Cash cows? Configuring low-carbon agriculture through green finance

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Abstract

'Green' forms of finance are deemed increasingly important in mitigating climate change. Despite growing calls to make financial flows consistent with Paris Agreement goals, to date little is known about the impact of 'green finance'. Drawing on literature on assembling resources for investment this research shifts the focus from financial *flows* to financial *pools.* It does so through an examination of a green financial instrument, the Green Schuldschein, issued by a multinational dairy company. This paper argues that by analysing how low-carbon agriculture is assembled as a resource for investment, we can begin to understand why green finance pools in some places, but not in others, and the implications for climate change mitigation efforts. It demonstrates that flows of green finance in the agricultural sector are unlikely to pool in places where they can have the most significant climate impact, but rather in places where they remain distant from nature's unruly qualities. It highlights the importance of examining how sites and processes of landing are shaped by both the financial and the extraeconomic relations of the wider fields in which new 'green' financial instruments are situated. In doing so, the paper demonstrates how assemblage thinking can both provide nuanced critiques of the idea that we can 'green' finance, and diversify our understanding of how finance and agriculture intersect.

Keywords

Green finance; agriculture; agrifood systems; social studies of finance; climate governance; low-carbon investment

Introduction

The conjunction of environmental and financial crises has in recent years led to increased interest in how the two are intertwined or can be jointly resolved. From carbon markets to payments for ecosystem services, catastrophe bonds to biodiversity offsets, fossil fuel divestment and clean infrastructure investment; the entanglements between finance and environment are both increasingly diverse (Bridge *et al.*, 2019; Christophers, 2019) and entrenched (Ouma, Johnson and Bigger, 2018). While there are calls for a Keynesian Green New Deal to 'solve' the environmental crisis (Goldstein and Tyfield, 2018), much so-called 'green' finance to date has come from the private sector and this is expected to continue in future. The widening and deepening of financial interest in the environment is emblematic of the tremendous growth of the financial sector in recent decades, always seeking out new investment frontiers (Ouma, Johnson and Bigger, 2018).

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The emergence of new investment frontiers is increasingly evident in climate mitigation finance. In line with the growing realisation that meeting Paris Agreement targets or achieving a net-zero economy requires change beyond the energy sector, 'green' investment has started to flow towards increasingly diverse corners of the economy. However, despite growing calls for private finance to play a role in reducing the climate impact of economic activity, there remains a dearth of research on how private finance is shaping climate action in the 'real economy' (the part of the economy that produces goods and services).

I began this research with a broad, but seemingly fairly straightforward, question: What is the potential for new green financial instruments to contribute to climate change mitigation targets? In particular, I was interested in Green Bonds and Schuldscheine, two similar green financial instruments, which are increasingly popular among investors. It is anticipated that $200 billion worth of Green Bonds will be issued in 2019, up from $11 billion six years ago (Pham, 2016; Sonerud and Adamini, 2017; Sharma, 2019). Their rising popularity has led some commentators to proclaim that "green bonds can solve our climate crisis" (Tuerk, 2019), and the World Bank (2019) has gone so far as to claim that "the green bond turned out to be a history-making event". At the same time, the European Commission is considering giving special treatment to certified green investments, such as lower capital requirements (Aschoff, 2019).

However, despite their green label, virtually nothing is known about the environmental impact of green bonds and other green financial instruments (Bracking, 2015; Cort and Krosinsky, 2015). I therefore set out to explore how these instruments are (re)shaping environmental (particularly, climate) governance in the agricultural sector. In doing so, I was also responding to a growing awareness of the deep linkages between food, environment and finance since 2008, driven by their respective crises and intersections between them (Isakson, 2014; Le Billon and Sommerville, 2017; Clapp and Isakson, 2018; Clapp, Newell and Brent, 2018). I sought to explore this process of reconfiguration by analysing the issuance of a Green Schuldschein (an instrument halfway between a loan and a bond) by a large dairy company to finance the reduction of its environmental footprint (FrieslandCampina, 2016).

It soon became apparent during my research that the money raised through the Schuldschein was not directed to the company's activities that generated the most significant climate impact: its dairy farms. This was unexpected as these farms make up 70-80% of the company's emissions, and there has been a proliferation of investment into farmland and the front end of agricultural production systems (see for example Clapp and Isakson, 2018; Isakson, 2014; Ouma, 2014, 2016). That raised a second question: Why was this flow of green finance not directed towards 'greening' these farms?

I answer this second question by drawing on recent work that considers how resources are assembled or configured for investment (e.g. Li, 2014). I explore how new green forms of finance intersect with already-existing sociomaterial configurations in the agricultural sector and institutional practices in the financial sector to understand how the notion of low-carbon dairy is assembled as an object of investment, and the implications for private finance's contribution in addressing climate change. Through exploring how investments are made 'landable', this article answers calls to (re)ground finance within the 'real economy' in order to examine how production and financial networks become entangled (Hall, 2013; Coe, Lai and Wójcik, 2014), and the environmental implications of this entanglement. Analysing where finance lands opens up new insights into how 'green' finance both configures, and is configured by, the intersections between international financial markets and local social, natural and political conditions. Such a perspective can help expand understandings of how far investments are 'real' or 'performed' when benchmarked against their real existence or scientific contribution to averting climate change

(Bracking, 2015: 2347). Furthermore, through adopting an assemblage lens I also highlight the agency of those at the receiving end of financial flows, offering a perspective that diversifies our understanding of the intersection between finance and agriculture.

