income, that's an investment that's too high, because you don't get enough production, so you don't get enough returns. Well, if nothing else comes along, then Rabobank is not willing to give that loan anyway, if they don't have the guarantee that that loan will be returned on time .

Indeed. Rabobank also has a partnership with Wij.Land. I also interviewed them, and I also asked them 'what are possible alternatives for Rabobank in the Netherlands?', and actually the pilot projects they are currently doing, mainly with wet cultivation. That is actually a kind of food forest, yet in line with the reduction of the livestock, so that you flood the land instead, and that therefore other cultivation is possible, and therefore, for example, mint or cranberry would be grown. could be. In this way, a sustainable revenue model could be rolled out. Is that something you think farmers would be open to ?

Some do, I think, but I think you should especially look at: what question potential does that contain? Therein lies the crux . So where is the market for that kind of promotion? That's the clue. That's a niche , and that's really nice. We are already seeing that image emerging, for example, you see it very strongly in dairy farming, where there is an enormous diversity of entrepreneurs. Entrepreneurs who still go for that increase in scale, produce efficiently and so on. But there is also a very large group, within which there are different movements, that we are trying to create a revenue model, which we call the blue earnings group. So organic, that is one route that is of course clear, which in principle also involves a good additional price from the market. Then you kind of get into what is generally sustainable, which is very close to organic, but which is not organic. Then you have a bit of that market revenue model, it is difficult to get a plus on that, because those chain parties that say 'if we set up too large a + here, we will no longer sell our product abroad, because other parties have to don't do that and they'll drive us out of the market ' . The question should perhaps be: is that still the case in the Netherlands? And you should also seriously consider that other earnings must come alongside if it is to guarantee a good income , which put you on the track for biodiversity, an extra effort on climate, an extra effort on water quality , somewhere that has to be done . .. The search is now, again, at the moment it is very much a question of 'can we get that from retail?', f.e. from the consumer. And can we not do that via fund formation, or rather not actually do this via subvention flows, because subvention flows are fine for a while, but it should not become the primary source of income. So it is very hard to find where do we find that cover to be able to take those measures? I keep coming back to the fact that that is the most important, see it as inspiration, agroforestry, food forests, gentlemen farmers, or Ons Land is also such an initiative where a group of citizens say 'we just buy a piece of land, and we see how to farm sustainably'. But that is niche, and that will remain niche . The main challenge is to gradually lead the large group in the right direction.

Indeed, time will tell what is possible there. Of course you represent all farmers, both the progressive farmers and the farmers who prefer to stick to business-as-usual. What is the average mindset of the farmer? It has of course also been shown before, even when it was discussed from the EU that there would be a reduction in livestock, that this was sensitive to the farmer in the Netherlands, in which you also took a position. How do you see the trend at the Dutch farmer? Do they want to move towards sustainability?

Yes absolutely. Earlier, around the conclusion of the climate agreement, we did a large survey among our supporters, it turned out that more than seventy percent , it was a representative sample, which says 'oh, we want to, we really like it. We also see that things are not going in the right direction, and we also want to do more with biodiversity'. Only in this is very much reflected 'this rule stands in the way' and 'I have no cover for my investment'. So what comes back a lot: 'yes, we want to, but please facilitate us! I think it's still the main line. There's always a group, and it's maybe ten, twenty percent, problems don't exist at all, paper unrealities, models, blah blah blah . It helps, of course if there is a certain degree of facilitation by the central government , or parties in the chain, of course, the outlets in fact, other logical stakeholders, for example, the financing partners. Yes, that they do take

on a facilitating role in this, in order to actually move towards that sustainability side, even more so, that that will take place anyway.

And what else can the government do? Temporary subventions and the like have already been mentioned, of course, but are there any other options?

A f you only voluntarily wants something to happen, then it just will not come , examples of the contraction of the livestock is very sensitive. What is the main reason for this? Because in 2015 the milk quota has been removed , despite you warning the supporters of 'boys that doesn't mean you can milk indefinitely', individual company decisions are made of we put a piece at the barn, we fill it with cows, and here we go! It must be what the sector does, but I have a goal, I'm going to grow, because I want a better income. As a result, milk production rose, which in fact exceeded the phosphate ceiling . Then a phosphate reduction imposed by the government was finally achieved, read: removing cows. If you see shrinkage of livestock as a measure , then fascinates not really anything else you technical solutions and innovation , management ... so you hit like the craftsmanship and innovation were awfully dead. So for the question you are then in the long term ... look, apart from the fact that now for nitrogen you really have certain peak loaders, which are close to a nature reserve. So companies will stop. I also think that there will also be less livestock, especially from the nitrogen policy, precisely because of the targeted approach to tackle that peak load. What do you get as a side effect? Because there is less livestock from those places, you also have benefits for the climate. The best measure is simply to have fewer beasts 'I no longer see the future for my company at this location, but I would like to continue at another location in the Netherlands where space is available, so relocation . There is a large group of entrepreneurs who think about quitting, also because they have no one for business succession. They are really just waiting for a good settlement. There has been a voluntary buy-back program. In the province of Gelderland for veal.

Also for stopping, that's not just something you do, that also involves a whole process , from the business location, how do we close it? How do we destroy things then? We want to prevent the impoverishment of the landscape, society says that too. So there are still quite a few issues. But we think that with that you actually get the most out of all those co-effects that come with it. The moment you then say that the slanderer has to stop because of ammonia, and the location next to a nature reserve, and there is actually slightly less livestock in the Netherlands as a result, I will just say, and that intensive breeding can be done by the permanent residents, it also has a positive effect on the soil, on biodiversity and on the climate. Then you actually take a much bigger pendulum with you, than just looking at one specific issue. Just an integral view that you then have.

Are there still parties with whom you collaborate intensively when it comes to these kinds of themes?

A good example is the 'Sustainable Balance' plan, which LTO has presented with the Dutch construction industry and with environmental federations in order to get rid of these nitrogen emissions.

We are also still the third largest employers' organization in the Netherlands, so with CNO-NCW on those socio-economic themes and labour. It depends a bit on the subject we spend a lot of time with. Just as Rabobank is, as it were, also a stakeholder of ours. These are actually somewhat the types of stakeholders that I have just reviewed.

Interview Marjan Peeters, 14-07-2021

Not familiar with RCB, so short you given itleg.

I'm curious how you look at it from a legal perspective.

Let me just say this. Of course I look at it from the knowledge I have from the law. Myself, from a legal point of view, I have always been reluctant to support these kinds of initiatives because the international justice system, the question is, is it strong enough to control it well? We are actually talking about the mechanism under the Kyoto Protocol. What you are describing is actually a form of CDM, as it was designed under KP. So that was my starting point. Then it is then the case under that CDM, that is great, there are conditions to that that the host country , I do not know, Kenya, Ghana, those kinds of countries, I do not know what kind of countries are being thought of , that they should actually declare that that investment contributes to sustainable development.

You also know, like me, that that is a very broad term . I don't know if those conditions are also applied in this project the Rabobank is doing, so if a statement is requested from the host country whether this investment contributes to SD, do you know if they do?

No, I don't know that. It is indeed interesting to find out if they do.

Now I am entering an area that I do not know exactly, so it may be the case that a central government of an African country says 'oh yes, this contributes to sustainable development', they would of course also like to have those investments in the country. But the question then is whether it also leads to sustainable development at the local level. Now I just have to point out that there are a lot of reports from different organizations and human rights organizations that say things like 'landgrapping', and 'conflicts with human rights' . And thus this practice, which Rabobank is now also going to do, has received a very bad light among the human rights organizations and the like. On the one hand, we can be very positive about this if it does indeed lead to improvements in the country. On the other hand, there is also the question 'what are the alternatives?', and 'isn't there an old colonialism that is emerging here?', these are ethical questions to which I don't have an immediate answer either, but they do are often referred to the outside world.

Well, it would be best if good agreements were made about this under the Paris Agreement, but that is exactly what has not yet been arranged, and exactly what they are trying to do in Glasgow this year. But I don't sit on that every day, but I also didn't understand that there is so much progress in it.

So that responsibility also rests with Rabobank itself if no agreements are actually made about this.

Yes, but in any case Article 6 of the PA does provide some criteria for this, but they are a bit vague. In addition, we also have the practices of the KP, where criteria have also been formulated. So that as a framework . I know, you get involved in reviewing other studies, so recently I also read another article, a concept, and they call it ' blue carbon ', which is about mangrove forests and stuff, which also store carbon. . That article was very much about the need for the local population to have better protection. So I see it still works. But I cannot comment further on that. So my question would be, how is that guaranteed or handled in this RCB project?

That is certainly a good question to ask. In my research I have indeed come to the same conclusion that for comparable projects, for example the REDD+, that standards do apply there, but then a reference is often made anyway when it comes to f.e. Indiginous people or the local population ... there are of course certain articles that are used for this, such as the European Human Rights. That's complex in this case.

If you look at European Human Rights, then that is of course binding law. But what about when a Dutch company finances an African rural company? Which human rights then apply? Africa also has a

charter, but then I know too little about it. So that would have to be looked into. In many cases there are human rights in the constitution there. So, of course, a foreign investment in that country must comply with the national law there.

Yes, exactly. Within the EU ETS there were also certain forms of criticism, and one of the problems is carbon leakage, which is of course a common problem in all forestry projects. How do you think that relates to the initiative that the RCB is planning? How can Rabobank deal with this in these projects? By carbon leakage in this case I mean the following: Suppose a forest is planted somewhere, whereby agricultural land is used to plant forest, so that this does not lead to the felling of trees elsewhere, because agricultural land is still available there. use. That is a different kind of carbon leakage than in the EU ETS.

Yes, a kind of displacement effect. Yes, big problem. I believe, but then I have my doubts that this was stated in the renewable energy directives. It contains a framework for importing biofuels, liquid biofuels from developing countries. Then it is not about biomass, but about liquid biofuels, ethanol for example. Ah, they call that Indirect Land-use Change, ILUC. A well-known issue, which we call displacement effects or indirect land use change, ILUC. Yes, it is of course very difficult how to arrange that so that you counteract it. How would you do that? This was also the case at CDM, where the additionality criterion applied. There is very good literature on that, how difficult that is. How are you supposed to prove that? In fact, CDM's popularity has really taken a toll on that. That hat is very difficult to ensure is .

Yes, with the RCB projects it can of course be said that the farmers were not already planning to do so. So in that respect Rabobank's projects are above the norm. So I don't know to what extent additionality is covered by that, or whether it goes further than just thinking that way.

I think that if Rabobank wants to do this carefully, it should also engage in a social discussion . Especially with those parties that are so vehemently against this . Ultimately, I think the goal is also to make the African country better off, and to reduce greenhouse gas as a result. But how can you get that sorted out? And to give another example: Here in the Netherlands we have something slightly different, but just as another example. Here in the Netherlands we have a huge discussion about nitrogen, which is different from climate, but there was also such a mechanism that if a little more happens here and a little less there, you see what happened, the judge rejected it. , and the country is locked. So, it is very difficult to get that approved by the lawyers . That may be very frustrating, because maybe it's done with the best of intentions, but when it does end up with judges, the first question is whether they understand it and secondly whether they will embrace it. I can't predict that, I really don't know.

