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The "Dirty Dairying" Campaign in New Zealand: Constructing Problems and Assembling Responses.

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Introduction

Agriculture in New Zealand is subject to considerable political and media attention due to its large economic contribution and, more recently, its highly visible environmental impacts. Dairy farming has experienced rapid growth and intensification during the last 30 years, and has come under heavy criticism from different sources: from the public to environmentalists and NGOs. The key crisis has emerged around water pollution. Rivers, lakes, streams, lagoons and wetlands are slowly deteriorating and dairy farming and its accompanying industry are increasingly being targeted as the main actors held accountable for this crisis. This particular entanglement of political forces and contradictory interests around the economic and environmental outcomes of dairy farming went through a major transition in the early 2000s through what has become known as the "dirty dairying" campaign.

This chapter will respond to the dirty dairying crisis by putting together new ideas around assemblage thinking with older theoretical framings that seek to uncover the way in which public and agri-environmental problems are socially constructed. We will examine the way in which the politics of rendering the connections between farming and farmed environments more visible has also made them more able to be politicised and responded to. At the heart of this new rendering is the assemblage approach which forms a central theme of this book collection.

Tania Li provides a prominent account of community forest management as assemblage which demonstrates the network of relationships that stabilizes and enables a particular enduring human relationship with land-based resources. In this chapter, we want to explore three of these elements – "rendering technical", "anti-politics" and "re-assembling". Thus, we shall reveal the way in which the multiple elements of the relationship between intensive dairy farming and water quality in New Zealand can be understood, both in composition and in its socio-political elements, as an assemblage, in order to explain particular environmental governance responses as a form of "re-assembling".

In order to disentangle this environmental and social imbroglio we will first explore the agricultural policy and the importance of dairy farming in New Zealand. Second, we will examine the historical origin of the "dirty dairying" campaign. Third, we will address the theoretical background of assemblage by using the case of diffuse (or non-point source) water pollution. Fourth, the effects of the expression "dirty dairying" will be presented. As a discourse that shapes a new representation of reality, this term creates a new ontological connectedness between farming and the environment which then enables new governance responses to take shape. Finally, we will linger on the dynamics of "re-assembling" revealed in the particular framing of, and responses to, water pollution, showing the re-appropriation by authorities and industry of a certain association of ideas in order to come up with governing tools.

The Neoliberal Transition in New Zealand Agriculture

New Zealand agricultural policy demonstrates a very peculiar characteristic: in many respects, it is almost non-existent! In 1984, the Fourth Labour government removed the main instrument of state intervention into agriculture – the subsidies allocated to farmers – and started deregulating the large government commodity export boards that controlled the exporting of key goods like wool, meat and dairy products. Afterwards, pastoral farming changed dramatically with the resultant slow decline of the sheepmeat and wool export sectors in favour of dairy farming which relentlessly moved towards its current status as the economically dominant farming land-use in New Zealand.

Agriculture has entered a new phase of intensification since the '80s reforms: stocking units per hectare, animal productivity per hectare, and agricultural inputs such as feed, pesticides or fertilizers, have increased dramatically (MacLeod and Moller 2006). Dairy farming has both intensified as well as become more geographically extended. It was located primarily in the North Island regions of Waikato, Taranaki and Manawatu and, while it is still a very important part of those regions' identities, has spread through the South Island – particularly in Southland and Canterbury – where widespread conversions from sheep farming to dairying have occurred (Forney and Stock 2014). Today, a dairy farm has an average herd size of 419 cows, up from 113 cows in 1975/1976 (LIC and Dairy NZ 2016). Sheep farming on the contrary has suffered a slow decline. The national sheep flock has declined from 70 million in 1982 to only 27 million in 2016 (Statistics New Zealand 2017). The growth of the dairy industry has followed a path of institutional consolidation. The pre-neoliberal structure of multiple grower-owned processing cooperatives supplying the monopoly-exporting New Zealand Dairy Board (NZDB) gave way to a rapid amalgamation of cooperatives. This process culminated in 2001 with the legislated transition of the export functions of the NZDB to a new mega-cooperative – Fonterra – which had emerged from the final amalgamation of the remaining two large dairy cooperatives. Fonterra consolidated the supply and export functions of the dairy industry for the first time – purchasing over 90% of dairy products and is credited with being the largest dairy export organisation in the world (Muirhead and Campbell 2012).

