Norges miljø- og
biovitenskapelige
universitet

Master's Thesis 2022, 30 ECTS
Faculty of Landscape and Society
Noragric

A Coastline Altered by Aquaculture: The sociocultural sustainability of fish farming in Arctic Norway

Katharina Karlsen Hessen

MSc International Environmental Studies

The Department of International Environment and Development Studies, Noragric, is the international gateway for the Norwegian University of Life Sciences (NMBU). Eight departments associated research institutions and the Norwegian College of Veterinary Medicine in Oslo. Established in 1986, Noragric's contribution to international development lies in the interface between research, education (Bachelor, Master and PhD programs) and assignments.

The Noragric Master thesis is the final thesis submitted by students in order to fulfill the requirements under the Noragric Master program "International Environmental Studies", "International Development Studies" and "International Relations".

Declaration

I, Katharina Karlsen Hessen, declare that this thesis is a result of my research investigation and findings. Sources of information other than my own have been acknowledged and a reference list has been appended. This work has not been previously submitted to any other university for the award of any type of academic degree.

Katharina Karlsen Hessen

Date: June 15, 2022

Abstract

Aquaculture is the fastest growing food production sector in the world, and Norway is this sector's largest producer of farmed salmon. More than one thousand fish farms are spread along the Norwegian coastline, producing more than one million tonnes of farmed fish per year. The industry is controversial, due to its environmental impacts, its tendency to generate massive private profits, and its impacts on traditional coastal activities such as fisheries and recreation. In spite of this controversy, the Norwegian government has determined that the industry should aim for a quintupling in its production volume by 2050. In order to ensure that this growth is sustainable, an indicator-based system (the Traffic Light System) was put in place in 2017. This system uses salmon lice levels as the sole indicator of sustainability, and areas where lice levels are considered acceptable are incentivized to grow by several percentage points each year. Critics argue that this system does not address the myriad other environmental issues that the aquaculture industry struggles with, such as emissions, pollution, genetic impacts on wild species and animal welfare. Others argue that the industry has impacts beyond the environmental dimension, and that the economic and social dimensions of sustainability need to be addressed in the governance of the industry.

This study examines the perceived social and cultural sustainability of the aquaculture industry in two Arctic Norwegian communities, and applies these qualitative findings to the creation of a framework to identify and measure sociocultural sustainability in aquaculture operations, using Sustainability Indicators. The framework consists of a barometer with principles and indicators for sociocultural sustainability, as well as a visual model.

Acknowledgements

I would like to thank my supervisor, Poul Wisborg, for his patience and conversation.

I would also like to thank the Telemark Research Institute (Telemarksforsking). First and foremost for believing in my project, but also for granting me a scholarship without which the fieldwork presented in this study would have challenged my own economic sustainability in ways I'd rather not reflect on.

In addition, this scholarship provided me the opportunity to receive advice and encouragement from Marianne Singsaas, whose instructions to stop reading and start driving north were a real game changer.

Thank you Magnus, for keeping both me and the tomato plants upright.

Most importantly, I raise my glass to the participants in this study. You let me into your homes, shared your strong black coffee and warm waffles, and you showed me the joy and grief of living a life closely tied to the coast and to its creatures. Takk.

Betre byrdi

du ber 'kje i bakken

enn mannavit mykje.

D'er betre enn gull

i framand gard;

vit er vesalmanns trøyst.

Table of contents

List of Figures

List of abbreviations

FAO - Food and Agriculture Organization (UN)

DWP - Draft White Paper

TLS - Traffic Light System

FOS - Fiskeoppdretternes Salgslag

MAB - Maximum Allowable Biomass

NOK - Norwegian Kroner

SDGs - Sustainable Development Goals

UN - United Nations

BP - British Petroleum

NIBR - Norsk Institutt for By- og Regionsforskning

UNESCO - United Nations Educational, Scientific and Cultural Organization

WCCD - World Commission on Culture and Development

UNCED - United Nations Conference on Environment and Development

SI - Sustainability Indicator(s)

GRI standards - Global Reporting Initiative standards

SLO - Social License to Operate

SINTEF - Stiftelsen for Industriell og Teknisk Forskning

FHF - Fiskeri- og Havbruksnæringens Forskningsfinansiering

NINA - Norsk Institutt for Naturforskning

NSD - Norsk Senter for Forskningsdata

FHI - Folkehelseinstituttet

GDP - Gross National Product

1. INTRODUCTION

1.1 Research objective and research questions

This master thesis aims to define indicators for measuring sociocultural sustainability in the Norwegian aquaculture industry. Through iterative coding and analysis of qualitative data from field work in two Arctic Norwegian communities, the study establishes a framework of indicators for identifying the level of social and cultural sustainability in today's aquaculture industry in Arctic Norway. The objective is to provide an example of how aquaculture producers, national and local governments, and members of local communities can evaluate the socio-cultural sustainability of current aquaculture operations, as well as providing an indication of how the industry is performing in this dimension of sustainability. As the Norwegian government aims for a fivefold increase in aquaculture productivity by 2050, this thesis hopes to illuminate the importance of considering sociocultural sustainability when deciding whether, where and how much the industry is allowed to expand.

This study operates from a main research question, supplemented by sub-research questions:

➢ How can stakeholders measure the sociocultural sustainability of the Norwegian aquaculture industry?
   ○ How do local residents perceive the aquaculture industry and its impact?
   ○ How can these perceptions inform indicators of sociocultural sustainability?

1.2 Reader's guide

This thesis begins with an introduction to the study. The second chapter provides a thorough historical review of aquaculture in Norway, outlining past, present and future developments and challenges. It then goes on to define sustainability as a concept, and assess the environmental, economic and social sustainability of aquaculture operations in Norway. In the third chapter, the methodology of the study is described and justified, detailing the choice of location and informants, as well as describing the iterative process of coding interviews and analyzing findings. The fourth chapter delves into the theoretical concepts of social and cultural sustainability and sustainability indicators, in addition to outlining other concepts relevant to the

study. The fifth chapter presents the data from the field work conducted, extracting potential indicators of sociocultural sustainability along the way. The sixth chapter discusses interview findings, and presents a framework for assessing socio-cultural sustainability, with indicators informed by literature reviews and interview data. The seventh chapter presents a conclusion on the study's findings and proposes future research to further examine the sociocultural sustainability of aquaculture operations in Norway. This is followed by a chapter of references, and an appendix.

2. BACKGROUND

2.1 What is Aquaculture?

Most historians agree that aquaculture – or the farming of fish and other edible marine species – originated in China as *aquahusbandry*, approximately 4000 years ago (Tidwell, 2012; Nash, 2011). Examples of techniques for trapping, live storing and feeding of wild fish for consumption are found throughout history across continents – from artificial ponds in ancient Egypt, and the *vivariae piscinae* of the Romans (Nash, 2011), to tidal traps for sea creatures built along the Hawaiian Islands. In the late 19th century, cultivation of species like European brown trout (*Salmo trutta*) and rainbow trout (*Oncorhynchus mykiss*) became common, although the practice long served primarily as a tool to supplement overfished stock in popular recreational fishing areas. Not until the mid-twentieth century did we see aquaculture starting to resemble what it is today: a complex multidisciplinary science, with over 200 different species being cultivated worldwide (ibid.).

As recently as 20 years ago, aquaculture still played a relatively minor role in the global food system (Naylor et al., 2021). Today, aquaculture is the fastest growing food production sector in the world (Ahmed & Thompson, 2019; FAO, 2020). In fact, while the amount of farmed fish keeps rising, the world's fisheries are by many claimed to be in crisis (White et al., 2004), and global capture has stagnated at around 90 million tonnes ever since the late 1980s (Hannesson, 2015). Over 75% of the world's fish stocks are considered fully exploited or overexploited, meaning these stocks will not yield any further growth in fisheries (Tacon & Metian, 2009), but the tonnage of world fish production has kept increasing. The growth factor is aquaculture

production. By 2019, the 'agricultural' production of fish was nearly equal to the amount of fish caught commercially in the wild (Ahmed & Thompson, 2019; Aanesen & Mikkelsen, 2020). The below graph from the FAO (UN Food and Agriculture Organization) shows the current trends in capture fisheries versus aquaculture production.
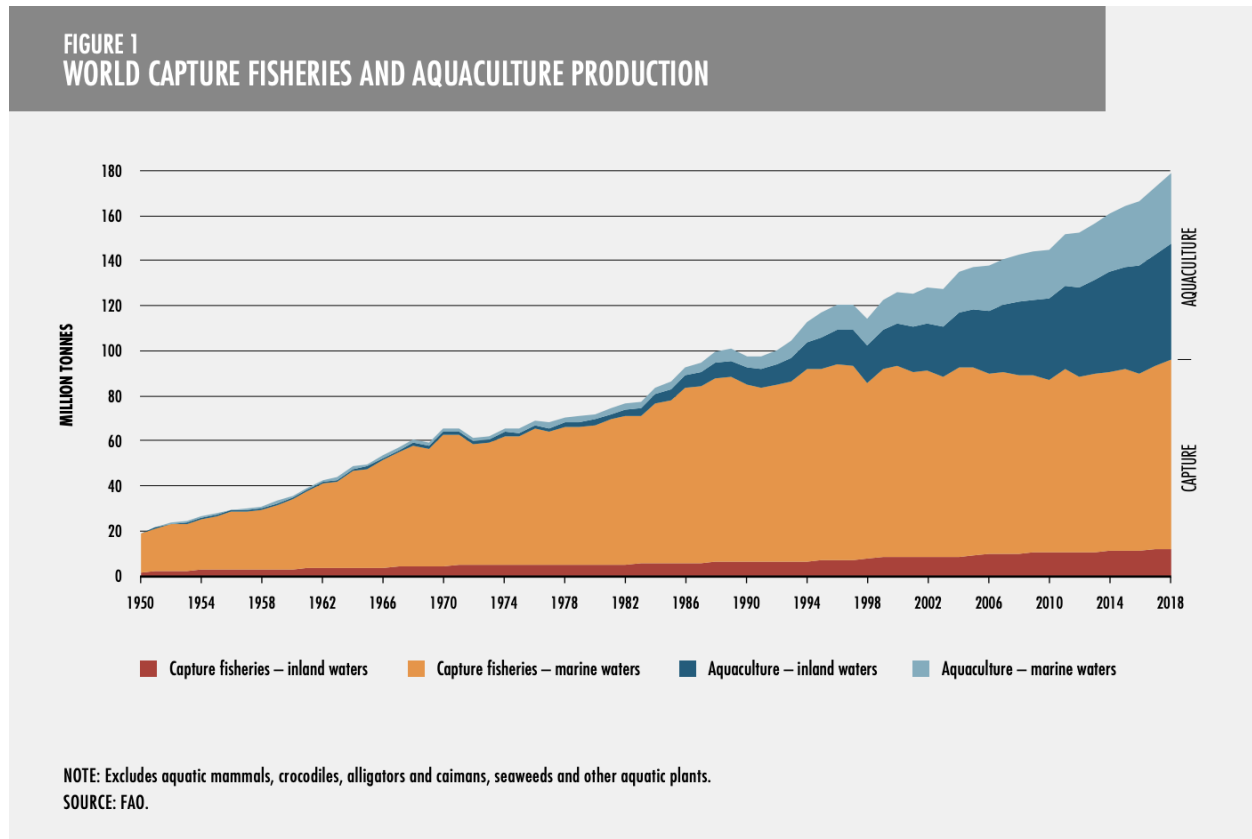
Figure 1: World Capture Fisheries and Aquaculture Production. *Source: FAO (2020)*

2.1.1 Aquaculture in Norway

Norway is often described as having ideal natural conditions for aquaculture. Home to one of the world's longest coastlines, punctured by winding fjords and clustered islands, plenty of coastal areas remain sheltered from the worst of wind and waves (Paisley et al., 2010). From its modest beginnings in the 1960s, aquaculture has grown to become Norway's fourth largest export commodity, beaten only by oil, gas and metals, and it has entirely eclipsed what used to be Norway's economic and social mainstay; capture fisheries (Liu et al., 2011). Aquaculture in Norway generates a yearly landing value of about 6.9 billion EUR (Robertsen et al., 2022), and

Norway's government is aiming for a quintupling of production by 2050. In order to discuss how this might impact the future of coastal communities, we must understand aquaculture's present impact in these communities. Before getting there, we first need to acquaint ourselves with the industry, its history, and some of its controversy. We start at the beginning.

Norway has seen bouts of aquaculture activity since at least the 1850s, when hatcheries for rainbow trout and Atlantic salmon were established. These early hatcheries were for restocking only; actually raising fish for consumption in Norway was first attempted (in freshwater) in 1910. In 1912, a government-funded project to raise rainbow trout in seawater yielded poor profits, and was quickly shut down (Paisley et al., 2010). A long hiatus followed, until the 1960s – where small-scale experiments with in-sea fish farming began to show promise. By moving from dams on land to open net pens located in the ocean, and focusing on salmon rather than trout, early Norwegian aquaculture farmers became moderately successful (Hersoug, 2021). These pioneers were mostly local fishermen or small-scale farmers who experimented with aquaculture as a supplement to their main income. However, it was the Norwegian government who encouraged and financially incentivized the activity, hoping it would generate economic activity in rural coastal areas, which had been hit hard by declines in wild fisheries (Olaussen, 2018; Liu et al., 2011). At this early stage production levels were low, and as a consequence there were few regulations. Aquaculture was more experiment than livelihood, small local family businesses dominated a small market, and farmers even received insurance payouts when farmed fish escaped their pens (ibid.).

By 1970, total aquaculture production in Norway was a modest 500 tons of trout and 100 tons of salmon (SSB, 1991). In 1971, the *Lysø Commission* was established by the government, and tasked with establishing a regime for developing and regulating aquaculture in Norway. Producers became licensed and registered, with one non-transferable license per owner, and the first producer-owned sales organization; FOS (*Fiskeoppdretternes Salgslag*), was formed in 1978 (Hersoug, 2021). The first permanent aquaculture law was under construction in 1981, and a policy brief from those days stated that "it is a goal to achieve the largest possible positive impact on society by developing the aquaculture industry, through the establishment of as many

good and safe workplaces as possible in the districts" (St.meld. Nr.71, 1979–1980). Bjørkan & Eilertsen (2020) outline how these goals were secured through "locally controlled ownership rather than a large-scale industry based on big capital from 'the outside'" (p. 5).

The 1980s in Norwegian aquaculture history were marked by a boom in operations, but also by struggles with disease outbreaks in pens, as well as growing concerns about the environmental impact of the aquaculture industry, due to emissions into the surrounding marine environment of fish feces, fish feed and medications (Hovland et al., 2014). In spite of these challenges, companies kept up their production numbers. In order to limit overproduction, the government decided to establish a fixed pen volume, going against the Lysø commission's suggestion that production should be capped by directly limiting each producer to 50 tons of salmon or 100 tons of trout (Hersoug, 2021). By allowing larger farms while also continuing to hand out new licenses, the industry was primed for rapid growth, and it grew – Norwegian companies even expanded abroad, to countries like Canada and Chile (Liu et al., 2011).

In the early 1990s the Ministry of Fisheries moved to impose a limit on production, as per the Lysø commission's suggestion, but this was met with skepticism from aquaculture producers. Instead, the government compromised and added a density regulation (kg of biomass per m3) onto the existing volume criterion. (Hersoug, 2021). A change in the Aquaculture Act in 1991, which allowed one owner to accumulate several licenses – combined with a general trend in deregulation and market liberalism (Hovland et al., 2014) – spurred intensive growth in aquaculture production throughout the 1990s and 2000s. The industry shifted from small family run businesses, to large-scale international companies (Bjørkan & Eilertsen, 2020). Around the same time, the FOS went bankrupt, which further contributed to the industrialization of the industry (Hovland et al., 2014). Small-scale farmers were quickly bought out, and production licenses were concentrated with fewer and larger companies (Olaussen, 2018). The biomass produced skyrocketed from just under 80 tons per employee in 1992, to 342 tons per employee by 2002. In addition, each kg was now produced at about half the cost, meaning that aquaculture farmers were cutting production costs, while significantly increasing production rates (Hersoug, 2021).

In the years to follow, several attempts were made to regulate and control aquaculture production. There were objections from both the EU and the US on Norway's government heavily subsidizing salmon farming, which led to cheap Norwegian farmed salmon flooding the international market. The Norwegian government relatively unsuccessfully experimented with different regulating measures, such as feed quotas, and later a control-system to limit the Maximum Allowable Biomass (MAB) (Hersoug, 2021). By the late 1990s, the aquaculture experiment had become a full-fledged industrialized adventure, with modern technology and equipment that increased production efficiency dramatically, and reduced required human labor on farms. Farmers could now produce more fish, faster and cheaper. (Hovland et al., 2014). Farmed salmon was becoming the "chicken of the sea" (ibid., p. 249), heavily promoted around the world no longer as a luxury product, but a commodity. A headline in the magazine *Norwegian Fish Farming* (translated from: *Norsk Fiskeoppdrett*) at the time sports a new attitude towards what the government had once considered problematic overproduction: "The problem is not that we produce too much, but that we sell too little" (ibid., p. 266). How well did Norwegian lobbyists do at selling farmed salmon in the 1990s and 2000s? Well, nobody used salmon in sushi until a Norwegian delegation's trip to Japan in 1985. By 2010, Japan's annual import of Norwegian salmon and trout was a whopping 165 000 tonnes (ibid.).

Although business was booming, diseases and parasites continued to pose a massive problem. Estimates from 2009 alone showed an export loss of almost 5 billion NOK due to *svinn* (loss of biomass/fish death) (Hovland et al., 2014). Several diseases and parasites afflict fish in captivity, and can and do spread to wild fish stock, but perhaps the most infamous of these is the salmon louse (*Lepeophtheirus salmonis*). Salmon lice had always popped up here and there in wild salmon populations, but the crowded open pens used in salmon aquaculture had proven a perfect breeding ground for this damaging parasite (Heuch et al., 2005). An animal welfare and economic disaster, salmon lice caused high mortality rates in pens, and massive costs both in terms of stock loss and expensive treatments. Science and business united in the quest for a solution to the louse crisis, but although treatments showed some effect and initial promise, the salmon louse quickly grew increasingly resistant to a range of treatments, and some treatments proved to be about as damaging to the fish as the parasite itself (Liu & Bjelland, 2014).

The second main concern of the industry as it grew into the 2000s was escaped farmed salmon. Since most farmed salmon live in sea-based fish farms that consist of net pens, something as banal as a hole in the net is overwhelmingly the main cause of farmed salmon escaping. Fish farmers in Norway are legally obliged to report escape incidents to the Norwegian Directorate of Fisheries, and a reported total of 1,960,000 salmon and trout escaped between 2010 and 2018 (Føre & Thorvaldsen, 2021). While the escapes of course contribute to *svinn* (loss) of biomass, the reason escaped fish cause major problems has to do with the *other* fish. Farmed Atlantic salmon and *wild* Atlantic salmon (*Salmo salar*) might share a name and more than a few traits, but they are genetically dissimilar. Norway has more than 400 waterways that are home to wild Atlantic salmon, and hosts an estimated 25% of the world's healthy wild Atlantic salmon population (Forseth et al., 2017). As for farmed salmon, researchers in Norway began working on farmed fish around 1970, with the stated goal of "turning the salmon into a domesticated animal" (Hovland et al., 2014, p.145, own translation). Genetically, this fish is a cross-breed of wild salmon stock, selected for qualities that were best suited for a life in captivity. Qualities ideal in a fish farming environment, but less-than ideal for fish living in the wild – and escaped farmed salmon destroying the wild genetic pool was becoming a headache for the industry (Forseth et al., 2017).

In spite of these issues – which persist today – the aquaculture industry continued to grow. In 2009, the Ministry of Fisheries and Coastal Affairs (now the *Ministry of Trade, Industry and Fisheries*) released their strategy for a more sustainable aquaculture industry, focusing on escapes, emissions, disease, land use and feeding resources (Hovland et al., 2014). Aquaculture production was now regulated by total biomass per cage, total biomass per concession, as well as by keeping levels of salmon lice below a set value (Olaussen, 2018). But the debate on the future of Norwegian aquaculture had reached a tipping point. In 2010, the head of Norway's Directorate of Nature Management (now the *Norwegian Environment Agency/Miljødirektoratet*) stated that the industry needed to halve its production, in order to protect both the coastal environment and the wild salmon stock (Hovland et al., 2014). Shortly thereafter, the head of research at the Institute of Marine Research (*Havforskningsinstituttet*) publicly countered this claim – he stated that in fact the Norwegian aquaculture sector could easily become ten times as productive, if

accommodated by national and local government (ibid.). Although everyone seemed to agree that aquaculture needed to operate in a 'sustainable' way, nobody quite agreed on what that meant. "Would sustainability only be tied to biology (sustainable use of ecosystems) or also to economic and social conditions (sustainable local communities)? What dimensions would be used, and what would the critical values be?" (Hovland et al., 2014, p. 311, own translation). It became clear that scientists, company owners and the government alike did not find common ground in terms of operationalizing the concept of sustainability for the industry (ibid.).

In 2012, a working group appointed by the Royal Norwegian Science Society (*Kongelige Norske Videnskabers Selskab*) and the Norwegian Technical Science Academy (*Norges Tekniske Vitenskapsakademi*) released a study suggesting that the salmon/salmonid aquaculture industry in Norway could grow fivefold by 2050. The study was titled '*Value created from productive oceans in 2050*' (Olafsen et al., 2012), and stated that "the marine-based industries must be assigned higher priority by Norwegian politicians" (p.8). On April 1st 2014, a press release from the government stated that they had begun working on a Draft White Paper (*høringsnotat*) – henceforth DWP – on '*growth in the aquaculture industry*' (Ministry of Trade, Industry and Fisheries, 2014a). Then prime minister Erna Solberg is cited in this press release, expressing that "predictable growth in the industry, while also addressing the environmental challenges, will strengthen Norwegian competitiveness and create safe jobs along the coast" (ibid., own translation). The press release stated that this growth would happen within an environmentally sustainable framework, and that the industry needed to solve its challenges related to lice, escaped fish, and feed access. Therefore, the coming DWP would present how an indicator-system for environmental impact is a necessary tool in a "future-oriented and predictable development of the aquaculture industry" (ibid., own translation).

On November 24th 2014, the government released their DWP; 76 pages of proposed policy on '*growth in Norwegian salmon and sea trout aquaculture*'. Perhaps most notably, the DWP introduced three alternatives for industry expansion, with the latter – the *action rule*, or a system of rules/indicators to determine allowance of growth – favored amongst them (Ministry of Trade, Industry and Fisheries, 2014b). This was the birth of the so-called **Traffic Light System (TLS)**.

In the DWP, the government stated that growth in the industry would be determined by a set of environmental indicators. The DWP then identified several environmental challenges (lice, escapes, emissions, animal welfare, disease), and judged their suitability as indicators of environmental sustainability in Norwegian aquaculture. The DWP landed on **salmon lice** and **escaped salmon** as the primary factors to consider. Since there is a "strong connection between the amount of farmed fish in the sea, lice levels of farmed fish and salmon lice impact on wild salmonid stock, especially sea trout, salmon lice is well suited as an indicator" (ibid., p. 6, own translation). Thus, the DWP suggested that using lice as the only indicator would still provide sufficient information about the environmental impacts of escaped farmed fish – presuming that high numbers of salmon lice would indicate high numbers of escaped fish.