Rabobank is also planning to launch this initiative in the Netherlands, and then of course they will have to deal with such things. I don't know if there is anything else under Dutch law to take into account?

Yes, especially European law, to start with. Because in Europe we have the LULUCF regulation, Land Use, Land Use Change & Forestry. A Member State must therefore indicate how many emissions are caused and reduced as a result . If Rabobank goes along with reducing emissions because more is absorbed, it could be the case that the member state of the Netherlands will say 'thank you Rabobank, we are going to sell that surplus to Germany ? That's a question I've had for more than 10 years, I've never been able to figure it out myself, but those who are going to work with it, they have to figure it out, because otherwise you don't know what you're doing.

Actually, it wouldn't really make sense, because yes, those credits are of course sold to a corporate that may be outside Europe, and then a country like the Netherlands can … that is also a certain form of double counting. In my opinion it wouldn't make sense.

Well, it is possible, if you have a solid legal framework in which everything is arranged very well, but that is very complex regulations. I don't know exactly what the LULUCF and the effort sharing arrangement contain. And I don't know the Dutch legislation in that area either. I see that too little connection is made with an initiative that is in itself very good, that is a pity, that the initiatives are very well intended, but that the translation, how it is connected with the EU and Dutch law and policy, I don't know if that's being explored enough.

Yes. The course also discussed that setting a price on carbon does not necessarily mean that the company itself actually reduces emissions. What do you think the effectiveness of the RCB could be?

In the course I mainly talked about emissions trading with a cap. Then you have effectiveness if you have compliance. That is the beauty of emissions trading with a ceiling. But what Rabobank now wants to do is more on a project basis, that is more the Kyoto Mechanism, and we therefore have more problems with that. Also because it is a much more expensive instrument, because you have to look at each project as such. So it's a very expensive form to deal with. You have a lot of administrative costs.

Yes indeed. One of those administrative costs is monitoring. That is also why Rabobank has teamed up with Microsoft. They say, they do have the tools, but only those are not cost-effective yet, so innovation really needs to take place to make that cost-effective. And therefore also interesting to … those costs really have to come down in order to be profitable for the project itself.

So they want to turn it into a profitable project?

In the long run, yes. What Rabobank intends is to charge a 5 to 10 percent commission. They always emphasize that they really want to focus on the farmer. Of course, this does not immediately yield a profit, but in the long term this is a revenue model that must become cost-effective and ultimately profitable. In any case, profitability is not directly the focus.

But then something else. They then want to sell it to companies in the Netherlands or Europe that want to be climate neutral. In the past, that was indeed a possibility under EU ETS. That EU ETS companies could buy CDM rights. I think that is reduced or is no longer possible. So you also have the question if Rabobank already wants to generate all these credits, who did they want to sell them to?

Yes, actually to parties that are currently not covered by such an EU ETS.

Yes, so for example pig farms in the Netherlands, for example?

Yes, for example. Microsoft itself therefore takes the credit for the pilot projects that are currently taking place. So they are also interested in that.

anyway. Microsoft is under which jurisdiction?

American jurisdiction seems to me, that's where their headquarters are.

Yes, in America you have those voluntary offsets even more, because you don't have a national cap there. You had the Chicago stock exchange, compensation mechanism in the 90s . But then the Dutch Rabobank is investing in an African country, and the credits are then sold to, for example, an

American company. That all has to be worked out very well, exactly how that works. So then the credit does not fall in the Netherlands, and is not applied in the EU. That's an important difference .

Yes, and in addition, Jos Cozijnsen, that carbon expert, also mentioned the problem that those credits should remain in the sector. There are also a lot of emissions and the like in agriculture, and credits are actually needed, also with the EU's thinking to bring it all together, so both the LULUCF and agriculture, to make it carbon neutral in 2035. But in this way, if you give those credits away to other parties, you do not keep them in the sector, and it is therefore not possible to compensate for that.

[Explanation about thesis]

Why do you say it's new? It actually resembles the CP. Of course you can say that it is innovative because it can be measured better, that is super super important, but that does not solve the human rights problem, that does not solve the accusation of colonialism , so I would look at that in a very nuanced way. Maybe it's super innovative, but I haven't heard of it yet, except of course that you can use new measurement techniques. It does not take away the objections that society has expressed to this.

So those forms of colonialism you mention relate to the North vs. South dynamics that are often cited?

Yeah, it's not that I'm saying that, but I'm giving you that that's what I'm taking on in discussion . Furthermore, there is also … I recently attended a conference, which also discussed the use of these modern technologies, with satellites and the like. And there it was also said by a lawyer that access to the use of those satellites is also unjust. That the rich can use it, but that, for example, monitoring data to gain insight into drought, rain, floods, that actually municipalities in Africa need to have that data, but it is just too expensive. So, there is also a question of justice at the bottom. The question of who has access to the data.

Indeed, I have also discussed this with Ron Cörvers, because he is the contact person at BISCI, which is an initiative also within SBE, which therefore looks at Fair & Smart Data. That is, of course, an important theme here. He also states that the farmers can have the data, but not the infrastructure to do something with that data. And the large parties do have those, of course, which means that the balance of power is not in balance anyway. It must be checked whether they can earn something from it in a certain way, with the data they have. That is one of the things they are involved in in any case, and Rabobank is also part of that initiative of BISCI, is one of the partners in it.

Interview Rob Elsinga & Data Analyst from Microsoft , 15-07-2021

First of all, I am very curious about how the collaboration came about. I couldn't find much information about that on your site besides Rob's article.

DA: There have been some publications about it, especially when Microsoft bought the credits. We announced this together with Rabobank. But how it came about, Rabobank and Microsoft have been

together for a long time. Rabobank is a Microsoft customer. Last year, a strategic partnership was signed between Rabobank and Microsoft, which deals with broader aspects of Rabobank. That is not something that is in the news, but it is something that has been signed between the two parties, to show: We are going to work together for something that covers the licenses for both, where we look: How can we change the priority? of Rabobank and how can we bring together Microsoft's priorities?

In December 2019 we really started the first conversations about project Acorn. That was the Airbnb for CO_2 back then . Then we decided in March to … We had those conversations to work this out together. We also had a team for that, you had a few from Rabobank, a few from Microsoft, about which Jelmer van de Mortel, so the lead of project Acorn. Then we actually looked, we can shape the idea and take three months for that, so that we all go to Redmond in March 2020, so where our headquarters is, where we also with our CEO Sasha would also be there , and then we would look together: This is what we have in mind. Is this in line with Rabobank's goals and Microsoft's goals? Does this make sense to set this up together? So it's really a joint initiative, where we would put both resources in, and set up together. Then of course we couldn't go to Redmond because of COVID, and then we did it virtually with the stakeholders of Rabobank and the stakeholders of Microsoft. Then we found out together that we thought it was a good idea. How we had set it up then, “yes, we have to adapt a few things to that”.

Lucas Joppa, our Chief Environmental Officer who had some questions about that, so we kind of got into a kind of iteration of constantly adjusting the proposition, or explaining why we had made certain choices and then returning them to Lucas. This is how we actually arrived at a proposition , also together with stakeholders from Rabobank . Then in June we discussed capturing that in architecture, and decided to build that through Microsoft Consulting Services. So Microsoft would also be a developer of the platform and that eventually started in September. Then we made a small adjustment in the architecture, and then we started building from December to June, and now it's live.

What is your role within Microsoft and this project?

DA: I'm Digital Advisor, I don't think it's very clear to you, what exactly that is. But what my role is, I have two clients: Rabobank and ING. For that I have to look at what are the business models? And how can I ensure that in five years' time they will still be relevant within their area, but also with their expertise. So it's a very clear win-win for both .

That is indeed the general objective that applies within Microsoft. Are there any specific objectives linked to this initiative from Microsoft?

DA: Well, we have teams from Microsoft Corps that make products, and they're not the most… those aren't the standard products, not really the cutting-edge products. They first want to coordinate the solutions that they develop there with a small group of customers who can test that product, but who can also provide feedback that ensures that it really matches what is desired in the market. Once enough iterations have gone through, the product is finally phased and introduced to everyone, every corporate customer.

Now we have a few such solutions that are very closely related to project Acorn, which we could also use. For Rabobank, this has the advantage that they can use the product first, but also that they have an impact on how the product is formed and have a say in this. That is also an important aspect for Microsoft .

So in that sense it is not just a pilot project for Rabobank to see whether what the Rabo Carbon Bank has come up with, or whether it works; but also to look for your own products, to see if it just has the desired effect that you expected from the product?

DA: Yes, exactly! We just want to stimulate as many market places as possible, so that more supply enters the market.

You just mentioned a few criteria, but what do those criteria have to meet for Microsoft?

DA: A lot! But what is important, for example, is that it permanently takes carbon credits out of the air. If it is not possible permanently, you have that per asset clash, for soil you have a certain timeline, for forestry you have a certain timeline for that, so you have different guidelines for this. Another is that it has a positive impact on society. So on the area we were targeting, so with us it's underdeveloped countries like Kenya, or actually all of Africa, very sub-Saharan Africa. If we plant the trees there, if there is the impact of the carbon sequestration there, then there must also be a positive impact on the communities, especially under served communities. This is a good project for that.

So those co-benefits, so to speak, are they also very important to you?

Of course.

What does the collaboration look like with universities to obtain the necessary knowledge needed for the products you make? You mentioned cutting-edge products that you are also testing through this project…

DA: Not for this particular project that I know of.

R: Yes it's good. Look, Microsoft has its own research organization, and it's called Microsoft Research. That's 1,200 top researchers I dare say, in all kinds of areas, who mainly look at applied technologies on the one hand . To give an example, we think we can make very big steps with energy-saving data centers. So, for example, we work together with the University of Eindhoven and TU Delft. We also work with research institutes, we are now in talks with Soton Delta? That's a specific example.

We of course also do a lot of research in the field of sustainability. So we also work with universities there. We actually have a couple of universities that we have some research programs with, but very often we do that through Microsoft Research. They then hire PhD students, say, for specific research. That is then a specific consortium . In addition to the universities, parties such as Deltaris , of course, also play an important role in this. So from a sustainability point of view, we are building a planetary computer. This actually means that we want to unlock a lot of open data about the climate, about oceans, about biodiversity, say, worldwide.

We have collaborated with Deltaris to develop more detailed data sets for climate, etc. We do this in many areas. That's how Eveline said, TU Delft is the showpiece, we are building a quantum computer there.