Today, several colliding interests and trajectories around dairying have a high level of visibility in public debate. First, although the national economy has benefited from dairy intensification, its consequences have become a significant source of concern for environmental groups. The recent intensification of agriculture (and dairy farming in particular) is seen as being responsible for the decline of water quality in waterways. After many decades in which agriculture was not a key target of environmental concerns, the influence of diffuse pollution from agriculture on water quality is now seen as the most compelling environmental issue in the eyes of the public (Hughey, Cullen and Kerr 2016). Second, New Zealand's deregulated agricultural sector has become a testing ground for "market-led" and/or voluntary approaches to environmental management – including the complex issues around water pollution. Stakeholders from different social and political groupings (government, industry groups, NGOs, iwi (1)) gathered in 2009 to form the Land and Water Forum, which has been tasked with providing recommendations to both national government and regional councils in relation to freshwater management. Third, despite the absence of agricultural policy per se, farmers are indirectly affected by several other pieces of legislation, in particular the Resource Management Act 1991 (RMA), which applies to natural resources and land use. While the farmed environment is only lightly regulated by international standards, this Act and the regulations it imposes are a source of considerable resentment from farmers. In this sense, the environmental problem in agriculture, seen within a wider transition towards neoliberal governance, provides two

compelling questions that we will explore in this chapter: how did a politically passive relationship between farming and the environment become problematized, and what kinds of new governance response are being assembled to respond to this new farming ontology?

Historical background of the dirty dairying problem

Our argument opens with the compelling need to clarify one quite singular ontological characteristic of New Zealand farming. For most of the 20th century, farming was never the subject of an environmental critique. The environmentalist movement that emerged in New Zealand after the 1960s tended to focus on a range of causes that never seemed to include farming as a threat to the environment (O'Brien 2013). This contrasts greatly with the "contested countryside" accounts of environmental conflict in Europe. Put simply, farming and the wider environment never existed within the same ontological space. While this curious ontological separation will be examined at more length in other publications, it also forms the essential pre-condition to all that follows in this chapter.

After these many decades in which farming activities had rarely been questioned, the separated worlds of farming and the environment were about to collide in a compellingly powerful conflict. In June 2001, several local newspapers published advertisements for a public interest campaign openly showing hostility towards dairy farming as a perpetrator of environmental harms. The campaign originated with Fish and Game, an NGO for fishing and hunting enthusiasts, and represented a dramatic entry into policy debate by a previously moderate organisation. The campaign created the loaded expression "dirty dairying", clearly associating dairy farming and environmental degradation (Blackett and Le Heron 2008). This represented a profound ontological challenge to a world which was founded on the separation of farming and environmental concerns. The campaign placed two concepts – dairy intensification and degradation of water – into the same political space and went on to criticise the lack of management of this problem by regional councils, the responsible local authorities for natural resource management.

A quote from Fish and Game's Chief Executive Bryce Johnson summarizes the strong impact achieved by the organisation with the coinage of the discursive coupling "dirty dairying" (Fish and Game as quoted in Ryan 2014, 5):

"If I had to pick one issue since the beginning of the new millennium for which Fish & Game New Zealand could claim the credit for having successfully forced onto the political stage, it would be the plight of New Zealand's natural water. The catalyst for this was our 'dirty dairying' campaign, the success of which took everyone by surprise. It obviously touched a public nerve that was looking for expression, and went viral."

In the "Dairy Farming & The Environment" position statement that underwrote the advertising campaign in newspapers, the organisation addressed the core logic of their demand for more environment-friendly agriculture:

"Habitat protection is critically important to the achievement of Fish & Game's statutory duty. We realised long ago that if the habitat is looked after then the animals that rely on that habitat will largely look after themselves" and "[a]ny activity that degrades the quality and/or extent of this habitat is therefore a threat to sports fish and game populations and Fish & Game is obliged to challenge its adverse environmental effects and those specific activities and agencies that cause it."(2)

It is not surprising that Fish and Game sought to protect fishing and hunting interests; what is more curious is that these interests had remained unprotected for so long. The ontologically challenging element of the campaign (and its broad support across New Zealand) was that there was no dispute on the basic scientific dynamics under consideration, rather that something that was previously held in the realm of the "uncertain" and "invisible" had been identified and problematized. The fundamental claim that water pollution is caused by dairying is *essentially* confirmed by research on land use effects on water composition (that affect water quality). There is clear evidence that New Zealand has undergone a significant intensification of its agricultural systems (MacLeod and Moller 2006) and this intensification can be correlated to an altered water composition (see Davies-Colley 2013 for a list of environmental studies). We deliberately use the term "essentially" in a conditional form, because water pollution is a wider problem – a result of its diffuse and transversal characteristics. Furthermore, as we will go on to argue, water degradation concerns the multiple and diverse values that are socially attributed to specific waterways. The scientific discussion of the contribution of dairy farming to water pollution is not, however, what primarily interests us here; it is rather the way this "wicked" problem was problematized. What we see here is an example of a private problem (rivers being allowed to exist in poor quality to allow for the continuation of private farming activities) that then became translated into a public problem through the dirty dairying campaign. In order for this translation to happen, a non-problem became reconstructed as a problem. Such reconstruction, particularly in the light of the prior passivity of this ontological space, provides a compelling subject for an assemblage-based approach to understanding and enacting agri-environmental governance.

