

Green transformation is a boundary object: An analysis of conceptualisation of transformation in Norwegian primary industries

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Abstract

The concept of *green transformation* is burgeoning in the academic literature and policy discourses, yet few empirical studies investigate what the concept actually means to diverse actors, and how it manifests in practices. This paper contributes to filling that gap. Through an analysis of policy documents and interviews, we investigate how central policy actors and interest organisations in Norwegian farming, fisheries and aquaculture conceptualise and enact transformation. The analysis of the policy documents shows that the concept ‘transformation’ is mentioned more frequently, and a rhetoric with close connotations to green growth is increasingly applied, which may leave the impression that there is consensus concerning what the concept means and entails. The interviews however leave a more nuanced picture. Among most of the actors, transformation is interpreted in terms of green growth, while a minority of the actors argue for a deeper sustainability, pointing to planetary limits. Clearly, what transformation is and what it entails is embedded in interpretive flexibility. The concept ‘transformation’ is plastic enough to be applied in several different, and partly conflicting, policy discourses and arenas. We argue that transformation can be understood as a boundary object, and different actors perform different sorts of boundary work to adapt the boundary object of ‘transformation’ to fit their agendas. Thus, it makes more sense to think of transformation in plural – *transformations* – instead of a single, consensual discourse. We find that the very practices of most of the actors are not transformative in the theoretical understanding of the concept and that inadequate attention is given to potential negative sides of transformation. Consequently, both scholarly and practical discussions on how to achieve transformation should take into account that different and (partly)

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conflicting interpretations will continue to exist and contribute to distinguish between different degrees of sustainability and related pathways.

Keywords

Green transformation, primary industries, boundary object, green growth, Norway

Introduction

Over the last decade, a string of literature has evolved around the concept of *transformation* in the context of climate change (e.g. Brown et al., 2013; Feola, 2015; Folke et al., 2010; Gillard et al., 2016; Kates et al., 2012; O'Brien, 2012; Pelling, 2011; Pelling et al., 2015). The emergence of this literature must be seen against the background of increased knowledge of and concern with global environmental change, such as climate change and biodiversity loss, and that incremental change may not be sufficient to address climate change. Recent high-profile political agreements, such as the Paris Agreement (UNFCCC, 2015) and the sustainable development goals (SDGs) (United Nations, 2015), have led to even more societal and academic interest around the concept of transformation.

At the same time, this increased interest has led to a range of different conceptualisations of the concept. In a review paper, Feola (2015: 376) finds that 'little consensus exists regarding the conceptual basis of transformation' and calls for more empirical studies that can aid conceptual refinement of the term. This empirically grounded paper responds to this call. The paper takes as its point of departure the ways in which transformation is conceptualised and operationalised by actors grappling with the very practices of transforming in the face of climate change, combined with a range of other variables, such as economic profitability, weather variability and regulations.

The landmark Paris Agreement firmly established transformation as an issue on the global agenda (Scoones et al., 2015) and the Intergovernmental Panel on Climate Change (IPCC) report on the impacts of a warming of 1.5°C highlights the need for transformation to keep global warming within 1.5°C (IPCC, 2018). But exactly what sort of issue transformation is, and how it shapes and is shaped by different contexts, is still largely an open empirical question. The conceptualisation of climate change is filtered through current perceptions and values, which influences the potential for transformative responses (see O'Brien, 2012). Norway is an interesting case in this regard, being a major global petroleum exporter combined with strong climate policy ambitions (Tellmann, 2012). In Norway, the term *green transformation*, has been established as a key policy goal on the Norwegian agenda (Haarstad and Rusten, 2018; MCE, 2017). In the Norwegian debate about green transformation, the concept the *green shift* has been conceived (Bjartnes, 2015) to discuss societal responses to climate change. As an indicator of the term's popularity and uptake in the public debate, the term became the new word of the year in Norway in 2015. In the government declaration of January 2019, the associated concept of the *green economy* is applied in the first key policy objective: 'The Government will continue to build a sustainable welfare-based society by restructuring the Norwegian economy, promoting growth and creating jobs, improving infrastructure throughout the country, supporting the transition to a green economy and ensuring diversification' (Government of Norway, 2019: 4).

Translating the Norwegian concepts into English, we have chosen *green transformation*, yet the concepts do not easily translate. For the most part, *green transformation*, *green*

economy and the *green shift* are used interchangeably (Haarstad and Rusten, 2018: 12), but the green shift is more commonly applied in the Norwegian public debate and mainly what the respondents of this study relate to. The *green shift* concept aligns more with a transition tradition, than transformation, and we will return to the distinction between transition and transformation in section two. The perceived need for a green transformation emerges against a backdrop of increased attention to climate change at the international and national scene, and a temporary decline in the Norwegian oil industry in the period 2014–2017. These two aspects are linked. Yet the perceived understanding of the content, goal and degree of change required in a green transformation varies greatly between different policy actors, ranging from incrementally tweaking business-as-usual by ‘doing things a little greener,’ to making deeper, substantial changes to status quo.

However, although the concept is established on the overall global and national agenda, little is known about how transformation is conceptualised and operationalised in sectoral policy communities at the national level and among sectoral interest organisations. The focus of the current study is the primary sectors of farming, fisheries and aquaculture in Norway. The sectors are both exposed to the consequences of climate change and mitigation policies, which further challenge the sectors through required emissions cuts (Kvalvik et al., 2011; Hovelsrud et al., 2010). These sectors are heavily regulated in a corporative manner (Almås, 2016; Farsund, 2004) which may pose challenges if proposed mitigation policies are at odds with the dominant imperatives and thinking in the sectors. Consequently, the Norwegian primary industries provide interesting empirical cases for investigating how actors respond to climate change and the call for transformation, including considering Norway’s climate ambitions. What we want to highlight here is a hypothesised discrepancy between the academic call for transformation and various actors’ understanding and application of what level of change is needed and their role in this change.