We also carry out fundamental research, so not only applied research, but also fundamental research . Leo Cauenhoven. Those are some examples, but we work relatively often with universities, and even in the field of responsible AI . For example, think about collaboration we have with … yes future regulations about allowing facial recognition. Applicable AI to Forensics, etc

And how do those kinds of collaborations come about? Is that that you put out a certain order for a certain university, or?

R: No, I would almost say that we have traditionally had somewhat longer relationships with a few universities. For quantum, there are really a few universities worldwide that are simply leaders in this field. What we also do, we sometimes do that consciously, but then it is not so much the reputation of the university that leads, but then it is much more the professor who leads it, and that also fits within the ambitions that Microsoft has in doing so.

Rob you just mentioned that the regulations for future innovations are very important. I also wondered in the context of the Rabo Carbon Bank, the technology you have to use for this, what does the regulatory framework look like at the moment?

R: Phew, that's a good question. I honestly wouldn't say. I would almost say is there already sufficient regulatory framework for this? We're actually in a situation now… Look, what we're actually doing, last year I believe we saved 1.6 Mt of carbon. We saved 6 percent from our own operations, and the rest came from 26 projects that have more to do with nature-based carbon capture. That 's actually what Rabobank falls into. Think of reformation, all that sort of thing. We are mainly in the state of what can we learn from doing that in a familiar way? That applies to us, even though Eveline just gave an example there, if we invest, if we buy credits from a forest that is being replanted, but in three years it will be cut down again, then you should know that. That has to be organised, you have to take fire into account, the forests are burning down, fraud is being committed . So in particular we are looking more into that angle of, how do you buy that well? On the conditions required for the system to get it closed? The Rabobank with its carbon bank fits in perfectly with that, because they actually lift it again ... They make a marketplace. Of course, it doesn't make sense for Microsoft to say 'we are big enough to do that one-on-one. And to, just to name a few, to negotiate with the Colombian government. You want to have a marketplace for that.

Because which contribution from Rabobank is very important to you that you do not have yourself, why did you enter into this collaboration and not work with such a government in Colombia, for example?

R: By the way, I don't mention Colombia by chance. So my colleague in Colombia is in talks with the government in Colombia to build such a marketplace. So governments also indicate that we want to commercialize our economy and the things we do in our country to conserve nature, so to speak . And you need a marketplace for that. Microsoft is also being asked to participate in it. So we look like gosh can't we put them in contact with Rabobank's carbon bank? But we also assume that several marketplaces will arise . I think that's only good. I don't think there will be just one marketplace for this. For us, Rabobank is really a frontrunner for building such a marketplace. We emphatically don't want to be such a marketplace owner. We are not the orchistrator in that, we want to provide the technology in that. And we actually want to ensure that such an ecosystem is created, and that the conditions are also right. That a global system is created through which we enter the world of nature conservation and the corporate world, which have very clear goals to undo carbon, to bring those two worlds together. They are an incubator in that, where we can test our technology.

I do not know if you still want to add something?

DA: I think he actually said it perfectly! I do have an addition, you just had a question about universities. Rob just mentioned Microsoft Research. Microsoft Research is also involved in this project. There are of course a lot of things that we at Microsoft are also working on to

investigate. One of those things is that we have now started a research project with Microsoft, Rabobank, and the University of Burundi. This is being funded by both Microsoft Research and Rabobank, to investigate which agrosystems can best be implemented. So they have a whole team there, so the Netherlands, but also Burundi in this case .

You asked about the expertise of Rabobank and Microsoft, right?

Yes, indeed, what the added value is for Microsoft, because Rob just said that you can also work independently with a party such as the Colombian government.

DA: Rabobank, on the other hand, has contacts with the intermediaries, so it is very easy to say that we are now going to focus on smallholder farmers, but how do you reach those smallholder farmers? They also have the knowledge of all intermediaries: What kind of smallholders are they? What crops do they have now? How can we reach them? What is important to them ?

You've said a few times that you're bringing that technology. Which specific technology does it concern?

DA: It's now being built by Microsoft Dynamics, and eventually Azure, which is our cloud.

The Rabobank site also states that remote sensing, artificial intelligence and machine learning are being used. Could you explain exactly how that works for this project?

DA: Do you know what remote sensing is?

Only in the baselines.

DA: Okay, let me explain. Well, so we have a lot of plots of land that we need to monitor. Previously, if you wanted to measure the carbon sequestration of a tree, you would walk around it with a tape measure, and you would measure 'what is the delta between two measurements?' Say a year. It just takes a lot of time, especially if you do 100 000 trees in a given area have . So we use remote sensing technology, so that's satellite images, public and private, but that's lider data too. Lider data is actually a kind of device that is put on a drone, or on an airplane, and it creates a 3D image of a country. That way you can compare a lider image from last year. That way you can also measure your delta.

So we use those different techniques of remote sensing . In addition, we also do ground validation, so measuring that, just before the initial phase, to see if it is accurate. This is then measured at the beginning and end of the year, so that you know what happened in that year. That data is bundled and sent to a remote sensing third party. That third party does an analysis, it has its own algorithm, and it does its own analysis based on thousands of factors that are looked at, and from that they make a calculation of 'so many tons of CO_2 are sequestred on this area, on this part of country . That is being diverted to the market place and the platform. Based on this, Rabobank can then say 'we can offer so many credits . Once a buyer for those credits is found, they are created, which they are created directly, which are then marketed to the corporate, so Microsoft in this case, because it means that the credits are created, but also sold immediately so no one can buy them anymore. The reason why ... There are several things that we are working on in the product group, for example casual orbital that is called, that is a solution where Microsoft works on ground stations, so that you immediately have an image ... when the satellite flies over it, then ingest those directly in Azure. Very raw data comes from the satellite, very raw. What that ground station then does is translate it immediately into data that you can use in the model . That's something we're looking at right now with Microsoft. The only thing is that that algorithm, making that algorithm is not that difficult, but

figuring out which factors to take into account is very complex . And that knowledge is just very specific Geo-spatial knowledge, and agricultural and ecological I know a lot of things that Microsoft does not have, so you always need that third party for that .

And what are the criteria that are currently being used for this, which are already clear?

DA: The criteria for the algorithm?

Yes, because you said, it is very difficult to determine which criteria to include. Which criteria are already clear that should be taken into account in any case?

DA: Really a huge list of things to look at, temperature, soil, there are just so many, I can't even name them. We have also looked with Rabobank, we want the algorithm to become part of Rabobank, so that we can also resell this algorithm as project Acorn. So as being able to offer some sort of solution, but it is so complex to do that without those companies. So much knowledge is involved, not impossible, but just as difficult for now.

And are there any results between the data from the satellites and the traditional method used?

DA: Difference in knowledge?

In the past, of course, it was only measured by pulling a cord around a tree and then you knew it. Of course you are now using a very revolutionary approach to that, but you are still checking to see if that produces equal results. I'm actually curious if there are any differences found, or if it might lead to the same results.

DA: The official answer is no. It's very important to keep calibrating to see if the plot you're assuming is, say, the coordinates you're assuming for the satellite images, so it's just a trial on error . There are sometimes differences in the carbon sequestration number that comes back. That's why we also do the ground validation just to be sure . We've done two phases of PLC's now, to test with different partners, with five satellite partners, which is the sequestration of the same plot of land where we also did ground measures, to measure what's most accurate. Each time the measurement is taken that is the most conservative . So, look, we ourselves benefit most from it if it matches reality as much as possible. But, in the meantime, just keep the most conservative.

Bright. You said the traditional method was indeed to pull such a ribbon around a tree, do you also take soil samples to look. Of course carbon can be offset through trees, but also through adjustments in the ground. Are those also things that can be measured in this way?

DA: Yes, we look at the above and below ground, so not only all the trees that grow there, but also vegetation etc.

And do you also do those ground samples to check that too?

I don't know, that's a bit too operational question. I'm not involved in that. So would you give that to Rawhok? Have to ask yourself.

Okay. Earlier I had a conversation with Jelmer van de Mortel of the Rabobank, and he told me that the site also stated that remote sensing was being used, but that that was actually not correct. But, actually I can conclude from your story that you do use that remote sensing a lot?

DA: I can't believe he said no remote sensing, because that's what all PLCs are about, and he's on top of it, so I think maybe he meant something else. It may not have been the case at the time of publication, but it certainly is now.

OK, clear. Rob, you just said yourself that you're a little further away from it. What is your vision of the Rabo Carbon Bank?

R: Well, to start with, and you can see that in the way we deal with our customers, we are really actively looking for corporate responsible organizations . As Microsoft, we have said that 'if we leave it to the governments, and leave it to the polder model, we will really not achieve the Paris goals. We can all try to switch to green energy, if we all do it we will not reach the targets yet. We really need to do a lot more. We believe that as a large organisation, we have a lot of buying power, a lot of innovative power, but also a very large ecosystem, we as organizations should do more about this. With us, I dare say that, it is about reversing the climate, the climate effects. We are therefore very actively looking for organizations that have the same commitment. Rabobank is one of them, but Unilever, for example, is also one of them, oddly enough perhaps, Shell is also one of them, which will play an important role, and to which we will also contribute our knowledge. They will also have to radically change their business model. There we are both a technology partner and a customer . Think for a moment about hydrogen, to start using hydrogen and to generate green hydrogen, to do green energy at sea you need companies like Microsoft. We also take that energy, that green energy, and we are committed to doing that for the next 10 years.

That is somewhat in the same spirit as what we do with Rabobank. So it's a meeting of minds, it's a commitment , but it's also using the technology, the buying power, and the rest of our ecosystem to make sure we can really start making things like this.

Eveline, I was also curious how revolutionary is the innovation that you apply through the Rabo Carbon Bank? Is it a revolutionary innovation, or how do you characterize it yourself?

DA: Very strategic project for Microsoft. There are still few marketplaces that originated from two corporates. So it is certain ... there is just another new one between two banks, but we have been working on it for a year and a half. It's a very strategic project, not only in terms of innovation, where one of our clients is doing something very different from the traditional way of making money for a bank, but on the other hand, also very useful for us, as I mentioned. said, to achieve our own goals. Also very strategic in that area , and if we then start building it together, and are at the forefront of what it will look like, that is of course very special for a company like Microsoft.

Because the technologies you use for this are already in this way, and especially by using those different methods together, has that already been applied together, perhaps by other parties? Or is that really a whole new way of working?

DA: As far as I know, everything we've made is a bit of a search because we don't really know what it's going to look like yet, because it doesn't exist yet either . So, we looked at what is our suite of products? Where do we cut corners? So, where can we use something that Microsoft has more than enough knowledge and experience with that we can easily implement, and what can we custom code, so what else needs to be made separately to make it a whole? So it's a combination of cutting-edge and our pretty butter?