Assembling and governing green economies

The last two decades have seen a substantial growth of new 'green' financial instruments – from REDD+ schemes to low-carbon index funds to 'green' mortgages for home owners – widening the sites and means through which environmental governance is enacted (Bracking, 2019). Despite their diverse forms and aims, such instruments rely on the existence of a wider green economy to be put to work. There are signs that such a green economy is emerging. While current levels of investment in climate change mitigation activities are still relatively small (The Global Commission on the Economy and Climate, 2016), they are growing rapidly (Campiglio, 2016; Buchner *et al.*, 2017). Nonetheless, it is estimated that additional investment of hundreds of billions, if not several trillions, in low-carbon activities is required each year to meet Paris Agreement goals (Bielenberg *et al.*, 2015; McCollum *et al.*, 2018).

However, such quantifications of green finance assume the existence of a green economy that can be brought into being, if only the right quantity of investment was made available. Instead, cultural approaches to economic and financial geography reminds us that enacting low-carbon economies is not simply a question of quantities. It also requires sensitivity to the processes and practices through which these new economies are put to work (see for example, Lovell and MacKenzie, 2011; Ouma et al., 2018). By asking where green finance lands, I draw on these approaches to understand how new green economies are configured, and to what effect. In doing so, I take as my starting point the notion that the establishment of a green economy requires a new green 'thing' to be made visible, defined, and allocated. This requires its green qualities to be made commensurate through new technologies and regimes of measurement (MacKenzie, 2009; Corson, MacDonald and Neimark, 2013; Campiglio, 2016; Bracking, 2019).

In the case of green finance, however, there are two types of green 'things' that need to be considered and aligned: a green resource or asset, the object of investment; and a green financial instrument, which enables the flow of finance to the former. This requires, firstly, that the resource-like qualities of the object of investment are made material (Bumpus, 2011; Li, 2014). Resourceness, according to Li (2014) is not a fixed property, but "an assemblage of materialities, relations, technologies and discourses that have to be pulled together and made to align" (p.589). Following Li (2014) and Bracking (2019) I argue that an assemblage lens can help interpret how these different dimensions (material and immaterial, human and nonhuman, social and technical) are brought together through processes of enrolment, alignment and coordination in an attempt to create order; and how the capacity to act emerges through these processes.

How such processes take shape is especially relevant for green finance, as 'resourceness' can be a feature of both the underlying material object (e.g. land, electricity, food) and that object's green qualities. For green financial instruments to be put to work, the 'green' and other (material) qualities of the object of investment thus need to be assembled, made to align which one another, and with the new financial instrument, the latter having gone through a similar process of assembling and alignment. This coming together is both a "necessary and prior condition" for green finance to flow (Braun, 2008: 671 in Bracking, 2019).

Processes of assembling and alignment have been detailed in literature on the making of material resources, such as land and agriculture (e.g. Le Billon and Sommerville, 2017; Li, 2014) and of 'non-existential commodities', such as carbon (Bumpus 2011). The latter has shown in detail the

processes through which carbon – as a green object of investment - becomes 'hemmed in' and functionally abstracted to create units of nature (e.g. credits that represent a specific quantity of emissions reduction) that can be allocated and exchanged (Bumpus, 2011). Such processes of abstraction are deemed necessary to continue their commodification and placement into wider systems of exchange, i.e. carbon markets (Bumpus, 2011), but also distance carbon markets from the material underpinnings of the climate problem (Lohmann, 2008). In this literature, the assemblage of sociomaterial relations underpinning the virtual carbon offset is primarily discussed in relation to their (un)cooperativeness in the process of abstracting carbon; the enactment of a commodity with a non-existential nature (e.g. Bumpus, 2011).

This emphasis on processes of abstraction, however, risks obscuring the significance of place (Lohmann, 2008). Instead, I seek to shift attention from how abstraction occurs to how investments *land* in particular places, because – as Li reminds us – "land they must" (2014: 589). In doing so, I analyse how objects of investment are assembled through the attachment of green qualities to a (material) resource. Such an approach enables a subtle, but important, shift of frame. Whereas much of the literature discussed above is focused on the *how* of carbon markets, I propose an emphasis on the *where* and *why* of such markets. Where does low-carbon investment land, and why there? In other words, it shifts the focus from the work required to enable flows of investment, to both the motivations and conditions that enable the landing, or pooling, of investment in a particular place. The next section will explore extant understandings of how this process of landing takes place in the agricultural sector.

Landing agricultural finance

The question of 'landing' capital has been increasingly explored in relation to physical places, especially (agricultural) land itself (Li, 2014; Knuth, 2015; Christophers, 2016), including in this journal (e.g. Ouma, 2014, 2016; Fogelman and Bassett, 2017; Le Billon and Sommerville, 2017; Li, 2017; Pedersen and Buur, 2017). In the words of Isakson (2014: 771), *"there has been a rush to analyse the land rush"*. This expanding agenda reflects renewed interest among investors in asset classes that promise more stable returns, particularly asset classes that are 'real things', such as land or agriculture (Ouma, 2014).

At face value, growing interest in agriculture as a new asset class appears to be easily explained: limited availability of land, combined with a growing population, environmental degradation and increased demand for bio-fuels are expected to shape future supply-demand dynamics and increase land values (Ouma, 2014; Pedersen and Buur, 2017). The focus on increased flows of foreign investment that are responding to anticipated (negative) environmental impacts, has at times become self-explanatory. This singular focus, however, potentially skews understanding of the diverse contemporary processes and dynamics of investments and their role in agricultural and environmental governance (Ouma, 2016; Pedersen and Buur, 2017).

While initial research into the rush for land and agricultural investments imagined such processes 'from above', more literature is emerging that seeks to develop a grounded understanding of how agriculture is turned into an asset class (Ouma, 2014), highlighting the spatial and temporal boundedness of new financial flows (Le Billon and Sommerville, 2017). This literature demonstrates that integration of land into circuits of international financial investment requires the rearrangement of processes that determine land's material and symbolic qualities (Ouma, 2014; Le Billon and Sommerville, 2017). It locates the ways finance is inscribed in agriculture in everyday actions and sociotechnical practices that invoke materialities, intermediaries, and temporality; highlighting how

new circuits of finance are practical accomplishments rather than pre-given entities (Ouma, 2014, 2016; Le Billon and Sommerville, 2017).