Despite a steadily growing body of literature on transformation and several suggestions for research agendas (Colloff et al., 2017; Fazey et al., 2018; Patterson et al., 2017), empirical studies of how transformation is conceptualised and operationalised by different actors *in practice* are still scarce (Feola, 2015). Since there is a link between academic understanding and the very practices of transformation, more empirical studies are critical, both to further develop the literature, but also to guide transformation in practice, which is of critical importance if we are to reach the goals of the Paris Agreement and the SDGs. This paper contributes to filling that gap, employing the dimension of *depth* of transformation as our analytical lens. We investigate how a set of key actors conceptualise transformation, their perceptions of the preconditions for transformation to occur, how the concept is translated into concrete plans and actions, and how contextual factors shape transformation processes and actions.

In this paper, we present an analysis of policy documents and interviews with key Norwegian climate policies actors, particularly on green transformation in farming, aquaculture and fisheries, asking: *How do the most important policy actors and interest organisations in Norwegian primary industries conceptualise and operationalise green transformation, and how can those conceptualisations and practices inform the scholarly debate on green transformation?*

We organise the paper as follows: First, we provide an overview of green transformation as discussed in current literature. Second, we provide key background to the context of the Norwegian primary sectors. We then describe the methods applied in this study and provide the results. This is followed by analyses and discussion of the discourses that materialise from our analyses. In the conclusion, we argue that the very practices of most of the actors are not transformative in the theoretical understanding of the concept and that inadequate

attention is given to potential negative sides of transformation. The interpretive flexibility of the concept helps keeping the debate on the agenda, but also bears the risk that the concept becomes devoid of meaning.

What is green transformation?

Transformation has increasingly become a key concept within climate change and sustainability research over the last decade (e.g. Feola, 2015; Kates et al., 2012; Patterson et al., 2017; Pelling, 2011). At its core is the understanding that the challenges arising from climate change are so profound that current, incremental approaches to these challenges are insufficient. Instead, transformation is called for (Blythe et al., 2018; Gillard et al., 2016; Kates et al., 2012; O'Brien, 2012). However, with respect to the challenges society is faced with from climate change there are still large uncertainties and questions raised regarding transformation, including what transformation is, how it comes about, how ensure a just, equitable and sustainable transformation, and who decides what to include and exclude (Blythe et al., 2018; Feola, 2015; O'Brien, 2012). In this context, the need for a deliberate transformation has been put forward, which democratically and purposely aims to shift society towards sustainability (Fook, 2017; O'Brien, 2012).

Ideas and debates on societal transformations are not new with climate change (Roberts and Pelling, 2019; see e.g. Polanyi's 1944 seminal work). There are several examples of transformations during recent human history, and lessons from these experiences may support the green transformation now called for (Leichenko and O'Brien, 2019). The literature addressing deep transformation discusses the need for challenging and changing the dominant social paradigm; the assumptions, beliefs, values, commitments, loyalties and interests that make up the social structures and systems (O'Brien, 2012). It is argued that the framing of transformation needs consideration of changes in values, beliefs and worldviews (Eriksen and Selboe, 2015; O'Brien and Sygna, 2013). Transformation is seen as a process that involves radical and deeper level systemic changes, including paradigmatic shifts in policy and management systems (Hulme, 2009; O'Brien, 2012).

Park et al. (2012) show the interlinkages between incremental and transformative change, recognising that incremental steps are necessary on the path to transformation. Notably, the direction of the incremental changes is important to observe, because incremental changes may result in lock-in to systems that are not contributing towards a low-emission society, for example, large road infrastructure developments or new licenses for petroleum exploration.

The difference in approaches or levels of change, in deep transformation and incremental change may be represented by a three-stage change. Pelling et al. (2015) argue that at the first level of change, status quo is protected, and only minor adjustments are made. At the second level, incremental adjustments take place, which may be important steps towards transformation (Park et al., 2012; Patterson et al., 2017). The third stage is transformation. Incremental changes occur in the current system, whereas transformative change challenges and shifts society.

Patterson et al. (2017) focus more specifically on governance systems and how incrementalism is embedded in these systems, suggesting a 'strategy of *incremental change with a transformative agenda*' to overcome the tension between incrementalism of governance processes and the need for larger, transformative changes (p. 4, emphasis in original). Scoones et al. (2015: 21) point to the pluralism of transformation, arguing that 'rather than there being one big green transformation, it is more likely that there will be multiple transformations that will intersect, overlap and conflict in unpredictable ways.' This highlights the need

to consider change in multiple interconnected areas (e.g. social, institutional, political, ecological, technological, cultural) in contextually relevant ways that appreciate the potential for co-evolutionary and non-linear outcomes.

As noted, the concepts applied in the Norwegian context, such as the green shift, bear more resemblance with the transition literature than transformation. Transitions towards sustainable societies are considered long-term change processes in both social structures and institutions to solve persistent problems that prevent sustainability (van der Brugge et al., 2005). The literature on transitions has particularly paid attention to sub-systems, such as energy- and food systems, mobility and transport, or industrial systems (Hölscher et al., 2018). Such processes are often termed socio-technical systems changes (Geels and Schot, 2007; Geels, 2014; Grubler, 2012; Lawhon and Murphy, 2012; Markard et al., 2012; Rotmans et al., 2001; Whitmarsh, 2012). The transformation literature typically has paid more attention to large-scale societal changes and the outcomes of these and is further associated with a different research community than transition (Hölscher et al., 2018). In line with Scoones et al. (2015), we find that transformation, rather than transition, covers the degree of change in question and covers broader structural changes. Further, more attention is given to changes in values and worldviews (O'Brien, 2012) and cultural change (Tàbara and Ilhan, 2008).

The literature seems to converge on the need for transformation, and that transformation is likely to take place as a stepwise change from status quo to something else. But there seems to be a gap in the literature of empirical studies investigating (attempts at) transformation processes and exploring the borderland between incrementalism and practices toward deep transformation. On a more general level, the literature diverges on what transformation is, how deep changes are needed, and how transformation comes about (Blythe et al., 2018).