R: I think you have to look closely at … I think the innovation is in bringing together the economic model, business model and technology . To cite an example, we had a discussion this morning about farm beach, which is a solution we have as, I'll just call it a platform for a service of intelligent farming. Yes, that also uses sensors, for example. But suppose you can make a profit of 500 euros per hectare of potatoes, then you can imagine that you cannot put 3000 euros worth of sensors in that field, with 20,000 euros solutions to monitor that. So also the search for practical solutions, the application, in the end there is really the innovation in the application to make it right. And also in

that case, so in farm beach, Microsoft has a lot of technology available, but we also need sensor technology technology, we need knowledge of chemicals, knowledge of a farm so to speak. So you ultimately need a consortium of companies that bring that together to make it workable and affordable for the entire ecosystem.

That is indeed one of the challenges of making it cost-effective. Are there any other major challenges you face in this project?

R: I dare not say so.

DA: You mean operational?

I don't know if you ran into any specific problems in this project?

DA: There are a lot of challenges that we've had, but I think the strength is that we can afford to do it. We have the resources, we have the capital to do this, on both sides, to facilitate this, and enough expertise and enough people around us who can help us in this ecosystem, but also in terms of partners. Our Chief Environmental Officer, Lucas Joppa, said, 'It's a great idea, and we really need it, and it's very important for Microsoft, too, but I don't see it happening, it's not feasible'. oh no! We were really like 'how are we going to do this?', and we were asked 'why exactly'? Then he had three big points, 'how is this going to work? How will this work? And this is not right'. He is of course the expert on sustainability, and how do you make that feasible in enterprise, that was the first challenge we had. Then we worked a lot with him, with his team, had a lot of iterations as I mentioned before. And tried very much of 'we chose this for this and this reason'. So far no insurmountable hurdles.

As a last question, you just mentioned all the stakeholders that you had got those on board. What collaborations are there actually? First of all, of course, you work together with Rabobank. Are there any other important parties you collaborate with in this project?

Yes, Alvanare?? Is a partner of ours . What often happens at Microsoft Consulting is, we make something, we build it, we are in charge of the architecture. Once it takes shape, we hand it over to a partner who will actually build it: Alvanare, they are now building it further. So Alvanade is an important party, I think that's the most important one next to Carbon Direct.

Interview Emma van de Ven, 19-07-2021

First of all, it is useful to know exactly what your role is at the Rabo Carbon Bank?

I'm going to start with Carbon Bank and the Acron first. Do you know this term?

Is it the same or a broader concept than the Carbon Bank?

Rabobank is a large international agricultural bank that people only know in the Netherlands, where the bank works with many farmers, including many small farmers. That's where Acorn originated. With this we can give small farmers access to the carbon credit market. Acorn started out of the ambition to help small farmers. Parallel to this, a little later, the large Carbon Bank was also launched . A larger Carbon Bank that not only focuses on developing projects and launching them, but also on advising customers who want to reduce carbon so that we consumers, but also B2C and B2B, insetting as offsetting, the bigger package . That arose parallel to Acorn. We are now working closely together, because Acorn is very specialized already a lot further than Carbon Bank,

while the Carbon Bank approaches it very much from the market. What does the market want? What does the carbon credit look like? There are a number of companies , initiatives, farmers, etc. that provide carbon credits to the Carbon Bank .

But the same people work for Acorn as for the Rabo Carbon Bank, or is that not always the case?

No, that makes it a bit more complex. Everyone who works for Acorn falls under Wholesale & Rural Both the Carbon Bank has now actually become an extra business line next door. The people who work for Acorn are under a different management than those who work for Carbon Bank, but in fact it is very much moving towards each other. The more that the bodies mature, the more they converge.

Does it also lead to complications because there are differences between them?

No, because in every area where we can work together, we work together. The Carbon Bank focuses very much on soil carbon, which is a completely different measurement method than you do with agroforestry. That's really planting trees.

What is the greater purpose of Acorn? Rabo Carbon Bank has its own specific goals that it wants to achieve in 2025, for example.

The difference is actually not very big. If you look at Rabobank's general mission, you have two great slogans: “Growing a better world together and Feeding the world sustainably” . Everyone pretty much knows what we do, but if you look at KPIs, they're a bit loose. For Acorn it is clear, but for the Carbon Bank it is not yet defined what they want to achieve because they are still in a testing phase.

If you read the latest articles, the ambitions were the objectives linked to the Rabo Carbon Bank. But if I understand you correctly, that is the objective of project Acorn and for the Rabo Carbon Bank when those projects are ready, new objectives will be vented from them.

Yes, additional objectives come from that. Because when the Carbon Bank was transferred to Barbara Baarsma, that was a very big PR moment. Shortly before that, we were actually publicly committed to the Acorn proposition. These were linked very quickly because Barbara could clearly indicate what had been achieved by the large Carbon Bank. That actually ended 1 on 1 in a media. That's good that so much has been published and written about it and Acorn is then a way in which the Carbon Bank gets its supply.

So there are many agreements and the Carbon Bank is part of project Acorn?

No, the other way around, Acorn is part of the Rabo Carbon Bank. Acorn is one of the ways the Carbon Bank creates carbon credits.

Oh I thought Acorn was a bit bigger and had been around longer?

Acorn has gotten bigger because it specifically has one focus. Acorn may well indicate while Carbon is still diverging. So you have to see it a bit, this is what the Carbon Bank is doing and Acorn is a lot faster straight into detail. While Carbon Bank is slowly profiling again. That's why it's easier to talk about Acorn. So, RCB: Diverge, so in width. Acorn: Converge, so in depth. This is important.

What has been your role and what is your role now? You said you were kind of in between at first.

I started in two positions, I have described those business lines vertically so to speak: so Consumers, Businesses, Wholesale & Rural . I started in a horizontal department, the innovation support department. Who works with all the vertical teams?? I was a validation expert in those teams. That

means that you are going to test a proposition completely and together you will decide OK this will work and then you continue with this.

[Additional info:] DTO [Digital Transformation], which includes the innovation factory, is a “horizontal” department. This means that it does not work in silos, but rather forms the connection between the vertical business lines that normally do not work together very actively. FYI: Carbon Bank is now also starting to become a business line, so that 4 th to Consumers, Companies and W&R.

Propositions, is that one of the propositions that Rabobank puts forward to help farmers and to give advice or something similar?

Yes, for example. So a proposition within the Carbon Bank could be: advise farmers on how to store more carbon in the soil or give advice on how to reduce their emissions. These are two different propositions within the Carbon Bank .

What timeframe are you talking about that there were only 2 people present?

March 2020

Could you tell me how many people are working on it now?

On Acorn 16 full-timers and another 24 part-timers and some external parties.

And at the Rabo Carbon Bank? You're saying that's actually the bigger picture?

Equally comparable numbers, around 30. I don't dare to say it very well because it changes so quickly. The Carbon Bank works much more with outsiders, so they hire more or less people depending on the need. That's more of a dynamic team. At Acorn there is more of a permanent team.

Can you tell us something about the expertise that the Rabo Carbon Bank itself has? What do they engage external parties for?

We actually work actively with a number of parties who do what I do. What I've done in the past, I've changed roles. That is simply developing that proposition further. What you see that we are good at as Rabobank is doing interviews and understanding in-dept what consumers think and feel. It is easier to collaborate with external agencies (who don't know much about in-depth interviews) and to do more growth hacking, f.e. by building three websites to see which generate more clicks, so for that kind of external stuff. We work a lot with these kinds of companies. Especially Carbon Banking because it focuses much more on consumers .

You say that Carbon Banking is more consumer-oriented, while the product being created is intended for corporates. Can you explain a little bit what the importance of focusing on consumers is?

Yes I think there is confusion there, that carbon credits are only for corporates. (Additional addition: consumers can also be corporates. Customers, company or individual.) That is one difference between Carbon Bank and Acorn. At Acorn we said: there are a few large corporates that have such a need for an offset that we can already cover the full demand with it. While in the future we may want to create supply. And with that also start serving other people, so to speak. We will now stop looking for more buyers, because we have enough. While the Carbon Bank is more concerned with the future. How would we like to be? Smaller or larger batches don't really matter for the supply.

If I go on holiday now and I want to convert those emissions, can I use the Rabo Carbon Bank in the future?

yes

Okay

You also create a difference between the Carbon Bank and Acorn. How well known are you as Carbon Bank? How familiar are you with the carbon credit market?

I'm researching it now. Before that I was already familiar with the EU ETS, how it works. So I did get to know a little more about it. Are you targeting specific aspects of it?

I mainly mean the difference between the compliance market and the voluntary market. The Carbon Bank is very much based on what consumers want to see? The changing market. And Acorn says, this is what we're going to offer. Those two attitudes are very valuable in parallel, because on the one hand you can further develop the definition of carbon credit, so that Acorn does that, while on the other hand you can build a good relationship with your customers, so you also know what they need. to wear. That it happens in parallel, I wouldn't say one of the approaches is better than the other because that market is so in flux.

The way in which I analyse the Rabobank Carbon Bank is through the Quintuple Helix model. I don't know if you are familiar with that? It is a model that works on the basis of 5 subsystems. Initially this included the university: the education subsystem. Government and the Economic Subsystem. Later, 2 other subsystems were added. Media and culture based public. The natural environment that encompasses everything. You see a dynamic emerging, actually a development of knowledge. One subsystem develops knowledge that flows into the next subsystem. In this way, all subsystems contribute to innovation that takes place. The public is an important factor in this. Not only as a consumer, but also how they view the initiative of the Rabo Carbon Bank. I'm also curious about the importance you attach to it. At some point, the public will like it. The public has often thought things through about all Rabobank's activities. You are now working more and more with, you are also focusing more and more on these kinds of projects. What importance do you attach to that subsystem, which includes the public and also the cultural value that the public has?

Yes nice question. I don't work at PR, I do know what Acorn does is very popular with managing boards, precisely because it gives a counter voice. Rabobank has been criticized a lot because they finance a lot in the agricultural sector. The agricultural sector is by no CO_2 neutral, especially with Dutch farmers who always kept under scrutiny are . You can't be much more charming when it comes to public opinion . On the other hand, it is also very important that this does not become some kind of corporate responsibility thing, but a really big part of Rabobank's revenue model. So it goes a step further than showing how much fun we are having. There really has to be a revenue model behind it to ensure that this can happen . That has less to do with public opinion about how much fun it is what we all do, because it also has to generate real money.

Long story short: Ultimately it is always a complex market, the carbon credit market. That is also the big reason why we at Acorn are redefining the concept of carbon credits. To say nature-based removal, ex-post, for starters. Transparency in the origin of those credits. We can offer by remote sensing, since you using remote sensing can just see what the differences year to year because you ex-post markets . These are all fairly revolutionary principles in nature-based removal. And precisely to make vagueness in that market very concrete, because there are so many different

credits, we said we really only do this for avoidance and reduction, we will trade as Rabo credits. It is really debatable whether you achieve anything positive with that. If someone points to a forest and says he's going to cut the forest and someone else says: no, no, here's money, don't cut the forest, then you have realized a carbon credit. Very bluntly said, provided that person does not cut down that forest because he earns money. You know how that market works. It's about what it takes. That is precisely why such PR problems are very difficult when you are talking about public opinion. If someone in a bad mood writes an article that is certainly about 90% true (extra info: 90% of the carbon market is indeed a disaster. Acorn is that 10%. See extra drawing added) and that puts it in a terrible light . And that 10% is something we're very explicit about. No, there is nothing else to look at what we do, it's just very important because otherwise all on one big heap swept the rest of the 90% of the carbon credits that are available are .