I find the notion of the 'field', and the role it plays in accomplishing new circuits of finance particularly fruitful. By field I mean the existing relations and political economies in which new investment objects and instruments are situated, and which condition what change can occur (see also Bracking, 2015; Lohmann, 2015). Fields then, are dynamic, relational arenas featuring particular logics, dynamic actor positions, and organisational forms (Wilshusen and MacDonald, 2017). Ouma (2016), for example, argues this means being attentive to the larger social, legal and technical architecture of the financial system, particularly the roles asset owners and managers play in accomplishing new circuits of finance. However, an attentiveness to where finance lands means also paying attention to architectures of the agricultural system. In other words, to understand how environmental governance is enacted one also needs to ask how 'extraeconomic forces' in the agricultural sector mediate agri-finance investments (Williams, 2014; Visser, Clapp and Isakson, 2015; Ouma, 2016).

A grounded understanding of agricultural investments thus requires us to take serious the complex, animate and distributed agency that finance encounters in agriculture (see also Bracking 2019). Investment in land has long been considered a risky proposition due to the "liveliness of agricultural products" (Le Billon and Sommerville, 2017: 213). However, recent investments have often not been driven by agriculture or land's productive qualities (see e.g. Fairbairn, 2014). As a result, the ability of agriculture to mould financial flows risks being neglected in analyses under the header of financialisation. To remain attentive to the agency of agriculture, it is therefore helpful to view the assembling and alignment of finance and resource as a two-way process. Le Billon and Sommerville (2017) refer to this as the interactions between processes that make investments landable, and those that make resources investable.

One way of understanding the 'agricultural field' is through broader agri-food system dynamics and its interactions with finance. To date, such understandings are rather uneven, with the majority of recent research focused on equity investment at the 'front end' of the agricultural supply chain, i.e. investment in land (Fairbairn, 2014). There are two further, rather separate, bodies of work. The first seeks to understand how finance is reshaping agricultural supply chains beyond the farm (Isakson, 2014; Clapp and Isakson, 2018; Clapp, Newell and Brent, 2018), while the second has analysed the interplay between environmental and food system governance (Clapp and Scott, 2018). Nonetheless, the intersection between the three dimensions of financial, agricultural and environmental governance – especially beyond investment in land – remains poorly understood.

Here, I therefore seek to bring together and build on these different strands of thinking around the landing of finance, and how the interaction between financial and agricultural fields shape this process. I do so by exploring how the rather capacious quality of 'greenness' shapes the accomplishment of new financial flows within the agricultural sector, where they land, and the implications for climate governance through private finance more broadly. In doing so I speak to the emergent literature on the landing of finance which has shown that the forms and impacts of investments are diverse and situated. These forms and impacts are not shaped by a singular field: they are given shape through the interaction between object ('green agriculture'), subject ('green' financial instruments) and the broader *fields* through which each are assembled and made to align in order to construct a new green economy.

By conceptualising the constitution of greenness and how this constitutive work contributes to the configuration of new fields of environmental governance, I focus on how such governance is

embedded in, and enacted through narratives, materialities, institutions and concrete practices that configure the field of governance and steer activities towards particular governance objectives (Bulkeley, McGuirk and Dowling, 2016). I adopt what Li (2007) terms an 'analytics of assemblage' approach to ask how narratives, institutions, materialities and practices configure green governance through the assembling of environmental subjects and objects, and make them commensurate with the wider field in which they occur, and how this structures new fields in the process. In other words, I question what is assembled, and what environmental actions and outcomes are opened or foreclosed as a result. I do so through an exploration of the issuance of a green debt instrument by FrieslandCampina, the fifth largest dairy company in the world and the first to issue labelled green debt. After providing a brief explanation of the empirical context, I will trace how and where the capital raised by the Schuldschein landed.

Agricultural systems as emergent sites of climate governance

Agriculture is increasingly a focus of efforts to mitigate climate change. For example, EU countries have committed to an average 30% reduction of agricultural emissions by 2030 compared to 2005 levels (Doornewaard *et al.*, 2017). Much of these reductions are to be found in livestock production, which accounts for approximately 14.5% of global anthropogenic greenhouse gas (GHG) emissions (FAO, 2013). Just under one third of those emissions emerge from the dairy sector (FAO, 2010). As a result, livestock production has become subject to new forms of climate governance, with major studies now advocating reduced consumption of animal proteins (EAT-Lancet Commission, 2018).

Much societal and research attention to date has focused on the emergence of alternatives to traditional forms of meat and dairy (e.g. Jönsson et al., 2019; Mouat and Prince, 2018; Sexton, 2018) However, little is known about how incumbents are responding to this challenge. The empirical focus of this study - Dutch dairy company FrieslandCampina - therefore offers an interesting opportunity to understand how a major incumbent responds to being drawn into the sphere of climate governance, and how it utilises 'green finance' to shape this emergent field of agricultural climate governance. FrieslandCampina is one of the world's largest dairy companies, with $12.4 billion in dairy sales in 2016 (Bellamy and van Battum, 2017), and also the first non-energy company to issue a Green Schuldschein, a labelled green debt instrument.