After the release of the DWP in 2014, the Norwegian government started working towards a quintupling by 2050, and encouraged municipalities to accommodate the aquaculture industry with this goal in mind. Norwegian aquaculture production would soon be regulated by a version of the TLS outlined in the DWP. This system divides the Norwegian coast into 13 zones, and the idea is to reduce transfer of lice between these zones. Every two years, these areas are assessed for salmon lice-induced mortality in wild salmon stock, and each zone is given a green (growth), yellow (no growth) or red (reduction) light for production levels over the next two year period (Johnsen et al., 2021). On October 30th 2017, the Norwegian government 'turned the traffic lights on', and announced their verdict for the 13 production areas outlined in the system in a press release (Ministry of Trade, Industry and Fisheries, 2017). 8 areas were given green lights for growth, 3 areas were yellow and 2 areas were red. The press release promised to offer increased production capacity to green areas, and also announced that in this first round, no areas would be obliged to reduce their production, regardless of color. The press release estimated that the assigned color codes would allow for a 3% growth in the aquaculture industry between 2017-2019. The prime minister is quoted stating that the government is accomodating industry growth by keeping their focus on how "the positive socio-economic consequences are significantly larger than the negative ones" (ibid., own translation)

The following year, in 2018, Norway's total production from fisheries and aquaculture was 4 million tonnes of fish (including molluscs and crustaceans). 77% of this tonnage came from aquaculture production, while 23% came from capture fisheries (OECD, 2021). These numbers largely reflect a monocultural harvest, with Atlantic salmon constituting more than 90% of production (Hovland et al., 2014). In fact, since 1990, Norway's production of Atlantic salmon has more than octupled (Aanesen & Mikkelsen, 2020; Olaussen, 2018); Norway produces more than 50% of all Atlantic salmon in the world, making salmon farming "the most important industry in rural Norway today" (Olaussen, 2018, p. 158) – far more economically significant than traditional capture fisheries, both measured in landing value and export numbers (Hovland et al., 2014). In 2019, 1,364,044 tonnes of farmed salmon alone generated about 68 billion Norwegian kroner in first-hand value (SSB, 2020). This is quite a leap from about 31 billion NOK in 2010, and preliminary numbers published by industry news outlets indicate that first-hand value from farmed salmon production in 2021 surpassed 80 billion NOK (Seafoodsource.com. n.d.). We recall that total aquaculture production in Norway in 1970 was a modest 600 metric tonnes of salmon and trout (SSB, 1991). Today, the total weight of aquaculture production in Norway is just above 1.3 million metric tonnes. The Norwegian coastline is currently hosting 1256 aquaculture production sites, 986 of these for Atlantic salmon and rainbow trout (The Norwegian Directorate of Fisheries, 2021).

From small beginnings in the late 1960s, aquaculture in Norway has gone on to become one of the largest and most profitable industries in the nation. With more than a thousand fish farms spread along the Norwegian coastline, the need for efficient and thorough regulation to ensure sustainable aquaculture production is paramount. Today, the Traffic Light System is the government's primary tool for ensuring environmental sustainability in aquaculture production. If things go according to governmental plans, we'll have five times as many fish in Norwegian fish farms by 2050. This means more farms, more locations, more impact and more challenges. Can this growth be sustainable? And if so, what do we mean by 'sustainability'? A few pages back, this text cited a pertinent question from Hovland et al. concerning the sustainability debate surrounding the aquaculture industry: "Would sustainability only be tied to biology (sustainable use of ecosystems) or also to economic and social conditions (sustainable local communities)?

What dimensions would be used, and what would the critical values be?" (2014, p. 311, own translation). We take this question with us into the next segment, where we focus on outlining a definition of sustainability, and present the three sustainability dimensions that frame this study.

2.2 What is sustainability?

Defining sustainability is a task worthy of lifelong research. This study – like so many others – refers to the overwhelmingly dominant definition of sustainability, as presented in the report entitled "Our Common Future" (WCED, 1987) by the World Commission on Environment and Development (later known as the Brundtland Commission). This report, often referred to simply as the Brundtland Report, defined sustainability as "meeting the needs of the present without compromising the ability of future generations to meet their own needs" (p. 15). While arguably anthropocentric – some feel these lines imply that "we should care for the environment not because of its intrinsic value, but in order to preserve resources for our children" (Kuhlman & Farrington, 2010, p. 3438) – the Brundtland report's definition still stands as the most commonly cited and accepted in today's discourse on sustainability. Since the Brundtland report was launched, more than 30 years ago, the term *sustainability* has become deeply embedded in countless layers of society.

The linguistic concept of sustainability is said to have originated in forestry, with the German word 'Nachhaltigkeit' being used since at least 1713 to describe the premise of not logging at a higher rate than the forest can regenerate (Kuhlman & Farrington, 2010; Wiersum, 1995). The simplicity of the word's origin therefore cuts to the core of an otherwise complex concept: if a practice is sustainable, it embodies continuity (Ben-Eli, 2018) – it can be *sustained*. Forestry is not sustainable if it shrinks or degenerates the forested acreage over time. Fishery is not sustainable if it drives species to the edge of extinction. Of course, the authors of the Brundtland report did not fetch the term *sustainable development* out of nowhere; The 1972 UN Conference on the Human Environment was held in Stockholm, and although not referred to explicitly, this is where the notion that environmental issues and issues of economic development could be addressed in symbiosis truly fell into focus (Mensah, 2019). When the Brundtland Commission's report came to fruition more than a decade later, these ideas had matured into the definition

known today. In the aftermath of the report, debates on how to define sustainability and sustainable development grew in number and intensity (Bailey, 2014; Lélé, 1991). While the term itself quickly acquired widespread recognition, some feared that the concept might become little more than "a phrase that everyone pays homage to but nobody cares to define" (Lélé, 1991, p. 607). Others pointed out that the term *sustainable development* is – at least linguistically – profoundly oxymoronic, seeing as to sustain means *continuity* or *to stay the same*, while development means *change* (White, 2013).

Perhaps most significantly, the Brundtland report's definition linked the future trajectory of human development to the environmental carrying capacity of the planet across generations (White, 2013) *Intergenerational sustainability* is a trending term, but how can we know the needs of future generations? For that matter; what are 'needs'? And what are 'wants'? One perspective on intergenerational sustainability is that those of us currently living are degrading and even destroying the natural resources on which future generations will depend for survival – that those coming after us will have to make do with far less of everything, due to our mindless consumption. Some say we are 'stealing their future' (Pickard, 2021). In their paper on conceptualizing future generations as stakeholders, Abrudan et al. (2021) conclude that while "we do not have the capacity to know what will be future generations' needs (...) we are perfectly able to understand or imagine that they will surely need a clean, tidy, non-polluted, safe – in one word – green planet" (p. 16).

Others have argued that we underestimate future generations' ability to innovate. Late American economist and market fundamentalist Julian Lincoln Simon suggested that "because we can expect future generations to be richer than we are, no matter what we do about resources, asking us to refrain from using resources now so that the future generations can have them later is like asking the poor to make gifts to the rich" (Martine & Alves, 2015; Simon, 1996). This assumption that future generations will be better off than we are is not founded in ignorance or egoism – there has been empirical consistency in most children outearning their parents throughout history. However, things appear to be changing. 92% of Americans born in 1940 went

on to earn more than their parents. For the 1984 birth cohort, this percentage shrunk to 50% (Chetty et al., 2017).

Thus, if we are to subscribe to Brundtland's definition of sustainability, we need to decide whether we expect those born in for example the year 2200 to have improved energy production, resource extraction and technological innovation to a point where they can do what we cannot: increase global living standards without destroying the ecosystem services that ensure a livable planet. Today, unlike in 1987, there is broad agreement that our Earth's climate is affected and altered by increasing human pressure on local and global ecosystems, along with unprecedented emissions of greenhouse gasses from the production and consumption of fossil fuels (IPCC, 2022). This further complicates how we define and understand sustainability, although we have never been more informed of precisely which measures are required. We now have numerical values and goals – in terms of for example CO_2-emissions and degrees of global warming – that provide a framework for action. If we believe in the numerous climate reports and studies that warn of a future with less access to natural resources, more extreme weather events and increasingly inhospitable climates, we may assume that we are in a better position than coming generations to halt ongoing activity contributing to environmental degradation.

The United Nations General Assembly has already landed on this conclusion, and tasked its member nations with adapting policy and societal structure to align with the **United Nations Sustainable Development Goals** (SDGs), a set of 17 broad objectives for the world to attain by 2030, presented in 2015 by the UN. The SDGs range from more quantitatively measurable goals such as Goal 1: No poverty and Goal 2: Zero hunger; to those less easily assessed, such as Goal 11: Sustainable cities and communities and Goal 16: Peace, justice and strong institutions (UN General Assembly, 2015). What becomes clear from observing what the UN considers relevant components of sustainable development, is that purely achieving an ecologically prosperous planet is not enough; we also need job opportunities, a responsible cycle of consumption and production, and good sanitation systems. These indicate that economic stability and a fair distribution of resources is essential. Lastly, a sustainable world per these SDGs is also one of equality, justice, peace, good health and well-being (ibid.). This brings us to a conceptual sub-

division within sustainability, a trisected approach to map out and group these individual relevant factors that together constitute the concept of *sustainability.*

2.2.1 The three dimensions of sustainability

Sustainability is often conceptualized as three *pillars*, or *dimensions*; **environmental**, **economic** and **social** sustainability. This trisected approach appears to have no single point of origin, but stems from a meshwork of literature on economy, ecology and social problems (Purvis et al., 2013). These three dimensions were a foundational part of the groundwork preceding the establishment of the UN SDGs (ibid.), and are today commonly used by for example governments, municipalities or companies, when addressing the sustainability of their operations.

Environmental sustainability is defined broadly as "a condition of balance, resilience, and interconnectedness" where human society does not exceed "the capacity of its supporting ecosystems" (Morelli, 2011, p. 5), a concept some have called 'living within planetary boundaries' (Rockström et al., 2009); accepting the biophysical limits to human exploitation of nature and its resources (Somogyi, 2016). As per the Brundtland Report's general definition of sustainability, intergenerational equity is important – environmental sustainability means leaving a healthy and prosperous natural environment to coming generations.

Economic sustainability, while always included as one of the three pillars of sustainability, is not nearly as frequently discussed as environmental sustainability (Soini & Birkeland, 2014). Spangenberg (2005) notes that the economic debate around sustainable development "is most often described as the need to maintain a permanent income for humankind, generated from non-declining capital stocks" (p. 48). As per the Brundtland Report, we can interpret this to mean that economic activity today should not negatively impact the economic activity of future generations. Foy (1990) wrote on how the degradation of environmental assets would have actual adverse effects on the economy, and divided these assets into exhaustible market resources (e.g. petroleum), renewable market resources (e.g. timber) and renewable non-marketed resources, such as physical and biological ecosystems (paraphrased from p. 771).

Social sustainability is a fundamental component of the sustainable development discourse. While economic and environmental/ecological issues were the primary focus of debate after the release of the Brundtland report, by the late 1990s the social component of sustainability became part of the agenda (Colantonio, 2009). Social sustainability is commonly agreed to lack a dominating definition (Hofstad & Bergli, 2017; Colantonio, 2009), but Barrett, Caniggia & Read (2002) propose that "the term generally refers to aspects of human social and cultural life such as equity and levels of inequality, public participation in decision making, and finally a variety of indices of well-being such as health, education, cultural autonomy, personal autonomy, security and happiness" (p. 1952). Although no agreed-upon definition exists as of yet, companies and governments alike are starting to incorporate the term as a part of their overarching sustainability strategies – while applying different criteria of measurement. We will look at this phenomenon in chapter 4.

These three main dimensions of sustainability usually stand alone, but are sometimes supplemented with categories such as *institutional* sustainability (Pfhal, 2005) or *cultural* sustainability (Hawkes, 2001). This study will primarily address sustainability as pertaining to social sustainability, but the dimension of cultural sustainability is expanded on in chapter 4.
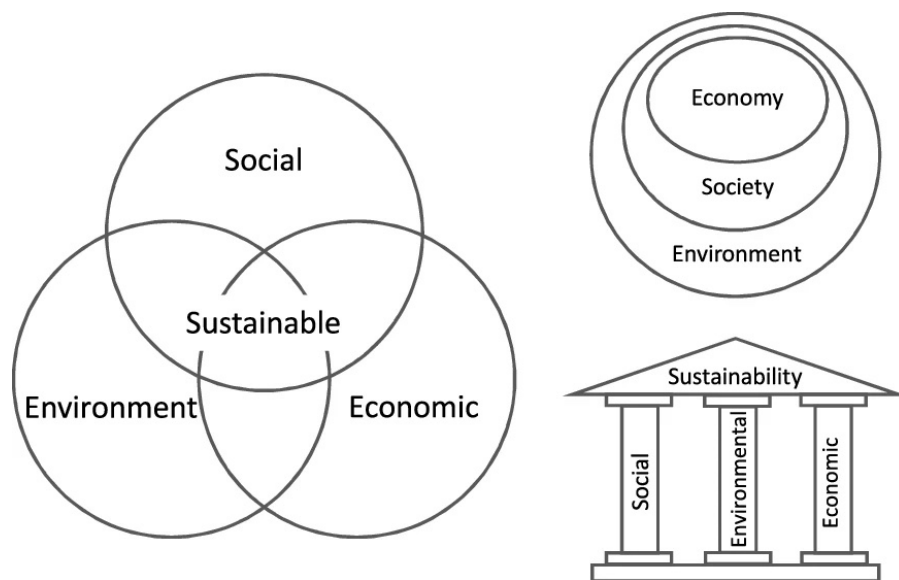

Figure 2: Alternative visuals for the trisected conceptualization of sustainability. *Source: Purvis et al. (2013)*

These three dimensions; environmental, economic and social, are crucial to understanding the complexity and interconnectedness of sustainability. Often, the term *sustainable* is consciously or subconsciously perceived as a synonym of *environmentalism*, which – as argued by Eric Pappas (2012) – "neglects that sustainability must be considered a system of interdependent factors, and that change in one factor is likely to result in an unpredictable change in other factors" (p. 2). Pappas uses the 2010 oil spill from the BP-operated rig Deepwater Horizon as an example of how something can be seen in the context of several sustainability dimensions: The spill was an *environmental* disaster, at an enormous *economic* cost. *Socially* and *culturally*, communities were affected, as the spill impacted people's habits and traditional activities – such as bathing, boating and shrimping (ibid.).

2.3 Sustainability in Norwegian aquaculture

As the review of Norwegian aquaculture history showed, aquaculture impacts both the natural environment and human communities in which it is established, through several interdependent factors. The industry has consequences for the environmental, economic and social sustainability of these areas, and the way these consequences are managed and regulated will determine how the industry can or cannot grow. A study by Lindland et al. from 2019 examined the attitudes of local residents and stakeholder groups towards Norwegian aquaculture. They concluded that "attitudes are not necessarily a matter of being for or against aquaculture", but rather that "what residents and stakeholder groups want is *sustainable* aquaculture" (ibid., p. 1). The Norwegian Aquaculture Act of 2005 addresses this quest for sustainability, and states that "environmentally friendly production considerations, the weighing of land use interests in the coastal zone, market access, as well as food safety, health and fish welfare issues will be topics that one will be expected to take into consideration to an increasing extent." (Norwegian Ministry of Fisheries and Coastal Affairs, 2005, p. 3). The literature, however, points to a legitimacy gap in current aquaculture management, where "aquaculture is failing to meet its potential because of the lack of integration of knowledge relating to social, ecological and economic issues" (Billing, 2018, p. 2).

As we've seen earlier in this chapter, the **environmental sustainability** of Norwegian aquaculture is a contentious issue. The Norwegian Ministry of Trade, Industry and Fisheries readily acknowledges that aquaculture both depends on and impacts its surrounding environment. In their DWP on '*Growth in the Norwegian salmon and trout aquaculture industry*', they state that "today's open-pen based production format means that there are no closed divides between the environment inside the production unit and its surrounding environment. Therefore, the industry depends on good environmental conditions, which means that potential growth is connected with acceptable impact" (Ministry of Trade, Industry and Fisheries, 2014b, own translation). As related earlier in this text, Norwegian aquaculture production has come under fire for negative environmental impacts throughout its existence – and these concerns have grown in sync with the industry's own expansion. The *primary* environmental concerns as defined by the government's Traffic Light System (TLS) are salmon lice infestations, and escaped farmed salmon damaging wild fish stock genetics by mating with wild salmon (ibid.). There are several other serious environmental concerns, including emissions from pens, feed value chains and animal welfare. Although a set definition of sustainability seems to be in constant development, the environmental dimension is by far the most defined and familiar sustainability dimensions relating to this industry, and research on the topic is vast and growing.

Economic sustainability in the industry is not as well-researched. Farmed fish is becoming one of Norway's most important exports, with a landing value of 68.5 billion Norwegian kroner in 2020 – a value that has doubled since 2010 (Robertsen et al., 2022). Although the industry is struggling with rising feed costs, and spending an estimated 6 billion kroner per year on salmon lice prevention and treatments (ibid.), high prices for salmon have ensured extraordinarily high rates of private profit (Misund et al., 2020). Some of Norway's – and indeed the world's – wealthiest people today are aquaculture company owners (Kapital, n.d.). This has caused a debate on how the industry's wealth generation is benefiting the rest of the population. Osmundsen et al. (2020) have worked on analyzing certification schemes for sustainability in aquaculture, and outline the economic sustainability dimension as "the impact a commercial actor has on the surrounding community, through economic contribution and responsible use and

management of resources" (p. 4). They state that there are issues connected to economic sustainability that go beyond the profitability of the firm; this sustainability dimension also includes economic effects on a larger scale (ibid.). This suggests that the economic sustainability of the industry depends to a large degree on how the income generated from the exploitation of common natural resources is distributed in society.

In Norway, the welfare state is largely funded by the *resource rent taxation* on the petroleum industry. This is a tax on the profit from industries that use common natural resources as the foundation of their production. Hydropower companies in Norway also pay this tax, but the aquaculture industry does not. In 2020, a government-appointed committee proposed an implementation, but the proposal was politically rejected (Åm, 2021). Although the resource rent tax on aquaculture operations was voted down, the 2022 national budget implemented new taxes on aquaculture profits, and also implemented a wealth tax on the ownership of aquaculture licenses. This has been fiercely debated in Norwegian media, with proponents arguing that these tax increases are long overdue, and will serve to curb excessive private profit. Company owners say this will only lead to further consolidation of smaller firms. (NRK.no, 2021).

Between 1992 and 2010, the number of companies had been reduced by 60%, while the number of licenses had increased almost 30%. A few multinational companies took control of the domestic and – to a certain extent – international market (Liu et al., 2011). Bailey (2014) has pointed to the consolidation of Norwegian aquaculture companies into a few, large and partially internationalized firms as another challenge to this industry's economic sustainability, because it places control of the industry – and much of its profits – with a few companies, which again might outcompete other industries. This consolidation has happened through mergers and acquisitions, and large Norwegian companies are now controlling increasingly large segments of the value chain – some aquaculture companies have started producing both farmed fish *and* fish feed (Asche et al., 2013). This increasing verticality of the market – where one company controls much of the distribution channel – can be a challenge to economic equity, and to fair competition between market actors (ibid.). Although the Norwegian aquaculture industry generates massive profits, and funds a lot of research, there is very little research into the economic sustainability of

the industry. This indicates that the definition is lacking, and that perhaps the criteria used to measure this dimension of sustainability are in need of an update. Further research into the economic sustainability of Norwegian aquaculture would be a highly relevant undertaking.

But this study will focus on the **social sustainability** dimension of the Norwegian aquaculture industry. Let's look at what kind of research already exists within the field. Nøstvold et al. (2019) have examined social sustainability in Norwegian fisheries, and stated that – in spite of the term's vague definition – in an *industrial context*, one would have to examine a company's external and internal social influence to determine their levels of social sustainability. In their study, which focused on domestic and international fisheries, the researchers looked at factors such as forced/child labor, freedom of speech, freedom to organize, fair wages, safety, training, protective equipment, pensions and recreational facilities (ibid.). This speaks to the *internal* social influence of an industry, and is often as far as firms will go in terms of defining their social sustainability. In Norway, working conditions *within* the aquaculture industry are not known to be an issue, and the industry is often lauded for managing to bring jobs to rural and economically disadvantaged areas. Roughly 10,000 people were directly employed in the industry in 2021 (The Norwegian Directorate of Fisheries, 2021), with a larger amount of indirect jobs (in for example technology, repairs and other products or services connected to the industry) estimated to be around 30,000 (Johnsen et al., 2020).

But as industry exists within society, the social sustainability of an industry must necessarily extend to the communities in which the industry operates. In terms of employment, there is no doubt that the aquaculture industry is an important social sector, especially in rural Norway. However, Bailey (2014) reminds us that while the industry can bring jobs to rural and economically struggling areas, it also "spreads wealth unequally, and forces changes in local customs and work even for those who do not choose to work in the industry" (p. 34). Some of these changes are subject of fierce public debate, and several municipalities are exhibiting reluctance towards accommodating for further aquaculture growth (Bjørkan & Eilertsen, 2020). Environmental concerns are one of the reasons some communities have grown skeptical towards aquaculture operations, as well as the modest economic returns to municipalities, but there are

other concerns of a more social nature that are also causing friction between locals and industry, especially fish farms impacting local use of coastal areas for commercial fisheries, tourism and recreation) (ibid.).

Research into the social sustainability of aquaculture in Norway is on the rise, and several recent studies are looking at local and national perceptions of the industry. As part of a project called AquaAccept, funded by the Research Council of Norway, Krøvel et al. (2019) observed that the planned growth in aquaculture will involve the public, and that delivering on policy requires good interactions between policy makers and the public (ibid). Their study used a survey to explore attitudes towards aquaculture within a community where aquaculture had a high impact, and compared these findings to findings from a nationally distributed survey. They found that general attitudes did not vary much between the national and local samples, and that perceived environmental impact was the determining factor in how socially acceptable the respondents perceived the industry to be. However, local respondents had differing attitudes towards the industry depending on their perception of the industry as a local job creator or not. The authors partially conclude that "in general, and due to the Aquaculture Act which removed the local ownership criteria, many coastal areas in Norway have not experienced increased employment in line with the expansion of the aquaculture industry" (p. 6). In terms of area use, this study finds that conflicts are "not really about space", and that the real conflict is around giving back to the municipality, and more a matter of fairness and dignity; that "the community should not have to give away its resources in order to build the fortune of distant foreigners" (p. 6)

Bjørkan & Eilertsen (2020) examined local perceptions of aquaculture in coastal communities in Northern Norway, using a mix of qualitative and quantitative research methods to look at how the general public as well as key stakeholders perceive the industry. They undertook a Social Impact Analysis, aiming at "identifying, monitoring and managing social impacts of large-scale industries" (p. 3). In their qualitative interview with stakeholders from the commercial fishing sector, they were told that the industry had altered their local fisheries to a great extent. One informant told of how "after they placed the aquaculture pens there, the shrimp stopped coming in" (ibid., p. 7) and another informant said "I am worried that fishers are squeezed out by the

aquaculture, since there is so much money and powerful industry interests" (ibid., p. 8). Their study found that in terms of socio-economic aspects, the general public in these municipalities perceived the industry to have a positive effect, while the environmental impacts on natural systems were negatively perceived. They found a very different attitude in fishers, who generally perceived the aquaculture industry as negative (ibid.). This echoes some of what is found in a study by Aanesen et al. (2018) on coastal recreation and visual intrusion from commercial activities in Arctic Norway. They looked at how households in this region "make trade-offs between recreational activities and commercial developments in the coastal zone" (p. 157), finding that there was high support for expansion of marine industry such as aquaculture, especially in rural areas and smaller towns, while more urbanized populations were reluctant to have more industrial activity in the coastal zone (ibid.). They conclude that policy makers should be "more reluctant when it comes to industrial expansion in the vicinity of larger towns and cities" (p. 165). Simultaneously, they did find a very clear preference for stricter regulations on commercial activities, especially relating to marine littering (ibid).

This is some of the most relevant existing research on social sustainability and social perceptions of aquaculture in Norway today. What this shows is that while there is a lot of research on perceptions from the general public, as well as from specific stakeholder such as fishers, there is very little evidence of in-depth qualitative research focusing on 'normal' people who are living in very close proximity to these industrial fish farms. However, there are several public and private social media groups addressing fish farming in Norway, where neighbors to these operations describe very negative impacts from the industry. In certain local newspapers, there are frequent articles on local opposition to the industry, and public hearing testimonies on aquaculture locations often feature emotional letters from neighbors who feel strongly bothered by the industry. Looking at how these people experience the social impacts of the aquaculture industry, is a knowledge gap worth addressing. The following chapter provides the details on how this thesis has attempted to do that.

3. METHODOLOGY

The study originated from a wish to examine the perceptions of the aquaculture industry within coastal communities, especially of those living in very close proximity to fish farms. In order to gather relevant data, and conduct a verifiable analysis of this data, a solid methodological approach was needed. This chapter describes the research methods and research design used in this study, the reasons why these approaches were chosen, and the ways in which they were applied.