It does indeed provide insight into how you look at this and how you deal with it with consumers. Another important aspect of this model is the collaboration with the educational subsystem, for example your collaboration with Maastricht University on BISCI. I'm curious how this collaboration came about.

Jelmer (head of Acorn) studied in Maastricht and I think he knew Ton Geurs. He thought it was interesting, let's talk. In my view, the project originated with Rabobank.

What was your goal with this collaboration?

Data management is a huge part of Acorn, data from the farmers, how much carbon is stored? And how does the value develop? Because we make and market carbon credits from Agroforestry, regenerative agriculture . So make sure that that value is returned to the farmer in a fair way. This is very important for the proposition because it is important that nothing gets stuck on the bow throughout the process. And the transparency and composition is very important to Acorn, the collaboration has just started to get a more objective picture. Solidaridad is the third party in this cooperation. We often work together as a partner on the ground, a pleasant party to work with . There is a lot of trust because there are different perspectives from both the knowledge from the ground up, what is the value of the data that comes from us, where value is created, to the ethical modulating side. You can see that very much in the Maastricht consortium. It's not just BISCI, it's DAD I believe, data analytics, and MSI. Sustainable Innovation?

MSI is our Maastricht Sustainability Institute

Yes, and those different factors are therefore very interesting for us. Precisely because it not only shows what we do, but also the impact of the choices you make.

And the objectivity of the research… My position now is Strategy & Research Lead, so partly strategy support, and partly I focus on research with external parties, of all shapes and sizes. So Fair & Smart Data is one of the projects.

It is interesting with the model that I use, because it also focuses very specifically on the exchange of knowledge. Could you tell us how things are between those parties? Because you are now really researching that R&D, how is the dynamic of that knowledge exchange?

Very nice so far. Everyone is still looking for what will be my end product, something group-specific, the expertise that comes together. We are sharing similar projects we participate in. And I like that a lot. In addition, it is very easy to collaborate with all those parties because we all have the same goal in mind. Actually, nothing we share is a risk, it can only get better. So there's basically you're not allowed to share, so figure it out. First: We are extremely tightly controlled by the European Bank as

a bank handling all that data. Secondly, we have analysed the data that we are now working with, because we work with a platform from the test street. We can't share uploads, but we can share everything else. There is a large test street from the university in which entrepreneurs can ask all kinds of questions. Everyone is just very enthusiastic about the work we do. I'm afraid I didn't answer your question correctly. Sharing knowledge is different from sharing data. We just don't have enough knowledge at this point. So that's why I'm approaching the subject from the data.

You indicated that because it is not yet so clear what the knowledge is, you look at the expertise of all parties. Can you name the parties? Can you say what the research group that is there consists of?

Do you mean this specific group? The Fair & Smart Data group?

In addition to Fair & Smart Data, are there other specific research groups within the Rabo Carbon Bank?

There is a major university demand from the Carbon Bank in which students solve problems for startups and entrepreneurs. It's actually a kind of contest. That was set up by the Carbon Bank with partners, there is a lot of money in it. Money motivated comes to us, we provide knowledge. There's for the Carbon Bank . What I do for Acorn is a lot more specific. So a few examples: We are now doing about 10 pilots with all kinds of parties on the ground, all of which are implementing agroforestry models with those small farmers. That is really at the pilot level to really learn as much as possible. There we learn a lot about the needs of those farmers, about the value propositions towards the farmers, about the financing need and the like . These are actually 2 private parties: an NGO that works with the farmer and the Rabobank. Not directly a separate institute. What I'm doing now is actually about what we are learning from those pilots in order to discuss this with Wageningen University, for example, to draw up research plans based on initial conclusions about how we can quantify impact . Those are quite a few individual projects. Not in the field of CO_2 storage, but in the field of social and economic consequences of participating in the project, for example. And for that, we first simply needed ground data to understand what we can research. So now we have come far enough to know what we don't know yet, and we can specifically ask for help from knowledge institutes. We do the same with the value proposition of farmers, and the usefulness of certain financial incentives, so where we have to pay a farmer to create a certain behavior, how can you get behavior so that you don't cut a tree to pay school fees, but grow something else. So encourage behavior . Because how is money handled day after day with those farmers? That's a completely different group investigating this. Stanford and Microsoft Research. In combination with Rabobank and university research partners and our pilot partners, not all. Depending on interests . A very nice group, projects that we are setting up, what we are still investigating, I wouldn't write about it extensively, because this is not so publicly known and worked out yet.

How did the collaboration with Wij.L and come about in the Netherlands? And are there other similar collaborations in the Netherlands?

I don't know.

Wij.Land originated from Commonland, it has written an approche how to create landscape restoration in 3 zones in 25 years. Weiland is an executive party of commonland. I heard that they are in the Netherlands, there you have a different business plan than in Africa, because the soil is different and such. In the Netherlands they are looking at how they can contribute to the Carbon Bank. Barbara Baarsma indicates that they would like to involve Dutch farmers in the project, but

that she did not yet have a clear idea of how they could do this. Weiland is one of the parties to investigate this.

That rings a bell. This is really the Carbon Bank. The Carbon Bank has a proposition that is really aimed at Dutch farmers, and another proposition is aimed at farmers in North America, Brazil and Australia, for example. I am not specifically involved in that, because it concerns such a different target group. It specifically concerns soil storage (CO2 storage in the soil, soil carbon) , and you can test that very well with samples from the soil in the Netherlands. In the Netherlands you can of course just drive by. So it's a whole different phase of research. Unfortunately I can't tell you much about that.

You already mentioned the remote sensing technologies yourself, and that you also have to take samples from the ground. In a conversation with Microsoft, I gained insight into how this works. They have also said that to check that remote sensing data they also use the traditional usages. Measuring the size of a tree with a cord.

Who were those people from Microsoft?

That was two people from Microsoft, a digital advisor and someone who had written an article for Carbon Bank, who was less involved. So the digital advisor said that to check the data, they also use the traditional measurement methods. Measure the circumference of a tree from the ground. She also said that it is possible to measure (by means of remote sensing) what the carbon storage is in the ground. I was wondering whether to check those figures for soil carbon you also do those soil samples independently to check whether those data are correct.

No, we don't. It might be good to explain the difference between soil carbon and underground root systems. Of course, a tree simply has a root system, and you can see a little bit from the tree's climate how big the underground root system is. Between 25 and 45% of the underground biomass can be seen above ground. We use a conversion factor for this. But that is very different from soil storage. Because trees are still biomass and soil carbon storage is not necessarily so. We are now closing with Acorn, by means of remote sensing we still exclude bottom carbon, because it is not yet reliable enough. At the same time, the Carbon Bank is looking into doing this by means of a whole lot of other factors that you can pick up by means of remote sensing. So they are working on that, while we are more concerned with above-ground biomass. Finally, we can bring that together. Because it is the sharing of two different algorithms that are complementary.

So you say that innovation is needed to gain insight into that. Are there also things that your colleagues are investigating? Or has that question been posed to universities? How do you try to understand that?

For Acorn we work together with experts. Remote sensing data analysts experts who have knowledge of agroforestry. What you see is that there are a lot of startups that say they can do it, but that's just not the case. You could say globally, in an area of 1000 hectares, the average carbon of a forest, which is completely different from a forest with different types of vegetation. Agroforestry is right is a lot of different plants together .

We invest an incredible amount of money in soil data. We therefore also share this data with research parties, because it is very valuable to them. Unfortunately, there are no universities (until now) that can help with remote sensing issues . Collecting ground data is very expensive. In fact, what we're doing is measuring hundreds of thousands of trees by hand. We use that data to train the algorithms. That's just so expensive. That's also the reason it's never been done, because it's so

expensive to collect that information. And that's what I mean by trust from above, so that we can invest on a large scale. That's really important.

How large should the scale be to make this cost-effective?

From my head are the first estimates for break-even, which have also changed again because we have learned a few things about the costs of certification, which we have been able to reduce considerably. That is because a whole lot of costs of remote sensing are arranged differently. I think the breakeven is around the million jacks, 1-2 million jacks , around those numbers. But don't quote me on that, because it changes a lot as we do more stuff… it's really a business case from April.

I am also curious how you came to Africa with the farmers. Were these already farmers who were already customers or how did you approach them to become part of this project?

Don't underestimate how small these farmers are. They are real farmers with half a hectare who had no legitimacy, no fundamental rights, no bank accounts. Who earn less than 1000 euros per hectare per year. Many of these farmers also have work through large traders, you have coffee and cocoa traders . Those are two very specific types of plants that are only done to smaller farmers. It is the larger parties in that market that have a gigantic network of small farmers and also know a lot about it and are very familiar with it.

So that was also a basis from which this initiative came about? That you saw from the market that those farmers really have an interest in this in addition to the co-benefits that they already receive anyway. Is the production of a product just hugely important? [Connection dropped] What I actually want to know is that these contact parties indicate that this is also the need of the market? And to what extent has that been the basis from which this initiative arose. Several things have of course come together, for example that the corporates need credits, but this is a different form.

This has been my contribution a bit at the beginning of Acorn, because the idea was to open up that market for small farmers by means of remote sensing. Assuming there was a pretty good reason for those farmers to plant trees. And what I've done in the beginning is dive deep into the realities of those farmers, what they're facing, what their own problems are and in the short and long term. This has resulted in a very large focus on agroforestry, because regenerative agriculture is so crucial for the degraded soil that everyone has to deal with, little rainfall. To put it bluntly, trees attract rain. It all has to do with the reflection of the sun, micro-climates . I could say a lot more about it, but science trees attract rain is now slowly starting to sink in . That ultimately determined the very specific focus of agroforestry. Because we saw that this is an agricultural solution that is very close to the natural climate and vegetation, but that gives farmers the opportunity to give soil diversity, to diversity in income streams, in eco-biodiversity, in harvest seasons and production. That makes a lot of difference. That's why we have chosen this .

And those smallholders, for example the cocoa farmers you involved in this. Any other important crops for smallholders?

Yes, coffee is a big one. For the simple reason that both coffee and cocoa have a great need for shade . That's really something that's really permeating both markets, which goes hand in hand with quality and production. We now have to make it an eco-system. But you also see very much that monoculture plantations (f.e.Walnuts , walnuts are more of a temperate climate plant, while macadamia nuts or cashew nuts grow a lot with smallholders.) are extremely sensitive to certain diseases. It also makes sense to make the ecosystem more resilient to these diseases. With those

trees, much more attention is paid to biodiversity, to ensure that you bring such an ecosystem more into balance .