Before diving deeper into the green debt issuance, it is worth highlighting the company's governance structures, which play an important role in configuring the company's climate actions. In the Netherlands dairy companies are deemed the most powerful companies in the supply chain (interview, environmental campaigner). FrieslandCampina consists of two separate, but related bodies. First, there is the Dairy Cooperative FrieslandCampina, consisting of 18,000+ member farmers in the Netherlands, Germany and Belgium, most of whom own and manage family-farms. Second, there is the company FrieslandCampina. Whereas literature on the finance-agriculture nexus has highlighted the rise of shareholder capitalism in recent decades (e.g. Burch and Lawrence, 2009), this does not directly apply to FrieslandCampina, where the dairy cooperative is the sole shareholder of the company. This means it has total control of the General Meeting of Shareholders, and appoints nine out of thirteen members on its supervisory board. As a result of this structure, the company's supply chain is both dispersed and integrated, with FrieslandCampina encompassing both the production stage (farms) and processing stage (processing raw milk into other ingredients and/or end products) of the dairy chain.

Schuldscheine as a tool of climate governance

In 2016 FrieslandCampina NV (the company) issued a *Green Schuldschein* to raise €300 million of 'green' finance to fund various sustainability initiatives. In recent years, Schuldscheine have become a popular alternative form of corporate financing. The instrument is of particular interest to companies seeking to widen their financing base and are also looking for stronger public exposure (Nord/LB, 2016). As I will demonstrate later, this also played important roles in the FrieslandCampina issuance. A (green) Schuldschein is in many ways similar to a (green) bond: they are both privately placed debt instruments (Kidney, 2016). They can have a fixed or variable interest rate, and investors almost always hold them to maturity (Kidney, 2016).[2] Like green bonds, green Schuldscheine are often evaluated by external parties, following the Green Bond Principles: "voluntary process guidelines that recommend transparency and disclosure and promote integrity in the development of the Green Bond" (ICMA, 2018: 3).

While Schuldscheine have a long history, the first *green* Schuldschein was only issued in 2016, by German renewable energy company Nordex (Kidney, 2016), with a further four green Schuldscheine issued in the following twelve months (Sonerud and Adamini, 2017). The FrieslandCampina issuance was the first time this 'green' debt instrument was issued by an agricultural company (FrieslandCampina, 2016). Due to its substantial asset base, FrieslandCampina also has a significant financing need. However, as it is an unrated company and does not have a public credit rating its financing options are more limited. FrieslandCampina's decision to issue a Green Schuldschein is therefore part of a wider strategy to diversify the company's funding (FrieslandCampina employee; TreasuryToday, 2016).

The €300 million Schuldschein was oversubscribed and attracted German savings banks, international institutional investors, as well as international banks. While a small part of the money raised was intended to contribute to the company's social sustainability aims – achieving a sustainable living for its farmers and developing nutritious products – the majority of funds were directed towards the company's aim of achieving 'climate neutral growth' by 2020 (FrieslandCampina, 2018a). In practice, this means the money has been primarily used to (re)finance energy efficiency measures and renewable energy generation capacity in its processing factories.

In the next section I will explore how the €300 million Schuldschein investment configured the notion of low-carbon agriculture, and how this configuration shaped where this investment did, and did not, land. In the discussion that follows I will discuss the broader implications for the (re)configuration of climate governance through private finance.

To understand how the Green Schuldschein (re)configured FrieslandCampina's climate mitigation efforts I conducted an exploratory study, interviewing nine people either directly involved in the Schuldschein issuance, or otherwise concerned with FrieslandCampina's sustainability activities. The first group includes FrieslandCampina employees, including those involved in structuring the Schuldschein offering; the Head of Sustainable Markets at one of the banks involved in the issuance; and analysts involved in evaluating the green credentials of the Schuldschein and other debt instruments. The second group include farmers, staff at an industry-led sustainability initiative, and staff at an environmental NGO. Most interviews were conducted in person, the remainder by

[2] However, unlike bonds, schuldscheine are not traded in a market nor listed on a stock exchange (Kidney, 2016). As they are not marked-to-market, they also avoid exposure to volatility in the bond market (Kidney, 2016; Linhardt, 2014).

telephone. Interviews lasted between 45 minutes 90 minutes and were recorded, and subsequently transcribed, and coded.

Unfortunately, no Schuldschein investors were willing to participate in the research. Therefore, the interviews were complemented by participant observation at various 'green finance' conferences and workshops in the UK, France, and Sweden between 2017 and 2019. I also conducted additional participant observation at a symposium organised by the dairy sector aimed at exploring the environmental impact of dairy farming. The discussions observed at these events were used to contextualise the interview data.

Assembling (green) finance for (low-carbon) agriculture

Here I explore how green agriculture was assembled as an object of investment in the case of FrieslandCampina, and how this shaped where the money raised through the Schuldschein issuance landed. Drawing on Le Billon and Sommerville (2017) and others who have looked at how resources and green financial streams are brought into being (e.g. Bracking, 2019; Li, 2014) I focus on four processes that contribute to the enactment of assembling green resources: (1) establishing the field of intervention; (2) establishing the object of intervention; (3) establishing the instrument of intervention; (4) legitimising the emergent assemblage.

Establishing the field of intervention

Before delving into the specifics of FrieslandCampina's Green Schuldschein, it is important to understand the wider field in which the object of intervention (low-carbon dairy) is situated. For agriculture, this means recognising the growing awareness of the environmental impact of agriculture, and of meat and dairy production in particular. The broad-ranging environmental impacts of meat and dairy production – from emissions to biodiversity loss – are increasingly recognised by consumers and policymakers. Indeed, while dairy consumption in most Western European countries continues to be high, it is no longer growing (AAFC, 2018; corraborated by a FrieslandCampina employee). Popular media channels are supporting a narrative that we're falling out of love with milk (Lewis, 2018), enabled by a substantial growth in plant-based alternatives (Mintel, 2018; Stokel-Walker, 2018). These changing consumption patterns are fuelling concerns among farmers and other dairy stakeholders that dairy consumption will decline in the near future:

> *'In Sweden they're being told to drink less milk to reduce emissions. Let's not do that here!'.* (Farmer at Dutch dairy farming symposium, 2018).