One string of the transformation literature focuses on the potential gains, opportunities, co-benefits and 'the good life' that may result from deliberate transformation processes that address vulnerabilities and inequalities through a shift towards a desirable future (O'Brien, 2012; O'Brien and Selboe, 2015; Pelling, 2011). The literature also focuses on the abilities and possibilities of steering towards a future that is more ecologically sustainable (e.g. Bennett et al., 2016; Jackson, 2009, 2011). Visions of a desirable future and potential examples, 'bright spots' of how to get there is given e.g. by Bennet et al. (2016). This positive outlook for change is also represented in international initiatives such as the UN SDGs (United Nations, 2015). This framing is however balanced in the literature by an attention to challenges, power dimensions, trade-offs and other aspects of transformation (Patterson et al., 2017), emphasising a 'dark side' of transformation (Blythe et al., 2018). Blythe et al. (2018: 5) discuss the challenges, or dangers, of transferring the academic understanding and discussion of transformation to practice. They argue that scientists use the concept of transformation 'to *describe* socio-ecological interactions,' whereas policymakers and practitioners increasingly use the concept as a tool to implement measures for change. This distinction represents potential risks and the authors define several areas where specific care needs to be taken in order to not 'undermine the transformation project' (Blythe et al., 2018: 3). An example is the application of the green economy, which have been criticised as used in the interest of capital accumulation (Blythe et al., 2018 refer to MacDonald 2013). Blythe et al. (2018: 8) argue that:

policymakers can distort the language of transformation to define acceptable formulation of problems and solutions to those problems that serve to reproduce existing structures of power and domination and justify business as usual.

Further, it is argued that society ‘remains on largely unsustainable development trajectories’ as interventions are not addressing the root causes of unsustainability and apply interventions that are easy to implement, but that has limited scope for transformation (Abson et al., 2017: 30).

Overall, there seems to be a divergence in the literature regarding the meaning of the concept of transformation. This lack of a uniform understanding leads us to hypothesise that transformation can be understood as a boundary object, originally defined as ‘objects which are both plastic enough to adapt to local needs and constraints of the several parties employing them, yet robust enough to maintain a common identity across sites. They are weakly structured in common use, and become strongly structured in individual-site use’ (Star and Griesemer, 1989: 393). From this perspective, empirical studies of the very practices of conceptualising transformation can test whether this hypothesis holds true, and simultaneously advance and refine the academic understanding of the term.

In short, through the lens of understanding transformation as a boundary object, this paper analyses actors’ conceptualisation of transformation through the *depth* of required change as portrayed in the literature: from incremental change to deep, transformative change; largely aligning with weak versus deep sustainability (Pelling et al., 2015; Scoones et al., 2015).

Norwegian primary sectors and green transformation

The primary sectors represent a cornerstone of most rural and coastal communities in Norway. These sectors support national policy goals of ensuring settlement across the country and a high level of self-sufficiency in food production. Employment in the primary sectors have declined for several decades but is still a significant employer in many communities (West and Hovelsrud, 2010). In some communities, fisheries employ up to 30% of the work force (West and Hovelsrud, 2008). The primary industries will be significantly impacted by climate change and consequences of climate change are already creating new challenges and opportunities (Kvalvik et al., 2011). For many fishers and farmers operating at the margins, the consequences of climate changes come in addition to challenging policies and framework conditions in the sectors (Hovelsrud et al., 2010).

At the government level, the Ministry of Trade, Industry and Fisheries (MTIF) and the Directorate of Fisheries (DF) are responsible for fisheries and aquaculture. Similarly, the Ministry of Agriculture and Food (MAF) and the Norwegian Agricultural Authority (NAA) are responsible for agriculture. These institutions, in particularly the Ministries, see as their primary role to attend to the interests of the sectors. The role of the Ministry of Climate and Environment (MCE) and the Norwegian Environment Agency (NEA) is cross-cutting, to ensure that climate change is taken into consideration across the ministries and in society at large. As such there are occasionally conflicting interests between the MCE and the sector ministries (Asdal, 2014).

Farming

There are large variations between farming systems in Norway, from small-scale sheep, goat and dairy farms to larger grain, dairy and meat producers. Typically, mountain farms and farms in higher latitudes are smaller scale, but the variation also cuts across the country. Two main interest organisations represent farmers, the Norwegian Farmers’ Union (NFU), which is the incumbent organisation, and the Norwegian Farmers and Smallholders’ Union (NFSU). The two are aligned in some questions but tend to have a slightly different outlook.

NFSU are for example member of La Via Campesina, the international peasants' voice, and emphasise more the farmers' role in the local community than do NFU. Conversely, NFU tends to be most in favour of larger farming units with full-time farm employment.

The annual farming negotiation between the farmers' organisations and the government regulates prices of produce, subsidies and other conditions regarding the sector. Since 2014, climate change has been on the agenda in these negotiations. Discussions of agriculture and climate change typically centres around the agricultural sector being significantly impacted by climate change, and the vast opportunities for mitigation through forestry¹ (e.g. MAF, 2009). In 2014, there was a political request to the annual negotiations to assess 'the challenges of agriculture in facing climate change', which resulted in a report addressing both mitigation and adaptation (MAF, 2016). For the first time, potential changes in food consumption were included, supporting a change to less meat and more vegetarian food consumption. This is a contentious issue, as production of meat and dairy is important to many farmers. The report was subject to negotiations and revisions before the final report was published. It is therefore notable that policy options regarding consumption change remained in the report.

Emissions from farming accounts for approximately 8% of national emissions (Statistics Norway, 2019). Norway is not an EU member but is a voluntary partner to the EU Effort-sharing regulation, which implies that non-ETS sectors (mainly agriculture, transport, buildings and waste) will have to cut GHG emissions by 40% by 2030 compared to 2005-levels. EU's LULUCF regulation, implying that emissions from land use, land use change and forests do not exceed removals by sinks, also applies to Norway. Norway signalled its interest to fully align its mitigation policies with the EU already in 2015. Since then, policies and measures for emission reductions in non-ETS sectors have gradually climbed higher on the agenda, including in the agricultural sector. Agriculture has a central position in the discussions about where to allocate the emission reductions from non-ETS-sectors, and in June 2019, the NFU and NFSU signed an intentional agreement with the government to cut GHG emissions from the farming sector by five million tonnes of CO₂ equivalents in the period 2021–2030. Mitigation in the farming sector is likely to require changes in the ways in which it operates. As a response to increasing policy demands, NFU together with a range of actors in the sector have initiated a 'Climate Smart Farming' project, in which emission reductions from each farm will be accounted for and the effect of measures will be documented. Central actors see this initiative as an important input to the debate concerning GHG emission reduction in the sector.