The Uncertainties of Water

Before we undertake a more detailed analysis of the ontological realignment of the "dirty dairying" problem, we must briefly return to Li's concept of assemblage. Li proposes an assemblage definition that goes beyond the Foucauldian concept of problematization – albeit while taking great inspiration from it – by giving analytical primacy to specific *practices* of governance. She demonstrates her particular approach to assemblage through an analysis of community forest management which combines elements such as: material things, socially situated objects, objectives, knowledges, discourses, institutions, laws, etc. Her assemblage framework comprises six kinds of practice: forging alignments, rendering technical, authorizing knowledge, managing failures and contradictions, anti-politics, and re-assembling (Li 2007a).

Among the six practices related to assemblage, we choose to concentrate on three of them as being particularly useful for understanding dirty dairying, its consequences and subsequent responses. For Li, rendering technical means: "extracting from the messiness of the social world, with all the processes that run th[r]ough [sic] it, a set of relations that can be formulated as a diagram in which problem (a) plus intervention (b) will produce (c), a beneficial result" (2007a, 265). Practices of "rendering technical" not only work to simplify a complex reality but they also transform the "messy" aspects of a situation into a network of intelligible relations that are more governable. Rendering technical is similar to the problematization process, since "the identification of a problem is intimately linked to the availability of a solution" (Li 2007b, 7). Here we can usefully draw parallels from policy science: according to classical public policy analysis, a public problem is in the process of being solved when an authority acts on a target group that is considered to be the origin of the problem. This process follows the well-known "naming, blaming, claiming" argument (Felstiner, Abel and Sarat 1980-1981). The authors show how an unperceived injurious experience becomes a perceived one. This transformation implies recognizing a situation by *naming* the negative experience, *blaming* an actor or a group

who is considered to be responsible, and finally *claiming* a solution. The designation of a target group is also the fruit of social construction. Naming certain actors as responsible for a problematic situation is a political activity that is embedded in problem-framing.

Furthermore, rendering technical is deeply connected with what Li calls anti-politics: "questions that are rendered technical are simultaneously rendered non-political" (Li 2007b, 7). In her terms, the practice of anti-politics refers to the act of stripping off the controversies, negotiations, arrangements (i.e. the politics) of a situation by redirecting contentious elements into the realm of technical expertise (Li 2007a, 265).

Finally, Li defines re-assembling as the practice of "grafting on new elements and reworking old ones; deploying existing discourses to new ends; transposing the meanings of key terms" (2007a, 265). As we will see, newly formed assemblages can be re-used by different actors and reworked to fit a specific goal.

The assemblage approach is useful in its compatibility with wider insights from actor-network theory – particularly about the wildness or vitality of non-human actors. Water is complex and uncertain in some key ways: it crosses boundaries in ways characteristic of "wicked problems" in the environment, the pollution of water is often from diffuse sources, the measurement of quality has its own metrological dynamics and politics, and there is no stable set of cultural or social points of view on the values and utilities of water. The world of water quality is unstable, complex, difficult to measure and, as a result, unknowable in an easily accessible way. This instability is fundamental to the character of the problem and its associated political practices. It both enabled the stark effectiveness of a campaign that dramatically simplified these dynamics, as well as having an essential role in shaping the re-assembling of a governance response by the key stakeholders after the crisis had emerged.

While the framing of "wicked problems" is familiar in discussions of environmental governance, our case study requires an acknowledgement of a problem that is wicked in multiple ways. A first mention of wicked problems comes from Rittel and Webber (1973) describing problems that are hard to solve, in contrast to "tame problems" (p.160). For Head, the wickedness stems from the "complexity of elements, subsystems and interdependencies", "uncertainty in relation to risks, consequences of action, and changing patterns" and "divergence and fragmentation in viewpoints, values, strategic intentions" (2008, 103). Furthermore, water pollution can be understood as a wicked problem, because it is an issue that exceeds the limits of a single dimension of public policy. Water pollution in New Zealand brings in the legal use of natural resources (under the RMA 1991), the management of property rights and specific regional practices of land-use planning. The number of stakeholders linked to the issue is a parameter that also need to be considered. Water pollution issues concern farmers, fishermen, hunters or other water users, but also non-human actors that other groups speak in behalf of, such as living organisms affected by a material alteration of a waterway. In this way, water problems can be linked to the ontological flattening and "wilding" characteristic of actor-network theory and its turn to "vitality" (Bennett 2009; Carolan 2013). As the following section will show, the quality of water is complex, inconsistent, contingent on different values, and includes a lot of non-human actors and vitalities that make it challenging to "know" and to contain, let alone govern.