3.1 Building from a quantitative survey

After conducting a preliminary scoping literature review to identify existing research, and potential knowledge gaps, I felt a strong need to 'test the waters' of my thesis proposal. In order to know if my research questions and thesis aim were on the right track, I created a self-completion questionnaire for distribution in Norwegian coastal communities impacted by aquaculture. In my preliminary literature review, I came across a study on 'perceptions of environmental and social change in Lofoten and Vesterålen in Northern Norway' (Kaltenborn et al., 2017). This study used a quantitative approach to map how local residents perceived potential environmental changes facing the region. Through the use of a structured questionnaire, completed over telephone, these researchers first collected simple background information (e.g. age, gender, profession), posed an open-ended question about potential environmental challenges in the region, and finally asked respondents to report levels of positive or negative impact from given drivers of environmental change in their communities. This study inspired the thought that perhaps using quantitative study methods to inform a qualitative study could generate more nuanced data.

When building the quantitative survey, it was imperative that the kinds of questions asked would generate responses informative to my qualitative interview guide. Through consulting existing literature on social research assisted by quantitative surveys, the work of people like Glenn Albrecht and Nick Higginbotham (see 2006; 2007; 2019) and Ashlee Cunsolo (see 2012; 2018; 2020) appeared. Their work on identifying and measuring emotive responses to environmental degradation was highly informative in the construction of this thesis in general, and this survey

in particular. Cunsolo's work on concepts like *sense of place* and *eco-grief* in Indigenous Canadian communities seemed highly relevant (e.g.; Cunsolo et al., 2012: *'From this place and of this place': Climate change, sense of place, and health in Nunatsiavut, Canada*; Cunsolo et al., 2020: *'You can never replace the caribou': Inuit Experiences of Ecological Grief from Caribou Declines*). For example, Cunsolo and her team used a mixed-methods approach in a study on the impacts of climate change on the well-being of residents in the Inuit community of Rigolet, Canada. This study found the use of a quantitative survey to inform qualitative interviews to be complimentary, and that the mixed-methods approach helped "provide a more detailed, rich and nuanced picture of the research and the impacts of climate change in the community," (Cunsolo et al., 2012, p. 541). Although the kind of 'multi-year, community-based participatory research' conducted by this team was far beyond the scope and scale of this thesis, adapting parts of their approach to a smaller scale seemed doable, and interesting.

The survey created for this thesis consisted of a few background questions on age, gender and location. It then asked about people's use of the coastline, and which factors they felt limited this use, selected from a list of potential factors. One of these factors was the aquaculture industry. The survey asked how far respondents lived from the nearest fish farm, how long the aquaculture industry had been present in their area, and whether they felt the industry affected their use of their *nærområde* (local areas for recreation). Selecting from a list of potential social and cultural impacts from the aquaculture industry (e.g. 'noise from operations', or 'altered access to recreational areas') the survey asked respondents to mark the ones that they were experiencing, as well as which of these factors affected them the most. The survey asked to what degree aquaculture had negatively impacted respondents (with alternatives ranging from 'to a very high degree' to 'no negative impact'), and provided some statements to which they would indicate their level of agreement (e.g. 'industrial impacts in and around the ocean/fjord are affecting or would affect my identity'). The final few questions asked respondents to identify their *emotional* reactions to ongoing or planned aquaculture operations in their area. The questionnaire ended with an encouragement to type other comments or remarks into a text box. Respondents were also given the choice to provide the name of their municipality (as a way for me to map out possible fieldwork locations) along with an option to provide their email addresses. This was

presented only as an *option,* for those who might be willing to be contacted for an in-depth interview on the topic.

The distribution of the survey was not guided by perfect means of representative sampling, but the identified population for the study was clearly residents of coastal communities where the aquaculture industry had active operations. Through a combination of data from the Norwegian Directorate of Fisheries (Fiskeridirektoratet.no, n.d.) – who maintain an online map of all aquaculture locations in Norway – and media articles on aquaculture locations in different municipalities and regions, I identified several municipalities where the industry was prevalent. I then posted the survey, along with a brief introduction to the thesis, in multiple Facebook-groups that served different purposes within these municipalities. Avoiding groups specifically focusing on aquaculture, I chose group with names such as 'What's happening in Senja municipality?', 'Information board for Sandnessjøen' and 'It's happening in Lysøysundet'.

The survey was open for six weeks, and received a total of 178 replies. The respondents were overwhelmingly male (67,4 %), and a small majority of respondents were between the ages of 35-60 (56,2 %). Most of them (44,9 %) lived in small towns (*bygd*: populations ranging between 200-500), and 82,6 % could see the coastline from their houses. 46,1 % of respondents chose the aquaculture industry as one factor limiting their use of the coastline, but 25,3 % said none of the listed factors limited their use. More than half of respondents lived either close enough to see/hear a fish farm from their home (43,8 %) or a short walk from the nearest fish farm (17,4 %). A small majority of respondents felt that the aquaculture industry altered their access to or use of nearby recreational areas, with some feeling a high degree of impact (25,8 %). 39,9 % did not feel that the aquaculture industry impacted this use.

The two factors of aquaculture impacts perceived as most problematic were 'emissions of organic or chemical waste' and 'altered access to fishing spots or other capture/harvest of natural resources'. 50,6 % 'agreed very much' to the statement 'my identity is connected to the nature in and around the ocean/fjord', while more than 60% agreed to some level that impacts from the aquaculture industry 'is affecting or would affect my identity'. When asked which emotions they felt related to ongoing or planned aquaculture operations in their communities, some respondents

felt 'frustration' (46,1 %), 'disappointment' (40,4 %) and 'disempowered' (39,9 %), while others felt 'optimism' (26,4 %), 'pride' (17,4 %) and 'hope' (12,4 %). When asked at what frequency they experienced negative emotional states due to existing or planned aquaculture operations, 42,6 % answered 'daily or weekly', while 12,9 % selected 'rarely', and 30,9 % 'never' experienced these feelings. Only 10,1 % had experienced 'thoughts about leaving this area', but 37,6 % got 'less pleasure from using local recreational areas' and 46,6 % were 'more concerned about the future of this place'. The 'open-ended' box for comments and remarks was a popular feature, and 42 respondents provided information here. These comments showed a diversity of opinions, with some feeling that the positive impacts of aquaculture were not taken into consideration, while others used the box to tell stories of their own experience with aquaculture operations in their communities.

I consider this survey a part of the *triangulation* of this thesis; the use of "more than one method or source of data in the study of social phenomena" (Bryman, 2012, p. 392). While this thesis does not present itself as a mixed-methods study – the use of the quantitative survey would have required a much more thorough population sampling and distribution, as well as a detailed statistical analysis of the data collected – the survey was an incredibly helpful tool to guide the development of the qualitative interview guide, as well as providing some hints as to where I might conduct my fieldwork, and even a few potential candidates for in-depth interviews. The responses given appeared to outline a tendency in many individuals towards negative emotional impact from aquaculture operations in and near their local communities. The degree to which a study can be generalized to the wider population of a study is called *external validity*, or *transferability*, and many qualitative studies do not achieve high degrees of transferability due to their preoccupation with 'depth rather than breadth' (Bryman, 2012, p. 329). This survey can hopefully add a small element of external validity, by at least proving that some individuals from other communities than the ones eventually selected for in-depth interviews also report negative emotional impacts from aquaculture operations.

(The summary report from the survey can be found in the appendix. It is, however, only available in Norwegian.)

3.2 Selecting locations for fieldwork

Once the survey had begun to generate responses indicating that the topic was relevant for further research, the next step was to narrow the scope of my study to a geographical location. Originally, I considered how one might choose three municipalities from three different regions of Norway, and conduct interviews in each of these communities, allowing for a comparative analysis of data collected. However, while current operations are primarily concentrated on the Western coastline of Norway and in the county of Nordland, current and planned expansion is mostly focused on northern parts of Nordland and the northernmost counties of Troms and Finnmark – partially due to predictions that salmon lice can be more easily controlled in a colder climate (Aanesen & Mikkelsen, 2020). There are 1410 active licenses with production in Norway today, nearly 500 of them located in these three northernmost counties (The Norwegian Directorate of Fisheries, 2021). This region – Arctic Norway – is likely to be heavily impacted by the Norwegian government's aim to quintuple aquaculture production by 2050, since this kind of growth will demand new areas for production, as well as significantly increasing capacity in areas already hosting fish farms (Bailey & Eggereide, 2020). I therefore decided to focus my fieldwork on areas north of the Arctic Circle, where the aquaculture industry is already a significant social actor, but where their impact is predicted to increase in the near future. By interviewing residents in communities where aquaculture already has a footing *and* where new fish farms are being established, it would be possible to find participants who were currently living close to fish farms – and maybe had been for some time – as well as participants who were only beginning to experience the influx of aquaculture in their neighborhoods. I wanted to know the emotional impacts of living next to a fish farm for five or ten years, as well as the impact of knowing that you might soon be living next to a fish farm. Media articles about aquaculture's social and cultural impact often centered on communities that were trying to stop the industry from establishing itself, and not a whole lot of attention was shone on those who were already living near the farms – maybe things were not as bad as expected once the farms arrived? For these reasons, and because I myself was born and raised in this region, I chose Arctic Norway as my area of study.

Now, Arctic Norway is huge. To get from Bodø, right north of the polar circle, to the North Cape at the northernmost point of the region, you'd have to drive for more than 15 hours straight, across more than 1000 km of road. It's evident that there will be variations in how the many communities across these kilometers perceive the impact of the aquaculture industry, and it's also evident that to cover this large area during a few weeks of fieldwork would require more resources than I had access to. In order to make the fieldwork doable (and affordable), I decided to focus on two areas, trying to conduct 6-10 in-depth interviews in each area. Originally it seemed logical to select two municipalities, but as recent Norwegian municipal reforms had merged and altered municipal lines in somewhat arbitrary ways, I landed on selecting two large fjords instead – a more 'natural' way to identify a regional community. These fjords were **Tysfjorden** and **Vågsfjorden.**

Figure 3: Map of aquaculture locations in the Tysfjord area. *Source: Fiskeridirektoratet.no*

Tysfjorden is located in Nordland county, between the municipalities of Narvik and Hamarøy. The fjord is 62 kilometers long, and is the deepest fjord in Northern Norway (SNL, n.d./a). The old Tysfjord municipality had a shrinking population of 1,925 in 2019, but this municipality is

now divided between Narvik and Hamarøy. The fjord has been known for its good fisheries, and the local herring population was a significant source of income and activity back in the day. Today, the local cement industry and the aquaculture industry are the main sources of business activity in the region, while fisheries have declined significantly. Prior to its dissolution, the municipal weapon was a black lobster – as the area is home to the northernmost lobster habitat in the world (SNL, n.d./b).

Figure 4: Map of aquaculture locations in the Vågsfjord area. *Source: Fiskeridirektoratet.no*

Vågsfjorden is located in Troms county, and stretches from Tjelsundet in the south to the island municipality of Senja in the north. It includes the municipalities of Harstad, Skånland, Ibestad and Kvæfjord. The largest municipality in the Vågsfjord area is Harstad, with a growing population of 24,804 as per 2022 (SNL, n.d./c). This area has been populated since Viking times, but didn't become a regional center until about 1870, when local herring captures brought wealth and activity to the region. Today, its main sectors of employment are public administration and

services (ibid.). Harstad is also the second largest aquaculture municipality in Troms county (Robertsen et al., 2022).

These two regions have a lot in common, while also being quite different. Tysfjorden has a small and shrinking population, while the population around Vågsfjorden is much larger and growing. As we see from these maps, Tysfjorden is quite narrow and windy, while Vågsfjorden has a much wider, more open fjord landscape. Both were traditional centers for fisheries, and while Harstad has already become one the largest aquaculture municipalities in Arctic Norway, Tysfjorden is increasingly relying on aquaculture as an industry to maintain and increase local economic activity. The fact that one can drive between Tysfjorden and Vågsfjorden in less than three hours, was another reason for selecting these two areas. That enabled me to spend one week in each location, in addition to the long drive there and back from my home in southwestern Norway.

3.3 Preparing for qualitative fieldwork

Once the survey had provided the quantitative inputs to determine the scope of this thesis, and research had provided an appropriate scale; focusing on the communities around Tysfjorden and Vågsfjorden – it was time to prepare for fieldwork. This study would be a work of **qualitative** social research, meaning that it emphasizes words over quantification – it's preoccupied with the *content* of data, not the amount (Bryman, 2012). Unlike quantitative social research, the starting point of a qualitative social study is rarely theory, although theory more often than not informs some of the subject matter and framing. Rather, this type of study seeks to gather data in order to arrive at theory. We call this approach *inductive*. However, the collection of data needs to be methodologically sound, and there are several factors determining whether your study is actually scientifically valid. Before I could pack up my recording equipment and head north, I needed to reflect on my research design.

3.3.1 Notes on research design

Any study hoping to have some impact in its field needs to satisfy certain criteria within the norms of scientific methodology, and the most prominent criteria used in quantitative research design are *reliability* and *validity*. These criteria are "different kinds of measures of the quality,

rigor and wider potential of research, which are achieved according to certain methodological and disciplinary conventions and principles" (Mason, 1996, p. 21). Although there are good arguments why these criteria can also be adapted to suit a qualitative research design, Lincoln and Guba (1985) suggest alternative criteria to instead measure a qualitative study's **trustworthiness**. These criteria are *credibility, transferability, dependability and confirmability*, and I find them far more useful for measuring the quality of an interview-based social study. Dependability – auditing by peers of all data collected– is not used as a criterion in this study.

The **credibility** of a study concerns whether research is carried out as per good practice, and whether the research findings are correctly understood by the investigator (Bryman, 2012). Ways to ensure credibility include *triangulation* and *respondent validation*. Triangulation was defined earlier in this chapter, as the use of multiple methods or sources of data in social studies (ibid.). The use of a quantitative survey to inform the qualitative interview guide is an example of triangulation. In addition, this study collects data both from primary sources (through interviews) and through reviewing secondary sources (like peer-reviewed articles, statistics, reports). Since the same researcher is conducting all interviews, as well as coding and analyzing all data, the use of *respondent validation* is applied to enhance the study's credibility. While developing this research design, it was intended that all interview participants would be provided with a draft of the chapter where interview data is coded and analyzed. The aim is "to seek confirmation that the researcher's findings and impressions are congruent with the views of those on whom the research was conducted and to seek out areas in which there is a lack of correspondence and the reasons for it" (Bryman, 2012, p. 391).

Transferability is another important criteria of trustworthiness. Since the nature of qualitative research is to intensively study a small group or a selection of individuals, it's a form of research that tends to favor 'depth over breadth' (paraphrase, ibid., p. 392). And, as Lincoln and Guba (1985) remind us, whether our findings will "hold in some other context, or even in the same context at some other time, is an empirical issue" (p. 316). Due to these factors, it is rarely possible to confidently generalize findings from a qualitative social study to a wider population. Instead, this study aims for what we call *thick description* – a rich account of the culture studied

(ibid.). In this case, we are looking at the Arctic Norwegian coastal culture, and the breadth of topics addressed in interviews, supplemented by the depth with which we will visit each topic, will hopefully supply a thick description of the social and cultural context for this study.

Confirmability is the final criteria of trustworthiness applied to this study. This concerns the conduct and intention of the researcher themselves; they should act in good faith, recognize their own subjectivity and work actively to reduce the bias with which they face their research and findings. To what degree have your values intruded? In this study, the kinship between the researcher and the study population (I grew up in a medium-sized coastal community in Arctic Norway) is potentially problematic. One cannot remain entirely subjective even when *not* part of the group being studied, and while my identity could to some degree allow for more trust and openness during the interview-process, it could also deceive me into presuming that I know what participants are trying to express, or into classifying participants based on localized sociodemographic prejudice. In order to reduce this bias, I knew I'd have to ensure that my interviewing technique and the work guiding the interview process were open, leaving participants to guide the conversation as much as possible. Which brings us to the next part of my preparation; building an interview guide.

3.3.2 Building a qualitative interview guide

 It had been clear to me from the get-go that I would want to conduct **semi-structured qualitative interviews**. These are more flexible than structured interviews, and allow the researcher to focus on the interviewee's point of view (Bryman, 2012). Participants are allowed to reflect on the complexity of the subject at hand, rather than being asked to choose between predetermined options on a form, or place their perceptions along a constructed scale. This format of interviewing allows for a guided, but free conversation, where topics are presented and questions asked, but the participants and researcher alike are granted leeway to explore beyond the interview guide (ibid.). Participants may ramble, go off on tangents, and explore their feelings around the subject matter. The researcher is free to ask follow-up questions to topics not originally suggested, or avoid subjects that suddenly appear irrelevant or even triggering (ibid.).

However, semi-structured interviews are not void of structure. All participants are supposed to speak on the same topic, and important questions or aspects of the research need to be addressed in all interviews. A semi-structured qualitative interview requires preparation, and these preparations usually result in *an interview guide*. Bryman (2012) emphasizes that the questions asked in a semi-structured interview need to enable researchers to "glean the ways in which research participants view their social world" (p. 473). I started by looking at the responses I'd received to my quantitative survey on the thesis topic, and began to shape a list of questions, topics and keywords that seemed relevant. I saw that it was worth continuing to explore several of the topics I'd focused on in the survey, such as coastal access, environmental factors, coastal identity and emotional responses to environmental degradation. The 'open box' at the end of the survey, which allowed for comments or remarks, generated a lot of qualitative information. People told their stories, explained their perspectives, displayed ambiguity and even directly advised me on what to include if I pursued the topic further. The main critique received was that the survey seemed to focus on the negative consequences of aquaculture, which was correctly observed. The idea of this study is to look at the ways in which the aquaculture industry can become socially and culturally sustainable, especially in the eyes of those who live very close to fish farms. A doctor rarely asks you about the ways in which something makes you feel better, they need to know what hurts. The same way a doctor seeking to treat a disease looks for symptoms, this study looks for symptoms – of unsustainable industrial operation. It is however clear that a study on the social and cultural benefits of aquaculture is a very relevant project. But this is not that project.

After making these reflections, I moved on to building the interview guide. 11 broad questions outlined the interview topics, while a column on the right contained possible follow-up questions, and questions to trigger elaboration. Questions were not too dissimilar from those used in the quantitative survey, but were left open-ended to allow for conversation. The opening question to every participant was 'Can you tell me a little bit about your 'place'?' In addition to the interview guide, I authored an information document, following a standard draft from my university, which contained information on the study's aim, participant rights and conditions of anonymity, as well as relevant contact information. The form also stated that the Norwegian

Center for Research Data (*NSD: Norsk Senter for Forskningsdata*) had received and approved the study's proposed data collection methods, and that I had assured the privacy and confidentiality required to collect this interview data.The final page was a declaration of consent, which all participants tore off, signed and submitted to me before the interview could begin. Having reflected on the research design and completed the interview guide, I was ready for the hardest part of preparing for a qualitative interview; finding someone who would talk to me.

(The interview guide and the form of consent can be found in the appendix.)

3.3.3 Selecting participants

Although my study population was defined – residents of the Tysfjord or Vågsfjord area who live in close proximity to the aquaculture industry – I needed to figure out how I would locate these people, and what sampling strategy to apply. Since I had a specific topic in mind, **purposive sampling** seemed the best option, as this is a non-probability form of sampling where you're not looking to randomly select research participants, but rather work strategically "so that those sampled are relevant to the research questions that are being posed" (Bryman, 2012, p. 418). For this study, I knew I had only the time and money to interview a limited number of people, in a limited geographical area. I knew that I was looking at whether the aquaculture industry was negatively impacting residents in coastal communities, although the inductive nature of the research meant I didn't have the study mapped out much beyond the data collection process. The data would guide my way forward, and I needed to make sure I got data that would give me something to work on. If I interviewed twenty participants who didn't live near fish farms, or use the coast for recreation, they would not provide usable data. I therefore settled on using what Etikan et al. (2016) call **critical case sampling**; a sampling method where "a select number of important or 'critical' cases are selected and then examined." (p. 3). This sampling method is often used in early research stages, to determine whether there is a foundation for more in-depth study. A master thesis is, in my opinion, typically an example of research that only begins to examine a knowledge gap. Bryman suggests using critical case sampling if one anticipates that choosing a certain case might allow for a theory to be tested (Bryman, 2012). While this was an inductive study, I was looking at whether people living in these areas with heavy aquaculture

influence would respond to questions in ways that aligned with existing research on other groups affected by industrial environmental changes. For these reasons, I chose to select my participants through *purposive critical case sampling*. It is important to note that using purposive sampling, and especially one as targeted as critical case sampling, does not allow the researcher to generalize the study to a population (Bryman, 2020). This study – being a master thesis aiming primarily to explore the topic – does not aim to generalize, but rather to provide a narrative that may or may not be indicative of a shared perspective.

Now, to determine whether a case is 'critical' or not, Etikan et al. (2016) suggest asking the questions 'if it happens there, will it happen anywhere?' and/or 'if that group is having problems, then can we be sure all the groups are having problems?' (p. 3). I wanted to know how people feel when the aquaculture industry comes into their neighborhoods, specifically because a quintupling of the industry by 2050 would mean that far more people living in these kinds of communities would be exposed to the same potential impacts. So, if these people were experiencing a lack of social and cultural sustainability, would that also happen in other communities where new fish farming locations are established? For those reasons, it was important to me that my sampling of participants was relatively broad. I wanted to interview people who had a fish farm in their 'backyard', I wanted to interview people who were potentially getting one, and I wanted to interview people who didn't live directly adjacent to fish farming locations, but still felt that it had impacted their communities – especially in terms of access to recreational coastal use. Due to existing research on stakeholder perceptions, such as Bjørkan & Eilertsen (2020), I was not specifically looking to interview fishers or other commercial users of the coast. In order to find my participants, I first contacted every survey respondent who had left their contact information in their survey response. I established contact with two survey respondents who lived in my selected areas and wished to participate in in-depth interviews. I also posted in facebook groups connected to the selected areas, asking for participants, and read articles about aquaculture in local news media, and messaged the writers of these articles, or contacted people they had cited or interviewed. Both of these approaches yielded little response. Reading public hearing testimonies submitted by locals to the

municipality concerning ongoing and previous aquaculture licenses provided some relevant names, and two of my participants were selected through this approach.

Being from the Vågsfjord area myself, I then used personal networks to spread word of my study, and received several contacts in this manner. When I contacted identified participants ahead of the interviews, I asked them if they knew of other people in their area who might be willing to talk to me. This began my use of **snowball sampling** – using participants' own networks to find more participants (Bryman, 2012). It is not at all unusual for purposive sampling to be supplemented by some level of snowball sampling (ibid.), and while I expected to locate all of my participants ahead of time through contacts and social media, this ideal proved a tad optimistic. By the time I left for Arctic Norway, I'd established contact with a handful of participants, and was concerned that my ideal sample of 15-20 people might be a lofty goal – even an impossibility. However, during interviews several participants suggested other participants, who again suggested other participants. Through this continued use of snowball sampling during the fieldwork process, I ended up interviewing 13 people.

7 of these 13 participants were from the Tysfjord area, and 6 from the Vågsfjord area. I wanted a sample that was broad enough to provide differing perspectives, and felt I mostly achieved that across gender, age, profession and whether people lived in very rural, rural, semi-urban or urban areas. One clear weakness is that the majority of my sample were men (8/13), and while I certainly tried to recruit more female participants, this proved challenging. Of course, the use of snowball sampling meant that most of my participants were referred to me by other participants – and when most of your participants are already male, they tend to have more men in their personal networks. Another weakness of the sample is my personal connection to the Vågsfjord area. It is unlikely in these smaller communities to not have some degree of connection to almost everyone, but I did not select any participants that were previously known to me – I had never met any of them, and they had no known relation to me or my immediate family at the time of selection. During a couple of interviews it became apparent that participants knew or knew of my family – in these places one's last name tends to give away family connections. While not ideal, these interviews were – to the extent of my understanding – not marked by these connections. In

terms of variation in how people were impacted by the aquaculture industry, 7 of 13 participants were living very close to one or more fish farms – close enough to see and hear their operations from within their houses. None of the participants worked in the aquaculture industry, although some had worked on aquaculture projects in outsider roles, such as financing. 3 participants owned vacation homes in the selected areas, while the rest were permanent residents.