Fisheries and aquaculture

Broadly speaking, fisheries in Norway are divided between the coastal fleet and the ocean fleet. The coastal fleet consists of smaller boats (up to 28 metres) fishing close to the shore. The ocean fleet are boats over 28 metres, such as trawlers. The number of boats, particularly smaller boats, has decreased significantly since restructuring policies in the early 1990s. The interest organisation the Norwegian Fishermen's Association (NFA) organise the largest number of the fishers, whilst the Norwegian Coastal Fishery Association (NCFA) has a smaller member base. Like the interest organisations in the farming sector, the NCFA has a stronger focus on local community and sustainability than do NFA. Aquaculture has become an important employer along the coast, and the seafood industry, including aquaculture, represents Norway's largest export industry after petroleum. The sector is organised in several interest organisations, the largest being Norwegian Seafood Federation (NSF), under the umbrella of the Confederation of Norwegian Enterprise. They focus their

attention to the EU, as naturally the European market and regulations are important for export from the sector.

Emissions from fishing boats are accounted in the transport sector, which is a sector expected to drastically reduce emissions in the coming years, largely through electrification. While significant electrification is underway in Norwegian coastal traffic, there is currently only one electric coastal fishing boat in use. The fisheries' authorities have not focused on climate change and mitigation to any significant degree. Few documents from the Ministry discuss climate change at all. The Ministry of Fisheries and Coastal Affairs² published a climate strategy in 2013, which focused on technology to reduce emissions and efficiency in the sector (MFCA, 2013). The strategy was to be revised in 2015, but no such revisions have been published to date. Until now, the fisheries have through a general refund scheme largely been exempted from the general CO₂-tax in Norway, but this scheme is becoming more diversified, favouring energy efficiency (see Isaksen et al., 2015).

Methods

The empirical core of the paper constitutes of policy documents and semi-structured interviews. In addition, we have followed relevant discussions in traditional and social media and attended about a dozen seminars and conferences about the topic.

A total of 30 policy documents at the national level have been analysed, spanning three main categories: climate and environment, agriculture and fisheries. We selected all relevant Official Norwegian Reports, White Papers, government strategies and directorate reports from 2005 until end 2017 and analysed these regarding how they conceptualise and operationalise transformation in the context of climate change. The selected documents were published by the Government, the three Ministries (MTIF, MAF, MCE), and the three Directorates (DF, NAA, NEA).

We developed an interview guide for the semi-structured interviews. The interview guide covered topics such as what actors included in their understanding of the concept of transformation, transformation agenda setting, goals set for transformation, the origin of the concept and the drivers for agenda setting in organisations. Further, the interview guide included understanding of own's role in transformation, what relevant knowledge is being used, how actors collaborate with other actors, and preconditions for transformation.

We recruited people who were working with questions concerning climate and environment in their role in the relevant organisations. We interviewed 17 people. These were representatives from the three Ministries of Agriculture and Food; Trade, Industry and Fisheries; and Climate and Environment; the two Directorates of Fisheries and the Norwegian Agricultural Authority; and the sector interest organisations of the Norwegian Farmers Union; the Norwegian Farmers and Smallholders Union; the Norwegian Fishermen's Association; the Norwegian Coastal Fishery Association; and the Norwegian Seafood Federation. In addition, we have interviewed one representative from the agricultural extension services, two researchers, and one agricultural cooperative representative. Most of the interviews took place during 2017. Interviewees were guaranteed anonymity.

The interviews were recorded and transcribed. The material has been analysed through the software programme NVivo, which has been developed to analyse qualitative data. We coded and analysed the material according to a set of categories defined by the main topics of the interview guide. All interviews were conducted in Norwegian and quotes from interviews and documents used in this paper have been translated by the authors, except Government of Norway (2016, 2019), which were published in English.

Understanding of green transformation in the primary sectors

In the following we present our findings. We start by presenting the various definitions given of green transformation and the perceived drivers behind the concept, before we offer a sector wise account of how the different sectors, actors and organisations have grasped and operationalised the concept, and what they perceive as the preconditions for the green shift to materialise in their practices. The input from interviewees is for the most part their individual perceptions and is not necessarily representative for the organisations they represent, unless they refer to a definition defined by their organisation.

Definitions of the concept

Transformation increasingly appears as a concept in the policy documents. The first time it was used in the context of climate change was in a climate policy White Paper from 2007 (ME, 2007). The increased use of the concept coincides with the decline in the petroleum sector and trends such as the increased use of concepts like the *green economy*, *bio-economy* and *circular economy*. One of the most concrete definitions of the concept from the sectors studied is published in the report 'Agriculture and climate change':

Society must be transformed in order to stop climate change and at the same time replace fossil resources with climate neutral, renewable resources. Concepts such as 'the green shift' and 'bio-economy' are central to the understanding of this transformation. These are expressions of changes in resource use, production systems, and consumption. Such changes are also required to limit the consequences of climate change. (MAF, 2016: 226)

However, a conspicuous finding across the data is that no consensual definition of the concept(s) of green transformation or green shift exists. Rather, the majority of the informants regard the concept as blurry and diffuse, with political undertones. The person who coined the concept the *green shift*, Anders Bjartnes, the director of a Norwegian think tank, said in an interview: 'The expression is so imprecise that anything may be included, and it may be applied in many different contexts. That is also an explanation for why its use has taken off' (Journalisten, 2015).

Representatives from NFSU, the extension service and the researchers interviewed explicitly expressed that they saw the concept as a rhetorical device used by politicians, whilst NFSU specifically noted that the Government had little credibility in their definition of the green shift, as it was seen as a way of addressing international obligations with little visible content in national politics. Also NFA linked the green shift to Norwegian international obligations, particularly the agreement with the EU, and noted the transformation related to reaching the set goals. One representative from NFU noted that the whole society needed to be part of the change:

To my mind it is about replacing non-renewable resources in society. The main challenge is very clear, that the whole society needs to stop using fossil energy and resources. (Interviewee, NFU)

This was contrasted with emissions from biological processes, what was termed 'natural emissions resulting from agricultural production' (Interviewee, NFU). Whilst the interviewee from NCFA noted:

I think of the green shift as a transition to a more environmentally and sustainable fishery, which emits less CO₂ than the current system. (Interviewee, NCFA)

Yet, despite the lack of a uniform definition and operationalisation, some common characteristics of the concept(s) can be traced in the data. First, a consistent finding is that the concept(s) entail(s) cutting emissions from fossil fuels, and a broader phasing-out of fossil products and raw materials; in short, a transition from non-renewable to renewable sources. Second, the green shift is seen as a process whereby all sectors need to contribute. At the same time, actors in all sectors provided arguments for why their sector should not contribute more than others. They defined their own sector as part of the solution since their core activity concerns renewable resources and understood their own sector as inherently environmentally friendly. Third, no actors see green transformation as something fundamentally new; rather it will be brought about by incrementally tweaking existing practices, where employing new technologies will play a key role. Finally, all actors focused on the opportunities that a green transformation could bring for their sectors, while none of the interviewees, for instance, mentioned changing mindsets or decreased economic growth.