While there are various reasons why consumers are switching, a mix of environmental concerns, especially climate impact and ethical/animal welfare concerns, are thought to be the driving forces behind the increasing popularity of plant-based meat and dairy alternatives (Mouat and Prince, 2018; Stokel-Walker, 2018; Jönsson, Linné and McCrow-Young, 2019). Meanwhile, start-ups operating in the area have been attracting the attention of investors, especially venture capital (Mouat and Prince, 2018; Fields, 2019). While some dairy companies have responded by strengthening non-dairy operations (Fields, 2019), FrieslandCampina, a dairy company owned entirely by dairy farmers, has instead sought to demonstrate its green credentials in a different way. It has felt the need to do so, partly to respond to consumer concerns, but also in response to growing political awareness of the dairy industry's environmental impacts. While there is no long-term emission reduction target for the dairy industry, stakeholders anticipate that national emission reduction targets will soon be translated into stricter regulations for the dairy industry.

Changing consumer habits and anticipated regulatory changes mean there is an emerging need for incumbent actors to reposition themselves as 'green' actors, whose activities contribute to a healthy environment. One way that the dairy sector is trying to position itself in a green light, and thus shape the field of intervention, is through industry-led initiatives. For example, the Dutch dairy sector set itself 'an ambition' to reduce its own CO2e emissions by 25% by 2030 (compared to 1990 levels), primarily through tackling carbon and methane emission (Rabobank, 2019). It has also initiated the 'Duurzame Zuivelketen' (Sustainable Dairy Chain), a collaboration of actors within the dairy sector seeking to improve environmental performance. In a similar vein, the international industry-led Dairy Sustainability Framework seeks to provide a 'holistic approach' to sustainability, encompassing seven different environmental criteria (DSF, 2019). Through these industry-led efforts, the sector seeks to enable a narrative that positions the dairy industry as part of the solution.

For FrieslandCampina, the issuance of a Schuldschein was a key narrative tool to signal the company's green credentials. One stakeholder explained that FrieslandCampina's choice for a Green Schuldschein to finance its activities, was not related to financial need. Rather it was chosen explicitly to communicate its environmental credentials to the outside world. And according to an employee, the company reckoned that a 'green' financial instrument might signal to outside stakeholders that FrieslandCampina's environmental policies must be strong. Issuing a Green Schuldschein was thus attractive to FrieslandCampina (as it is for other green bond issuers) because it gives the issuer a 'green badge' (Climate Bond Initiative Conference 2018). An employee of the company argues that such a badge could play a potential role in pre-empting the introduction of stricter regulation.

The role of green finance as a communication tool to extend a sector's social license to operate was also visible in the financial sector. When I attended a major climate finance conference in 2018, a significant number of speakers mentioned the power of green finance to rehabilitate the financial sector's reputation. At another conference, a speaker from a major British bank explained how his employers viewed green finance:

> *'Let's face it, we're not very well-liked. For us, this [green finance] presents an opportunity to restore some of the trust that people have lost in us'.* (Climate finance conference, March 2018).

The presentations and conversations at climate finance conferences therefore indicate that a major attraction of green forms of finance is their presumed ability to restore the reputation of the financial sector, among policy makers and public. This echoes findings elsewhere that some organisations consider climate change and sustainability to be primarily a reputational risk (and opportunity) rather than a physical one (Folger-Laronde and Weber, 2018; Harvard-Williams, 2019).

What is thus evident is the emergence of two complementary 'fields' in the agricultural and financial sector, which are beginning to converge around their desire to be 'seen to be green'. In both cases the notion of greenness is seen as a powerful narrative tool, to enhance public (and political) confidence, potentially pre-empting stricter regulation. As the next section shows in more detail, the emerging shape of these fields and how they position green financial instruments as primarily a communication tool, play an important role in how green financial flows come to be assembled and where they land.

Establishing the object of intervention: the cow in the room

I have established that there is an interest for incumbent actors in both the agricultural and the finance sector to display and communicate their green credentials to external stakeholders. But this

is insufficient for explaining how the broad notion of 'greenness' was translated into the types of projects – technological measures focused on improving energy efficiency and use of renewable energy in processing factories – that were funded through FrieslandCampina's Schuldschein. As I will demonstrate, one part of the explanation of how 'greenness' was translated can be found in the source of emissions (and their unruliness) and the structure of the dairy supply chain.

For the Schuldschein money to be directed towards a narrow set of technological interventions, FrieslandCampina first narrowed the idea of 'green' to 'climate', and subsequently to 'CO2'. As I described in the previous section, dairy's multiple environmental impacts are recognised among stakeholders. These stakeholders, including politicians, NGOs and farmers, also recognise that a range of solutions is required to address them. As one interviewee from an environmental NGO explained:

> *'The climate impact of food could probably be solved through technological measures alone, but might make no difference, or even have a negative impact on other environmental dimensions, such as biodiversity. […] We need to go back to the start: how can we have healthy, sufficient food, with a limited impact on the environment? We need to start again from scratch, and we need long-term solutions for farmers, not short-term fixes.'* (Interviewee, NGO).

These words were echoed by a dairy farmer in response to a debate on what the dairy sector can, or should, do to tackle climate change:

> *'Technological gimmicks alone won't be enough.'* (Farmer, Dairy symposium)

Indeed, FrieslandCampina's Corporate Social Responsibility strategy seeks to tackle a mix of concerns, including animal welfare, biodiversity and climate concerns. What is therefore interesting, is that the Green Schuldschein was primarily used to address the company's carbon emissions, silo-ing the climate impact of dairy from its other environmental dimensions.