Water quality and the Complexity of Non-point Pollution

What is water quality? The good or bad quality of a waterway depends on the value that is assigned to it, an assignment made by its use, among other criteria. Johnson, quoted by Davies-Colley (2013, 33), describes water quality as:

"A measure of the condition of water relative to the requirements of one or more species and/or to any human need or purpose… [and] the suitability of water composition for supporting a range of water values, including habitat for aquatic life and human uses including recreation."

Water quality refers to the physical, biological and chemical components that constitute it. In this, it differentiates from water quantity (even though volume can be a relevant measure of the quality of water bodies). But, more importantly and fundamentally, water quality is related to values: a waterway is not only a waterway, but, for instance, a place dedicated to fishing for brown trout, a reservoir used for irrigation or drinking, a living space for a certain eel species or even a childhood memory. For example, within the framework of the River Values Assessment System, Hughey and Booth (2012) detail a list of six categories of values (here synonymous with use): recreation, character, ecological, cultural, developmental and other values. Each value or use attributed to a waterway brings in one or several measures of the quality of the water which are: physical and chemical characteristics, nutriments rate, optical variables and microbiological indicators (Davies-Colley 2013). We can also add to this typology "less tangible" values that some associate with a waterway. The visual degradation of a particular space or the mere knowledge of its degradation can negatively impact the personal value associated with it. Economic values of water are part of the problematic. For example, tourism is an important economic sector for New Zealand (Bain and Dandachi 2015) and it relies notably on the "clean" and "green" image of the landscape, including waterways, which stands in stark contrast to other economic actors like dairying.

This high diversity of possible uses or values show that it is not possible to speak of water quality as being represented by a universal constant. The "will to protect" water must be contextualised and is bundled within wickedly complex relations of needs, values and uses.

Water quality problems in New Zealand are primarily the result of non-point source pollution (point source pollution having been already subjected to legal constraint in the 1970s). Within the context of our wider argument, the diffuse aspect of water pollution makes it difficult to point to a specific individual or group (with a few uncommon exceptions involving extreme infringements) thus making it difficult to pin down or strongly identify a single culprit. This plays its part in creating "invisibility" as a characteristic of water quality. By demonstrating the complexity of non-point discharge and by establishing a list of potential threats for water and the different natural factors that alter its quality, we want to show how unstable and unknowable water quality has been as a field of specific governance and political action.

The substantial complexity of water pollution in New Zealand can be illustrated through three approaches: the diversity of water bodies, pollutants and soils. First, water pollution impacts on water bodies differently whether they are rivers, streams, lakes, wetlands or in underground aquifers. For example, a river with a weak flow rate induces a higher tendency to be affected by pollutants (Davies-Colley 2013); as for lakes, by their stagnant nature, they are more vulnerable than rivers. Higher temperatures as well as a limited depth and size are factors which also increase their vulnerability (Parliamentary Commissioner for the Environment 2012). Second, pollutants are of diverse nature: sediments, nutrients (mainly nitrogen- or phosphorus-based molecules) or pathogens constitute the main categories of pollutants that have an impact on water composition and result respectively (and approximately) in murky waters,

eutrophication and toxicity (Parliamentary Commissioner for the Environment 2012, 2013). Third, the very nature of the soil is also a determining factor in the way contaminants move - whether the soil is, for example, alpine or gleyed. Other factors include the lag time between the pollutant discharge and its effects in water (Howard-Williams et al. 2010) or the high number of farmers involved in a catchment or around a river making it nearly impossible to target a single accountable farmer for a pollution issue.

A final element to this opacity and instability of water quality as an object of governance is that even among farmers there are varying points of view. In a study of farmers in Canterbury (one of the South Island dairying regions), Duncan (2013) shows that they offer reasons explaining to why their contribution to water pollution is perceived to be minimal. Among the reasons are: spatial characteristics (the distance of their actions from the river, the absence of permeable soil on the farm), the nature of their soil (their clayey composition, the depth of the topsoil) or other reasons (the presence of filtering aquifers for nutrients, a low pluviometry in the region). These remarks seek to show the complexity of the movement of nutrients from the farm to the water: "The fact is, little is known about what happens beyond the root zone beyond modelling and assumptions about attenuation. As far as farmers are concerned, this relationship is not direct – there are many factors that can impede the movement of nutrients from the farm to the river and, it would seem, moderate responsibility" (Duncan 2013, 7). Consequently, she adds that "[f]armers (i.e. those who are expected to change their ways) see the problem as temporary and contingent upon a range of highly variable factors and its effects influenced and impeded by a number of equally unknowable circumstances" (Duncan 2013, 8). Duncan (2016) argues that farmers rely on knowledge practices that accommodate the variability of biophysical factors, as opposed to modelling science which eschews variability and is based on variables which constitute authorities' conceptions of them as the water quality problem.