Drivers behind the green shift

All interviewees were asked about the drivers behind green transformation. Responses can be sorted in two main categories, climate policies and climate change as a physical phenomenon. *Policies* was a keyword mentioned by all informants. Several interviewees highlighted the importance of the Paris Agreement, as several political decisions which impact the primary industries' framework conditions have been made in anticipation of and after the Paris climate summit in 2015. In addition, the recently passed agreement between Norway and the EU on how Norway can fulfill its Nationally Determined Contribution to the Paris Agreement jointly with the EU was mentioned several times as an important driver. Scientists, NGOs and public climate policy authorities were mentioned as actors who contributed to drive the green shift up on the agenda, although politicians were perceived as having a leading role.

At the other end of the scale, the Government's Ocean strategy (MTIF and MPE, 2017) does not discuss green transformation, except for noting its importance twice in the introduction. This represents a paradox as the main goal of the strategy is green transformation and sustainable development. Further, the strategy defines the petroleum industry as the most important ocean sector, and thus the government does not appear to be driver of the green transformation.

Climate change as a *physical phenomenon* was mentioned as a driver, requiring both adaptation and mitigation. NFU has had a climate strategy from 2006. At that point, the climate issue had started climbing on the political agenda in Norway, among other factors as a result of the work of the Norwegian Commission on Low Emissions, resulting in the Official Norwegian Report entitled 'A climate-friendly Norway' (ME, 2006). However, it took longer for climate change to firmly establish on the policy agenda in the agricultural sector (MAF, 2009).

Changing *consumer preferences* was also mentioned as a driver by some informants, arguing that Norwegian consumers pick up international trends, placing more emphasis on the links between food, health, climate, sustainability and animal welfare. Finally, energy efficiency and economic gains were mentioned as drivers, particularly in the fisheries sector.

Transformation in the farming sector

In the farming sector, climate change and green transformation was high on the agenda. Particularly the last five years, the sector interest organisations and public authorities have

worked actively to shape what they see as the sector's appropriate responses to climate change, and to carve their role in the green shift. For instance, both the NFU and NFSU have discussed green transformation at their general assemblies, they raise the topic in the annual farming negotiations with the Government, and the NFU has developed a strategy for the bioeconomy (NFU, 2016). NFU mainly focuses on energy use, including transport, and the replacement of fossil resources. NFSU, however, generally takes a different position. They argue that Norwegian farming policy is paradoxical with the national aim of increasing food production, which will increase emissions, while on the other hand setting GHG mitigation goals. Secondly, they point to the paradox of increased food production and significant food waste in the value chain.³ The NFSU are less focused on technological development and GHG accounting than is NFU and argue that what is needed is changed perceptions and attitudes 'to soil, to agronomy, to ways of producing, and of those producing the food' (Interviewee, NFSU).

Generally, a core imperative was to replace fossil resources with renewable resources. Interviewees repeatedly pointed to the difference between fossil and biogenic carbon cycles, and focused attention to opportunities in the bioeconomy (e.g. products from forests), enhanced utilisation of photosynthesis, and increased efficiency in farming (lower emissions per produced unit).

One interviewee from a government agency argued that climate change is challenging the farming sector because it concerns the core of farming politics. He argued that environmental concerns are different, as adjusting modes of production fulfill environmental standards. Conversely, climate change challenges policies in areas such as land use, husbandry, the distribution of food production across the country, and the discussion of meat production against cereal and vegetable production.

The sector organisations and sector ministry see their primary role as attending to the sector's interests, which means that they will both agree that climate change measures are important and necessary, and raise subsidies that may increase emissions, such as subsidies for production of red meat and dairy, at the annual farming negotiations. This quote from an informant in the Ministry of Agriculture and Food largely sums up the Ministry's position:

We are a sector ministry and will of course make sure that our sector contributes [to emission reduction], but at the same time, we have to defend the interests of the sector (. . .) Everybody is interested in that we reduce emissions as much as possible. The art lies in doing it the right way, the most correct way possible. (Interviewee, MAF)

The farming sector, organisations and government agencies are working on several fronts to contribute to transformation, and to be part of defining solutions to the challenges of climate change. They argue that what is needed is changing regulations, technological development, changed practices, knowledge-based management, a higher level of efficiency, climate smart farming counselling on each farm, an GHG accounting system that includes the GHG mitigation from measures at farm level, and a tax and subsidies system that allow for changes in extension services' farming practice.

Transformation in fisheries and aquaculture

In the fisheries sector, green transformation was lower on the agenda, yet still present, primarily regarding compliance with regulations. Key actors observed that climate change and green transformation, including policies, would increasingly impact the sector and its

framework conditions, and were working on what they perceived as appropriate response measures. Smaller actors in fisheries were concerned with better framework conditions for introducing new technologies, including electrical vessels, as well as climate footprint of products. In aquaculture, green transformation and sustainability was on the agenda, primarily driven by profit considerations, branding and CSR, but also as adaptation to a changing climate.

In the fisheries, climate policy concerns the composition of the fleet and emission from different fishing vessel types. Both ocean trawlers and coastal boats emit GHGs, and NCFA contends that the coastal, smaller boats emit less than the trawlers, and may provide higher quality products and apply more environmentally friendly catch methods through passive fishing equipment. Coastal, small scale fishing boats are important for coastal communities and have a larger societal function than the ocean fleet in some communities. Overall, we observe that sustainability is higher on the agenda in NCFA than NFA.