3.4 In the field

Once the sampling criteria and method was in place, and my quest for participants well underway, I got into my tiny red car and drove north through spectacular winter landscapes for 1500 kilometers, until I got to Tysfjorden. Here, I began meeting with participants. I spent about one week in the Tysfjord area, and the subsequent week or so in the Vågsfjord area. Due to long distances between each town or village, and because each interview tended to last for many hours, I was able to conduct 1-2 interviews per day during this period. Interviews were primarily conducted in participant's homes, but a few participants preferred to meet in public locations, such as libraries or coffee shops. One interview was conducted digitally, as the participant was not in the area during the fieldwork period. During interviews, I got permission to record the conversation with a small microphone, which enabled me to focus entirely on the participant and their stories, rather than take constant notes. Bryman (2012) also points out that recording interviews can correct the natural limitations of our memories, permit repeated examination of participant's stories, and increase the trustworthiness of the study by providing scrutinizable data (paraphrased, p. 482).

Although I had prepared for these interviews academically, I was relatively unprepared for the interview experience. My interview guide proved useful in a few situations, and certainly helped structure my thoughts, but most interviews were much broader in scope than I had expected. Most participants needed little prompting to address the topics I had outlined, and several interviews – especially the first ones – generated new topics that I noted and took with me in subsequent interviews. As the process went along, my own knowledge of the topics grew, and this might have added some depth, or a sense of mutual understanding to the later interviews – I could now nod in places where a week earlier I would have lifted my eyebrows in surprise. In

general, the interviewing experience was an overwhelmingly positive one. Physically being in the places that participants were talking about was an emotionally and culturally meaningful experience. Seeing people in the context of their lives provided a perspective on their words that no amount of reading could have begun to match.

3.5 Transcribing interviews

As soon as the interview process was over, I began **transcribing the audio**. Bryman (2012) had warned me that the process would be "very time-consuming" (p. 482), taking at least 5-6 hours per hour of recorded audio, but I still underestimated the amount of hours I would spend on transcription by a good few weeks. Although I started by transcribing entire interviews, I soon felt overwhelmed, and contacted my supervisor who advised me to only transcribe relevant passages, as per Bryman's observation that sometimes large portions of interviews might not be reticent or relevant to the study (2012). This easened the workload, but I still ended up generating a total of 39 382 words in pure transcription. That is about equal to the amount of words in this entire thesis. Although researchers often use professional services to transcribe audio for them, I had neither the financial ability to do so, nor really a desire to. Transcribing the interviews allowed me to become intimately familiar with the stories participants were telling. At the end of my fieldwork, I'd spent countless hours listening to their narratives, but they had all begun to mix and bleed into each other in my memory. And, most importantly, I would be using the information in these interviews to guide the rest of my research process – transcription was the process that jump-started my analysis. Themes and topics began to emerge through repeated review of the data during transcription, and while I allowed myself to finish the transcription process before I started coding, much of the work was well on its way by the time I finished transcribing, and started coding.

3.6 Coding and analyzing interview data

Coding interviews is a way to label, separate, compile and organize data (paraphrased from Bryman 2012, p. 568), filtering components that appear potentially theoretically significant or socially salient (ibid.). Working with qualitative interview data like that gathered in my fieldwork

is likely to require the use of tools like *coding*, and *constant comparison* – a phase of the process where you're constantly moving between emerging categories of data and the theoretical concepts they are linked to. Through *open coding*, you break down, examine, compare, conceptualize and categorize data – this process creates concepts which are then grouped into categories (paraphrased from Corbin & Strauss, 1990, p. 61). When I began coding, I first looked for themes and topics to emerge across interviews, and consulted previously reviewed theory as well as new sources in order to anchor these themes and topics in existing theoretical concepts. Like Bryman suggests, coding this data proved to be a process of constant revision and fluidity, where "the data are treated as potential indicators of concepts, and the indicators are *constantly compared*" (Bryman, 2012, p. 568). What the initial coding process provided, was a set of categories that pointed to how participants perceived the impact of the aquaculture industry.

While reviewing existing research on themes and topics that emerged in the coding, I began to see that the most relevant theoretical concepts across interviews were those of social and cultural sustainability. I began to see that what my data were offering, was in fact something akin to a framework of how participants interviewed perceived a socially and culturally sustainable society in relation to the aquaculture industry. Some of the concepts I'd already researched in my preliminary literature review were still relevant as components of social and cultural sustainability, but my early findings while coding showed that a much more thorough literature review on sustainability – and how to measure it – was in order. After conducting this review, of which the resulting theoretical framework is found in chapter 4, I returned to my data for a new round of coding, which gradually progressed into the process of analysis. While the approach of a *thematic analysis* is diffuse and poorly defined, much beyond the idea of looking for repetitions, categories and similarities or differences (Bryman, 2012), I would call my approach an **inductive thematic analysis**. The inductive nature of the study lies in its use of data to define the relevant concepts rather than the other way around, and the analysis looked for themes across the interview data. - while *constantly comparing* the data to the theoretical concepts and existing indicators from my literature review.

This next round of coding and analysis yielded four overarching categories, with a long list of themes and topics within those categories. Reading through interviews again and again eventually enabled me to reach a level of *theoretical saturation* – where little new data was emerging, and the categories were well developed and distinct from each other (Corbin & Strauss, 1998). At this point I had compiled a categorized 'recipe', with potential indicators for sociocultural sustainability, informed by the codes generated from the interview data, as well as by several reviews of research and theory. This resulted in a written analysis of the relevant interview excerpts within each category, which is found in chapter 5. After writing chapter 5, I engaged in the planned *respondent validation*, where each participant received a copy of the chapter, along with a numerical code which identified each participant's quoted passages. They were asked to provide feedback on how they perceived the interpretations of their words, whether they felt well represented, and whether they were fine with the selected quotes being used. This process generated useful feedback, and while nobody objected to the general presentation of their perceptions, some participants asked to have parts of quotes removed, and one participant provided verifying information to support one quote that I had presented in the text as 'not verified information'.

Through this highly iterative process, where I moved back and forth between theory and data multiple times, and also between coding and analysis, I processed the interview data collected into a framework for sociocultural sustainability in Norwegian aquaculture, which is presented in chapter 6.

4. THEORETICAL FRAMEWORK

4.1 Defining and contextualizing social sustainability

Defining *social sustainability* is even harder than defining *sustainability*. A thorough literature review will offer no clear-cut answer to the question "what is social sustainability?", nor provide a unified framework for how to measure it – neither quantitatively nor qualitatively. A NIBR-report on public health and social sustainability by Hofstad & Bergsli (2017) concludes that the term lacks a dominating definition, and agrees with Colantonio (2009) that this lack of consensus

is due to different disciplines applying different criteria – as well as the many diverging perspectives on social sustainability as a concept. We can at the very least attempt a definition founded in largely agreed-upon definitions of sustainability, and draw lines from the Brundtland Report to presume that – like with environmental and economic sustainability – we are looking at preserving beneficial social structures for future generations, and managing social resources in a manner that enables those coming after us to enjoy thriving societies; continuations of ancestral lines connected to local history. But social sustainability is also about creating and maintaining solid social structures in the present. Bailey (2014) describes it as "the maintenance of a community as a coherent, functioning unit" (p. 30-31). We recall from chapter 2 that Barrett, Caniggia & Read (2002), related it to aspects of human social and cultural life, "such as equity and levels of inequality, public participation in decision making, and finally a variety of indices of well-being such as health, education, cultural autonomy, personal autonomy, security and happiness" (p. 1952).

Early literature on the subject of social sustainability did follow the main narrative presented in the 1987 Brundtland report, by focusing on the 'developing nations' of that era – poor countries where basic needs were left unmet. Today, social sustainability is finding its place in research on more affluent, industrialized societies (Hofstad & Bergsli, 2017), with much of the current research focusing on urban development and urban sustainability (ibid.). When applied to societies with increasingly complex and interconnected challenges, the concept itself must and does change. A part of this change is a shift from what Colantonio calls a 'hard' social sustainability (e.g. employment, poverty lines), towards 'softer' criteria that are not as easily measured (e.g. happiness, sense of place) (Colantonio, 2009). Meadows (1998) related this to our *values*, using examples of responses to a study conducted in U.S. communities where inhabitants were asked to define indicators of their own long-term welfare. Answers ranged between "whether we have to lock our houses and cars", "whether wild salmon still run in the river", "whether the children will go on living here, or move away" and "whether, when we open the windows, we can smell the sage" (p. 2). These responses say something about the intangible nature of social sustainability – but in a society where progress is measured in more tangible

ways, decision-makers in the public and private sphere probably need some more practical guidance towards achieving socially sustainable processes and outcomes.

In March 2020, the Norwegian Institute of Public Health (*FHI*), published a guide to socially sustainable communities on their website. They state that public health and social sustainability are complementary concepts in the quest to develop a society where (1) humans needs are at the center; (2) there is social justice and equal opportunity for all; (3) local residents in communities can affect the development of their *nærmiljø* (Norwegian term for one's nearest, local environment – both ecologically, socially and geographically) as well as the development of the municipality in which they reside; and (4) participation and collaboration is facilitated (paraphrased from Fokehelseinstituttet, 2020, own translation). The FHI mentions that the Norwegian government has tasked its municipalities with ensuring the sustainable development of their local communities, and encourages municipalities to ask themselves how social sustainability is protected through their planning policies, and followed up with actual measures (ibid.). The FHI further identifies four overarching goals that are vital in the planning of socially sustainable communities: (1) a sense of belonging/attachment (to people and places), (2) a sense of safety, (3) access to housing, work and local services, and finally (4) trust in people and government (ibid., own translation). Some of these goals are given precise indicators to measure progress, such as statistics on election participation, and statistics on air quality. These types of indicators may help local and national governments guide their policies and politics as they face increasingly strict sustainability requirements. We will address the importance of indicators later in this chapter, but first we take a look at how the private sector interprets and defines social sustainability.

In order to achieve sustainability in businesses and industry, a range of tools and certifications have been developed – systems of measurement that aim to ensure sustainable processes and outcomes (de Fine Licht & Folland, 2019). In recent years, these tools and certifications are beginning to include the dimension of social sustainability, but the development and implementation of this third dimension is made difficult by the lack of a clear definition – which reduces trust and confidence in the concept, while also enabling powerful actors to implement

their own definitions that primarily serve their own agendas (ibid.). The lack of clarity, and constant evolution of social sustainability has made it perhaps the trickiest sustainability dimension to visualize and implement for both governments and the private sector worldwide. Some simply omit the social sustainability dimension from their stated sustainability goals. Companies like the online retail giant Amazon.com Inc. spend a considerable amount of time and effort to promote their 'sustainable operations', listing their goals and accomplishments on their website. "We are building sustainability into all of Amazon's operations" (AboutAmazon.com, n.d.), the company states, but the sub-categories listed on their website speak of strategies such as lowering their carbon footprint, using renewable energy, aiming for sustainable transportation modes, net-zero-carbon buildings and net-zero-carbon shipping (ibid.). Social sustainability is not mentioned, nor do any of their current achievements or goals speak to the social dimension.

However, many companies are starting to specifically address social sustainability on their websites. Let's look at some Norwegian companies, and how they integrate the concept into their operations. Coor, a Nordic facility management business, have "integrated" social sustainability into their "business goals" (Coor.no, n.d., own translation). They define social sustainability as "working for all people to have equal opportunities to a stable, healthy life, to receive education, work and live without discriminatin of any kind" (ibid., own translation). Coor uses the UN Sustainable Development Goals to inform their chosen measures to ensure social sustainability, and have focused their efforts on Goal 3: *Good health and well-being* and Goal 5: *Gender equality.* Their concrete actions listed are; hiring a diverse workforce, accommodating for employees with disabilities, making workplace safety information more accessible, and becoming certified in a work environment standard to improve the physical and psycho-social work environment. Norwegian holding company Ferd, an investment company that springs out of the family fortune accumulated from a tobacco factory acquired in 1849, also dedicates a section of their website to social sustainability. They state that they "also involve social sustainability in our projects, and use community involvement in order to achieve strong results in these areas" (Ferd.no, n.d.) They endorse the UN SDGs, and list some of the measures they take towards sustainability. These include reuse of materials, energy efficient buildings, green mobility, proptech (environmental and technological innovations), as well as using landscape

planning to protect biodiversity and focusing on 'health-promoting buildings' (ibid.). From these two examples, we already see that social sustainability is interpreted in a variety of ways. Coor considers a socially sustainable company to be one that creates a diverse, healthy and safe working environment for its employees. Ferd's measures are mostly focused on environmental sustainability, but include some social aspects such as greening architecture and constructing buildings that promote good health in users. There are myriad other examples, but many share similarities with those of Coor and Ferd – they are relatively vague, with few precise indicators of how the company will measure and monitor their social sustainability. And they often focus on *one* group of people – often either employees, or the consumers of the goods produced/users of the service offered – rather than society as a whole.

A far more thorough and theory-informed perspective on social sustainability comes from planning-, engineering and architecture giant Asplan Viak. On their websites, they promote themselves as a 'professional spearhead' of socially sustainable city- and area development (AsplanViak.no, n.d.). Their website lists resources such as a brochure on social sustainability, a series of short films on topics within the concept, as well as an 'awareness-tool' for assessing city- and area development projects according to social sustainability measures; *The Social Barometer* (Detsosialebarometer.no). This tool focuses on what Asplan Viak calls 'three central elements of social sustainability' (ibid., own translation): (1) human needs at the center, (2) inclusive and robust local communities and (3) social justice. The tool asks a wide range of questions on the project's knowledge of local interests, actors and user groups, such as; Will the area's identity be maintained, or altered per the wishes of local residents? Will cultural memories, landscapes and other structures in the area be altered or enhanced? Will people experience a more vibrant neighborhood as a result of the project? Who is affected negatively or unfairly by the project? Will the project contribute to privatization, or exclusion of some groups? Will the project increase pollution, congestion? (ibid., own translations).

Asplan Viak show in their communications that they have thoroughly researched the concept of social sustainability, and incorporated a broad variety of criteria into their assessment-tool. What is interesting, is that Asplan Viak are 'selling' social sustainability as a service. Their brochure on

social sustainability details services they can offer to strengthen the social sustainability of a project, ranging from designing buildings and green areas, conducting surveys to inform a project, communicating the company's sustainability vision, and even a socio-cultural place analysis to determine interests, needs, identity markers and qualities connecting a place to its users. Of all the Norwegian companies whose take on social sustainability has been reviewed here, Asplan Viak's social barometer' seems to outline the most holistic vision of social sustainability.

4.2 Defining and contextualizing cultural sustainability

Before leaping any further into the concept of cultural sustainability, we might do well to attempt defining 'culture'. A word that originally referred to the cultivation of the land, it was included in the Dictionnaire Universel under its current meaning about 300 years ago (Maraña & Al, 2011). Chiu (2004) refers to two dimensions of culture; the social dimension (kinship, family structure, social network, identity, status, etc.) and the ideological dimension (values, ideals, norms, standards, rules, etc.). UNESCO, the only UN body with culture in its mandate (ibid.), defines culture as "the set of distinctive spiritual, material, intellectual and emotional features of a society or a social group, encompassing, in addition to art and literature, lifestyles, ways of living together, value systems, traditions and beliefs." (UNESCO, 2001). Today a massive agency working for peace, sustainable development and human rights, UNESCO (United Nations Educational, Scientific and Cultural Organization) was founded post World War II, with the aim of "advancing, through the educational, scientific and *cultural* relations of the peoples of the world, the objectives of international peace and of the common welfare of mankind for which the United Nations Organization was established" (UNESCO, 1945, p. 8, emphasis my own). The agency initially worked to protect tangible cultural monuments, but quickly moved to include intangible forms such as music, storytelling, traditional knowledge and practices (Wiktor-Mach, 2018).

Initially, culture seemed to be at odds with the idea of development: "Heritage was a treasure, while development – a force threatening its survival" (Wiktor-Mach, 2018, p. 2). But as Chiu (2004) points out, culture is not static. Culture evolves, develops, changes its identity. Therefore,

cultural sustainability is not about keeping a culture preserved, unmoving, frozen in time – a sustainable culture is dynamic and flourishing. As we absorb this thought, we might see that culture and development are not only similar in their nature, but complementary and even codependent. Former Secretary-General of the United Nations, Javier Pérez de Cuéllar, has stated that development efforts often failed "because the importance of the human factor – that complex web of relationships and beliefs, values and motivations, which lie at the very heart of a culture – had been underestimated in many development projects" (WCCD, 1995, p. 6). He went on to head the World Commission on Culture and Development (WCCD), whose 1995 report 'Our Cultural Diversity', mapped out the importance of thriving culture as a criteria for successful development. The report refers to the Brundtland Commission, and how their work managed to convince the international community that ecology and economy were interconnected systems in the pursuit of sustainable development. Now, the report argues, we need to incorporate culture as an equally important system (ibid.). The opening lines of the report are striking in their direct and damning honesty: "Development divorced from its human or cultural context is growth without a soul." (ibid., p. 15).

Jon Hawkes argues strongly for culture as a fourth sustainability dimension in his book 'The Fourth Pillar of Sustainability: Culture's Essential Role in Public Planning'. Hawkes proposes that the aspirations and values of communities are the foundation of society, and these are closely connected to culture. Our knowledge, beliefs, memories and identities are culture, as is our 'way of life'; our customs, our faiths, how we dress, what we eat, our language, our social norms, our traditions and institutions (Hawkes, 2001). Culture is personal, culture is political, culture is in every aspect of human existence, perhaps "such an all-embracing concept that it can have little practical use in the 'real' world – at least, in the world of government" (ibid., p. 3).

But Hawkes does not allow its complexity to stand in the way of attempting to distill and utilize culture as a measurement of societal function. In fact, he echoes what Meadows taught us earlier in this text: just because something is difficult to measure, doesn't mean it's unimportant. Hawkes argues that culture is in fact the bedrock of society, "not the decoration added after a society has dealt with its basic needs" (ibid., p. 3). Linking culture to sustainability, Hawkes

criticizes the three dimensional approach, noticing that while the world 'culture' might occasionally appear here and there in the literature on environmental, economic and social sustainability; "when it comes to practical matters, culture reverts back to its traditional designation of the finer and more refined artifacts of civilisation that one may appreciate after the food is gathered, the roof mended, the road sealed, the workers paid, the children vaccinated, the criminals apprehended, and the water purified" (ibid., p. 25). He resists this exclusion and devaluation of culture, and claims that thriving communities are built on shared values, a shared sense of purpose, and lively cultural activity. He thus redefines the *four* pillars of sustainability (ibid., p.25):

➔ **Cultural** vitality
➔ **Social** equity
➔ **Environmental** responsibility
➔ **Economic** viability

Hawkes also proposes a number of Cultural Indicators, such as measuring the level of communities 'access to cultural processes and mediums', 'fluency in cultural processes and mediums' and 'action in cultural processes and mediums' (ibid., p. 33). Other indicators that he highlights selected from different studies include; 'participation in local community', 'feelings of trust and safety', 'value of life', 'neighborhood connections' and 'sense of place'. Hawkes suggests allowing communities to develop their own indicators, based on their shared history, values and aspirations (ibid.).

Agreeing with Hawkes, the WCCD and UNESCO pushed for the inclusion of culture as a fourth sustainability dimension during the development of the 2015 UN Sustainable Development Goals, but the final document landed on using the three pillars of sustainability discussed earlier in this thesis; environmental, economic and social sustainability (Soini & Birkeland, 2014). This exclusion is probably one reason why cultural sustainability rarely has its own section on large company websites, or is addressed in Norwegian municipality plans. Soini & Birkeland propose that "culture is not yet institutionalized as an aspect of sustainability because it has not yet been systematically included in sustainable development policies, practices, or assessments compared

to ecological, economic and social sustainability. Consequently, international, national, regional, and local policy aimed at sustainable development often examines the cultural dimension as part of the social one or completely ignores it" (ibid., p. 214). We are about to engage in the former; examining the cultural dimension as part of the social one – but through merging the two concepts.

4.3 Merging social and cultural sustainability

In this study, social and cultural sustainability are merged into one sustainability dimension; **sociocultural sustainability**. The concept is not my own invention, but an established concept developed as a reasonable compromise between the two sustainability dimensions. The term 'sociocultural' or 'socio-cultural' is defined by the Cambridge Dictionary as "related to the different groups of people in society and their habits, traditions and beliefs". Social and cultural sustainability overlap in many ways, but also have distinct areas of concern; continuation or establishment of social well-being is the focus of the former, while continuation of culture is the primary concern of the latter (Chiu, 2004). The importance of both dimensions has been outlined earlier in the text, and the importance of sociocultural sustainability as a part of the three pillars is also clear. To paraphrase Cernea (1993); no matter the environmental or economic soundness of an undertaking, it will stumble and eventually crumble if it isn't also *socially and culturally* robust (p. 18). The model below shows common and distinctive features of social and cultural sustainability, as defined by Chiu (2004):
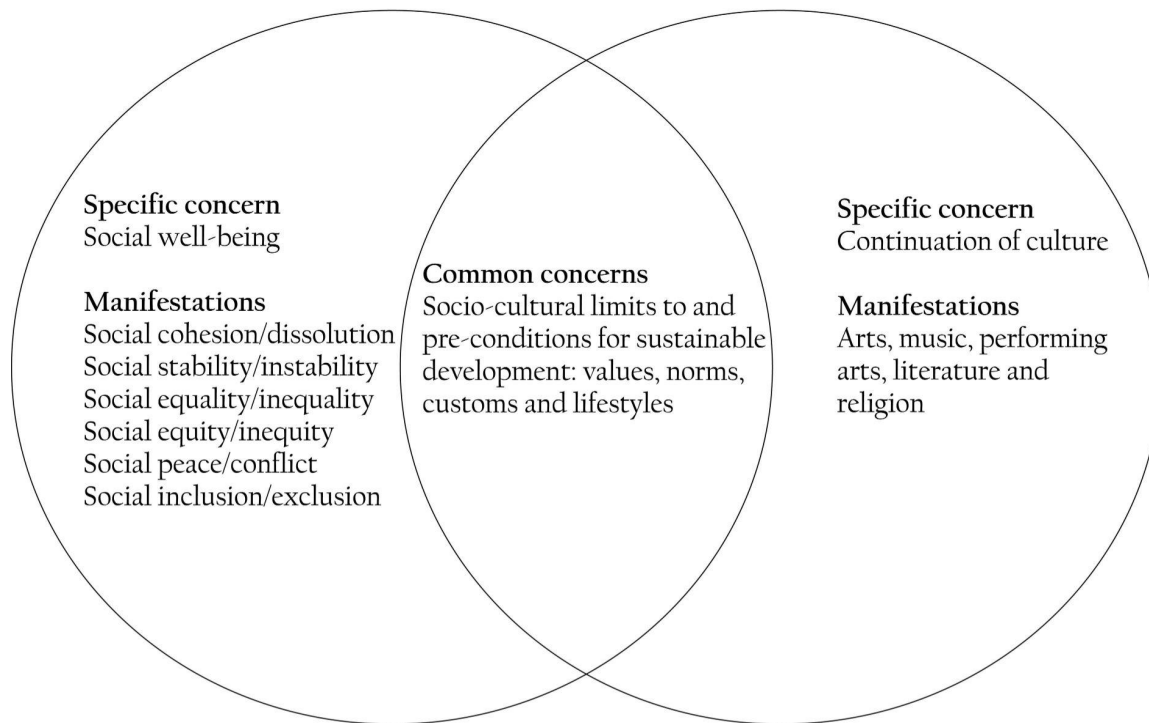
Social Sustainability

Cultural Sustainability

Specific concern
Social well-being

Manifestations
Social cohesion/dissolution
Social stability/instability
Social equality/inequality
Social equity/inequity
Social peace/conflict
Social inclusion/exclusion

Common concerns
Socio-cultural limits to and
pre-conditions for sustainable
development: values, norms,
customs and lifestyles

Specific concern
Continuation of culture

Manifestations
Arts, music, performing
arts, literature and
religion

Figure 5: Common and distinctive features of social and cultural sustainability. *Source: Chiu (2004)*

4.4 Can we measure sociocultural sustainability? The use of Sustainability Indicators

The 1992 UN Earth Summit in Rio de Janeiro resulted in the document 'Agenda 21: Declaration on Environment and Development', an action plan for how to achieve sustainable development worldwide. This document states that "prevailing systems in many countries tend to separate economic, social and environmental factors at the policy, planning and management levels" and determines that the responsibility for change "lies with Governments in partnership with the private sector and local authorities" (UNCED, ch. 8, point 8.2). As part of the action plan, all UN member nations are asked to develop systems that monitor and evaluate progress towards sustainable development "by adopting indicators that measure changes across economic, social and environmental dimensions" (ibid., ch. 8, point 8.6). These indicators are called **Sustainability Indicators (SI)**, and are one of the ways sustainability is measured in both government decision-making and industry self-monitoring (Milewski & Smith, 2019).