In summary, the "problem" of water quality lies well within the category of the "political" not because of any overt strategy or chicanery to hide it from the public gaze, but mainly due to a set of inherent complexities stemming from the underlying biologies, the complex interactions between farms and waterways and the difficulty for even directly involved land-users to know what their influence is. Water quality is therefore a wicked problem because it is a problem in which there was no immediate foothold for the established suite of scientific and regulatory mechanisms to step into. That ungraspable quality was erased in 2001 through a clever and direct ontological reframing of the problem.

"Dirty Dairying": the creation of a new ontology

A search of the content of New Zealand media (national and regional) with the Newztext (3) tool shows the emergence of the expression "dirty dairying" in June 2001. This exactly aligns with the date when Fish and Game advertised their bitter critique of the dairy industry in several local newspapers. Since then, the combination of "dirty" and "dairying" has frequently been used to define water pollution problems from intensive agriculture. The conjunction of these two common words was simply non-existent in the media before this date.

The campaign mobilised a number of tactics identified in a previous section of this chapter as being effective in moving issues from being private issues to public problems. By specifically associating milk to water degradation, it created a new ontological juxtaposition, generating a peculiar assemblage around the water pollution problematic. Thus, within the frame of Felstiner, Abel and Sarat's problematization theory (1980-1981), the constitution of this problem named the problem as dirty waterways (naming), identified dairy farmers as the group

of actors accountable for this issue (blaming), and offered a way to solve it (claiming) by asking for more regulation from the industry itself and regional councils. The problematization of "dirty dairying" aligns with the second step of Li's practices of assemblage – rendering technical – as we see a new set of relations between different elements being formulated in an unequivocal way.

Following the launch of the campaign, numerous articles constituted a written war between environmentalists and farmers that helped embed the dirty dairying concept (Dearnaley 2001, Stuff 2001a; Stuff 2001b). Since then, the combination of "dirty" and "dairying" are regularly used in the media (1370 occurrences in the media such as articles, press releases or radio information from June 2001 to December 2016 – see Table 1) and official reports. Examples are numerous: "Commissioner to investigate dirty dairying" (Radio New Zealand Newswire 2002), "Final warning for dirty dairying pair" (Neems 2009), "Cleaning up dirty dairying" (The Dominion Post 2017) and so on.

Year	Occurrences	Year	Occurrences
2001	99	2009	129
2002	123	2010	128
2003	66	2011	125
2004	56	2012	132
2005	27	2013	131
2006	18	2014	110
2007	58	2015	72
2008	68	2016	28

Table 1: Number of occurrences of the expression "dirty dairying" in New Zealand media (source: Newztext Search)

Clearly, quite quickly after 2001, dirty dairying as an ontological juxtaposition had become a thing. The next question is how this began to have effects and trigger specific reactions.

Dirty dairying as a discourse makes visible a specific part of the network constituted by water in collaboration with other heterogeneous elements (which affect its "quality"). It is here an alignment of specific assemblage thinking and wider ideas in actor-network theory, particularly the works of Michel Callon (1986). Indeed, some of the practices contributing to assembling are strikingly similar to "interessement", one of the four steps of Callon's sociology of translation: "Interessement is the group of actions by which an entity […] attempts to impose and stabilize the other actors it defines through its problematization" (1986, 62). In either an assemblage logic or an actor-network approach, elements linked together exceed the boundaries of the human world and connect objects like waterways to pollution (including cows' excretion and urination, or molecules of nitrates).

This crystallisation is then perpetuated by the media and takes shape in governance instruments. The creation of a new ontological coupling, as a thinking category, echoes the creative capacity of discourse (Feindt and Oels 2005). In an uncertain world, the "dirty dairying" discourse proposes a certain web of (causal) relations as being the reality itself. The expression brought the two previously ontologically separated realms of farming and environmental issues together and therefore created a discursive coupling on which it was possible to exercise a form of power. The problem of water pollution was not new per se: the phenomenon known as water pollution was already addressed by media, scientific literature and legislation; but the expression "dirty

dairying" amplified and reconfigured it. The key foothold was to create an association between a previously unknowable problem and a specific culprit – dairy farmers. Thus, the dirty dairying campaign defined a new potential target group to which policy intervention could be applied. The use of this expression highlighted the ecological pressure which the country was experiencing around the intensification of milk production and built from this association a problem, which, even if it was previously recognised, did not have such an easily knowable quality.