Okay, I have one final question: You said there are ten pilot projects, including in the Netherlands and the US. Which countries does it concern exactly?

They are somewhat more pilot projects. For Acorn, it's about ten. The Carbon Bank does not necessarily have pilot projects, but they specifically work with specific farmers because the larger farmers also have projects on their own, so they don't have to turn it into a whole project. With Acron, the pilot projects are therefore located in different places, actually on all continents.

And specifically in Africa, you already mentioned Kenya, a country with which you have a lot of cooperation. So I assume that is also one of the countries where the pilot projects are taking place?

Yes Kenya, Burundi, Tanzania, Vietnam, Zambia, Liberia. There are still a few projects that are not up and running yet, but we are working on them. All countries are actually around the equator, and all projects are with the help of partners that we have.

What is the biggest challenge for Carbon Bank?

If I have to answer that on behalf of the Carbon Bank … I find it difficult, because it is a very diverse collection.

Or maybe from Acorn if that's easier.

For Acorn, it's really about creating as much supply as possible, getting as many farmers on board as possible, to organize this transition as quickly as possible. And that just happens slowly, especially if you can't fly to a country where you want to work. So we have to do everything through partners. The same problem is very much true for the Carbon Bank. I think one of the bigger challenges for the Carbon Bank is to quantify that bottom in a scalable way.

Interview Han Brouwers Solidaridad , 20-07-2021

So I came to you through Ron Corvers. It's nice to see that you are also collaborating in this way. Perhaps you could first tell us a bit more about Solidaridad?

That's good. I don't know if you had any information beforehand?

Actually only through the information Ron had provided in the interview, so he had given an introduction there, but not really.

I'll start with myself first. I have been working for Solidaridad since the end of 2017. I'm not really a techie, but I've always worked on that interface. At Solidaridad I am mainly concerned with digitization, but we will talk about that in a moment. Solidaridad as such, founded in 1969, so we have been around for 52 years now. Originating from a protest movement in Latin America, actually against the military regimes at the time.

Hence the Spanish name?

Yes, especially focused on farmers, on land expropriation, driven by the Catholic Church at the time. There sat a missionary who was very progressive, who advocated that you stand on the barricade if there was unrest anywhere. Long story short, that's where it started. Slowly but surely that has changed from protest, social land ownership to much more the agricultural component. How can we help farmers to develop a better position. Over time, a broader programming has emerged from this philosophy. One of the major milestones was the development

of Max Havelaar, a coffee brand. Fair Trade (international) eventually emerged from Max Havelaar. That's actually our DNA. In fact, we were the first in that field. Everything that has been developed in Fair Trade since then has its origin in that farmers' movement that started in 1969.

Over time that has grown and the organization has grown into a CSO as we call it today, a Service Society Organisation, with branches in 42 countries in my head, where we are organized in six regions that have a high degree of independence . We have become a network organization over the years. This means that the regions are largely independent, legally and financially. But yes, say, developing a joint strategy with the joint umbrella. We also contribute to this, but the focus in regions is on other objectives. Those regions are South America, Central America, the third, fourth, and fifth are the African regions, so East, West, and South. And then we have Asia, which is a regional office, and that's also the largest region, which covers Asia. What I said, based on the situation in those countries, our programming varies. But the focus is strongly on working with farmers, and increasingly also in industry. Partly related to the agricultural sector. Then you have to think of cotton, cotton is ultimately a natural product. In agriculture, but also in the chain behind it. So from cotton to textiles, that is a very important and ever-increasing component. For example, the second is leather. That is also a by-product of say the agricultural sector. The focus is therefore on farmers and workers in those chains, whereby we actually focus on the social component. So exclusivity, labor rights, no child labour. So you have a range of activities.

The economic component. How can we ensure that the income position improves, how can we ensure that those farmers organize their agricultural practices in such a way that they get a higher yield at lower costs, so simply increase yield, but also sales, so how can we do they better align with national and international markets? How can they access financing? For example for possible upscaling. So those are important elements in it .

The third component is the sustainability factor. Our current strategy, we work with five-year plans, in accordance with the old communist thinking.

In previous strategies, our focus was very much on international commodity supply chains. Take fourteen commodities, then you have to think of coffee, cocoa, food & vegatables, palm oil, dairy, meat, there are fifteen or thirteen commodities where the focus was very much on Max Havelaar, Fair Trade, on the entire sector transformation. The focus has always been on standardization. To be successful in the end… a product like Max Havelaar is nice, but it still remains a small niche. If you really want to achieve systemic change , you really have to change the entire sector. In short, as long as Unilever and Nestle don't join in, you're not going to change the world, so the focus was very much on that sector transformation.

It has taken shape over the years. When we started the new five-year planning, we also looked closely at what has been achieved in those five years. For example, when you buy chocolate or coffee, you have to look for a label these days, à la Rainforest Alliance, Fair Trade, etc.

Awareness has been created, it is true that all those global brands have that label. So a certain awareness has been created. It is also true that the consumer is like 'it will be'. I mean, how many people buy that consciously? And what's actually behind it? We analyzed that sector transformation, and then we said, that sector transformation should really take the next step. We have to follow through on that.

On the other hand, if you look at, we'll just call it global mega trends, if you look at the African continent, and the Asian continent, there are very different challenges, in the development of mega

cities, the migration of the population from the countryside to the city. The gigantic climate issues, pollution, deforestation, you name it. So in our strategy we have shifted the focus from purely commodities to a combination of local supply chains. In programming and in the field, the focus is not only on producing more, but also what does healthy food look like? So to give local food more priority. But those local chains, they still remain. We call this program reclaiming sustainability. What we actually mean by that is that we put the farmer back in the center. It can both work locally and provide local markets with healthy food, but can also still play a role in the international supply chain. How for example? Through diversification. If you are a cocoa farmer, just as an example, ... an even better example is coffee. Coffee is one of the most climate-sensitive products. If you are a coffee farmer, you are dealing with climate change. There must adapt to you. Then you have various options, for example with shade plants, better absorption of water in the ground, etc. And that way you can diversify. In Africa, there is the example of macadamia trees, which are a very good crop to grow with coffee. Climatically, you make the coffee stronger by means of the shade, but at the same time, if a lot of water falls in a very short time, it also ensures absorption. And that way you also have a different crop, higher value, higher quality. You will also develop a new source of income.

Through these strategies we try to make farmers less dependent on a crop, on the one hand, where they are in a value chain where they can be locked-in immediately. On the other hand, you improve their position by realizing multiple sources of income, more stable sources of income. But before you get there, and that's the core of the programming, there's a lot that needs to be done. Then investments must be made, in this case in macadamia trees. Does he have that money?

But this is indeed an example that fits in with the RCB, of how they want to help farmers in Africa, also through agroforestry. How did this collaboration with the RCB, and with Rabobank come about before?

Well, Rabobank has always been a player in this field, of course. Or at least two of the four, the B and the O, which stands for farmers' loan bank. Of course, Rabobank has always been purely an agricultural bank. In that sense it is already a natural player. When I joined Solidaridad there were already several projects. Rabobank also has a foundation that finances projects, among other things. And as Solidaridad, and that applies to many NGOs in the Netherlands, we entered into all kinds of collaborations with Rabobank, and still do. As a project financer, etc. With regard to the somewhat longer term, we actually have two elements that are also interesting specifically with regard to my work when it comes to Rabobank.

One of these is access to finance. We are working on quite large projects in West Africa mainly to give farmers access to finance. It is necessary to scale up, the fragmentation in the cocoa sector is so great , all farmers with half hectares, a quarter hectare, to make that really economically viable. To make that a really good business case. Then it has to be scaled up, then investments have to be made in extra land. There are many farmers who are old and who want to stop.

A bank is of course not a guarantee fund, but they can be part of such a project, for example, there are a few small micro-fund institutions among them, which also run a risk when things go wrong. In that case, we guarantee for something like half a million euros.

In the longer term, they can also play a role in this as a bank, in which case they can provide the loan themselves as a bank, if that is part of the strategy. The most important thing regarding the Rabo Carbon Bank, I see a form of cooperation developing there that is strategic for us, but which can be strategic for our target group in particular. There are many possibilities, but we still have a long way to go.

Are financial loans also something that is also relevant at the RCB?

No, that's at Rabobank. A few of those projects run through the foundation. We have two projects in which the Rabobank Foundation really contributed to the design of the model. Setting up the interventions, nature, etc. So we already have a long-term relationship with Rabobank in this way. This has changed over the years, because Rabo has also had varying focus areas. We are now seeing a strong awareness of this whole story, especially in recent years. So you definitely see that. And two, I think the move to enter the carbon market is a very important one, and also a very logical one for the RCB. But also a very interesting one, also for our farmers in the areas where we work.

You already mentioned before the collaboration with the Rabo Carbon Bank, there are still some challenges. So what are the specific challenges?

Not so much in the collaboration itself. We now have a number of Acorn projects running. These are pilot projects that are taking place in Africa. The cooperation there is absolutely excellent . The commitment etc. It's more in the challenges in the field. On the one hand, the projects currently underway with Acorn are all agroforestry projects. Our overall strategy also places a huge focus on soil carbon, f.e. the absorption of CO_2 in the soil. We still have to make that shift partly ourselves. But I know that the RCB is also working on that. That's one thing.

Do you have people on the ground who provide those training?

Yes, we are always working, and that is the strength of our network structure. On the one hand, we work regionally with regional offices that have a high degree of independence. Our teams in the regions and in the countries, that is mainly local staff, people who are raised and born and trained. There are a lot of agronomists, and of course quite a lot of people who did their master's or PhD in Wageningen.

Yesterday I had an interview with Emma van der Ven of Rabobank (Acorn), who is also involved in BISCI. She also told me how they are in contact with those farmers, which is actually through traders. So there are also different parties in between. In addition, you also say that you have the networks. So those are basically the different ways you, as different parties involved in the RCB, interact with those smallholders. So it is through you through those networks, and through Rabobank it is through the traders and then back to the smallholders?

Yes, and that's where we often meet, because those traders, especially when it comes to programs, let's hold on to West Africa for a while. Those traders also often have improvement programs in which they in turn make use of NGOs with training capacity in the field. So you often see partnerships with big traders. Now there are also traders who have slowly but surely built it up themselves. So there is also a very important component of how do you eventually get to the ground? For Rabobank, this really comes from those traders, because they also finance those traders. So that's what I mean by their natural domain. They are in that sector as financiers of large agricultural producers and processors, so that is their perspective. Sometimes it overlaps, sometimes it's a partnership, and sometimes we don't meet.

In this project of the RCB it is therefore complementary that there are different ways in which that smallholder can be reached, and that there are also people on the ground through you to be in contact, to provide those training courses. That's really where you two find each other.

Yes.