The Ministry (MTIF) has no clear policy or mandate to drive transformation processes. They state that changes in the sector happen by themselves, that for instance the first electric fishing boat is in use, and a third of aquaculture installations are electrified. Because of this, the Ministry has so far not seen any need for actively regulating aspects concerning climate, as exemplified in this quote:

The businesses themselves are ahead of us. They propose suggestions for what they would like to do. (Interviewee, MTIF)

The main topic discussed is the proposed lifting of the CO₂-tax exemption (Isaksen et al., 2015). In addition, government support for electric fishing boats was called for by the NCFA. The aquaculture business organisation focuses their efforts on lobbying policy developments in Brussels to influence the regulation of the sector.

Preconditions for transformation – How to realise green transformation

Interviewees from across the sectors highlighted the need for government interventions, either in the form of policies, subsidies and tax schemes, environmental labels and concrete measures. They requested a higher ambition from the government coupled with funding and incentives to allow for the necessary changes in the sectors. The cost of transformation for each farmer, fisher and fish farmer was considered an obstacle for implementing new technology and practices. Informants claimed a lack of willingness from public authorities to spend public money on the costs related to green transformation.

Among others, it was argued by the NFU that the challenge of the green transformation will require new collaborations between actors that do not normally collaborate.

The debate concerning climate is so comprehensive that it assembles actors that normally don't collaborate. (Interviewee, NFU)

The *roadmaps for green competitiveness* were considered important in this regard. The roadmaps were government-initiated reports for 15 sectors, including the food sector, to address how Norway may improve its green competitiveness (Government of Norway, 2016; Vangelsten et al., 2018). Interestingly, it was not primarily the finished report, but rather the *process* of bringing various organisations, producers and businesses together and discussing green transformation shift that was considered valuable for starting new conversations and new collaborations.

Notably, a minority of the interviewees argued that an important precondition for transformation is to understand it in the context of deep sustainability.

I don't think that the green shift may be understood in any other way than in the most sustainable way, in which the production and the conditions necessary for production are given a perpetual perspective. (Interviewee, NAA)

Following this, good agronomy was deemed necessary, meaning sustainable use of the land and adapting practices to the natural conditions. A point in case was made by NFSU, who argued that currently, the farmers' available tools and machines define farming practices rather than the preferred adjusting practices to the available soil resources.

For farming an important discussion is the emissions caused by meat production, and particularly red meat and dairy. One interviewee argued that a precondition for transformation was that the sector accepted that 'the cow is the problem' and started transforming food production towards vegetarian food. This links well with debates concerning the role of consumers. Most interviewees argued that the consumers largely define what is produced. MAF stated that the farmers produce what the consumers want, whilst others focused on the power of consumers to shift production towards low-emission and climate friendly production and produce. For both the fisheries and aquaculture, the role of consumers was considered important for changing practices. This is particularly the case for the aquaculture sector, as highlighted in this quote:

Contrary to farming, we are talking of an extremely large export sector. Aquaculture is completely dependent on consumers in other countries. (Interviewee, DF)

The fisheries and aquaculture sectors highlighted the framework conditions, which ensure economic gains and 'trust in the policies' as the main precondition for transformation. They argued that changes already were taking place in the sectors, and the challenge of transformation was considered feasible. For aquaculture, a shift or transformation was not considered necessary, but they saw developments in the sector as a continued development towards sustainable production. However, it was argued that further changes in the fisheries sector hinge on subsidies to support the cost of new technology, such as electric boats, and a tax system that gave benefits to those with a low carbon footprint.

Moreover, technology and technological development were generally considered key for transformation in all sectors, and electrification of vehicles and vessels is considered promising for avoiding using fossil fuels. There was a general *technological optimism*, as shown by this quote:

the government is technologically optimistic, and in the real world there are no reasons not to be optimistic either. (Interviewee, MCE)

However, whether new technologies would contribute to green transformation, or rather continue to uphold status quo in terms of unsustainable practices, was not addressed by any actors. In the next section, we will further analyse and discuss these findings.

Analysis and discussion: The multifaceted character of green transformations

Overall, four main findings stand out from the empirical material. First, although green transformation is on the agenda at the government level and progress has been made the

previous five years, there is still a lack of consensus regarding what green transformation is and what it entails for the different sectors. Generally, green transformation receives more attention in the farming sector than in fisheries and aquaculture. The reason for this is probably that the farming sector is more prone to both implementation of climate policies and physical risks from climate change. There is consensus across the sectors that existing practices need to be changed, which also may entail new opportunities and win-win solutions. However, whilst climate policy authorities see their role as ensuring that all sectors contribute to green transformation, sector policy authorities see their role as making sure that the sector has the best possible framework conditions and seek opportunities to reconcile sectoral business interests with green transformation. The following quote serves to illustrate that tension:

Clearly, we start off with two different perceptions of reality and with different expertise on either side, and then we gradually approach each other. And this is obvious. The MCE's role is to ensure the best possible environment and as little GHG emissions as possible. And we are a sector department and, of course we must make sure that our sector contributes, but at the same time we must safeguard the interests of the sector. Naturally there is a tension there, and sometimes decisions are lifted to the government level. (Interviewee, MAF)

Second, among the interest organisations, green transformation is on the agenda, but we observe a differentiation between large and smaller actors in all three sectors. The large organisations focus their efforts on tweaking practices to increase the value creation in the sector, while smaller actors focus more on how their activities can be sustained in a longer term, to a larger degree focusing on long-term sustainability.⁴ However, the organisations' agenda in the transformation and climate debate largely concerns documenting how their sectors are reducing emissions, that emissions are unavoidable in food production, and that other sectors should make relatively more cuts. According to several informants, NFU has not been a driving force for green transformation as such. Rather, the organisation has engaged to prevent its members' framework conditions from being worsened by stricter policies and regulations, and to make farming practices better adapted to a changing climate. There is according to one informant, however, an increasing subset of younger, small-hold farmers who are above average concerned with sustainable food production.

Third, no actors, except one interviewee, question economic growth as such. Continued economic growth and green transformation are considered complementary and compatible with sustainability. However, there is a growing debate in society and in the academic literature over this connection. For instance, Holden et al. (2017) argue that continued economic growth is not compatible with long-term sustainability and argue for a new definition of sustainability, which excludes economic growth.