From a public perspective, the perception of New Zealanders about the main causes of water quality has evolved since 2000 in a way that compellingly bears out the power of this coupling. During 2001, farming as a cause of water quality degradation was considered to be just one factor like any other along with industrial activities, hazardous chemicals, sewage and storm water (Hughey, Cullen and Kerr 2010). It is now – in 2016 – the clear top concern with 60% of surveyed people perceiving farming as having the strongest negative impact on water quality in New Zealand (Hughey, Cullen and Kerr 2016). We do not argue that this dramatic trend is solely correlated with the dirty dairying campaign; but it seems nevertheless a very important contributor to this change.

Making water pollution governable

The dirty dairying campaign created a new field of political possibilities around water quality. A new ontology of water quality was now in operation and a regulatory and political response was urgently needed. This response would initially come from the major players in the dairy industry. Founded, coincidentally, in 2001, the dairy company Fonterra occupied a quasi-monopoly on the collection of milk in New Zealand and was compelled to act in response as one of its first actions as a new business entity. It quickly took over the problem of dirty dairying and proposed a solution embodied in the *Dairying and Clean Streams Accord* (hereafter the Accord), a policy created jointly between Fonterra and the Ministry of Primary Industries (formerly known as the Ministry for Agriculture and Forestry). The Accord's provisions started in 2003 and ran until 2012.

The Accord represents that next stage in the rolling out of practices within an assemblage framework. It can be seen as performing a concerted remodelling of the problem configuration. It was also an opportunity to take the lead in responding to the crisis, thus avoiding stronger state regulation of the industry (Jay 2006). The five objectives proposed by the document were: 1) the establishment of fences on the banks of rivers, streams and lakes, 2) the construction of culverts to protect small waterways at stock crossings, 3) compliance with the regional councils' rules on effluent discharges from dairy sheds, 4) the adoption of a nutrient budget system to manage nitrogen in farming systems, and 5) the protection of significant wetlands with fences (Ministry for Primary Industries 2013). In 2013, the *Sustainable Dairying: Water Accord*, proposed by dairy farmers' representative organisation Dairy NZ, succeeded the original Accord (Dairy NZ 2013).

The Accord's re-appropriation of "dirty dairying" was politically highly effective: it took up the key ontological juxtaposition created by the campaign, namely a link between dairy farming and watercourses, and replied to it with a new solution: keep the cows out of the water! Thus, the main strategy in the Accord was the protection of water by preventing cows from approaching small streams, rivers and lakes. This was discursively highly effective, even though: "[T]here is […] room for debate about what is a 'stream' and about whether protection of surface water (as opposed to groundwater) is sufficient to offset the effects of dairy effluent

on paddocks." (Jay 2006, 272). In Callon's terms, this separation was laid across materials, vitalities and actions that don't necessarily observe human boundaries and overflow outside networks.

Technically, practices implementing three of the five objectives of the Accord were almost achieved in 2012, the remaining two being the wetlands protection objectives and the 100% compliance with regional council rules (Ministry for Primary Industries 2013). The Accord was also criticized as deploying a partial vision of the problem with the means not corresponding to the objectives needing to be achieved (Deans and Hackwell 2008; Holland 2014). The *Sustainable Dairying: Water Accord* then extended the original Accord objectives to include more detailed riparian, water use and nutrient management as well as dairy conversions. It also included the small number of other dairy companies and cooperatives as well as Fonterra.

In the end, what we observe in the case of these new agreements and practices is the act of making problems governable (Callon 1986; Lascoumes 1996; Oels 2005). The (re)organization of a problem is carried out in such a way that it is possible to exercise a policy intervention against it. Whether they are industry-driven agreements or governmental regulatory practices, we observe a common quality – the technical re-appropriation of a complex situation. Rose, quoted in Li (2007a, 279), mentions "switch points where an opening turns into a closure". Here, the campaign launched by Fish and Game represented the opening and the policies stemming from Fonterra or the government worked towards creating a closure. The regulatory answer to a problem is stripped of its political aspects, namely the wicked complexity, material vitalities, and the multisectoral arrangement of diffuse water pollution, and transformed into something that can be managed through technical measures. In short, the choice of a policy and the instruments it incorporates translates a specific configuration of the problematization (Lascoumes and Simard 2011). In responding to the crisis of dairying and water, it is not hard to see a significant disjunction between extensive objectives (improving New Zealand freshwater) and very specific instruments.

Conclusion

In conclusion, the term "dirty dairying" has changed the agri-environmental debate in New Zealand. The concept, which emerged from a campaign led by an NGO, put dairy farming at the heart of the environmental issue of water pollution by associating it with dirty practices.

Water pollution is a wicked problem, especially because of non-point discharges. A multitude of factors indicate its complexity. The nature of the pollutants, the type of freshwater bodies and soils, meteorological indicators, sources of pollution and values or uses attributed to rivers reveal the inherently wicked nature of the problem. Moreover, it is a problem that crosses political sectors and engages a large number of actors.