The company's focus on emission reductions can be traced to 2015, when it identified climate change - and regulatory efforts to tackle it - as one potential barrier to growth. In response, it formulated the goal of climate neutral growth, which mirrors a regulatory goal of climate neutral growth for the entire Dutch dairy sector. 'Climate neutral growth' means (for both company and country) that there should be no net increase in emissions by 2020 compared to 2011 levels, and a 20% reduction in emissions compared to 1990 levels (Doornewaard et al., 2017; interviewee, FrieslandCampina). In theory, this allows for increased production levels without associated increase in emissions, although early evidence shows that emissions in the dairy sector have continued to rise (Doornewaard et al., 2017).

Most of the Schuldschein money was directed to this idea of climate neutral growth. However, although approximately 70-80% of emissions from dairy are farm-based emissions (Hill, 2017 – corroborated by interviewees), the money raised through the Schuldschein would not be used to tackle these emissions. Instead the company would target the 10-15% of emissions emitted by FrieslandCampina's processing factories, which among other things, turn raw milk into milk powder for international markets. It became evident during my fieldwork that the operationalisation of 'greenness' as 'climate' was subsequently further narrowed to 'CO2 reduction', to be addressed by new technological measures focused on enhancing energy efficiency and renewable energy generating capacity. The organisational and technical challenges of operationalising the green qualities of farm-based emissions offer an insight into why this happened.

First, the structure of FrieslandCampina's supply chain is such that there is a high level of vertical upstream integration. The 18,000+ Dutch, Belgian and German dairy farmers who are members of FrieslandCampina have to sell their entire production to the company, while the company is obliged to buy all the raw milk produced by them (De La Mano et al., 2009). This supply chain structure – with 18,000 farmers selling their product to one company – means the asset-base of the production (i.e. farming) stage of the supply chain is highly fragmented. This is not unusual. Despite horizontal and vertical integration within agricultural supply chains, the riskiness of agricultural production and the challenges of appropriating surplus value have ensured that fragmented family farms continue to predominate agricultural production (Isakson, 2014). This fragmentation makes it not very amenable to large-scale investment (CBI conference 2018). While individual farmers may be able to access loans or other forms of finance to implement environmental initiatives on their own farms, it would be difficult to coordinate this among all farmers. Only a company with a significant asset-base (such as FrieslandCampina) can issue a Green Schuldschein that will attract significant inward investment.

Second, while FrieslandCampina is partly a cooperative, where its farmers are also its members, this does not guarantee that farm-based emission reduction initiatives are welcomed or necessarily taken up by its members. Farmers roles in combatting climate change is slowly being accepted by farmers, but resistance remains, with some farmers arguing the sector is disproportionally targeted by politicians and climate activists (Dairy symposium 2018).

Finally, most farm-based emissions are methane (CH4), a form of carbon that is much more unruly than the CO2 emitted in the company's factories. Methane emissions are highly variable, depending on a cow's diet and breed, and methane's Global Warming Potential value has been updated several times over the years, meaning that conversion of CH4 into the widely used CO2e measurement is rather unstable (Trottier, 2015). In addition to the unruliness of carbon-in-methane, monitoring of environmental outcomes on farms is still in the early stages. While data access is somewhat simplified due to the integrated nature of FrieslandCampina, monitoring on-farm emissions accurately remains challenging, making it difficult to implement funding based on emission reductions. As such, the processing factories offer a more straightforward means of operationalising carbon reductions, and – importantly – communicating this to external stakeholders.

To summarise, while dairy production has multiple 'green' dimensions, the Schuldschein operationalised 'greenness' in a manner that was much narrower – targeting CO2 emissions from production factories through technological changes. The 'unruly' nature of CH4 and farms/farmers means that the impact from farms remained out of scope. The decision not to target farm-based emissions was further enabled through the lack of institutionalisation of greenness in the financial sector – as the next section will explore.

Establishing the instrument of intervention: what is 'green'?

Company finance generally occurs through a combination of financial mechanisms. Fixed-income mechanisms such as bonds, loans and Schuldscheine are distinctly different from (equity) shares, as they do not enable the financier to obtain ownership rights nor the ability to influence corporate decisions and operations. Instead, they simply provide the financier with a fixed part of the revenue from a project or firm (Arjalies *et al.*, 2017; Galaz *et al.*, 2018).

One might expect that green bonds and Schuldscheine offer investors the opportunity to make investment decision to invest based on the sustainability rating of the project funded (Arjalies *et al.*, 2017). However, my interviews confirmed the findings of Arjalies et al. *(2017*): many, if not most, asset managers apply existing evaluation practices to green bonds. In doing so, they transpose a

market technology based on 'traditional' financial considerations such as yield curves and company credit ratings to a new market. In practice, this means that financial returns of green bonds remain largely disconnected from the anticipated or achieved environmental impact of the projects funded, or of the green credentials of the issuing company. Instead, as the Head of Sustainable Markets at a bank involved in the FrieslandCampina issuance explained, the issuer's financial risk profile is a determining factor for investors:

> *"Schuldschein investors will always consider the creditworthiness of the issuer first. That creditworthiness is determined at the level of the issuer, not the bond."*

As a result, the green qualities of a bond or its issuer tends to not feature heavily in the decision-making process. This is facilitated by ongoing lack of agreement on how to institutionalise the 'greenness' of green financial instruments. Without specific regulation, the Green Bond Principles (ICMA, 2018) serve as a general guide on what can be considered a 'green project'. While these principles guide what counts as 'green', it contains no stipulation of additionality to differentiate emissions produced by a green bond project from the baseline emissions if the project did not take place. As a result, it is not uncommon for money raised through green bonds or Schuldscheine to either go towards a company's general budget or to finance initiatives that have already been implemented or would be implemented anyway (CDC Climat Research, 2012; Clapp, 2018). Indeed, in the case of FrieslandCampina, one company employee emphasised,

> *"It is not the case that we are taking extra measures [as a result of the Schuldschein]. Some think we have €300 million for additional sustainability projects, but that is not the case."*

Instead, the majority of Schuldschein funds were used to re-finance efficiency projects that had already been implemented or were in the process of being implemented.