What are indicators? Well, the late environmental scientist Donella Meadows – who authored some of the seminal work on sustainability indicators – said that "indicators are natural, everywhere, part of everyone's life" (Meadows, 1998, p. viii). They "arise from values; we measure what we care about. And they create values; we care about what we measure" (ibid., p. viii). We use indicators to monitor systems, such as the weather (clouds might indicate rain), the human body (a high temperature indicates fever), and a rattling engine indicates an expensive excursion to the car repair shop. 'Indicator' has many synonyms; sign, symptom, signal, clue, warning, hint, measurement, or rank (ibid.).

In the aftermath of the 1992 Earth Summit, research and initiatives involving Sustainability Indicators bloomed, causing Meadows to caution that poorly chosen indicators may do more harm than good. An example of a potentially treacherous indicator, according to Meadows, was GDP (Gross National Product), because indicators of sustainable development must not be pure indicators of growth, but indicators of efficiency, sufficiency, equity and quality of life (ibid.). The issue, of course, is that we may far more easily measure things in dollars, yen and kroner, than measuring quality of life – of which there are probably as many indicators as there are people alive today. Yet researchers like Milewski & Smith (2019) acknowledge that "in order for SI to provide meaningful information on policy progress towards sustainability, SI must include a reference value (e.g. target, standard, norm, goal, benchmark) that, when measured, indicate movement towards or away from a stated objective, as well as providing the public with a measure of government accountability on policy narratives and initiatives" (p. 2). The launch of the UN Sustainable Development Goals in 2015, was quickly followed in 2017 by a 'global indicator framework', where each sustainability goal was connected to a multitude of indicators. For example, goal 14 (Life below water: Conserve and sustainably use the oceans, seas and marine resources for sustainable development), has specific indicators for each sub-target: Goal 14.b (Provide access for small-scale artisanal fishers to marine resources and markets) will be measured by indicator 14.b.1 (Degree of application of a legal/regulatory/policy/institutional framework which recognizes and protects access rights for small-scale fisheries) (United Nations, 2017, p. 17).

Norwegian company Hydro, one of the world's largest aluminum companies and partially owned by the Norwegian state, is one example of a company operating with specific indicators in their self-monitoring of sustainability. On their website, they have trisected their sustainability promises into *climate*, *environment* and *social* (Hydro.com, n.d./a). Their social strategy is condensed into three main points; (1) investing in education to train people for 'the future economy'; (2) supporting a just transition, by contributing to economic development; and (3) ensuring the 'sustainability data' of their products by ensuring a responsible supply chain. They detail their progress towards sustainability by using multiple standards, such as the UN SGDs and the GRI Standards (Hydro.com, n.d./b). In their 2021 annual report, they detail their more general 'environmental and social achievements' of the past year; they emphasize the amount of people 'educated', 55 million NOK invested in charities, sponsorships and community investments, and an increase in gender balance (Hydro.com, n.d./c).

In their separate GRI index report, the company refers to their status per several given GRI Standards in both the environmental, economic and social dimensions (Hydro.com, n.d./d). The social dimension is governed by standards such as occupational health and safety, training and education, non-discrimination, child labor, indigenous rights, human rights, etc. It also contains a section called 'society', with standards such as implementation of local community engagement, coordination with local natural resource management, number of significant land use disputes, operations with negative impacts, and how the livelihoods of people who've been resettled due to the company's operations have been affected. Hydro's performance in relation to these standards are not that easily located, as the index report only refers back to page numbers of their annual reports (ibid.). When cross-referencing, it is often not obvious how the GRI standards relate to the information given in the referenced pages of the annual reports. For example, the GRI standard G4-MM7 on "the extent to which grievance mechanisms were used to resolve disputes relating to land use, customary rights of local communities and Indigenous peoples, and the outcomes" refers to page number 53 in Hydro's annual report. This page is a description of Hydro's 'Corporate Governance', including their 'Code of Conduct' and a flow chart of how governing bodies within the company operate in relation to each other. There is no mention of land use disputes, nor any other key words from the related GRI index. There is even a *report on*

the reporting of the GRI Standards index available on Hydro's website, conducted by the Sustainability Accounting Standards Board (SASB) (Hydro.com, n.d./e). This report addresses this G4-MM7 standard by categorizing it as 'discussion and analysis', and listing the unit of measurement as 'n/a' – a common abbreviation meaning 'not applicable', 'not available', 'not assessed' or 'no answer'.

I use this example from Hydro's own social sustainability reports to show that setting social sustainability indicators for industry is complicated. Companies like Hydro clearly spend a lot of resources on reporting the sustainability of their business operations in relation to a long list of GRI Standards, yet most of their 'hard' accomplishments are related to environmental and economic dimensions of sustainability, not the social dimensions. Yet, this is a company that operates in several local communities, impacts the natural and social environment in those places, and has more than doubled its annual revenue in the past decade (Hydro.com, n.d./c). They, if anyone, would have the resources and occasion to implement strict standards for social sustainability. But without a clear definition of the concept, and a lack of agreed-upon Sustainability Indicators for socially sustainable practices, companies, government and other institutions are quite understandably struggling to measure how their practices do or do not fulfill the requirements of a socially sustainable practice. We risk falling into what the sociologist Daniel Yankelovich called a *quantitative fallacy*; to measure what can be measured, and disregard that which can't be measured – then presuming that what can't be measured is unimportant, or even that what can't be measured doesn't exist (1972).

So what then about using Sustainability Indicators to assess the aquaculture industry? Milewski and Smith (2019) offer one example of what this might look like, by evaluating a set of indicators focused on the sustainability of the Canadian aquaculture industry. The Canadian government launched a national action plan to ensure sustainable growth in the aquaculture industry in 2009, modeled on the principles of sustainable development outlined in the Brundtland Report (ibid.). This document had defined broad indicators for the three pillars of sustainability, with the social pillar focused on securing the *social license to operate* (SLO) (ibid.). In 2012, the government released a report where they outlined their intention to develop

Sustainability Indicators for Canadian Aquaculture, with the resulting indicator framework displayed below (ibid., p. 3). This framework also includes indicators for social sustainability; encouraging social responsibility,

Table 1
Summary of Canadian aquaculture sustainability themes, objectives and indicators as outlined in DFO (2012).

Sustainability Pillar	Themes	Objectives	Potential SI[a]
Environment	Maintaining healthy productive ecosystems	Protecting fish and fish habitat through site allocation processes, managing organic waste, controlling introductions and transfers of fish, escape prevention	Escaped fish Water quality Benthic monitoring
	Using resources efficiently	Feed management, water and energy conservation and production-area optimization	Responsible sourcing of marine raw materials Marine ingredients in aquaculture feed
	Maintaining animal health and welfare	Minimizing stress and reducing disease and pest risks	Disease incidence
Economic	Economically viable and successful sector	Delivering economic growth in rural development, job creation and domestic and international trade	Labour income generated Return on investment
Social	Encouraging social responsibility Ensuring safe and healthy aquaculture products	Respecting local communities, Indigenous and labour rights, safe workplaces Meeting nutritional needs	Employment Value-chain traceability Voluntary certification

[a] All sustainability indicators (SI) identified in the 2012 *Aquaculture Reporting Initiative* were designated as being "under development".

Figure 6: Canadian Aquaculture Sustainability Indicators. *Source: Milewski & Smith (2019)*

and ensuring safe and healthy aquaculture products (ibid.). As Milewski and Smith point out, social SI tend to focus on indicators that are "easier to measure such as employment, wages and salary, safety at work, and gender inclusion" (ibid., p. 4). This observation certainly aligns with what Meadows expressed in her work on indicators, as well as what we've seen in examples from companies like Coor and Hydro, who are trying to integrate and measure social sustainability in their operations.

In their text, Milewski and Smith mention that Canada's government has identified employment numbers as a social indicator, but without setting a target. This, they argue, is due to the fact that technological innovation in the aquaculture industry is so efficient, laborers are becoming less and less essential. They point to Norway, saying that "nowhere is the impact from improved technological efficiencies more evident than in Norway which grows almost ten times more farmed salmon than Canada, but does so with slightly more than twice the direct labor force" (ibid., p. 4). Milewski and Smith are not convinced by the Canadian government's choice of social SI, concluding that developing meaningful indicators for social sustainability in aquaculture remains one of the most pressing sustainability issues in aquaculture development today (ibid.).

Here in Norway, work on an *Aquaculture Sustainability Barometer* has been ongoing since 2015; a collaboration between food research institute Nofima, research institute SINTEF Ocean and governmental information portal BarentsWatch, and funded by FHF (The Norwegian Seafood Research Fund – a state-owned company financed by the aquaculture industry). In June 2021, researchers from Nofima and SINTEF published a paper titled 'Making a Web-Portal With Aquaculture Sustainability Indicators for the General Public' (Mikkelsen et al., 2021). In this paper, they present a Sustainability Indicator framework for Norwegian aquaculture, having chosen indicators guided by criteria such as; "scientific validity, data availability, robustness, precision, practical feasibility, cost efficiency, ability to communicate information, understandable, acceptance by stakeholders, and relevance for policy priorities" (ibid., p. 3). They explain that indicator selection is a process that benefits from the involvement of relevant stakeholders, but that aquaculture – being a contentious issue – might benefit from an expert-led process, as "available information can shape decisions and affect stakeholders" (ibid., p. 3). Nevertheless, they informed their indicator framework partially through a nation-wide survey with 630 respondents, selected to be representative of the general population, and informed by a literature review, workshops and meetings with stakeholders. After seven years of working on the Aquaculture Sustainability Indicators Web Portal project, they landed on the following themes to represent their indicators; Environment, economy and social. We see from the table cited below that their social segment has sub-topics we've come to know by now, such as area use and societal contributions.

TABLE 2 | Themes in the portal, as of March 2021.

Environment	Economy	Social
Disease	Costs	Area use
Emissions from fish farms	Feed composition and origin	Certifications
Escapes	From feed ingredients to produced fish	Employment
Fish mortality and losses in production	Production value	Job absence
Greenhouse gas emissions	Profitability	Nutrients and unwanted substances
Impact on wild salmon	Value added—contribution to GDP	Occupational injuries
Sales of pharmaceuticals		Societal contributions, taxes, and charges
Salmon lice		
Utilization of residual raw materials		

Figure 7: Themes in the portal, as of March 2021. *Source: Mikkelsen et al. (2021)*

The Web Portal itself was launched in 2018, and while it doesn't offer a structured indicator framework for assessing aquaculture sustainability, it presents statistics within these chosen themes, and describes the sustainability concerns of the industry. The web portal seems mostly geared towards public information, rather than as a tool for the industry itself to evaluate its practices. The 'social' bulk of the site offers numbers on employment, area use in square kilometers, taxes and charges paid by the industry, amounts of unwanted substances emitted, and a few more quantitative indicators (Barentswatch.no, n.d.). A quantitative fallacy might be rearing its ugly head here; nowhere on the site do we hear about impacts on specific local communities, or the more qualitative data that might indicate how the industry is impacting coastal culture or social dynamics.

Another Norwegian project looking at aquaculture sustainability indicators comes from NINA (Norwegian Institute of Nature Research), which looks at developing a *coastal sustainability barometer* for Northern Norway. This study leans on the UN Sustainable Developments Goals, as well as using a framework developed by an interdisciplinary team of scientists in 2012, called The Ocean Health Index – a "framework for assessing ocean health based on the sustainable provisioning of benefits and services people expect from healthy oceans, such as food, cultural and social value, and jobs" (Oceanhealthindex.org, n.d.). This Norwegian study focused on six municipalities in Northern Norway, recruiting 20-30 people in each municipality to contribute. These were not necessarily a representative sample of local community populations, but an attempt to identify relevant perspectives from people within sectors and groups such as; the aquaculture industry, fisheries, hunters, offshore petroleum workers, the Coast Guard, local youth, indigenous populations, workers in the tourism sector, e.g. These participants replied to a survey, and then participated in group discussions. Their responses were used to develop a set of overarching themes, guiding principles and accompanying criteria (what we might call *indicators*) (Engen et al., 2020).

Since this study aimed to compose a sustainability barometer for the entire coastal zone of Northern Norway, it involves multiple aspects of coastal resource use, such as fisheries, tourism, and other interests. However, it does contain proposed indicators for the aquaculture industry in

particular, as well as more general indicators that also apply to aquaculture. Several of these indicators fit within the social and cultural sustainability dimensions, and are very relevant to an assessment of sociocultural sustainability in Norwegian aquaculture. Within each theme, there are principles (P) and criteria (C) to support these principles. For example, within the theme of 'sustainable food production', there is the principle *P4: Positive perceptions and few land-use conflicts*, the principle *P1: Good management and regulation*, and the principle *P7: Local and small-scale production*, amongst others. These are supported by indicators such as *C1.1: Regulations enable local entrepreneurship* and *C7.1: Food production is mostly managed by non-industrial actors, rather than large external actors* (Engen et al., 2020, p. 24-25). Another theme, that of 'place-attachment, outdoor recreation and sustainable area use', pretty much feeds directly into the sociocultural sustainability dimension. Principles listed include *P1: Preservation of locally important places*, *P5: Preservation of local traditions*, and *P8: Local participation/ influence in decisions that impact development of the local community.* These are accompanied by criteria such as *C1.7: There are possibilities to experience the silence of nature*, *C5.2: There are arenas for experiences and knowledge-transferral between generations*, and *C8.2: Fishers are consulted in the process of granting permits for aquaculture in new areas* (ibid., 2020, p. 28).

Engen et al. show us how Sustainability Indicators can truly reflect the complexity of sociocultural sustainability. In these indicators, we catch glimpses of Meadow's council to measure the things that are difficult to measure, we see Hawke's values and aspirations on which societies are built, as well as Birkeland's nature-culture interface. This framework and its indicators are highly relevant to this study – Engen et al.'s qualitative fieldwork was even conducted in areas very similar to the areas visited during this study's fieldwork. We take these indicators with us as we move into the next chapter, where we meet people who live in close proximity to the aquaculture industry. But first, we'll briefly outline a few other theoretical concepts of interest to this study.

4.5 Other concepts of note

In addition to the main theoretical frameworks used in this thesis – on sustainability and sustainability indicators – there are a few other concepts that will inform indicators, or guide

smaller sections of the analysis and discussion. These therefore require a brief introduction before moving on to the analysis. The concepts emerged in different manners; some were part of the initial literature review that informed the interview guide, others became apparent while transcribing and coding the interviews, or emerged during the inductive thematic analysis.

4.5.1 Environmental justice

Environmental justice emerged in the U.S. as a concept in the 1980s, and was closely associated with *environmental racism* (Mohai et al., 2009); a concept that focused on how ethnic and socio-economic minorities were more likely to live and work in ecologically degraded and polluted environments (ibid.). Environmental justice elaborated on this concept to become a more generalized, cross-disciplinary field looking at aspects of environmental inequality. Bullard (1996) defined it as "the principle that all people and communities are entitled to equal protection of environmental and public health laws and regulations" (p. 493). Brulle and Pellow claim that there is a link between exploitation of the environment and exploitation of human populations, and that environmental inequality stems from broken social processes (Brulle & Pellow, 2005). Engen et al. (2021) developed a survey-tool to examine environmental justice among coastal planners and small-scale fishers in Northern Norway, focusing on how the rapid economic development in marine sectors can lead to injustices such as " the spatial displacement of small-scale fishers, Indigenous peoples, exclusion from decision-making, and inequitable distribution of benefits and costs" (p. 2). The study by Engen et al. uses a common subdivision of environmental justice principles and indicators, namely *recognitional justice* (culture, knowledge, Indigenous rights), *procedural justice* (participation, influence, access to justice, accountability, trust and fairness), and *distributional justice* (marine resource abundance, important habitats, physical access, livelihood, fisher's income, quality of fish or shellfish, fishing effort, fairness) (ibid., p. 10).

4.5.2 Sense of place

Sense of place originates from the field of geography, and has been applied as a concept since at least the 1960s (Kudryavtsev et al., 2011). It's often defined as consisting of two interdependent

factors; *place attachment* (a bond between person and place), and *place meaning* (symbolism ascribed to a place) (ibid.). It's an emotional experience as much as a physical one, and while it can be strongly positive (feelings of comfort, safety, familiarity), it can also be used in reference to negative feelings (fear, uncertainty, placelessness) (Foote & Azaryahu, 2009). An important point to make is that sense of place is subjective; either individually or collectively (Lee et al., 2013); you feel connected to your cabin, as does the rest of your family. To someone else, it's just a building. Amundsen (2015) examined place attachment in residents of coastal communities in Northern Norway, and found that "fisheries are intrinsically linked to sense of place" (p. 269). This hints that a place is not mere geography, it is a blend of nature, societal factors, culture and emotions. Amundsen concluded in her study that in many cases "place attachment means commitment to respond to the challenges facing the communities" (p. 271).

4.5.3 Eco-grief and solastalgia

Canadian researcher Ashlee Cunsolo defines the term *eco-grief* as: "the grief felt in relation to experienced or anticipated ecological losses including the loss of species, ecosystems, and meaningful landscapes due to acute or chronic environmental change" (Cunsolo & Ellis, 2018, p. 275). Humans have a relationship to their surrounding natural environment. When this environment is altered, degraded and even destroyed, the people whose lives exist adjacent to or immersed in these landscapes are likely to experience feelings of grief, loss of identity, anger and hopelessness. A sub-concept within eco-grief is *solastalgia*, or "the distress that is produced by environmental change impacting people while they are directly connected to their home environment" (Albrecht et al., 2007, p.95) Its etymology derives from the combination of the words 'solace' and 'nostalgia', the former speaking of comfort and consolation, while the latter is associated with melancholia and a longing for a distant place or time. Feeling nostalgic for an environment, a 'place' that still exists, but has been significantly altered. Today, the term is applied in research on the emotional, mental and spiritual health implications of climatic and environmental change (Galway et al., 2019). Albrecht describes how solastalgia can be seen in populations where people have experienced industrial landscape changes, through the example of a study conducted in a rural Australian community impacted by the mining industry. "Citizens

were alarmed by the thought of losing the peace and quiet that typified their previous amenity and lifestyle. It was not simply the physical environment; it was also the loss of a community connection" (Albrecht, 2019, p. 56).

5. Analysis/findings

In this chapter, you'll finally meet some real people. Not scientists, economists, prime ministers, directors of institutes, tired graduate students, or any of the other voices that have been prominent in this thesis thus far. In the fieldwork that informed and guided this study, 13 local residents of Arctic Norwegian communities impacted by aquaculture were interviewed. These were in-depth interviews, many of them spanning entire afternoons and evenings, while some lasted for only slightly longer than the estimated hour set aside for the task. How these participants were selected, how the geographic and topical scope of the study came about, and the rest of the methodology guiding the fieldwork – that's all detailed in chapter 3. This following chapter is all about listening to the voices of those whose local communities have been altered by the rapid growth of the aquaculture industry, and trying to map out the sociocultural landscapes within which this industry has established itself. The chapter is long – more than 50 pages – with many sections of complete citations from participants. This is a choice I've made, to document thoroughly the data that is guiding my analysis, to provide evidence of my findings. I've tried to shorten this chapter significantly, but have landed on the relatively comprehensive version shown here. In my opinion, these citations are most impactful when allowed to sit in their context. For a briefer reading experience, themes and topics used in the framework presented in chapter 6 are bolded.

5.1 Meeting local residents in communities impacted by aquaculture

Arctic Norwegians are coastal people. Most cities, towns and larger settlements in this part of the country are nestled in bays or situated in calm fjord arms. Proximity to the sea is only natural; since the very first settlements arrived, the ocean has provided food, trade, work and leisure. This is changing. Fisheries, once the foundation of Norwegian society, have declined steeply, and the vast majority of people who used to combine farming and fisheries for sustenance have passed

on. Very few people rely on this traditional livelihood today. In its place, we see new types of livelihoods staking a claim to the Arctic coast, and prevalent among these is the aquaculture industry. As outlined earlier in this thesis, industrial aquaculture is a contentious practice, facing increased scrutiny for its environmental impacts in coastal areas, while also being lauded as the 'new oil' for a nation whose economy is rapidly changing. In this chapter, we hear from people who live near these farms, whether they see them from their living room window, or pass them on their way to the nearest fishing spot. They are from different backgrounds, socio-economic situations, and have different stories to tell. What unites them is their experience of living in communities that are being altered by aquaculture.

While each interview was conducted following the same interview guide, many of the participants addressed themes in the guide without being prompted. In addition, many themes that were not a part of the guide started popping up in several of the interviews. Through an inductive thematic analysis, the data was grouped into four broader categories; the **natural** landscape, the **social** landscape, the **cultural** landscape and the **emotional** landscape. The term 'landscape' is used here as a reference to the definition as outlined in Olwig (1996), where 'landscape' refers to the "appearance of a land as we perceive it" (p. 630). These 'landscapes' are perceptions – participant's *own* perceptions of their nature, society, culture and emotions as impacted by aquaculture, as well as *my* perceptions of participants' relationships to their nature, their society, their culture and their emotions. They also are intended to provide a visual conceptualization for this framework; that we're mapping out these four landscapes or 'layers' of a community.Much of what was conveyed during these in-depth interviews can be nested within one or more of these four categories. Then, within each category, there are several distinct topics, which serve to pinpoint specific aspects of aquaculture's impact on these 'landscapes'. Using the data grouped within these overarching themes, and their subordinate topics, we'll eventually develop a framework for sociocultural sustainability, with indicators informed by our background research, our theoretical literature review, and of course the qualitative data collected in these interviews. But that's for our next chapter. Now, we'll examine the interview data, and dive into the Arctic communities around Vågsfjorden and Tysfjorden.

NOTES ON INTERVIEW TRANSLATION: All quotes are translated from Norwegian by the author of this thesis. Where a Norwegian term has no proper English equivalent, the Norwegian term is used and italicized, usually accompanied by an English explanation of the term. Sadly, much is lost in the translation from Norwegian to English. However, I have attempted to do the participants some level of justice by translating their wording in a way that hopefully maintains the flow and rhythm with which they have spoken, rather than translating word-by-word from one language to the other. This has been done with great care, to avoid altering the participant's intention. All participants are anonymous, and identifying information has been omitted or altered to protect the identity of the participant. The mention of larger geographical areas – such as Tysfjord or Vågsfjord – are an exception, as it is well documented and understood that all participants are from these areas.

5.1.1 The Natural Landscape

The first category inducted from the thematic analysis was **the natural landscape**. This category encompasses aquaculture's impact on its natural setting; emissions, pollution, area use, area access, recreation, natural resources, biodiversity and the physical properties of fish farms. But the focus of this category is how these environmental and ecological changes impact *humans,* people living in affected communities; the ways in which an industry impacts the natural environment of a place matters to its people and its culture. Concerns for local species, land use conflicts, noise and light pollution from fish farms – these all impact the sociocultural sustainability of aquaculture, because people are connected to nature, dependent on nature, and important participants in their surrounding ecosystems.