It is striking to see how Fish and Game's dirty dairying campaign froze some of these relations by associating the problem of water pollution with the previously unobjectionable realm of agriculture. To use Li's terms, this association rendered technical this situation in a very specific way. This had powerful consequences, and since the campaign began, the media then frequently used this previously non-existent coupling, a transition that clearly demonstrates the relevance of discourse and its ability to bring problematic realities into existence. In this sense, one can speak of the construction of a problem but not, ultimately, its resolution.

This new ontological alignment provoked a re-appropriation, or re-assembling, by dairy industry stakeholders who proposed governance solutions that had the effect of translating one assemblage into another. The practice of re-assembling is therefore found in both the problematization of an issue and in the answer to this newly constructed problem. The politics of assembling and re-assembling, however, still took place in an unstable terrain, and while the simple juxtaposition of dairying and dirty has been unfrozen, the other, wilder, elements of the network of actors continue to flow through and beyond the boundaries of governance. The governance project of water quality will always be subject to vital materialities and unknowable totalities, resulting in many bounded, partial and temporary fixes. In this example, we have been able to see to what extent agri-environmental governance and the public problems it seeks to frame are not self-evident, but rather the result of the will of actors who assemble the elements according to particular and political interests. For all these reasons, by taking an assemblage approach to understanding agri-environmental governance, we are able to better grasp both the governance practices and limits of assembling and re-assembling water quality.

Endnotes

(1) Iwi is the Maori word meaning tribe(s). It is commonly used in New Zealand English.
(2) https://fishandgame.org.nz/about/f-and-g-position-statements/dairy-farming-and-the-environment/ (last accessed on 18th July 2017).
(3) www.knowledge-basket.co.nz/ (last accessed on 18th July 2017).

References

Bain, Carmen and Tamera Dandachi. 2015. ""100% pure"? Private governance efforts to mitigate the effects of "dirty dairying" on New Zealand's environment" in *Handbook of the International Political Economy of Agriculture and Food*, edited by Alessandro Bonanno and Lawrence Busch, 40-58. Cheltenham: Edward Elgar Publishing.

Bennett, Jane. 2009. *Vibrant Matter: A Political Ecology of Things*. Durham: Duke University Press.

Blackett, Paula and Richard Le Heron. 2008. "Maintaining the 'Clean Green' Image: Governance of On-Farm Environmental Practices in the New Zealand Dairy Industry." In *Agri-Food Commodity Chains and Globalising Networks*, edited by Christina Stringer and Richard Le Heron, 76-87. Aldershot: Ashgate.

Callon, Michel. 1986. "Some elements of a sociology of translation: domestication of the scallops and the fishermen of St Brieuc Bay" in *Power, Action and Belief: A New Sociology of Knowledge?*, edited by John Law, 196-223. London: Routledge.

Carolan, Michael S. 2013. "The Wild Side of Agro-food Studies: On Co-experimentation, Politics, Change, and Hope." *Sociologia Ruralis* 53 (4): 413-431.

Dairy NZ (2013), Sustainable Dairying: Water Accord. A Commitment to New Zealand by the Dairy Sector, July 2013.

Davies-Colley Robert J. 2013. "River water quality in New Zealand: an introduction and overview" in *Ecosystem services in New Zealand – conditions and trends*, edited by John R. Dymond, 432-447. Lincoln: Manaaki Whenua Press.

Deans, Niels and Kevin Hackwell. 2008. Dairying and declining water quality. Why has the *Dairying and Clean Streams Accord* not delivered cleaner streams?. Wellington: Fish & Game New Zealand and Forest & Bird.

Dearnaley, Mathew. 2001. "Milk versus water: a clash of cultures". *New Zealand Herald*, 11 June 2001.

Duncan, Ronlyn. 2013. “A view from the Farm-gate: Farmers’ Perspectives on Water Quality”, Conference paper presented to the New Zealand Agricultural & Resource Economics Annual Conference, Farm Impacts of Environmental Policy, 28-30 August. Christchurch: Lincoln University.

Duncan, Ronlyn. 2016. “Ways of knowing – out-of-sync or incompatible?: framing water quality and farmers’ encounters with science in the regulation of non-point source pollution in the Canterbury region of New Zealand”. *Environmental Science & Policy* 55: 151-157.

Feindt, Peter H. and Angela Oels. 2005. “Does discourse matter? Discourse analysis in environmental policy making”. *Journal of Environmental Policy & Planning* 7 (3): 161-173.

Felstiner, William L. F., Richard L. Abel and Austin Sarat. 1980-1981. “The Emergence and Transformation of Disputes: Naming, Blaming, Claiming . . .”. *Law & Society Review* 15 (3/4): 631-654.