This limited additionality of green bonds seems a point of discussion, but not of concern, among finance professions. While some argued that additionality is important to maintain market integrity, others argued there is potential to improve the 'greenness' of bonds as the market grows, but that "we need to start somewhere" (author's notes, climate finance conference, March 2018).

The current lack of agreement on whether and how to measure 'greenness' within the Green Bond/Schuldscheine sector has important implications. It means that the previously identified challenges, such as challenges of measuring and addressing emissions on farms, may not be as important as I had initially anticipated. From an investment-perspective it generally does not matter how green a green bond is. Indeed, the Green Bond Principles specifically state that their purpose is "not to take a position on which green technologies, standards, claims and declarations are optimal for environmentally sustainable benefits" (ICMA, 2018: 3). While such an approach allows for a level of geographical and sectoral flexibility, it also de-incentivises issuers to consider more challenging or risky projects with greater potential for decarbonisation.

What matters, then, is making *perceived* greenness visible and making (financial) risk commensurate rather than making quantities of carbon visible and actionable. To do so, and to legitimise the emergent flow of green investment, the role of external verification bodies is integral.

Legitimising the emergent assemblage: the role of verification

The previous three sections analysed how the notion of 'green' dairy was translated into a fairly technocratic vision, directing funds towards (often refinancing) measures to reduce carbon emissions in the dairy company's processing factories. I explained that a form of 'greenness' that

neither targets the most carbon-intensive practices of a company nor necessarily provides any additional carbon savings to be become investable, can be understood by the transfer of existing financial evaluation practices to the emergent field of green finance. Here, I explore how a fourth process – legitimising – helps explain how this notion of greenness came to be accepted and reproduced, enabling the stabilisation of the emergent assemblage.

To legitimise FrieslandCampina's approach to 'green dairy', the company brought in an external verification body to provide a 'Second Party Opinion' of the Green Schuldschein issuance. It is increasingly common for the issuers of green bonds and Schuldscheine to bring in an external party to review an issuance. In 2018, 89% of all issues bonds received at least one external review, a 50% increase compared to 2014 when only 60% of green bonds had undergone independent review (CBI, 2015, 2019). Such reviews can take various forms, such as certification under the Climate Bonds Standard or green bond ratings, but more than half of issuers chose the more flexible Second Party Opinion in 2018 (CBI, 2019).

The importance of external review has been attributed to investors' own lack of expertise in evaluating more-than-financial criteria. Therefore, external reviewers are considered an important part of the process, primarily to protect investors against claims of greenwashing. However, responsible investment analysis is a new field, supported by little academic expertise and training (Arjalies *et al.*, 2017). Practices of evaluation still continue to evolve and emerge.

As it stands, evaluation practices tend to focus primarily on the allocation of funds and how the process of allocation is governed, rather than on the outcomes achieved. An interviewee from the Second Party Opinion provider, explained how their process works:

> *"We assess various anticipated climate impacts, but do not quantify greenhouse gas emissions reductions. Instead we might evaluate the resources allocated by the issuer to manage greenhouse gas emissions for example: are they appropriate, are there specific people in charge, are they competent, and is there specific monitoring in place?"*

While they assessed several environmental criteria, the Second Party Opinion provider did not seek to quantify or benchmark intended outcomes of the issuance. This is not uncommon. A look at other Schuldschein reports and frameworks also sees promises that issuers "may report" on achieved environmental impacts (e.g. Encevo, 2018: 14). This language echoes the Green Bond Principles which also only requires environmental benefits to be quantified "where feasible" (ICMA, 2018: 3). Instead, the assessment focused primarily on whether the resources allocated by the issuer to manage its emissions are appropriate. As such, the legitimacy provided by external assessment is rooted in the governance arrangements through which the funding is allocated and the carbon-reduction measures are to be implemented, rather than the specific decarbonisation potential of FrieslandCampina's suggested measures..

This means that to obtain a positive Second Party Opinion, it is beneficial for FrieslandCampina to focus on a part of its activities it can more easily control, and where it has existing monitoring and reporting procedures, rather than where the most significant carbon reductions can be made. In doing so, the legitimising function of Second Party Opinion providers and other verification bodies thus serves to legitimise an emergent assemblage where greenness is used as a communication tool, and where the desire to be 'seen to be green' trumps the maximisation of environmental outcomes.

Concluding discussion

By analysing the use of a novel financial instrument – a Green Schuldschein – I have explored where new forms of 'green' finance pool, opening up analyses of the intersection between finance, environmental change and agriculture. I have loosely drawn on assemblage thinking as an analytical concept, seeking to understand how narratives, company structures, (un)ruly forms of carbon, and institutional practices combine into a configuration that shapes how green forms of finance are enacted, and their environmental implications. Furthermore, by asking where finance lands and why, I build on the argument by Le Billon and Sommerville (2017) that assemblage thinking enables focus on the specific mechanisms or devices that enable finance to flow to new asset classes, as well as on context and alternative possibilities. In doing so, I have demonstrated the importance of paying attention to where new forms of finance land – and do not land - and the how 'green' agricultural resources are assembled through these financial flows.