Fourth, across the data there is a sharp focus on mitigation and little attention given to adaptation. Several actors mentioned the need to adapt to a changing climate, but largely focused their attention to mitigation and risks connected with changed framework conditions when prompted to discuss green transformation. Physical risk was considered a variable outside their control. However, this is in contrast with much of the transformation literature which includes adaptation in the conceptualisation of transformation (e.g. Pelling, 2011).

How deep a transformation? Greener growth and sustainability

In our conceptual framework, we describe *depth* as a key dimension of transformation, referring to degree of change, which in the literature range from incremental changes

(Geels et al., 2015; Patterson et al., 2017) to deep transformation, including values and mindsets (O'Brien, 2012). In our empirical data we find one main discourse, namely *greener growth*, which has close connotations to Dryzek's discourse of *sustainability* (Dryzek, 2013). The main imperative in the greener growth discourse is to work within the current system and tweak it, rather than fundamentally challenge or replace it (Geels et al., 2015). In other words, greener growth does not represent a deep transformation. We use the term *greener growth* and not green growth, as all actors in the primary industries already perceive themselves as green since their core activity is growing, harvesting and managing renewable resources. Transformation to them is to make their activities *even* greener, and several perceived being 'green' as deeply rooted in the tradition of their sector. Economic growth is seen as a positive, productive force which needs to be sustained, but adequately regulated to avoid, prevent and deal with negative environmental externalities, while simultaneously maximising economic profits.

The core of this discourse is incrementally modifying business-as-usual, often by incorporating new solutions into established practices, for instance in the form of new business opportunities and innovations. Moreover, all actors emphasise potential advantages of transformation: new opportunities, continued greener growth, new value creation and more jobs in their sectors. The discourse was particularly strong in aquaculture, but also well represented in farming. One example is NFU's strategy for bioeconomy, which describes the opportunities available by exploiting new technologies and raw materials (NFU, 2016).

Both in the policy documents and the interviews, the focus was on the opportunities represented by transformation, and actors were vocal and explicit about new opportunities and increased welfare. However, also (potential) 'dark sides' of transformation processes are traceable in our data (Blythe et al., 2018), although expressed more subtly and implicit, such as fear of unfortunate regulations, 'unfair' and 'incorrect' burden sharing regarding demands for GHG emission reduction, abrupt climate change and destroyed resource bases.

The greener growth discourse is arguably best described as a *shallow* transformation geared towards economic growth and new opportunities. However, there is also another, less visible but clearly traceable discourse on sustainability in our data, particularly through the interviews. Although the concept of sustainability is extensively debated (see for instance Holden et al., 2017), it is widely accepted that sustainability comprises three dimensions: environmental, social and economic. Close to all the interviewees placed more weight on economic sustainability than on environmental and social sustainability. However, a small minority reflected a more balanced approach, placing comparatively more emphasis on social sustainability, in the form of vital local communities, local livelihoods, and long-term, perpetual environmental sustainability.

Interviewees adhering to this *balanced sustainability* are not necessarily opposed to continued economic growth as such but are more concerned that growth must happen within long-term planetary boundaries and simultaneously sustain local communities. Those adhering to this discourse seemed more inclined to accept the need for a deep transformation, although this was not directly expressed by any of the interviewees. There were still clear differences from the greener growth discourse through the focus on ensuring the perpetual availability of natural resources and the importance of social sustainability.

The main actors conveying this perspective were essentially the smaller organisations within farming (NFSU) and fisheries (NCFA). In other words, there seems to be a division line in our data: large actors favour the greener growth discourse, foregrounding economic sustainability compared to social and environmental sustainability, while smaller actors seem to have a more balanced view on the three dimensions of sustainability.³

For instance, NFSU highlighted concern for life and wellbeing over increased agricultural production and consumption and solidarity across generations and national borders. Similarly, large actors generally focused more on the opportunities of transformation, while smaller actors took a more nuanced view, expressing a risk that eternal economic growth, although greener, may lead to long-term negative effects in terms of depletion of renewable resources and less sustainable local communities and livelihoods.

In sum, we found that the majority and large actors adhered to a greener growth discourse, which is rather shallow in terms of transformation. These actors focused on the new opportunities in the form of incremental solutions and on economic gains. Two smaller actors, however, took a more balanced view on sustainability, and more clearly and explicitly acknowledged potential negative consequences of transformation.

Transformation as a boundary object

Despite the differences between the transformation discourses, all interviewees relate to one concept: the green shift. As noted in the introduction, the concept can be traced back to a Norwegian think tank, who defines the green shift as:

a continuous ongoing irreversible and unstoppable process. The green shift involves reduced greenhouse gas emissions and improved resource productivity in all sectors of society, and at the same time offers new opportunities for value creation. (Bjartnes, 2015)

The dominant greener growth discourse can be read almost as a blueprint of this definition, whilst the more balanced sustainability discourse does not seem to be fully covered by this definition. How can we explain that two partly conflicting discourses relate to the same term when engaging with green transformation?

One explanation can be that transformation come in plural, *transformations*, an argument put forward by Scoones et al.'s (2015: 21): 'rather than there being one big green transformation, it is more likely that there will be multiple transformations that will intersect, overlap and conflict in unpredictable ways.' But if transformations come in plural, how come actors still use the same concept of the 'green shift,' when they evidently attach different meaning to the concept?

Returning to the first analytical point in this section, we observed that transformation is on all actors' agendas, but there is a lack of consensus on what the concept means and entails. For instance, whilst there is consensus on the need to stop using fossil fuels, there is no consensus on the scale of economic growth. Yet the different actors apply the same concept, adapting it to fit their broader agendas. Thus, just like the concept *boundary object* may be of useful in grappling with the many different definitions of transformation found in the literature, the same concept may also be helpful in conceptualising the very practices of transformation. It seems clear that the green shift as a concept is plastic enough to be used by different actors for different purposes. Furthermore, the concept seems to oscillate between ill-structured and well-structured versions (Star, 2010): ill-structured at the national level, as no clear consensual definition seems to exist among the actors, and more well-structured on the sectorial level and the interest organisations in the different sectors. Actors operationalise and adapt the concept to fit their core activities.

According to Star and Griesemer (1989: 393), boundary objects 'have different meanings in different social worlds but their structure is common enough to more than one world to make them recognisable, a means of translation. The creation and management of boundary objects is key in developing and maintaining coherence across intersecting social worlds.'