Is there anything else within that dynamic that is important in terms of input from you as different parties in that collaboration?

I can give a lot of answers to that. One of the most important factors is the role of governments. On the one hand from regulations, but that is more for the longer term, but on the other hand also in initiating and co-financing things that would otherwise not happen . This access to finance project is largely financed by the Dutch government through NSO, Netherlands Space Office. Sounds a bit strange to do that via the Dutch Space Agency, but that has to do with the input of Dutch satellite information to use it to monitor deforestation and other facets.

That is of course also one of the reasons why Rabobank has teamed up with Microsoft for the RCB. They also use different satellites, of course, both public and private. You already mentioned the Dutch space agency, I don't know whether it is also an important player for Rabobank?

No, actually the Ministry of Economic Affairs is all about stimulating important sectors. This was one of them. This had been a project cycle that is now ending. I don't think it is for Rabobank… When it comes to the dynamics in the collaboration, it is indeed a bank, or financier, that is the supply chain actors, Cargil etc, the buyers.

So the traders in that case?

Yes the traders. When it comes to palm oil, it also involves local players, because the first pressing or processing of palm oil can partly be done locally. But those are indeed the supply chain actors, so the traders, but also the brands. If you look at the market, we also work directly with Mars, with Nestle, etc., the large chocolate processors. Supply chain actors, financier , but always local stakeholders in the field of regulations. So that can be either a local, regional or national government. Knowledge institutes always local, universities or otherwise since . And the 'boots-on-the-ground' , that's us with agronomic knowledge. Because then the agronomic knowledge component comes into play.

And for this project with Maastricht University, what was your objective?

Well, that actually originated or happened ... so we have the long-term program internally that we are starting up. We started doing this a year and a half ago, and it is now starting to take shape, we call it Fair Data. Fair is then not in the academic context of Findable, Accessable, etc., but fair in the sense of Fair Trade. So responsible data, ethical data, etc. What is the underlying idea? Looking at what is happening in the world in the field of Big Data. I don't have to explain it to anyone, we are all suppliers of data to Google and Facebook, and a few other parties. There are only a few who make tons of money with it. That business model has now been developed to such an extent that there is no turning back. Of course you see all kinds of movements in the field of privacy , but also slowly but surely sovereignty.

What we want to prevent is that traders, Cargill, EDM, put those farmers in a lock-in situation where they have no way out. I'm not saying it happens...

But the possibility is there.

Perhaps we are now on the last wave or overblown neoliberalism, How many followers will make it less so.

Let's hope so.

Yes, exactly. But it could happen usefull under pressure from shareholder value, so there is an Important component there. We have to protect Those farmers, that sounds a bit paternalistic, but

at least raise awareness. The WWF is busy protecting the rain forest. They come up with a program to combat deforestation, They Need data. What you see, you can already see it in practice, is That Those farmers who are visited four or five times a month by different organisaties That come to collect all kinds of data are fragmented all over the world, and Ultimately, what does it benefit the farmer? We said, if you now go back to our theme for our five-year strategy, reclaiming sustainability. What do we mean by that? We are going to positioning That farmer as an entrepreneur who can operate as a usefull sustainability entrepreneur. You can organize all kinds of activities around That farmer That Contribute to, Ultimately, the SDGs. Improving income positions, access to healthier food, food safety, soil carbon, f.e. a balance with nature, stimulating biodiversity. All are major themes of this time actually.

The long-term objective is that other revenue models will emerge in the long run. We are already experimenting with this , but a scientific framework is not yet under it at all. That's always good to see if all those assumptions we've made are correct? The validation of that, we are a long way from that. We can say, that farmer generates a lot of data, if we just keep it with that farmer, he will build an alternative income stream, or an alternative business model . But is the farmer really waiting for that? So all those assumptions that have to be tested . What are the interests of the university? What are Rabobank's interests? What are our interests? Interests sounds then, not that everyone is there for their own interests, but you have certain objectives, you have to meet certain conditions. So we are in that phase now. That's the interesting thing.

Now with Green Deal, one of the basic principles of the Green Deal is that goods imported from outside the EU will get a carbon tax, yes, how are you going to measure that? How do you go about all those elements that will determine that this product is produced less environmentally friendly than that product? A slightly lower import or higher import levy is levied on this . I don't know how they're going to do that, but they certainly thought about it. You will need a lot of data for that. That's something that's still playing in the background.

That carbon tax, that's not the same for the due diligence plans that the EU had announced, is it?

I believe that due diligence was also social. Or social elements such as child labor etc.

But is it really the case that such a carbon tax will be levied on products from outside the EU?

Yes, I got that from the plans. I haven't delved into it yet. One of the building blocks was about emissions. In China etc. certain regulations are not applied at all, and then there would be unfair competition [or a waterbed effect]. So it's been thought, if we equalize that now at the border, we'll force other continents, the US, Asia to think about it too. If it is not arranged, you still pay. Then the incentive to invest is also somewhat greater. This will partly be data driven. So In that sense, the timing is right now to look at how you deal with All Those That data in chains. Back to that farmer, for a farmer that is ultimately very relevant, because in the food supply chain it is at the base, it is at the beginning. So let's help that farmer on that data journey, to get his data business in order.

Are there any other relevant parties involved in BISCI?

We are also working on a few pilot projects Regarding our fair program data. How we see that. One of those parties we work with is Global Gap , a German organization à la Rainforest Alliance That monitors sustainability labels. So They develop the standards of a product When these receives a sustainability label, if this and this condition is met. That is actually, back to our roots, Max Havelaar and Fair Trade etc.,

You Can also do this data-driven. Farmers can use the data and the data they provide. That we can combine with satellite data and soil data, all kinds of other sources of data. If you now combine thesis and develop algorithms for this, you no longer need the entire industry auditor. . Sure, They can lie about it, but algorithms can take you a long way. You Can also develop other models, I said axis with satellite you can do a lot.

By combining all those types of data by means of a block chain, where all transactions of a supply chain can be recorded. Many different conclusions can be drawn from this combination.

One last substantive question, because in the beginning there was also talk about that systemic change that is necessary, which was actually your previous five-year vision. The RCB has also indicated that they want to contribute to systemic change in the food value chain, also through their network, or carbon movement. What do you think is the added value of the RCB in bringing about this system change?

I think the added value is very great in that sense. Just very flat, it often revolves around money. It is not the case that Rabobank simply has the money to spend it just like that, but Rabobank is a pivot. Take the traders, for example, who are simply partly dependent on the financing of a bank. They will have to respond to changing legislation , changes in the market or changing consumer behavior . That also means investing again, so a bank also plays an important role there. They can, a bank can also contribute to the achievement of certain objectives in terms of financing requirements. So they play an important role there. And when it comes specifically to carbon, there is an important role in the pre-financing. As I just said, with agroforestry you still need a certain amount of pre-financing before you actually start compensating or capturing that CO_2 . So a bank also plays an important role there. Look, in the end these movements are only making if sufficient resources are . And a bank… as I just said, it's not free money, they can't give that money away, but they can steer based on policy. And there is a very big role for a bank. Specifically with regard to a carbon bank, I think it is very important that they have taken such an initiative to make it very … Look, it comes from a project situation where they are experimenting in many ways with compensating emissions. Ultimately , you want to make that scalable, do you indeed want to go to systemic change , do you have to start producing it, does it just have to become a standard product that can be easily rolled out, etc. And a bank can also do this with the resources it has, but also through the network that it has a crucial role to play in that.

Rabobank had also claimed in an interview that, in order to meet the demand in the market, every bank should actually become a carbon bank. What is your view on that statement?

Yes, maybe. Look, not every bank is active in Africa or Asia, or in agriculture, but there are many more elements. I have to admit that I haven't thought about it specifically, but I can imagine that every bank, well take a transport company, when they need financing, of course they also have a role to play. So emission rights can also be traded there and the financing of a transport company can also be made partly dependent. Whether that really is a carbon sofa, or whether that is more in the condition of a sofa, I dare not say, my knowledge does not extend far enough. If the principle is that every sector should be made aware of its contribution to this problem or challenge, then every bank should become a carbon bank, I agree.

Interview Bart Millenaar , European Parliament, 21-07-2021

Shall I introduce myself? My name is Bart Millenaar, and I am the policy officer for agriculture, fisheries and the environment for Jan Huitema. Jan Huitema is a member of the European Parliament of the VVD as you probably know. He is therefore a full member of the environment committee, and

a deputy member in the agriculture and fisheries committee. My work is therefore mainly to support him in the work of the Agriculture and Fisheries Committee. But the environment committee also discusses various things that relate to agriculture and fisheries, so I do that part of the environment committee as well. That ranges from drafting amendments, writing briefings for Jan, making speeches and the like, that's kind of my job in the office.

So my thesis is really about carbon farming. I have seen various cases, including from the Commission in particular. One of those things is the 'Farm to Fork', in which the Commission had therefore indicated that it wanted to promote carbon farming as a new green business model, thus also a new source of income based on the climate benefits it thus provides. In addition, it was also announced that there would be an action plan for the circular economy, in which a kind of regulatory framework would be developed for the certification of carbon farming based on some kind of control mechanism. That should be ready sometime at the end of 2021. Is there anything relevant about that already?

Yes, because you contacted us based on what I think Jan tweeted as well. And just to provide some more context: You do indeed have the Commission's 'Farm to Fork' strategy, which is not a legislative document, but a strategy in which the Commission makes proposals for the legislative proposals that they are going to make. There is also talk, for example, of a circular action plan , which is already out. Jan has also been very busy with that. Indeed, something was also mentioned about a carbon market initiative, and that is indeed all you mentioned the third quarter . Just what the status is now, and actually the reason that Jan posted about it on social media is that the Commission has already published the results of the two-year study on the operationalization of carbon farming. In it they screened several case studies and actually propose how they, the EU, can actually facilitate it, a carbon initiative. And indeed, after the summer we expect the Commission to come , they are working on that now, I think they are already very done with it, but it will be published after the summer on how they can facilitate this in a European context so to speak.

So everything is known. Is there perhaps something relevant that could at least be of interest to the RCB?

In fact, they name ... as far as I know the Rabo initiative, they run into a lot of things that many similar initiatives also run into, and I think that is the research part. Also in the EU they run into the same questions of how can we guarantee that the carbon that is stored will be released later? How can we set up a system that does not penalize farmers who have already stored a lot in their soil? All that kind of questions that are not just things that Rabobank encounter runs .

Indeed.

So also at European level, and what the role of the EU is. They say we are going to facilitate that, facilitate in different ways. So we do research there, as they have done, on the same questions where Rabobank they do research also doing to me at. Secondly, they want to see how they can create a central certification system, so that yes actually that voluntary certification that Jan is working on, that is actually part of a stacked income, where farmers get income from different angles. So they want to strike a certain harmonization there .