Through focusing on the question where new flows of finance do and do not land, I have first of all demonstrated that green financial instruments are not necessarily directed towards those economic activities where greatest carbon reductions can be achieved. Indeed, it continues to be common for green bonds to be used to refinance projects, with little or no expectation of additionality. This is reinforced by the means through which 'greenness' has been (and continues to be) institutionalised, in particular through the Green Bond Principles. Despite critiques of the lack of additionality requirements in the green bonds sector, there is little sign that emerging regulatory frameworks to govern green bonds will change this. Indeed, the European Union's Green Bond Standard Working Group argues that concerns around additionality result from a "misunderstanding of the structural refinancing role of bonds" (TEG, 2019: 19). In other words the practices and conventions of the (financial) field actively shape how green financial instruments and the processes through which their green qualities are established. This raises questions around whether green bonds and Schuldscheine can realise the "huge potential" to "tackle climate change" that has been attributed to them (Pal, 2018; UNFCCC, 2018; Blanding, 2019). Furthermore, it brings into question claims that certain quantities of (green) investment are required to meet Paris Agreement goals, or other nationally-determined climate targets. As I have demonstrated here, and as others have argued elsewhere (e.g. Bracking, 2015) green finance does not smoothly flow from A to B, but depends on a green economy to be brought into being. If, however, such an economy and the financial practices that underpin it are not targeting the most climate-intensive activities, then such quantifications may be a moot point. To understand the potential of finance to contribute to the Paris Agreement it therefore remains essential to be attuned to the question: where does the money land?

Second, and following on from the previous point, beyond empirical investigation into the substantive contribution that new green financial instruments can play in tackling environmental crises, this article also offers conceptual insights into how new forms of finance shape environmental governance. Through exploration of a counter-intuitive case this account 'destabilises' (see also Ouma, 2016) dominant understandings of the financialisation of agriculture, and of nature more broadly. By focussing on processes of landing in low-carbon finance I shift the focus from financial *flows* to financial *pools*. This means I do not take the sites where finance lands for granted, but rather, I have considered the 'where' of financial pools as an open question, with multiple possible answers. Analysing where finance lands opens up new insights into how 'green' forms of finance both reconfigure, and are reconfigured by, the multiple fields through which they are assembled. I have demonstrated that these intersections between international financial markets and local social, natural and political conditions, give shape to climate governance through private finance.

Doing so highlights the need to understand the plural ways finance and environmental governance interact (see also Bridge *et al.*, 2019). While – justifiably – a 'financialisation' lens has been highly prevalent in recent research on the intersection between finance and agricultural and/or environmental governance, as Kay (2018: 172) reminds us, the environment is not a flat terrain over which financial investment can be unproblematically stretched (see also Ouma et al., 2018). New financial flows are not something 'done to' agriculture, but actively shaped and mediated by the 'agricultural field': the extraeconomic relations that shape and govern the agricultural sector. My example here has demonstrated that it is worth considering and examining this agency of the object of investment. My focus on FrieslandCampina - a powerful incumbent actor - enabled me to highlight the agency of agricultural actors, and their interactions with these extraeconomic relations in the wider agricultural field. It demonstrates that actors and relations in the agricultural field are not necessarily being 'subjected' to international finance. Rather, they can, and do, play an active role in assembling the qualities that turn agricultural products into a low-carbon resource. In doing so, they shape where finance is directed in a way that suits their interests, as much as that of investors.

Agriculture *is* reworked as a result of financial flows, but this is not a passive one-way process. Instead, the field is constantly re-worked through introduction of new legislation, technologies, consumer pressures, and so on, which mediate these emergent financial relations in a multitude of ways. In this case, the encounters between finance and environment are not simply an attempt at financialisation resisted by socionatural conditions on the ground. Rather, what this exploration has demonstrated is that local social, political and ecological conditions actively shape – from the beginning – what is deemed possible, and where financial flows are *invited* to land.

This case demonstrates green finance does not necessarily enact a 'hostile takeover' (Kay, 2018) of nature, but rather a mutually agreed circumvention of nature. While the notion of 'greenness' was essential to bringing actants together and making finance flow, its role in shaping where finance lands was minimal – except for its absence. By this I mean that the notion of a new 'green' resource was essential for making this particular form of financial flow possible, enabling FrieslandCampina to attract a new kind of investor and diversify their investors base, a goal that specifically came to the fore through the interviews. Similarly, the 'green' adjective was important for FrieslandCampina from the perspective of an incumbent seeking to negotiate a changing field, where environmental concerns around agricultural production have come increasingly to the fore among both consumers and policy makers.

While the notion of greenness was thus important to enable the company to communicate its new vision for low-carbon dairy and for it to attract new investors, this focus on 'greenness' only played a minimal role in shaping *where* these new financial flows landed. By framing 'greenness' through a lens of technological efficiency and innovation in production factories, rather than through tackling nature's more unruly qualities (such as methane emissions), the emergent financial flows of the Green Schuldscheine sought to avoid tackling nature's liveliness, rather than seeking to overcome, or subsume, it. What was at stake here was not the maximisation of value to be extracted through financialisation of farmland, but the maximisation of value through ensuring the longevity of a major agricultural incumbent's social license to operate.

Of course, these findings are – at least to some extent – specific to the case described here. The nature of bonds and Schuldscheine, with their fixed rate of return, is very different to the dynamics of equity investment, enabling different ways to assemble and govern greenness. Furthermore, questions remain as to how the desire to push green bonds to tackle climate change bounds the consideration of climate change into financial decision making to a small subset of the financial

system. At the same time this research offers an exploration of the intersection between finance and environment beyond the 'pristine' natures of forests or wetlands, instead considering the industrialised natures of the agricultural sector. As there are signs that – for now at least – green bonds continue to expand into a diverse array of sectors and issued by a diverse array of actors, it will offer fruitful opportunities for researchers to consider the multitude of ways in which environmental cf. climate change, and their governance are – or not – reshaped through new financial flows.

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