Clearly, the concept of the green shift has different meanings in different social worlds, for instance across different interest organisations, such as NFU and NFSU, or MAF and MCE. But it is precisely the elasticity of the concept of the green shift that makes it a means of translation, a hub for communication across different but intersecting social worlds.

Different actors which (partly) cooperate without consensus tend to tuck back-and-forth between different versions or aspects of the concept. For instance, the NFU express that they want to contribute to green transformation, and claim that they do, but simultaneously argue that Norway should increase its agricultural production, pointing to Norway's resource base and other competitive advantages, such as a healthy environment and animal welfare. However, increased agricultural production may increase GHG emissions, particularly if the increased production comes in the form of more ruminants, which is not necessarily sustainable from a climate perspective, nor in line with Norway's climate policy targets, according to both MCE and NEA.

Importantly, that transformation may be seen as a boundary object does not mean that such goal conflicts are resolved. Rather, it means that conflicting targets may continue to exist, but are masked by being parts of the same boundary object. Linking back to transformation as a boundary object underlines that it may facilitate translation and communication across different social worlds that traditionally do not communicate but are needed to do so to achieve green transformation. However, transformation as a boundary object may mask irreconcilable goal conflicts and divert attention from unsustainable practices, especially when these practices are supported by powerful interests. This ambiguity of the green shift as a boundary object was also pointed out by several of our informants, as exemplified by this quote:

Personally, I am not supportive of the "green shift" concept. It is somewhat like sustainable development which may be applied in any context and given any meaning. (Interviewee, NFU)

Interestingly, the same issue has been raised in the transformation literature:

It has been argued that the high conceptual elasticity and lack of empirical grounding of the concept of transformation generate the risk of voiding the term of meaning, and consequently easily co-opted by actors who aim to defend the status quo rather than promoting radical societal change. (Tanner and Bahadur, 2013)

Our study provides empirical grounding for conceptualising transformation as a boundary object. In our view, it adds analytical value to think of transformation in terms of a boundary object, since the concept of boundary object encourages empirical analysis of transformations as an ever-changing multifaceted assemblage of actors and practices. It is only through thorough analytical attention, and constant iteration between theory and the very practices of transformation, that we can avoid that the term becomes void of meaning and co-opted by path-dependent, powerful vested interests. Given this critical point in history, that global emissions need to peak as soon as possible and thereafter be rapidly reduced, Park et al.'s (2012) recommendation to pay attention to the direction of incremental changes and measures suggested for green transformation seems as important as ever. As shown in this study, that applies particularly to the role and direction of incumbent and powerful actors, because unless these align their very practices with long-term sustainability, transformations to global sustainability may likely fail. Future research should investigate how the literature on leverage points for transformational change (Abson et al., 2017;

Meadows, 1999) are relevant in such processes and can be made more relevant through iteration between analysis and practices.

Conclusion

The concept of green transformation is on the agenda of state authorities and interest organisations in the primary industries in Norway and there is agreement that all sectors need to contribute. However, the operationalisations and very practices of the concept is a multifaceted assemblage of diverse, and (at least) partly conflicting interpretations and practices.

To what degree and how economic growth is compatible with green transformation has been discussed and questioned in the literature (e.g. Jackson, 2011). However, no actors in the present study question continued economic growth as such, only the frames for continued growth. Path-dependent, powerful incumbent actors dominate the debate and incrementally adapt their rhetoric and practices in order to fit a green transformation agenda. In that sense, the current practices of green transformation in the primary industries in Norway do not run very deep and are primarily focused on opportunities and greener growth. These incremental practices mask part of the 'dark side' of the green shift (Blythe et al., 2018), whereby powerful actors work to maintain a lightly tweaked version of status quo rather than deep transformation. However, a subset of smaller actors advocates a more balanced approach to sustainability, portraying a picture of sustainability where economic growth does not occur at the expense of long-term environmental and social sustainability in the form of vibrant local communities and livelihoods. Put differently, these actors argue for a deeper transformation, and are more explicitly aware of potential negative sides of transformation.

We have in this paper argued that it makes sense to think of green transformation as a boundary object: used by different actors for different purposes, but still engaging in the seemingly same discussion. Actors actively engage in boundary work to make the boundary object of transformation to better fit their broader agendas. Thus, arguably a precondition for transformation is to more openly acknowledge that transformation is a diverse assemblage of partly conflicting ideas, practices and actors. Boundary objects, such as green transformation, keep the societal discussion going and items on the societal agenda. That green transformation may well be understood as a boundary object also implies that transformation comes in plural, *transformations*, as pointed out by Scoones et al. (2015). However, as highlighted in this paper, the very practices of most of the actors is not transformative in the theoretical understanding of the concept (e.g. Pelling, 2011), and inadequate attention is given to potential dark sides of transformation (e.g. Blythe et al., 2018). Thus, the transformation debate should address whether and how it is possible to make the incumbent actors go deeper and become more aware of potential dark sides of transformation. Further, the debate over transformation in the sectors needs to be part of a wider debate about direction of change in society as a whole.

Highlights

- We conduct an empirical analysis of how Norwegian policy actors and interest organisations in primary industries define and operationalise green transformation.
- The dominant discourse is greener growth, which is challenged by a sustainability discourse.

- Large and powerful actors tend to favour greener growth, while smaller and less powerful actors adhere to a sustainability discourse.
- Climate transformation may be seen as a boundary object: meaning different things to different actors at the same time.
- The plasticity of the concept helps keeping transformation on the agenda but challenges its ability of being a meaningful and actionable concept.

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Notes

1. The agricultural sector includes farming, forestry and horticulture. In this article, we focus on farming.
2. Ministry of Fisheries and Coastal Affairs (MFCA) are now integrated in the Ministry of Trade, Industry and Fisheries (MTFI).
3. In 2017, the government and 12 organisations in the food sector signed an agreement to reduce food waste by 50% by 2030 (www.regjeringen.no/no/aktuelt/avtale-om-a-redusere-matsvinn/id2558931/)
4. For the aquaculture sector, a study found that the large Norwegian aquaculture companies were requesting a higher degree of regulation and environmental standards than smaller companies (Vormedal and Skjærseth, 2019)

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