Now, as aquaculture enters a natural environment, it might take some time to notice that something is changing. When asked how they first came to notice the aquaculture industry's arrival, most participants had to pause and give it some thought: "No, well, there wasn't that much aquaculture, I didn't know much about it. I hadn't really..can't remember thinking about it much (...) Then a few years went by, and it was over there, and there… When I'm on the upper part of my property now, I can see four industrial fish farms." (8). Another participant who lives adjacent to a fish farming facility reflects on their first impression: "No, I just saw it appearing a

little here and there in the fjords, and..noticed this stuff, and..wondered what it was all about. But it's different when you get it so close to you." One participant recalled noticing the farms in other parts of the country: "I guess I've driven past it, when I've been out driving, been down along the fjords in *Vestlandet* (the western coast of Norway), and… Of course I've driven past fish farms, but I have..it hasn't concerned me. I had no relationship to it before. Which of course made the shock even bigger." (6)

However, speaking to one local resident in the Tysfjord area, they could very clearly remember the moment they became aware of aquaculture: "I haven't always had *that* in my line of sight – the fish farm in the back there, that I see through my windows. My struggle has..it didn't start with a farm. It started with a cod." (1) The story of this cod is worth citing in its entirety, as it displays the quiet but significant ways that aquaculture can alter the natural environments in which it becomes established: "I think 2010 was the year I discovered fish farming. The thing was..I was out on the sea, fishing with a buddy – my kids, his kids… We caught a cod. And that cod, he was kinda… Usually you *know* what you've got on the line. You'll go; this is a coalfish, this is a cod... But for me, suddenly, I'm thinking..what is this..oddity? What kind of fish is this? So we got him up, and then..you know, a cod is usually *rigid*, right, when you get it onboard? But this one was totally limp, he just sort of 'poured' over the gunwale. There was no muscle, no..*tæl* (grit, stamina) in him, right? And then..well, I'd never seen anything like that before, and I said "What's with this cod?" Now, the guy we were out with, he lived here, and he said: "That cod there, we're gonna toss". And I asked him why, and he just sliced its stomach open and fish feed poured out – feed waste from the pens. I was standing there on deck, wondering: "What is this? What is happening?" (1)

This story is one of many like it. The one topic that every single participant raised, and which generated the most data when coded for topic occurrence within any of the four categories was this; how **emissions from fish farms** are impacting the marine environment around the farms. We might recall that the Traffic Light System rejected these emissions of nutrient salts, fish feces, leftover fish feed and medications as an indicator for aquaculture sustainability. And yet, a primary concern of the local residents interviewed was what these emissions do to wild marine

life. Participants spoke of reduced fish stocks near fish farms, but they seemed even more deeply concerned about how the fish they *did* catch had been altered. Several pointed out their concerns with **wild fish feeding on the leftover feed pellets** that slip through the open net pens and into the surrounding marine environment, and how this food affects wild fish. One participant recalled: "I caught two coalfish. 'Aye, this'll be something..!' So I'm there gutting them. No pellets in them, but that liver..it was completely unnatural. And that was, I reckon, fish from (a fish farming area nearby). At least it was something completely unnatural, it wasn't natural food that fish had eaten. So..that was one of my first..then, that this was something..something was happening in the natural environment, in the ocean, because of these fish farms." (11)

One participant went more into detail on how these changes are also affecting commercial fisheries: "It's in every arm of the fjord. When people go to..they had some fishers in here, 5-6 boats fishing for coalfish. And when they went to deliver the fish to the fishmonger, he said: 'Did you land these in Tysfjorden?' Yeah. 'Then you get the minimum price, plus a bit less. Cause you can't eat it.' And you can't eat it." (2) This ruins the fish commercially, but also degrades the experience of recreational fishing. The same participant explained: "I can't stand on the shore anymore, fishing. He's filled with pellets, and he stinks when you get him out of the water. You can't eat him. He's got no liver, and..when you grab him, like *this*, there should be a resistance, a firmness. When you grab a coalfish (who's eaten pellets), you can *squeeze* him. It's all soft inside. He's totally destroyed. And not just the coalfish, the cod is the same way." (2) Yet another participant relayed their own experience with catching wild fish fed on industrial fish feed: "I've been out fishing here myself, by (the island), and..the first coalfish I caught – springtime two years ago – it was bursting with this farmfeed. (...) And when I went to filet it, it was so fatty that it fell apart. The whole thing fell apart, you *couldn't* filet it. It was impossible, cause it was so greasy, from that farmfeed that it's been grazing on. And then some people say; 'Oh, but it's perfectly edible, it's perfectly usable fish, the fish isn't ruined'. But it's ruined for *me*, as a fisher. I don't want a fish that's so fatty he falls apart. Whether he's poisonous..that's not what this is about. Something has happened to that fish. Something is also happening to where the fish travels, to graze on this feed. *And* it's doing something to the traditional fishing spots we've had and used. There's been a local fishery, right, we've got all these *meane* (fishing spots) around

here, where the fish are supposed to gather. And of course these fish farms impact that. Definitely. So that does something to us." (9) This problem of catching fish fed on industrial fish feed doesn't appear to be limited to the immediate vicinity of fish farms: "No matter where we are, it's..you're lucky if you catch fish that doesn't have pellets in it." (2)

However, participants were not only concerned about emissions running their fish meals. The general health and biodiversity of marine creatures was addressed by all participants, and they explained their concerns that **emissions from fish farms might be harmful to the health of the marine ecosystem**. A participant living a mere few yards from the coastline reflected on the changes: "What it looks like on the ocean floor beneath (the fish farm), I don't know. But of course the reason they've chosen this location is because there's strong ocean currents here, so (the emissions) are transported by the current. But..that doesn't mean they go away. It stays in the ocean, and a lot of it is, I would presume, right underneath the farm. Even though it's been spread a bit wider, it's still there, and… We never catch wolffish (*steinbit*) anymore. (...) As for cod..we used to fish on the other side, where that fish farm lies. If you were out fishing and didn't catch anything, you could always head over there, cause you'd catch something there, always. But since that farm came..now I don't know if it's because of..I mean I'm not gonna blame the fish farm, cause it could be..a general warming of the ocean, or something else, it could be. But..there's no fish anymore. The cod is mostly gone. You'll catch one now and then, but it's not..it's rare now." (8)

One participant explained how they perceived emissions from open pens to impact wild fish health: "First of all it smells..intensely. Second, all the intestines of that fish..it's destroyed. You'll almost never find a liver in the coalfish. It's gone. Same for – you can find cod with giant heads, and you see how the body..the bones of the body are..it's like they're zig-zaged. Or you lift it up, and feel..there's supposed to be some firmness to it. When you can do like *this* and feel its bones..because the flesh is like jelly, the meat? Something's wrong. (...) And when you can find that, several kilometers away..they're not just destroying (the environment) near the pens. They're destroying further away." (2) One participant avoids fishing near the fish farms entirely: "I can't..I've seen the misery of that fish. Coalfish with tiny heads and a large body, their liver

growing into their flesh. It's no good. And that smell… So, yeah, a lot of stuff has happened since they came around." (12) Others also agreed that the fish get sick from emissions, especially industrial fish feed: "There's no doubt about it, a fish that feeds on pellets gets a messed-up digestive system – it gets sick. And you see it, large coalfish, people say that a coalfish that's been feeding on pellets for a while..he gets a black, fucked up liver. (...) Eventually, he'll head down into the deep waters and die." (11)

One participant from the Tysfjord area had also noticed changes, and heard stories from within their community. "The redfish is completely gone over there, and nobody eats the fish they catch nearby either. Yeah, sometimes they'll catch..sometimes the coalfish have been by the farms here, and people catch them, and then..yeah, it smells like..well, they don't eat that fish, put it that way. And you could see earlier, when they were using..yeah, both emamectin benzoate (a common delousing agent) and that other one, several times they found *krill* (small crustaceans) all up on the shore, these belts of krill..which maybe resulted from that. That was a short while after a delousing treatment (on a fish farm). So they can find…yeah, I know of several cases where they found loads of krill, this dead krill on the shore, pile after pile." (3) Death in crustaceans was also addressed by a participant from the Vågsfjord area: "When I had some crab traps over here, not too far from the fish farm, around the cape here..I pulled up a couple of crabs, and they had holes in their shells. A tiny hole. And I didn't notice it much, but then I shook the crab, and it was like he was filled with soup. Which he's not supposed to be, he's supposed to be..firm. And so – BAM BAM – I opened him up. Nothing but black sludge. And it must have something to do with..those delousing toxins." (12)

Several participants also expressed worries that **emissions from fish farms might be harmful to human health**. One participant expressed concern that this wild-caught fish fed on pellets is sold commercially: "If you talk to the fishers, you'll know that if you don't gut this fish immediately, if you leave it all day on your boat until you reach land..it's a totally different fish that comes ashore. Which the *fiskemottak* (location that purchases fresh fish for resale) either doesn't want, or pays a lower price for. So something is wrong. (...) It means that the quality that consumers get – probably in fish cakes, these mixed products – is of a quality that you wouldn't

really want to eat." (10) The same participant came back to this issue later in our conversation: "It's scary what's happened. And when the Norwegian Food Authority (*Mattilsynet*) goes out and says 'No, don't worry about eating that fish, it's not dangerous', then you've kind of accepted that..that nature has changed. You're getting people to accept that they can eat a fish that's got soft, squishy flesh, that smells like hell when you gut it, that has an enlarged liver… Because the energy content of that feed is way too high for the coalfish, genetically. So something is wrong, you're pushing the limit. I think if a farmer was feeding his livestock in a way that caused the local moose to develop soft, squishy meat, there'd be an outrage. But when it comes to fish, the rules seem to be different." (10)

Another participant found delousing treatments particularly scary in terms of human health. "No coalfish or cod or halibut or redfish or..no fish is gonna come out of the water and say 'Don't take me, cause we've been feeding on the delousing chemicals!' They eat medicated feed. Even though… The salmon inside the pens are controlled, but the fish around it aren't. And *that's* the fish people are gonna eat." (2) Other participants also feared the consequences of delousing chemicals in wild fish: "Another thing is the uncertainty around..when it comes to medications, not least with emamectin (common delousing agent) which is used a lot today, also here in this district. And we know that the half-life of emamectin is..it's a few days, maybe a few weeks. Which means that the feed that..when medicating, in those delousing periods (...) that feed that falls through the pens and is eaten by wildfish..it contains medicine." (10)

People interviewed were well aware that fish farming requires locations with relatively active ocean currents spreading their emissions – if not, the waste would accumulate exclusively beneath the pens. One participant, who'd been notified that a fish farm might move to the bay below his cabin, expressed his frustration: "Their argument for moving this (fish farm) is that there's insufficient 'spreading', but facts are they have to shut it down because there's now so much pollution that the salmon is dying. And so they're moving (the fish farm) to outside of our place, because apparently there's better 'spreading' here." (7) Another participant addressed the same issue, stating that it reminded them of the so-called 'tall stacks policy' of the 1960s: "To prevent all the pollution pouring down into the cities, amongst the people, they built those tall

chimneys, and attached fans, to spread it even more… And it's the same thing, I feel, now. As long as they have enough 'spreading' they can emit as much junk as they want, into the ocean." (1) Another participant questioned the actual efficiency of ocean currents in spreading these emissions: "I saw, even just that brief period here on this beach, what happened. But they'd say 'Yes, but there's currents and tidal waters, and…' Okay, but all that stuff doesn't just disappear between low and high tide." (5) These emissions are something local residents struggle to understand the legality of. "And in a teeny tiny area!", one participant yelped. "If it was a city, if it was Trondhjem city, they'd get arrested, the whole bunch!" (4) "Why, why should the aquaculture industry be allowed to release nutrient salts, when everyone else who does is so strictly regulated? Agriculture, private people..right?" (1)

The conclusion from the coding of this topic – emissions from fish farms – is that every single participant expressed grave concerns about how these emissions of feed, nutrient salts, feces and medications were impacting the natural environment surrounding the open pens, how toxins might make their way into humans and wild fish, as well as frustration with the lack of regulation on waste emissions. A solution fronted by almost all of the participants, was using closed-containment technology to capture and filter emissions. "The point here, which it's also important to make, is that there are very, very few people who are *against* aquaculture. Almost nobody, I meet very few. (...) Most people are not there yet, they just want..well, for the fish farms to be closed-containment. So that you can control the emissions, control the lice, isolate a pen if there's disease, you can control the drainage… People *know* this. At least here, people are very aware of what (they) have accomplished in (closed-containment fish farms)." (1) One participant also fronted closed-containment fish farms as a way to improve animal welfare inside the pens. "If they get into closed pens, there's not that level of mortality. They're going around picking up dead fish all the time. Every damn day they're picking dead fish." (2) The same participant continues: "That's gotta be a win-win for Nordland county, right? Close the pens, more jobs (...) *and* people can fish and swim in the fjord. And it's gotta be a win-win for the industry owners too. Cause they're losing..all that feed that goes through, they're losing..because there's so much feed going through. And they're saying that there's a shortage, worldwide. They're starting to use bushes to feed (the farmed fish). And still – they won't close the pens, so

that they can *use* the feed, so that the fish can eat..can use that feed, without the other fish – *our fish* – eating that crap. " (2)

Within this topic of emissions, some participants also drew attention to factors that are not entirely prevented by closing the pens. Trash, pollution and microplastics from other parts of the operation are other issues that participants felt strongly about. "We discovered something, which I've noticed for a couple of years that they've been doing..they're actually cutting these feeding tubes, with a saw. Zero collection of those micro-plastics." (12) Another participant mentioned a different micro-plastic issue connected to feeding tubes: "We know that in the feeding tubes, for example, there's a descaling of plastic that the pellet takes with it when it's shot through there. So that's tons and tons of microplastics." (6) "And where does this microplastic go?", asked one participant rhetorically, before answering their own question; "It goes into the salmon. With the feed." (12) Trash from operations in general was mentioned as a problem, with one participant offering an historical anecdote to describe the issue: "I live in an area where..nothing ever washed up on the shore. My father used to say – because in my childhood it was all about finding these things, *kavvel* and *blåser* (types of buoys), and..anything you could make use of. He who had a shoreline like that, he was a fortunate man! But my old man shook his head..nothing ever washed ashore here. I'm glad he's gone today, so he doesn't see all the stuff washing up… (...) It's damn crowded down by the shoreline now, wherever you go along the beaches here, it's filled with – and they're not obliged to clean up, they should be made to clean up." (11)

The next topic identified within the theme of the natural landscape, is the importance to local residents of **a rich and native marine biodiversity**. The Arctic coastline is diverse, and home to species who are often specifically adapted to their native regions. Some areas are known for their wild salmon rivers, some for their unique lobster. **Viable populations of native species** are crucial in more ways than one – local communities are attached to these species, and concerned when they decline, shift their migration patterns or disappear altogether. One resident recalled recreational fisheries of the past: "It was fun! Because every time we went fishing, we had no idea what we'd pull up. Now..there's almost nothing." (2) They went on to list several changes in the local biodiversity that they felt might be related to the arrival of aquaculture: "When we get

cod seeping in here these days, it's very little. Earlier we caught a lot. Haven't had the herring in here either, in.. (...) Earlier the boats would come in, they'd lay out around (area), and then come in for the herring. Killer whales, we've had only a few of them in here. Not that long ago, the fjord was filled with killer whales." (2) Another participant highlighted the importance of two interdependent species: "(Here's the) food for the *skrei* (Norwegian type of cod) – since this is a winter habitat for *raudåte* (a small zooplankton), you know. All these fjords, the Vestfjord and the Ofotfjord, they're *raudåte* areas. (...) So it's really quite interesting that (fish farming company) have placed their farm right in the middle of an incredibly important grazing area for the *skrei* up there in Vesterålen, and the other they're gonna place right in the..the epicenter, kind of, for the hibernation of the *raudåte*." (4)

One participant told of a native species they hadn't seen in a while: "You can see for yourself how many fish farms there are – and when they came in with these farms, because it really exploded – it only took a few years and there were loads, there were suddenly ten fish farms. And then the mackerel left, it left Tysfjorden. (...) So now we have almost no mackerel, whereas a few years back there were this and that many tonnes of mackerel, and this and that many tonnes of *Tysfjord-mackerel*. Now there's almost nothing." (2) A different participant from the same region explained the uncertain fate of another native species; the Tysfjord-lobster, whose habitat is also important to the local wild salmon population. "They've promised not to use any delousing agents, that they'll assess and see, do research on the effects this has on the lobster. At the same time, this is in the middle of one of the most important migration routes for wild salmon in the whole Ofotfjord-system. (...) All of the salmon in the Ofotfjord migrate through that area. And that's where they're dying to place these fish farms. With open pens." (1)

One participant recalled the biodiversity of their local beach, from when they were young, long before the fish farm arrived; "There I was, scouting, had water binoculars with me. (...) We'd lie there and let the high tide come. And life would appear, the crabs and..all that. It's all gone. Now it's..it's just trash, chopped tubes." (5) Another participant also lamented the loss of 'tiny life' on the beach. "When you lift up a rock, you've got these tiny..that crawl all over – it was filled with life. And suddenly, it was totally dead." (2) These creatures are also observed to be in decline in

deeper waters: "Some people have been reacting to this..you'll put out a line, right. There were these spots when it was friggin..the bait would be gone in a couple of hours. But now..now they're pulling the darned bait back up again. Where are those creatures that used to live on the bottom?" (12)

One factor mentioned by several participants is **the placement of fish farms in known fishing areas, spawning grounds, or important migration routes for wild species**. "I know of fishers who've been warning ever since the 1980s against the aquaculture industry taking areas that are..yeah, important ecological areas, reproductive areas, areas that are important to the fisheries…" (1) The map below shows one aquaculture locality in Tysfjord, as mapped out by the Norwegian Directorate of Fisheries (*Fiskeridirektoratet*). The map shows how the farm overlaps with spawning grounds for cod and other fish (yellow grid), as well as habitats/grazing areas (green grid). These data, and data for any active aquaculture operation, can be verified through the website of the Norwegian Directorate of Fisheries.
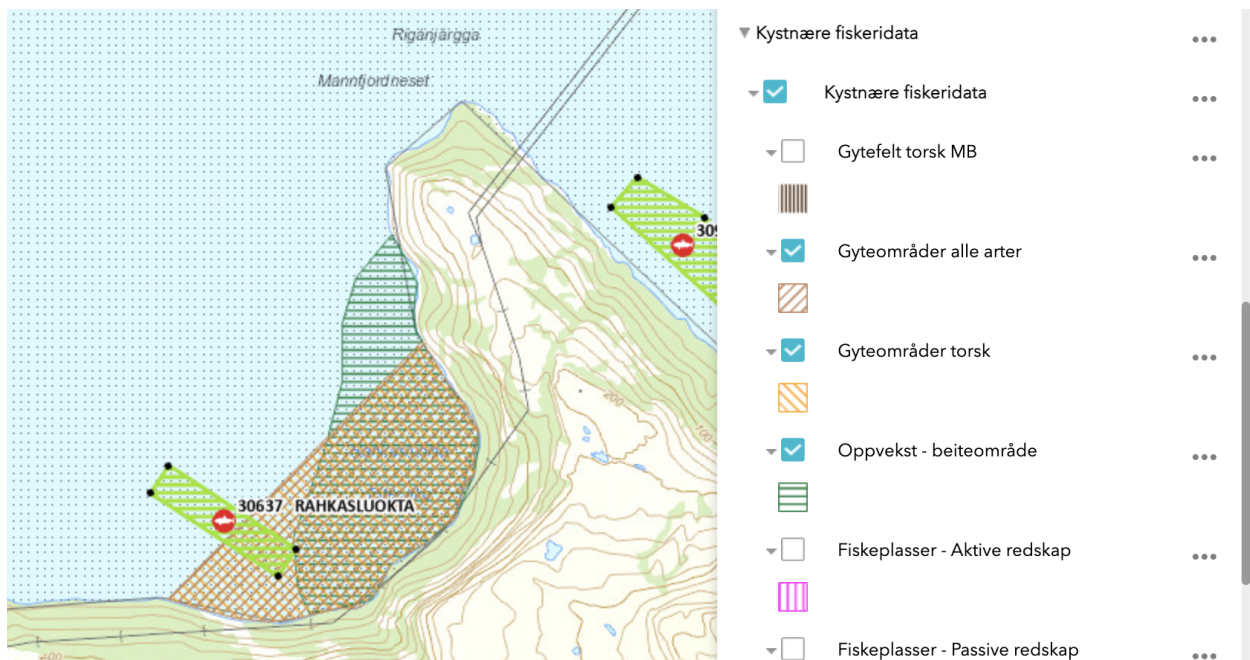
Figure 8: Rahkasluokta aquaculture locality, with spawning/grazing areas. *Source: Fiskeridirektoratet.no*

One participant told a story of how the aquaculture industry had called in local fishers for a meeting, telling them they wanted to know which areas were of particular importance to them,

ahead of determining where to place their fish farms; "And during the break, the fishers sat and debated amongst themselves whether it was smart to name their spots, because it could be..that the industry would choose precisely those spots. But they landed on showing their locations – where there was good catch, good habitats for wild fish; where they'd *least* want these farms established. And he told me, that what they'd discussed during the break – that's exactly what happened. They located the farms where you'd least want them, because in the ocean, the thing is..where there's loads of currents, there's good nutrient access. Fishers know this. That's why the wild fish live there. But that's also where you get good 'spreading'. So it's ideal for the fish farmers, to hide their emis– to get..it's not called 'hiding' your emissions, it's called 'reducing'..well, anyway, for them it's an..environmental action plan, kind of." (1)

Locals expressed frustration that the industry often doesn't consider local fisheries and other marine interests before placing their fish farms. "If you look at (area), they've taken shrimp field after shrimp field. (...) Shrimp fishers work sustainably, by spreading across several fields, making sure not to 'fish out' any of the fields. And then these fields disappear anyway, because they're placing aquaculture pens nearby. The shrimp can't handle that. There's a lot of despair in (that area), amongst fishers, because of that. (1) Participants who'd witnessed changes over time, were also apprehensive: "I was skeptical of that farming location there. Because they placed it in the middle of..I'd been out fishing there, caught big fish there. Now it's..well, you can't fish there anymore, can you? And it was placed right in the middle of the habitat for local wild fish, there in (area), there's a spawning ground there." (8) One participant could point to the rapid changes in areas with long traditions for fishery; "There used to be a shrimp field here. In 2014, it was in the coastal zone plan (*kystsoneplan*). In the plan from 2019, that shrimp field was gone. In my childhood they'd be out there, trawling for shrimp. Catching cod with shrimp in their stomachs was common. It's been a long time since I've caught one of those." (11)

While all species are sensitive to industrial impacts in their habitats, some species are threatened by the farmed fish itself. **Genetic introgression between wild and farmed species** has already greatly impacted the wild salmon population. A participant from the Vågsfjord area brought up what they feared might be a new sustainability challenge in the near future: "Now *cod farming* is

coming at full speed. (...) It's a different cod than the one we have in our local waters. And it'll escape as much as the salmon escapes, and mix with the local cod population. Which then alters the genetic material in the old fish. Where will this end? What are the consequences, in the end? You can imagine..a genetic change like that, it just keeps going. Which could mean catastrophe for the resources we actually have, in the ocean. Nobody really knows. So that's one of the major concerns – it hasn't been around here, because we don't have any salmon rivers or rivers for trout, here locally. But where they do, those rivers are almost ruined, and the local salmon is ruined, because of that gene mixing. So it's pretty serious. It's not at all sustainable." (9)

As discussed earlier in this chapter, this kind of genetic mixing is one of the main threats to the **wild salmon population** in Norway. The other is salmon lice. One participant addressed this issue: "They're pretty rude these guys. Yeah, I call it rude; 'It's the *wild* salmon, it's the salmon coming from the sea that brings it in'. I had to say to them, honestly, what in the Lord's name do you guys have anchored out here? It's *lice factories* you've got out here. They're so close that the lice can hop from one fish farm to the other." (11) Another participant, a wild salmon fisher, expressed their frustration with the ongoing decline in wild salmon populations; "It's not sustainable, having to drag the smolt past all these fish farms and then out into the big ocean. And the migration route for salmon in (area), it's out through the (strait), so he's passing..yeah, he passes 3-4 fish farms before making it to (area). (...) And he's..he's struggling. No, listen..Norway is responsible for..for the natural life. Maintaining the natural life, defending the native species. Not just for the joy of someone like me, but… You're supposed to do what you can to allow species to maintain their own existence. That's your responsibility, as a nation." (10)

The statements examined here, provide good data on how biodiversity and native marine life is important to local communities, both in terms of use value in fisheries and recreational use, and for its inherent value – the fact that people are connected to their environment and the species within it. This inherent value of nature and natural landscapes was also addressed by participants in ways that are less related to specific species, and more related to the general landscapes along the coastlines, and the kind of experiences people value when they enter natural spaces. This topic, on the necessity of **wild coastal landscapes**, yielded some interesting perspectives. People

expressed that they wanted **sizeable and continuous areas where industry is not a part of the landscape**.

Fish farms are different from other industries and development, in that they don't necessarily require roads or other infrastructure – they are accessible by sea. This means that fish farms can pop up in almost any bay, cove or fjord, as long as the municipality has permitted it. "Tysfjord is already one of the largest aquaculture municipalities in Northern Norway, so I can't understand how… There's something called..in the guidelines from the Directorate of Fisheries (*Fiskeridirektoratet*), it said that..there was a bullet point that..you're not supposed to place fish farms wherever possible, there are supposed to be free zones, for the public and fisheries and these things. I think that's very important." (3) "People are noticing," said another participant; "that there's an enormous consumption of nature." (1) One participant described a coastal area near their house, where the municipality is in the process of permitting a fish farm: "There's a seabird colony right next to that spot, as I mentioned before. And there's a living, untouched..there's not even a power line anywhere nearby. So it's kind of an untouched area, with a very diverse marine life. Lobster, redfish, you name it..eagle nests – or, we found that too – and ravens and otters, and a seabird colony and… It seems totally wrong to transform that into an industrial area." (3) The importance of **preserving coastal nature where there's silence; no sound, lights or other disturbances from industry** was also a value expressed in interviews. One participant recalled the silence by the shore after coming back from work trips at sea: "When you're used to..I recall many times when I'd come home from the sea – cause we had two main engines, it's like that on those boats – I'd wake up from the sound of a magpie walking across the roof. That's how quiet and wonderful it was." (5) Today, the participant's property is neighbored by a large fish farm.