The third thing they mention is therefore also looking at linking grants to such a system. So when I look at the CAP grants, and also from the LIFE program, and some other programs too . So what is also interesting for Rabobank, which I think they are also aware of, is that harmonization can take place, and that there is a certain willingness to also consider grants as the same system as private. That's the most important thing from my perspective . I look very positively at these kinds of

voluntary initiatives, but in the end, when I look at the income position of the farmer, it has to come from several angles if we want to make the translation.

Sure. I also read that the EU also finances pilot projects. Do you have an idea what kind of financing that is? And whether Rabobank might also be able to make use of this?

Yes, that is mainly financed from the Rising Europe. I don't have a very specific picture of which projects fall under this at the moment, but I think there are many people at Rabobank who understand this, who can apply for grants.

Sure.

But indeed, what is most important is that there is already a lot of attention for it at the moment, and that the general subsidy, the chance of a subsidy, does improve the chance of a successful subsidy application . What you usually see is that when there is more attention for a subject, one of the pillars is sustainability and climate approach, the more carbon storage is seen as a viable opportunity to reduce climate impact, yes the more attention you see going for it in those subsidies.

Bright. Of course, the 'Fit-for-55' has now also been launched, a comprehensive story that has emerged from that. Are you aware of whether there are still interesting things in it for carbon farming?

Yes, that is indeed important because of the link you make there, because as you may know we have the ETS system. The emissions trading system. At the moment, agriculture is not covered by this, it is more likely to fall under the effort-sharing regulation, you call it. Fortunately, farmers do not have to buy credits to run their business, which companies should do under the ETS. At the moment, with the new proposals of the 'Fit-for-55', the ETS system is actually being extended to additional sectors. Just to quickly make the link to agriculture: At the moment, agriculture is deliberately left out , but what I read in articles is that organizations say 'gosh, can't we also order the ETS for credits stored in agriculture? ?'. Well, that is now under the 'Fit-for-55' that is not a proposal yet, but on the one hand that is also a gap, which you could possibly think about, but it is that companies that fall under the ETS fall , yes what I just said, they have to buy credits to be allowed to emit at all.

What the risk is if we now start to give agricultural credits in the ETS, then we also give those companies an opportunity to slow down with their reduction, but that is off topic for a while.

What is important for agriculture, it now falls under the effort sharing regulation, and actually apart from that you have the LULUCF .

But there you have the Land Use, Land Use Change, and Forestry. Well, under the previous LULUCF law, the intake had to equal the emissions from those LULUCF sectors. So a country absorbs CO_2 and other greenhouses, but when that degradation changes, it also emits. And what now falls under the 'Fit-for-55' is that agriculture will actually be brought under the LULUCF. This was actually still excluded, it fell under the effort regulation, now it is being merged. That is why the goal is now set to make LULUCF + agriculture climate neutral by 2035 .

I had indeed received it.

That is therefore the most important from 'Fit-for-55'. I think that will be a very big challenge. That also means for a country like the Netherlands, with a lot of livestock farming, because livestock farming is also included. It is very difficult for a country like the Netherlands, but it also offers the opportunity to look at the entire system in an integrated manner instead of just looking at land use

and agriculture separately. So you can look more integrally. Just a link to what you are interested in. This indirectly influences the importance of carbon markets. Because to be climate neutral for all those sectors by 2035, funding is simply needed from different levels to achieve this. The LULUCF does not necessarily offer a separate income stream, but it does put pressure and new attention on this voluntary approach.

You mentioned it just now, but then there is of course a problem that arises, and that is, on the one hand, you already indicated that agriculture is currently not covered by the EU ETS. If that were the case, then those credits would remain in that sector. So what you have with an initiative like RCB, that the farmer generates credits and therefore sells them. But as already said, it actually has high emissions itself, especially if you look at the nitrogen problem in the Netherlands. Actually by selling those credits his own emissions are not covered. And actually, you already indicate with that LULUCF, that those forests should actually also compensate for agriculture. But actually by selling those credits you lose that added value, right? So I wonder how that can be realized with such initiatives now, and the perspective of neutrality in 2035.

I think it's Very Important to see Those Things separately from each other. So you've got the Legislative Framework, that's what we just talked about, there's ETS underneath, and you've got the effort sharing below that, you've got LULUCF underneath. ETS, companies have their individually, they really have to buy those credits. But with LULUCF and ECF, those are more national interpretations. National targets must be achieved, but fortunately the farmer does not necessarily have to buy credits or the like under the effort sharing. So that's one thing.

To Achieve Those goals you need funding, so you need government money for that. As far as I'm concerned, as many private income streams as possible. So the credit system, as I understand it, for example of the Rabobank, it actually only compensates That sectors are not covered under the legislation, so to speak. In other words, the Rabobank sells the credits to parties in order to work in a climate neutral manner. So what you're saying that carbon storage in agriculture would be grounds for other sectors not to reduce. That is why you should prevent this as much as possible in the Legislative Framework . The moment you already work on a voluntary basis, at a rate such as Rabo initiative. So you already have a company that itself already says I want to be climate neutral, and if you say it yourself, my experience is that companies or at first look very cost-effectively themselves What they are going to do. For those companies just have that certain remainder ... That motivation is already there. I think that last bit is only used for what they really can not do themselves. And if they can Stimulate the farmers with this also, or Contribute to the farmer's revenue model, then that seems only positive to me. But, as you say, it needs to be looked at very closely, and research, I think that should also include economic and social research, into what the actual effect on the CO_2 emissions of companies' behaviour.

Yes, and of course the well-known problem of double counting. Suppose the Netherlands has to have a certain … wants to have a 49% reduction by 2030, and those farmers in the Netherlands will also supply projects under the RCB mechanism, and supply those credits, and parties from outside the Netherlands buy those credits, then you naturally have that there are it is said that farmers have done that, and does that not fall under the 49%? Those are challenges, of course.

I think that's the biggest challenge, but those credits are not included in that 49%. I mean that's precisely the policy framework where we do have good accounting rules. And there really can not be tampered with, those goals are clear . That other question, then you come back to the whole technical thing, that we do not yet know at all what the actual effect of disturbance in the soil. We do

not really know how things like agroforestry work yet. So, yeah, that's just really hard to say what the effect or thatwill be .

There are of course many different certification systems. I have also heard that in 2022 or 2023 the Commission really wants to look specifically at those voluntary market certification schemes. And I think it's about guaranteeing a uniform certification system for one certificate, produced anywhere, compared to another certificate produced elsewhere. Is that correct, that assumption?

Yes, I think there will be more information if that carbon initiative is indeed published. I think they already know very well what they want, they do indeed want to achieve a certain harmonization at European level, which will ultimately be a voluntary carbon credit. And so more of that research is needed .

One of the issues with that, in my view, I had also talked to a carbon expert about several projects. He actually indicated that every project is actually different, and that many different factors are important in determining the price that is asked. And a so-called 'beautiful project', where the highest standards are really worked, so that has a different price than say a normal project. So I'm very curious how that can be cast in a universal certificate.

Yes, that is very difficult of course. Indeed, I do not know if you've seen it, that Commission study , otherwise I can send it to you. They have published a technical manual . They do usefull a number of case studies there. There they deal with, for example, projects That deal with rewetting peat soils, agroforestry, organic matter in the soil, grass land, and usefull integrally claustrophobia work with live stock farming, then you do not Necessarily have storage in the soil, but then it is a reduction . Those are all completely different things. At a certainement point, if you want to HARMONIZE that, a certain distribution key has to be used. I think that's the politics behind it. That is the question, how are you going to do that . But otherwise, in terms of harmonization I am, I think that is a good idea. That kind of harmonization would be very important for the farmer 's business model .

I also had a specific question about a report released from the Court of Auditors, which basically, rips of the European agricultural policy. Especially since Europe naturally wants to become carbon neutral on the one hand, but it is actually stated that European agricultural policy is actually absolutely not on the way to becoming carbon neutral. I was actually curious if that had any effect on the EP.

Yes, that report certainly had a lot to do with it, but it's also been known for some time, hasn't it?

No, it's not new no.

So, what the European Court of Auditors is actually saying is those greening measures from the current CAP, they have proven to be absolutely ineffective, and they have often had no effect on changes, f.e. changes in land use. For example, there is a requirement to allocate a portion to ecological focus areas. In many cases the farmers comply, and so the status quo is subsidized more. So now a deal has been reached for the new European agricultural policy that will come into effect in 2023. Just for your perspective, what I, or what Jan has always invested heavily in, are the eco-schemes . By this I mean that part of the first pillar is used to link payments more directly to the farmer's results, and also to give the farmer more room to offer those measures himself.

Our perspective on this was the greening measures that were actually Imposed at European level, and then I also saw, having Studied in Wageningen myself, we saw that or at least the farmers do in practice to meet those requirements. What is much more important is to have local implementation , and so you can compile the measures also locally . Is that from our perspective it is

for the shift to sustainable agriculture, local plans are important and room for manoeuvre for the farmer. To be rewarded for this, based on the results . We are allowed to be critical of our farmers and set goals. But that report from the Court of Auditors says, 'At least it didn't work this way!' Now, 25%, or at least 25% now goes to the eco- schemes . We had hoped it would have been more. We have also worked for that, and we have also worked to organize those eco-schemes as well as possible. It is now up to the Netherlands to implement this. I think that's an important shift, but I think we need to take an even bigger step for the next 7 years. The eternal story.

Finally, I'm curious about your view on the quote from the RCB, and that was actually to answer the question of corporates in particular, every bank should become a carbon bank. What do you think of that?

I think that's a very good idea. As far as I'm concerned, the more funding there is in this area, the better! And, yes, provided we said before, good research needs to be done , what do you call that? That you will fail when there is more space for credits. But what I had also heard from Rabobank, banks simply have a unique position to facilitate in this area. We can start all kinds of offices, and all kinds of separate projects can come, and all kinds of project bureaus can be set up to facilitate that, but then I think: banks already have the financial knowledge of the markets in their pocket, and yes, you have the supply and demand side. So when you talk about those voluntary initiatives, banks have a very important role.

Finally, I was also interested in the forest strategy that was also launched by the EU. I don't know if you remember anything about that?

Yes, it was actually published as an afterthought of the 'Fit-for-55', it sets the goal of planting 3 billion trees in the EU per, I don't know what the timeline is exactly, but I will have it on Friday sat reading for the first time, or yes, then was the presentation. However, the Netherlands also has its own forest strategy, the Ministry . I think that when we talk about such a forest strategy , it is very important that we look at a European level, and do not disapprove too much nationally, which yes, the Netherlands… In principle I still see opportunities too. We still have a lot to do with existing forests, and we can still do a lot within the built environment , but if we are really talking about preserving primeval forests, they should not necessarily be in the Netherlands. Of course we really have to strengthen the Natura 2000 projects, but the link to the RCB ... Indirectly that also has an influence on the LULUCF, because if we plant more forests, that means that we also have more absorption, that also means that there indirectly… Perhaps that indirectly reduces the need for carbon farming.