Forney, Jérémie and Paul V. Stock. 2014. “Conversion of Family Farms and Resilience in Southland, New Zealand”. *International Journal of Sociology of Agriculture and Food* 21: 7-29.

Head, Brian W. 2008. “Wicked Problems in Public Policy”. *Public Policy* 3 (2): 101-118.

Holland, Phil S. 2014. “The Dirty Dairying Campaign and the Clean Streams Accord”. *Lincoln Planning Review* 6 (1-2): 63-69.

Howard-Williams, Clive, Robert Davies-Colley, Kit Rutherford and Robert Wilcock. 2010. Diffuse pollution and freshwater degradation: New Zealand Perspectives, Selected papers from the 14th International Conference of the IWA Diffuse Pollution Specialist Group, DIPCON 2010.

Hughey, Ken F. D. and Kay L. Booth. 2012. “Monitoring the state of New Zealand rivers: How the River Values Assessment System can help”. *New Zealand Journal of Marine and Freshwater Research* 46 (4): 545-556.

Hughey, Ken F. D., Ross Cullen and Geoff N. Kerr. 2010. A decade of public perceptions of the New Zealand environment: a focus on water and its management. Lincoln University.

Hughey, Ken F. D., Ross Cullen and Geoff N. Kerr. 2016. Public perceptions of New Zealand's environment: 2013. Christchurch: EOS Ecology.

Jay, Mairi. 2006. “The political economy of a productivist agriculture: New Zealand dairy discourses”. *Food Policy* 32 (2): 266-279.

Lascoumes, Pierre. 1996. “Rendre gouvernable: de la "traduction" au "transcodage": l’analyse des processus de changement dans les réseaux d’action publique”. *La Gouvernabilité*, CURAPP, 325-338. Paris : Presses universitaires de France.

Lascoumes, Pierre and Louis Simard. 2011. “L'action publique au prisme de ses instruments. Introduction”. *Revue française de science politique* 61: 5-22.

Li, Tania. 2007a. Practices of assemblage and community forest management. *Economy and Society* 36 (2): 263-293.

Li, Tania. 2007b. *The Will to Improve: Governmentality, Development, and the Practice of Politics*. Durham: Duke University Press.

LIC (Livestock Improvement Corporation) and Dairy NZ. 2016. New Zealand Dairy Statistics 2015-16. Hamilton.

MacLeod, Catriona J. and Henrik Moller. 2006. “Intensification of New Zealand agriculture since 1960: an evaluation of current indicators of land use change”. *Agriculture, Ecosystems and Environment* 115: 201-218.

Ministry for Primary Industries. 2013. The Dairying and Clean Streams Accord: Snapshot of progress 2011/2012, February 2013.

Ministry for the Environment. 2013. Freshwater reform 2013 and beyond. Wellington.

Muirhead, Bruce and Hugh Campbell. 2012. “The Worlds of Dairy: Comparing Dairy Frameworks in Canada and New Zealand in Light of Future Shocks to Food Systems” in *Rethinking Agricultural Policy Regimes: Food Security, Climate Change and the Future Resilience of Global Agriculture* edited by Reidar Almas and Hugh Campbell, 147-168. United Kingdom: Emerald.

Neems, Jeff. 2009. “Final warning for dirty dairying pair”. *Stuff*, News, 25 July 2009.

O'Brien, Thomas. 2013. “Fragmentation or Evolution? Understanding Change Within the New Zealand Environmental Movement”. *Journal of Civil Society* 9 (3): 287-299.

Oels, Angela. 2005. “Rendering climate change governable: From biopower to advanced liberal government?”. *Journal of Environmental Policy & Planning* 7 (3): 185-207.

Parliamentary commissioner for the Environment. 2012. Water quality in New Zealand: Understanding the science. Wellington.

Parliamentary commissioner for the Environment. 2013. Water quality in New Zealand: Land use and nutrient pollution. Wellington.

Radio New Zealand Newswire. 2002. “Commissioner to investigate dirty dairying”, 26 June 2002, Time 12:34.

Rittel, Horst. W. J. and Melvin M. Webber. 1973. *Policy Sciences* 4: 155-169.

Ryan, James. 2014. Farming in a fishbowl: Insights from environmental leaders. Kellogg Rural Leaders Programme 2014.

Statistics New Zealand. 2017. Agricultural Production Statistics: June 2016 (provisional), Wellington.

Stuff. 2001a. “Dairy: Farmers under fire over 'dirty dairying'”. *Stuff*, Rural, 18 July 2001.

Stuff. 2001b. “Dairy: 'Dirty dairying' protest goes to industry heads”. *Stuff*, Rural, 19 July 2001.

The Dominion Post. 2017. “Cleaning up dirty dairying”. *The Dominion Post*, 11 January 2017.