And exactly this, having the aquaculture industry as your neighbor, is a topic that every participant wanted to address. Although not all participants had fish farms in their immediate vicinity, more than half of participants did. The main issues brought up by these people were noise, light pollution, losing their familiar view of the ocean, and a general feeling of discontent. They wonder why there is not **a shielded zone around homes and vacation homes.** It's

important to understand that fish farms are ususally placed in areas that are rural, off the beaten track – places where people often settle precisely because they want quiet. "Yes, we've chosen to live here. And then we get this fish farm operation, over there. (...) If we wanted to live next to industry, we'd have settled in the city. We've decided to live here because we want peace, and calm. And that thing, that's an *industrial operation*." (13) Another participant lived so sheltered that conducting the interview meant putting on a pair of backcountry skis and trudging up through a snowy pass, before cruising down to the coastline. Their family had owned the land for more than half a century before the fish farm came. "If only they'd place these operations in an industrial area… You don't place these things in the most..peaceful places. It's a *factory*, that's what it is." (5)

People strongly wished it was **not permitted to place fish farms in areas where existing homes or vacation homes will be impacted by noise, light pollution and other types of disturbances**. The main issues? Noise pollution and light pollution. Aesthetics were also brought up, but one participant explained why aesthetics were not their primary concern; "The visual – that's one thing. But even if I close my eyes, there's noise. It certainly feels like..and that's the worst thing about having it so close to you, you never get rid of it. You never find peace, you never find rest. Because there's a constant hum, or a total racket when they're at work." (6) They explained how the noise was made worse by the local topography; "We couldn't see (the farm) directly from our cabin, but it got so close to the mountains that there was a terrible racket from it. And sound, you know..it carries really well across water." (6)

The noise described is from a combination of sources; most fish farms are powered by diesel aggregates on anchored boats next to the farm. These often run 24/7. Then there's boating activity to and from the farm, there are boats that 'suck' farmed fish up from the pens for slaughter, and boats that 'fill' the pens with new fish, there are feeding boats, and there's communication between the people working on the pens. "It's when they play music (on the fish farm) that there's *real* noise. They'll have the door open, and be playing music as loud as hell. Now if you play music, you can't hear anything. So they yell at each other. They've got walkie-talkies, but they yell. It's like a competition to make the most noise, for some strange reason.

They can stand on one end of the pen – they're huge, these pens – and yell." (2) One participant was especially shaken by an occasion when they suddenly heard what sounded like loud explosions; "And we were thinking, what do we do, oh my god, it's a war! And I called the police. (...) And it turns out..they were cleaning those tubes, the feeding tubes. Couldn't they have..because then they *shoot* these..sponges through the tubes, with extremely high pressure, to clean them. Couldn't they just have let me know? Just a quick message on the phone?" (5) Another participant also living very close to a fish farming operation explained how the regular disturbances impact their daily lives: "Working rotations (*turnus*), or having grandkids visiting or stuff like that, in their busiest seasons? No way." (12)

Light pollution was also described as a major challenge for those living near the farms. One participant conveyed his frustration in a lighthearted manner; "I've told (my wife), I thought after 1945 (the end of WWII) we'd be done with blackout curtains!" (12) He continued in a more somber tone; "We've been in touch with the county governor a bit, because of noise… But listen, sometimes you gotta sit inside here with your sunglasses on, cause they've got such strong lights on those boats. So of course, that's not ideal. And then it's..no matter what time of day – we've got our bedroom facing the ocean there – there could be exhaust fumes coming in if the wind's direction is off, right? So we're pretty heavily bothered by this." (12) Another participant living in a dark and rural area detailed their experience with light pollution: "The thing is, they've got these massive spotlights, and it's pretty close to us, right, that fish farm? And one of the perks of living here is being close to nature, to the northern lights, the light in general..I mean..the whole experience. (...) if you're gonna be out there underneath the northern lights, you don't wanna be underneath a street lamp, right? So of course, those spotlights out there..they degrade that experience. I've been in touch with them, and they've turned off..they had two rows going, so now they've turned off the top row, they only use it..they only turn that one on when they're actually out there working. So that improved things a little bit, but..yeah…" (8)

Several participants pointed out that they experience these high levels of noise and light pollution even at night and on the weekends. "Then there's that..how the feeding boats come at night, always. It's like they can't come at any other time. (...) It's no fun trying to sleep when they come

at night." (2) People firmly expressed that **fish farms in areas with existing homes or vacation homes should keep the noise- and light pollution within normal working hours**. "I've threatened to press charges. 'If you don't remove that boat there, with its engines running in the middle of the night' I said, 'I'll press charges'. 'Oh, but that's a serious matter…' Yeah, but it's a serious matter to me that I can't sleep at night, I've got work in the morning!" (12) Those complaining don't necessarily feel that local people who *aren't* directly impacted understand their plight. "Yes, I've become this big… 'Can you believe she doesn't like it..?' And I get them saying; 'Oh, is there noise?', 'Oh, but it can't be that bad, don't let yourself get worked up about it…' Yeah, but – I'll say – I can hear it twenty-four hours a day!"

Considering the impact detailed above, of having a fish farm close to one's property, it's no wonder that these properties are less attractive on the market. Nobody I talked to had purchased their homes or cabins *after* the fish farms arrived, and they doubted anyone would pay much for a home or cabin located that close to an industrial fish farm. "If I'd known how it would get in here, I would never have bought this property." (12), said one participant, and continued; "And..of course this house is degraded in value, nobody's gonna want to..the day we leave, or choose to sell – which we're not ready to do – I doubt we'll get a price comparable to the house over there, that's not as bothered…" (12) Another participant from the same area agreed; "This is something that's been talked about for a long time. There are many of us who'll probably, because of the fish farms, have our property values reduced." (11) These people felt that **if a fish farm has to be located in an area with existing homes or vacation homes, property owners must be compensated for lost property value**. "Because that's another point," sighed one participant; "I mean, who's gonna want to buy this. With this factory right here in the bay? Nobody. We're left with the losing card. I mean..we could never sell. Not that we'd want to, we don't." (5) They then told the story of seeing a listing for someone else trying to sell a property near an aquaculture locality; "There was a cabin, out on (island). (...) There were beautiful pictures, the view..it was so idyllic. Gorgeous cabin. But there was a window, cracked slightly open. And in it..you saw the reflection of this massive fish farm operation, right there. It sold for 300 000 (Norwegian *kroner*)." (5)

The final topic identified within the theme of natural landscapes, is that of **coastal access for recreation and fisheries**. As previously described, Norway is a coastal nation. People have always been using the coastline for fishing, boating, bathing, swimming, walking along beaches and gathering in bays. As aquaculture becomes prominent along the coast, it also occupies large coastal areas, altering and sometimes preventing access to and use of important areas. Every participant interviewed spoke on this topic, and many had specific grievances that they wanted to share. One of them was that they wanted the aquaculture industry to be **considerate of fairways (*farleder*) for fishing vessels and recreational vessels**. "If you're on a boat, and there's a lot of wind, they'd round that cape and sail along the shore. Because here, you can't sail..in Tysfjord you can't even have the sails up on your sailboats because there's so much downburst (*fallvind*). So suddenly they've gotta go – in small boats – go mid-fjord rather than going by the shore." (2) Another participant from the Tysfjord area confirmed: "What needs the fishers have, what safety concerns..because often there are fairways (*farleder*), safe fairways that disappear. So suddenly there's a whole fjord you can't even enter, for large parts of the year, because that safe fairway? There's a fish farm there now. So then you've gotta go far out on the sea..because you gotta stay 100 meters away from those (fish farms), that's the law. So you've gotta go out in the middle of the sea, to keep safe." (1) A participant from the Vågsfjord area explained that the 100-meter rule (vessels cannot go within 100 meters of a fish farm) can make life tricky for fishers and boaters. "I barely dared to navigate my boat between their (operation) and shore. (...) They're much closer now than they used to be." (11) One participant, with a fish farm right outside their cabin, felt shut out. "We can't use the bay as we'd like. If we've got a boat..whether we're rowing out or have a motor boat – because there's this 100-meter zone around the fish farms, where you can't go. Not that you'd wanna, but, well… It's someone coming, a cuckoo getting cozy in someone's nest, right? You know that one? Yeah. And kicking out those who belonged there." (6)

In addition, several people voiced concerns about fish farms not being well marked on nautical charts, especially the **lack of marked fish farm anchorlines** – which often stretch far beyond the farm itself. The map below shows a section of Tysfjorden, where you can see that some anchorlines stretch almost to the other side of the fjord. "And they're caught off-guard", one

83
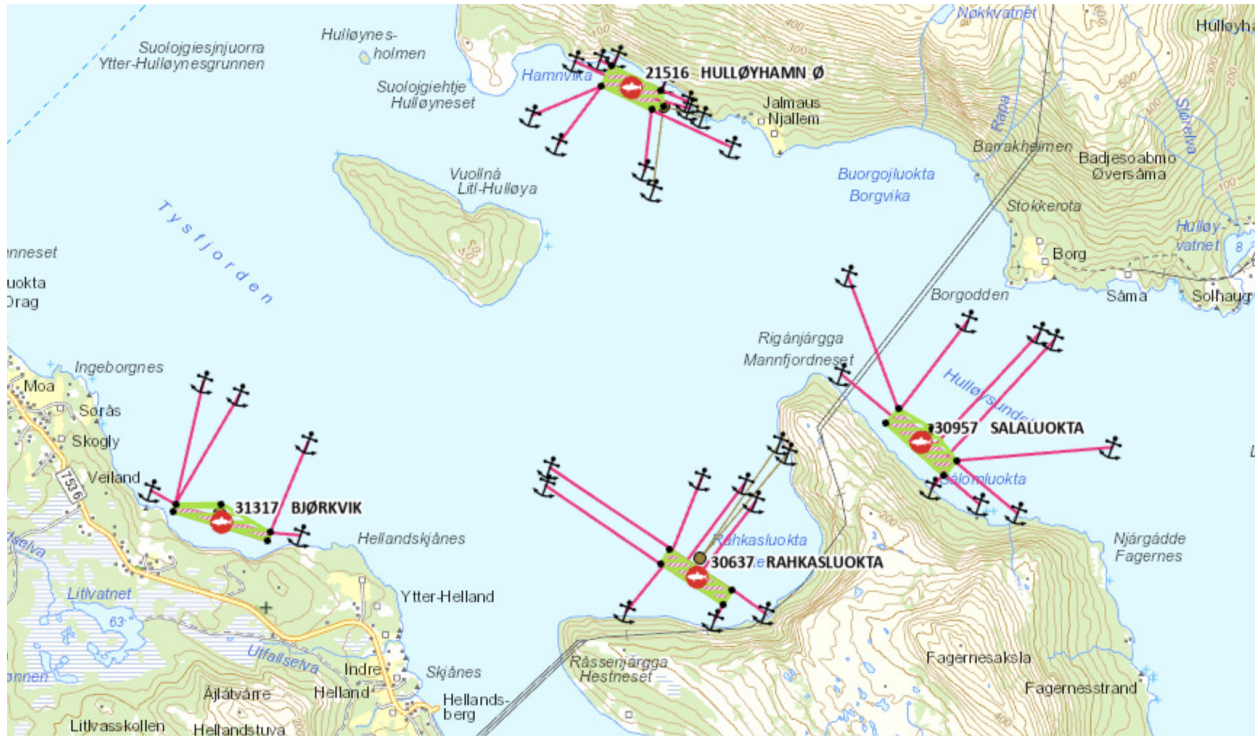
Figure 9: Aquaculture localities in Tysfjorden with anchorlines. *Source: Fiskeridirektoratet.no*

participant explained; "Small boats run into the anchorlines and don't understand anything. Crash right into that stuff." (3) Another participant confirmed; "It's been very poorly marked, those things, taken an awfully long time to get them into the official map system (*Kartverket*), that there's a fish farm there. I've reacted to that. I'm a seafarer myself, and I like traveling around." (12) The anchorlines also impact life on the shore, as one participant explains; "What they're doing, the fish farmers, everywhere, is they put out their anchorlines – they have this little area, and then they put out their anchorlines so far out that they block people in. This (fish farming company), they drove their lines all the way to the other side, across the entire fjord. You could see their anchor points in the *marbakke* (high water line along the shore) on the other side." (2)

Another topic that appeared within this theme of coastal access, was the lack of **a shielded zone for recreation, e.g.; beaches, playgrounds, docks, and other popular recreational areas**. As one can see from the map above, fish farms are more often than not located in bays and other semi-sheltered zones; the exact same zones preferred by locals for bonfires, swimming, and

social gatherings. In many communities, these have been meeting points for generations, and are important areas both socially, culturally and from a public health perspective. "Of course it's a whole new era now," said one participant; "with these fish farms popping up in bay after bay – because they place them in these sheltered bays everywhere, and those are the nicest spots we have in this area, these bays. Often with a bit of nice beach, maybe even a sandy beach..recreational areas that we've been using since forever. So they've been meeting points. (...) Folks from these villages would bike there, go there on Sundays, and..used it as a recreational place, would sit there and drink coffee and roast hot dogs, and… Beautiful, nice place. And it was announced, a few years ago, that they were gonna have a fish farm there, right there in the bay. And of course you react. Because that does something to our environment. I mean the aesthetic environment, our experiences..it does something to our lives." (9)

Another participant explains how social gatherings have been made more difficult since a fish farm arrived in their local bay: "The thing is..we don't go to the shore anymore. So that idyll is entirely gone. We'd go, all of us, if we were here – neighbors and all – we'd all go, carry down our food and drinks (...). And we'd be together, until midnight, early morning, we'd be there." (5) A participant from the Vågsfjord area explained how the environmental impact report (*konsekvensutgreiing*) done ahead of placing a fish farm in their local recreational area, did not mention this use. "That we've got a playground in here, that wasn't mentioned. (...) They've been given permission to place it here. An area which, all along this bay, is used as a recreational area, especially in the summertime. Families come here from god-knows-where, with little kids, out swimming in the ocean. (...) And now people are starting to react, they're seeing these pieces of dead fish, fish fat and all this junk washing ashore. And, yeah..is it clean? Is it proper? Is this a cozy place to bathe?" (11) Another participant dreaded what might happen to their local recreational area if a planned fish farm is given permission to start operations; "It's a very important *nærområde* (local recreational area), for people in this whole region. And..a fish farm of that size..pollutes quite a lot. So it would probably be..I've seen some 'spreading maps', and it's sort of..along the beaches and all of..the whole area that it'll be spread to, as far as I've understood (...) it's the equivalent of unfiltered sewage from almost 40 000 people. According to

calculations from the Norwegian Environment Agency (*Miljødirektoratet*). So that will have quite an impact." (3)

A popular recreational area in a more urban part of Vågsfjorden was also suggested for fish farming activity, but the project was halted due to massive local protests. One participant reminisces: "You know that when spring comes, there are 30 kayaks launched from (area). They paddle over to (island) and light a fire. And you'll see..you know of family gatherings over there, where they bring their kids, sleep over… It was totally and entirely obvious that if this industry was gonna have access to areas that are important areas for recreational use..you had to do something." Another participant from a more rural area did not have their protests heard; "Now the people living out here in these areas, we're not being heard at all. That's strongly experienced, that our interests, what concerns us, that's not weighted, it's not… For example how this, over there in (the bay) is an important recreational area for us – that doesn't mean a thing when someone comes along with millions of kroner, promising big income. You get totally overrun, and almost ridiculed. Because what kind of value is that? Measured up against the krone-value you can get from that salmon?" (9)

In summary, the factors that seem to most impact local communities when aquaculture alters their natural landscapes, are emissions/pollution from fish farms, changes in local biodiversity, the need for untouched coastal landscapes, noise, light pollution and other forms of disturbance in residential areas, and access to the coast for recreation and fisheries. We now move on to the next category, that of the social landscape.

5.1.2 The Social Landscape

The aquaculture industry has, as we've seen in the previous segment, clear physical impacts on the natural environment – impacts which have social and cultural consequences. But the industry also impacts society in ways that are not directly related to its pens, its anchorlines, its emissions or the decibel-levels of its operation. There are matters such as how plans are made, how information is conveyed, how rules and guidelines are followed. The trust, or lack of it, in public processes and public officials. Is there a sense of true democracy? Are people's voices heard? Do

local communities benefit from the operations within their municipal borders? These kinds of factors contribute greatly to the perceived sociocultural sustainability of an industry. In this segment, we'll examine interview data that relate to the social structures of these communities impacted by aquaculture.

The first topic didn't need to spring out of an inductive thematic analysis, it became obvious from the first few interviews conducted. **Open communication** with local residents is something many are missing, and several felt entirely overrun when the fish farms appeared in their neighborhoods. "It suddenly came. This huge feeding fleet was dragged in. (...) Then it turned out it'd been announced in *Norsk Lysingsblad* (a Norwegian state publication of announcements which require public notification) and in (local newspaper) at the end of December, or something. When nobody has the time to read the paper, and..yeah. Nobody knew about it. So none of the landowners were consulted, and..we didn't know anything about it." (6) Several participants shared this experience: "Suddenly, that fish farm arrived, the one that you see there. And it was like..they came like a thief in the night, that's how it was. Nobody informed me, not orally nor in writing. No information, nobody talked to me, nobody asked me, and it just..suddenly it was there. (...) On land, we have something called *nabovarsel* (mandatory notice to neighbors), but evidently not when it comes to the sea. So I called the municipality (...) and it had been announced, there'd been a tiny ad in (the local newspaper), apparently. A paper I did not subscribe to. So that..was the only way this had been made public, through a tiny ad in the paper (...) And I found that..that felt like a violation, to be honest. It's..I'm thinking that this was..14 years ago, maybe, soon. But even then, it's not something that should happen." (8)

"When the industry is submitting an application," explained one participant; "they need to submit it for public review. So it's announced in the newspaper. But most people don't read those tiny announcements." (10) The main change wanted by participants in this matter, can be condensed down to wanting **an official notice (*nabovarsel*) sent to all nearby landowners ahead of launch, expansion or cessation of aquaculture operations**. The process, from first considering an area for aquaculture, to actually anchoring the fish farm to the seabed – that's a process where the local community needs to be thoroughly and properly involved. If not, they

will feel overrun and disrespected. "And of course, it's a part of my quality of life that's been stolen from me, in a way. Since I never even got to make a statement, or anything..in any way. (...) That neither the local government nor the fish farming company somehow..contacted me. I find that really odd. On land, these rules about *nabovarsel* are very strict. But once it's past the shoreline, apparently you don't need to follow them. Then you just go right ahead." (8)

In general, participants experienced that they were not informed about details around the aquaculture operations in their area. We recall from the previous segment that one participant was frightened by sudden explosions – which turned out to be the cleaning of food tubes. They expressed frustration that they didn't even receive "a simple message on the phone" (5). They expanded on this frustration; "I mean, if they'd provide some information, that then-and-then, so-and-so… There's nothing, they're more secret than *PST* (the Norwegian Police Security Service)!" (5) From this topic, it's clear that an open communication with local residents would improve the social landscape that aquaculture has chosen to become a part of. And unlike the criteria of the previous category, where emissions and limited locations were at stake, this post doesn't have to be all that costly to the industry. "It wouldn't cost them anything", this participant pointed out, "to just give us information about this and that". (5)

In addition to *receiving* information, participants expressed a strong wish to *provide* information themselves. When an aquaculture project is being planned, most of the process is between the municipality and the industrial actor. While there are mandatory processes for public hearings in most aquaculture projects, many are unaware of projects before they're well underway – as described above – and when people *are* informed and able to submit their *høringsinnspill* (hearing testimonies), they often feel that these testimonies have very little impact. Some expressed feelings of powerlessness, of being systematically brushed aside. The importance of **local influence in decision-making** cannot be overstated. Some social groups are very natural stakeholders to consult ahead of making decisions on aquaculture locations and operations. **Relevant actors in these cases, such as neighbors, fishers, recreational users and local environmental groups, should be solicited for their input.** Including them in the planning process is the only way to achieve results that align with ideas of social and cultural

sustainability. "Fishers are systematically not heard," sighed one participant; "and I find that so insane. (...) Two meetings, at the very start of the planning process, and then; massive meeting activity with the aquaculture industry, but the fishers hear nothing." (1) Another participant explained how they'd tried to use official processes to voice their concerns about a fish farm in their neighborhood; "Written objections to (the municipality), we've written objections and protests to the county municipality (*fylkeskommunen*). Loads. Loads. Loads. And loads of phone calls. And..we're not being heard." (6)

In addition to their own experience, wishes and pleas, many of these participants have solid, scientific evidence to present in their testimonies and objections to the municipality. Reports on biodiversity loss, maps showing spawning areas, measurements showing levels of toxins in the water. Participants were astonished when they discovered that **both expert knowledge and local knowledge is often not pivotal**. "The Norwegian Institute of Marine Research (*Havforskningsinstituttet*) has been conducting research there, so we have this totally..I mean, that knowledge is verified. And it's very strange that verified knowledge is not weighted. It's sad. Because these public hearing processes, where people are putting in a lot of work, and..it becomes this..ornamental process (*skinnprosess*), it becomes a bluff." (1) The participant continued their train of thought; "People are 'heard', but they're not..what they report is not systematized, it's not processed..often it's one person sitting with a responsibility to present their judgment..'objection overruled', 'objection sustained', or one of these..roundabout answers. What kind of way is that to treat qualitative knowledge coming from people who are tied to the ocean through generations?" (1)

Even expert opinions from other government actors is often not enough to sway municipalities who've decided to grant permits to aquaculture operations. One participant told of working to protect an area that had been classified as a marine protected environment in the municipal plan. Their objection was sustained, "and so of course we were happy, assuming that now there wouldn't be a fish farm in that area. But it didn't take longer than this fall, five years later, the (fish farming company) applied to the municipality for dispensation from the municipal area plan, to put a fish farm there. They still thought this was the ideal spot for a farm. So now this is

out for public hearing, and we're back to investing our time. And both the county governor (*statsforvalteren*) and the Directorate of Fisheries (*Fiskeridirektoratet*) are advising against granting dispensation. (...) So we'll see how it goes." (7) Another participant hinted that some people working at these other public institutes were skeptical of the hearing processes; "This friend of mine, a fisherman, called the Directorate of Fisheries, and they said 'No, when the municipality has said yes, it's almost impossible to stop it.' It goes through". (3) Contrary to this point, one participant perceived their municipality as unable to stop the aquaculture companies – that the industry is in fact far more powerful than both local people and local government; "If you bring one lawyer, they bring ten. If you bring ten, they bring a hundred. You get nowhere, no way. And neither does the municipality." (2)

One participant explained how putting effort into these processes can sometimes feel like a waste of time: "The thing is, after some time you get exhausted. Because you're using a lot of energy to research and understand things, and a lot of energy to..every time there's another application (...) But you spend so much time getting into these applications, and writing testimonies, right? And then it's discouraging every time, because you're not being heard; 'overruled', etc. And of course eventually you get fed up. You get tired, because it's incredibly tiring to get invested in it, putting your heart in it, accumulating all this knowledge, reading all these documents, writing – and then getting rejected and not being heard, every time. It's hard. So eventually you get fed up. You can't be bothered. And you kind of…'Yeah, let them go ahead'. There's this fatalism in people, I think, who just let it go." (8) These quotes outline **the importance of hearing testimonies and objections being heavily weighted in the decision-making process**. If locals and their concerns are not accommodated in the planning process of aquaculture operations, the social and cultural sustainability of the industry is dead on arrival. "You arrange town hall meetings, you arrange public hearings..only to throw it all out the window. It's disrespectful towards people, it's disrespectful towards the ocean, and it's disrespectful towards the future." (1)

Moving onto the next topic identified through analysis of the interview data, we can draw a line from both the need for open communication and the need of local influence in planning processes, to a crucial factor in making these processes and decisions legitimate in the eyes of

the local community; trust. Or specifically, the Norwegian term *tillit*, which is moreso a combination of trust and confidence. What became clear from talking to participants, was that several felt they did not have ***tillit* to the local and national governments** keeping them informed, or to public processes being transparent, objective and not rigged in favor of aquaculture company owners or even politicians themselves.

One participant described their experience from participating at a municipal board meeting. The municipal coastal area plan was being processed, including proposed fish farming locations: "And there were testimonies, from..yes, petitions, and notices from people using the area, and..boating associations, and..what are they called – local municipal sub-committees (*kommunedelsutvalg*), and..fishers, and..all kinds of people. There was so much, incredibly much, really. I think there were like fifty notices or something, which is a lot, at least that's what I've been told. Plus, there were petitions, a few different petitions from different places. But when it happened..and it happened at the end, that someone proposed a demand for closed containment pens, I don't really know where it came from. But the county council for planning and industry (*fylkesråd for plan og næring*), or whatever it's called now, was very displeased with these proposals, and made an objection, sort of saying 'we're getting *this* location, and *this* location, and…', maybe a third location, too. And just stated; 'those are the terms, or we're not approving the coastal zone plan'. And then..I was there in the meeting, and it got all..nobody, not (the mayor) or..they didn't even *mention* any of the notices that had been submitted. But they voted on whether the fish farms would be closed containment (...) and that was voted down. And – BAM – okay, we've passed the coastal zone plan. So that's how it happened." (3) The participant described feeling surprised and confused at how the county council seemed to make the final call, and then supplemented their story with a curious detail; "They were so coordinated, the county council and the fish farming company..that when they got that decision, a positive decision from the municipal board, they handed in a complete application, with all the signatures..all the things they needed, they handed that in 2-3 days after the meeting. So there was a lot of coordination between the county council and the fish farming company..and maybe the municipality, what do I know? But they had a complete application ready. For those exact locations where the county council had..had suddenly objected and said 'we're getting *these*

ones'." (3) *(This particular account has been verified through review of communications between the participant and the county municipality.)*

There are indications in the interview data collected that this type of coordination or mutually beneficial cooperation between fish farmers and government decision-makers is not a one-off. One participant shone some light on reasons why municipal and county governments might be prioritizing the aquaculture industry over the preferences of local communities: "I'm registering that the Minister of Fisheries (*fiskeriministeren*), he's traveling around, giving lectures and saying that this a *growth industry*, that it's gonna multiply, and encouraging municipalities to free up marine areas for aquaculture. So of course..the municipalities are in a pretty tricky position, caught between local opinion and national guidelines." (7) But this participant was not certain that municipalities would manage to find a good balance between industry and local needs; "Of course I understand that a municipality such as (my municipality), they need industry, and..there's not much else happening up here, maybe some tourism coming up. But I'm starting to doubt, as (the fish farming company), as they get bigger and bigger, and have more..power, I guess you'd have to call it, in the municipality..the municipality aren't able to balance these business interests with environmental interests. And when you read the municipal plan for (this municipality), they've got at least 3-4 pages on how important this coastline is to their residents." (7) Some participants were less diplomatic in their views; "They (the municipality) are bought and paid for by the fish farmers. That's how it is. It doesn't matter what they say." (2)

One participant, who had looked quite extensively into their local government's practices, described a local political culture where industry interests were highly prioritized, and how this influence over local government was largely due to successful lobbying; "There was so much evidence that the aquaculture industry had a lot of power, economic power probably, over the municipality. And how they were using these 'backdoors' to access the political powers within the municipality. Which meant that they easily got (aquaculture location) through, easily got (aquaculture location) through. In addition..as the industry has begun to struggle with getting new locations, because the local resistance has grown, they've started using increases in biomass as a way to increase production, to increase revenue. And..yeah, we've found these dispensations

to be suspicious, how they could get processed so fast by the municipality. (...) With dispensations, you're avoiding the planning- and construction laws (*plan- og bygningsloven*). Which means you can more easily access new areas. If your municipality..in general that's how it works – if you can get the municipality on your side..you can use whatever power you have." (10)

Surprisingly, several participants expressed quite strong feelings that current governance of the aquaculture industry went against their perceptions of what Norwegian democracy means; "I'm meeting a lot of people who've believed that Norway is this justice-driven, democratic society; where you can voice it when injustice is done, and that then..well, they expect that when you point at injustice you'll be taken seriously." (1) Other participants echoed this sentiment; "I guess there's no other nation in the world, almost, where you've got more trust, really, in the democratic process. But when it comes to the process around these fish farms, then..then something is contributing to weakening that trust in democracy, because there has been such a lack of democratic processes. They'll argue that there's been a public hearing, and it's been reviewed by..this-and-that. But to most people, that becomes very..technical. They're talking about biomass, and talking about..all this terminology that they..that most people don't understand. Making it something that's happening on this other level, up there..experts sorting things out amongst themselves. And those who are supposed to benefit from having a democratic society, they..are actually left on the outside.." (8) This participant highlights a crucial, and easily accomplished goal; local and national **governments need to communicate process requirements and case information using comprehensible, common language**.

A society where people are questioning where the power really lies, and whether government actors are making decisions based on the common good, or business interests, can never be socially sustainable. "I'm born here," reflected one participant, "and we really appreciate this coastline, and the nature, of course – which is connected to what's on the shore as well. But we're now seeing that the municipality is probably..so controlled by (the fish farming company) that they are struggling to govern these natural areas." (7) In Norway, there's also a cultural perception of certain democratic values that constitute a part of people's identities. "People carry

grief", said one participant; "Because there's so much distance between the way this is practiced, and the old, social-democratic values that are part of the population." (1) One participant reminded themselves of where the power truly lies; "They've been given permission. And it's important to me that it's *our* politicians who've given them that permission. Now, of course, we have the politicians that *we've* elected. (...) That being said..the aquaculture industry pushes the limits..as far as they can." (11)

When coding for themes, another topic appeared repeatedly within the theme of trust in government. Several participants do not feel that the fish farming industry is expected to follow rules and regulations as strictly as 'everyday people', or – in some cases – even other industries. Their perception that **everyone should be treated equally under the law**, is a crucial component of sociocultural sustainability. "There are strict laws here, if you want to build something along the coast – there's the 100-meter belt (Norwegian law against building less than 100 meters from the shoreline) and all that. (...) Those of us who live here, who've always lived here, we can't build anything in that coastal zone, because that's supposed to be a common area, accessible to all. But, these fish farms, those you can anchor up everywhere. (...) Clearly, environmentally – in relation to the coastal zone, in relation to the shore environment – they're a lot more damaging than a *naust* (small, traditional boathouse)." (9) Another participant concurs; "We had to..when we were building the garage last year, we had to file applications with the county and apply for everything (...) They can make themselves at home, while we've gotta go with our hat in our hand to the municipality and apply for this-and-that." (12)

Municipal regulation of sewage was mentioned earlier – how one fish farm can emit the equivalent of a large city, had that city not been obliged to filter their emissions. One participant wondered why the rules are so different for industry and private people; "The fjord is not a dumping ground. Here in (this municipality) at least, they've inspected every septic tank around, in case there was a drop of leakage. But the fish farmers, they're allowed to..100% out. But of course, mister Hansen or mister Pettersen with that small septic tank, they're an easier target." (5) Many participants argued that aquaculture is even treated differently under the law when compared to other industries, especially agriculture, and pointed out the stark differences in

regulations and consequences. "Even in pig- and chicken farming..if they were anywhere near the same mortality rate as (fish farmers)..it would be a catastrophe. There would be an uproar." (11) Emissions from fish farms are, as detailed earlier, a major concern for local residents. Here, they also pointed out the very different approaches in aquaculture and agriculture, as one participant told of how a small farm located above a local bay got in trouble for runoff (*avrenning*) polluting the water below; "They couldn't afford to (filtrate their runoff), they had only a few animals, so that was way too expensive for them..they shut down. And then later they..they put up a giant fish farm, right there. Now that's *zero* filtration, that's regression..that's ten times worse." (2)

People want the aquaculture industry to follow the law, and for laws to apply similarly to similar sectors. They also expressed indignation at an observed tendency of aquaculture companies to often **implement infrastructure in coastal areas *prior* to their applications for permits or dispensation being approved**. These kinds of moves make people feel that the companies consider themselves above the law, and that public processes are mostly for show. Although small acts, they serve to weaken trust in governmental processes. One participant talked about an ongoing project near their cabin; "They're putting out the anchor points. But it's not even processed yet. So (the fish farming company), they're certain they'll get it." (2) Another participant was observing the same pattern near their home, in an area where the permit is pending; "I bet they've invested in a bunch of assessments and stuff. And now they've already put out their anchor points, so I'm guessing they've invested a fair amount. And they wanna get their money's worth." (3)

The final topic identified within the theme of trust in government, concerned what Norwegians know as '*habilitet*', meaning that **decision-makers** in for example municipal board meetings **should have no conflicts of interest**; stocks in a company, being close friends with or working for a company owner, etc. – this would make them '*inhabile*'. Strict requirements for the '*habilitet*' of decision-makers was a frequently addressed point in interviews. One participant explained why this is necessary; "It's a bit difficult, because..in (this municipality) several members of the municipal board (*kommunestyret*) are working in or for (the fish farming

company), or have close relations to others who do. (...) It's often like that, in a small municipality, but it's still a cause for concern." (7) Another participant told of how they'd been chatting with someone working for the Directorate of Fisheries (*Fiskeridirektoratet*); "And then they told me, they'd been on a trip..on the luxury yacht of (this aquaculture company owner). Gone in there, to (this place), to (that place). Beautiful weather, glittering waves, sunshine, all that. And then they'd had this lovely brunch (...) and a lovely dinner. And I'm wondering..what in the heck is this? Do you think they're bought and paid for much? And that's the person who's gonna sit and decide whether they'll get this location, get more salmon. Who'll recommend to the county that they grant more permits. Who'll ruin it all to the point where we can't eat the fish in the fjord." (2) While participants acknowledged that it can be hard to know where the line for a conflict of interest goes, they also placed that responsibility squarely with decision-makers; "It's not illegal to know somebody, it's not even illegal to go on a vacation with the boss of an aquaculture company. It's not supposed to be like that. But..but at the same time, they're supposed to keep their path clean. They're supposed to do that." (10)

The next topic to emerge within the social landscape, is a little more vague, but perhaps even more important in its complexity. **Vibrant and livable local communities** are the foundation of social and cultural sustainability. The first topic that clearly shows the direct impact of the aquaculture industry on the vibrancy and livability of local communities, is whether the industry is actually **locally anchored**. Meaning, is the industry primarily owned and operated by people who live in the community? People who are connected to the local culture, the local land? One participant described how aquaculture has changed in their local community: "Here in (this municipality) at the end of the 1970s, there were a few small actors – *small*, right? And they'd go bankrupt all the time and start over again. It was learning by doing. Nobody here had any issues with that, right? It was..exciting, and..everything was really small-scale, locally owned businesses, or independent entrepreneurs doing their thing. Then it grew. Kept getting bigger, and some stood out..some did better." (4) Participants generally expressed concerns that companies are getting bigger, there are more international owners, and less revenue and work being generated in local communities. "And many of those companies that are active here, like Cermaq and Salmar and Mowi, right, and Lerøy..these are companies that don't belong here.

They're taking most of their revenue to other parts of Norway, if not abroad. (...) And that's something that affects people's opinion, their positivity towards this industry growing." (10)

One participant felt that the industry was taking advantage of Arctic resources; "The money generated from the aquaculture industry changes hands in Bærum (a wealthy municipality in the south of Norway), not here. There are some locally..more locally anchored ownership, but really it's..most of them have their headquarters down south. So in a way, we're subject to..a colonization." (6) Another participant was more concerned about the interest of international companies: "I'd have some more sympathy for this aquaculture business if the money went to the local community, to (the municipality). (...) I've never had anything against internationalizing businesses, and creating global brands, but I'm suspecting that international aquaculture companies aren't all that preoccupied with protecting natural environments in Norway. And when you know that 80% of the revenue from (company) goes to (foreign country), it doesn't increase your sympathy. If the money went to the municipalities, maybe we could accept a few fish farms here and there." (7)

Although a tendency to focus on the aquaculture companies that aren't locally anchored was prevalent, people also emphasized that there are exceptions; "Almost nothing comes back. With some exceptions, because there are some municipalities – like (municipality) for example, that has (company). There's loads of jobs there, and the municipality receives a lot of revenue..so they're super enthused about aquaculture. Because there, the money's raining locally too. (...) But there's only a few places like that. Otherwise, mostly, we only get the negative consequences of this." (9) A few participants mentioned that some aquaculture companies aren't strangers to contributing directly to the local community. "You'll see that in (area) they've paid for some of the dock for recreational fishers. In (place), they've paid for the concrete for the boat launch. And in (area), they support local soccer teams and sports, and sponsor tournaments and that kind of stuff. And of course, you shouldn't see the negative in that. That's actually a positive." (10) However, most of the discourse centered on a development towards centralizing and privatization that participants were not fond of. "The ocean is priceless, but it's always been

common property. You could use it..today *I'm* using this area, tomorrow *you'll* use it. And now we're selling the ocean to Mitsubishi. More and more foreign companies are coming in." (11)

Within the topic of locally anchored business, it's natural to address the topic of jobs. People interviewed seemed frustrated by the heavily promoted argument often presented by the aquaculture industry; that it provides jobs in rural areas. "And then there's those jobs they keep talking about. It's all 'we need jobs!'. Nobody from (this island) works there." (12) Another participant saw similar tendencies; "(The aquaculture industry) creates some jobs, sure, but there's not exactly an overwhelming amount of jobs on these fish farms." (8) One participant went into more detail; "The argument is usually; 'loads of jobs!'. That was the argument in (area). Ended up being *one* job. The rest went to foreign seasonal workers. In (area) they're saying 'if you give us access to this location, you'll get..we'll build a salmon slaughter facility with 100 positions!', etc." (10) One participant felt that their own concerns about the industry were far too easily sidelined by the use of arguments about jobs: "It hurts, to get that thrown after you in the village… 'Yes, but there's so many jobs!' There are less and less jobs, everything is becoming remote-controlled. So that argument is just nonsense." (5) One participant argued for what they believe *does* create and sustain jobs in rural communities like the ones studied: "How many jobs have we recreational fishers maintained? The boat builders we employ, the repair shops we visit, the equipment we buy, yes..and just by living here." (11)

There's no arguing that local communities depend on stable and desirable jobs in order for people to move there, stay there, and thrive there. And this brings us to the next topic within the segment on vibrant and livable communities; **does the industry impact people's desire to live and remain in these local communities**? Put in Norwegian terms; how does aquaculture impact *bolyst* (the desire to move somewhere) and *blilyst* (the desire to keep living there)? We've already addressed some of this earlier in this chapter, where we saw that people living very close to fish farms are definitely experiencing a reduction in their desire to live and remain locally. We've also seen that losing access to marine and coastal areas makes a community less attractive. How do the participants feel about the present and future vibrancy of their communities? "If you're gonna have a positivity and optimism around these northern Norwegian

coastal communities, you first and foremost need to start playing on the same team as those already living here, and not run them over… *Blilyst* and *bolyst* and quality of life are not just decorative words in the societal segment of a municipal plan. (...) There's a strong tendency of industry and business interests being lifted above the interests of the people who live here." (1)

"We need people here", one participant said, "that's what we're missing. We're not short on jobs, but on people." (3) Does aquaculture contribute to bringing in new people? To make people want to stay? One participant claimed otherwise; "I think they're contributing to people *not* wanting to move here, because a lot of..whether they're moving back home, or moving here from elsewhere..often it's outdoor recreation, being in nature, fishing, etc. That's their reason for moving here. It's rarely to boost your career (...), but for other interests. And I don't see how loads of..the more fish farms, the less..I mean, it doesn't heighten the interest in moving back home, put it that way, with all these industrial fish farms." This participant pointed out that municipalities like Tromsø have been restrictive in terms of allowing aquaculture operations, and instead focused more on tourism. "They've understood that if they were to carpet bomb all their fjords and straits with fish farms, it would degrade the tourist experience, which again would reduce the flow of tourists. But (in this municipality) they've done the opposite. (...) Instead, they've decided to become one of the largest aquaculture municipalities in Norway. And I guess they are, today. But I don't think all these fish farms contribute to population growth. I don't think so." (8)

One participant recalled how they'd perceived these questions back when they were involved in local government. "My perspective back when I was (an elected official) was 'what will we live off of?' 'Aquaculture', was one of my replies. It might still be..I mean, it's definitely still one of the replies from (the municipality). But..how about asking some questions, right? Aquaculture – in what way? And at what cost? Is it at any cost? What are we waging in the game? What are we destroying on the way, for short-term winnings?" (4) One participant reflected on how their work before retirement had been all about promoting these kinds of industries; "I've been sitting and financing these fish farms. And thought it was this important, growing industry – which of course it is – and never saw the downsides to it. We'd hear about disease outbreaks, but the fish

farms..or, the people running them, would say; 'No, it's not a problem, we've solved it, we're not polluting, we've got disease under control.' And we believed it in (our company). It's not like we could verify it. But then I retired, and started spending half the year in (area). And there are loads of fish farms there, that have come in the past decade. (...) And then we're experiencing, you know, that they've already destroyed some of our best fishing spots. (...) So that's kind of a contrast, then, to the positive view I used to have of aquaculture." (7)

What do these quotes tell us? Perhaps that how the aquaculture industry does or does not contribute to vibrant and livable communities is variable. We can see that maintaining healthy, natural environments is a requirement for thriving communities. Perhaps providing jobs in itself is not enough – people need social structures around these jobs that make them want to settle and stay in Arctic coastal communities. "You've got to have a balanced relationship to this," said one participant, "because..you know the industry is important. I know that maybe..one, or even two of my grandchildren might work for the aquaculture industry in the future. But the argumentation is always; 'but the industry is so important, you have to let us grow'. That's just not enough. The industry is important, definitely, with a lot of jobs and money circulating. But that can't be the only argument." (10) Another participant argued that what really matters to a community, is establishing an identity, and being anchored in one's own history – a history that they feel the aquaculture industry is not protecting; "What happens when people don't have a history? Then you don't have that identity you need, that'll keep you from moving away when there are three shitty summers in a row. It's obvious that this will..an increased focus on..an increase in the establishment of fish farms will only lead to more people moving away, I'm sure of that." (6)

Within this social landscape, our next theme is money. It's been addressed here and there in the text already, but the topic came up so frequently throughout the interview data analysis, that it requires a more thorough review. We've started already, by discussing people's concern that money from the industry doesn't necessarily stay in the communities, but there is a socially and culturally important discussion happening in these interviews, a discussion on whether money in itself is a good enough argument to allow industry growth. And whether the money that is generated is being properly taxed, whether there's **economic justice** in the way the aquaculture

industry makes its money. "Of course, when that money comes in, it means something, when you're struggling with everything in the municipal economy. So there's a big 'hallelujah' amongst the politicians. Look at this, great stuff. But again, I'll say this; we're sitting here. We're here. I'm not seeing any of it, where's that money? What's it doing to me and to us, here? Nothing positive." (9) This participant continues to reflect; "If the shop closes down, then the school closes down, and then what? In spite of the fact that we've got more and more fish farms generating millions and millions. In our..they're *our* areas. And I've reacted to the lack of taxation of this, right. If I want to use an acreage or two of my neighbor's property here, I'd have to bloody pay for it. Of course. I have to pay to use *utmark* (outlying fields), even, to chop firewood in the forest. But they can establish themselves all along our coastline here, without paying a single *krone* to use our areas, in the sea. The sea is as important as the land. And they don't pay for it..it's completely meaningless." (9) Another participant reacted strongly to a news report that several mayors from some Norwegian municipalities were starting a petition to reduce taxes on the aquaculture industry; "And I'm thinking..hello?! You've got to be..*reduce* taxes on these..oligarchs? You should do the exact opposite, and the taxes should be funneled to the local communities, and not the state. (...) They should benefit those who live – like me here and the people on the other side there, those living in close quarters with these fish farms..we get nothing. Nothing." (8)

Another participant agreed that taxation of the industry is flawed: "(Municipalities) are lured in by the promise of money. The current system of taxation is basically..an incentive for poor municipalities to place..to destroy more of the ocean." (1) They further elaborated on this point; "As I see it, in terms of what is right for Norway..passing a resource rent tax (*grunnrenteskatt)*, that's what's..Norwegian. Something uniquely Norwegian, which has led to us having the welfare state we have, and the democracy that we have, and..the community that we have. And now they're sitting there, getting richer, and acquiring more power, so that they can get even richer… And it comes at a cost. At the cost of everyone else, and the cost of species, of nature, and of sustainability, right?" (1) And this economic tool, **applying a resource rent tax on all aquaculture operations** appears to be a requirement for the social sustainability and social acceptability of the industry. While the industry has strongly lobbied against such taxation, the

general consensus within the group interviewed, is that nobody fears for the bottom line of aquaculture companies. "As I've been thinking – when I see that Witzøe guy, who owns SalMar and all that – when you start paying 200 million *kroner* in *taxes*..haven't you earned enough?" (12) "I've been taught," one participant said; "that nature is to be cared for. And then they come here..just to make a few… They can't take that money with them, now can they? Unless they've got pockets in their *likskjorter* (burial shirts/shrouds)." (5)

From this segment, it seems that participants do not perceive the economic steering of the aquaculture industry to be sustainable, and that taxation is one existing tool to curb what is by some perceived as mindless accumulation of capital. Another point made is how money simply isn't the primary measurement of quality of life to these participants. They want a more equal society, and expressed no desire, in their interviews, for more personal wealth. What they all did express, was that money generated from the exploitation of local natural resources should benefit all residents in that area, and not end up further enriching a few CEOs. "There's a bigger picture here. There's this system, where small things get bigger. You'll look to the coast of Finnmark, right. Where once upon a time, all the fish was delivered locally for processing. There were all these jobs, all this wealth in local communities. And then it snowballed, with larger rigs on the sea, right, these boats got larger – look at how big they are now, the boats off the coast of Finnmark, all the way up. And they don't go anywhere near the shore with their fish. They process it aboard. No land-based industry at all. And it grows. Business grows and grows and generates enormous amounts of money…for 15 people sitting on the coast of Møre (a wealthy region on the western coast of Norway)." (9)

The final theme emerging from the data categories within the social landscape, is that of **environmental justice**. Much of what we've already examined falls neatly within the concept of environmental justice. As we recall from the theoretical framework, environmental justice in academics looks at the equality of distribution of environmental impacts, from a socio-economic point of view. Participation of fishers and other local stakeholders in the planning process of aquaculture is an example of an environmentally just policy. Recognizing cultural heritage and the rights of Indigenous people is another example. Environmental justice is about **recognition,**

fair processes and a fair distribution of positive and negative environmental consequences.
Since many of the previously identified topics relate to this topic, but have found their place within other segments, I've chosen to let this segment focus on the environmental justice principle of **fair distribution** – since this was a topic brought up by many participants. The main concern was how fish farms are distributed in relation to socio-economic power:

"Isn't it typical..they suggested placing a fish farm next to (island) on the south side of (city). Which means you get close to the city, to the city-side. And there were huge protests. And it was stopped. And there's no doubt about why; it was because you could suddenly see it from (area) and from the city, and it was in the faces of those living in the city. There were enormous reactions, politically and everything. 'No way!'. There are no fish farming locations on that side of town. So they come here. They come into the traditionally rural areas. That's where everything is placed. And then you're extracting millions of money from this business, in these areas. And basically none of it comes back to us." (9) This type of statement was repeated several times in interviews. That fish farms are placed in rural areas, not necessarily because those are better areas for aquaculture, but because people in the cities don't want fish farms in their recreational areas, in their line of sight, and local politicians yield to their protests. But those same politicians often encourage an expansion of fish farming in rural areas. A participant from the Tysfjord area lamented this tendency; "At the same time they're sitting in (city) and saying 'we don't want it near the city, cause we have to protect our harbor', and 'we don't want it in that or that fjord'. Oh, I get angry." (2)

A participant from the Vågsfjord area confirmed; "There was a big debate when they applied for permits in (area)," they recalled; "But there are so many people living there, there were such massive protests, because no way were they gonna have a fish farm near (area), there are so many people living there. But here, here it's so sparsely populated that we're not heard. So it's..where there are the most people, they've got a chance to avoid it… If you're a small community, not a chance. You'll get the fish farm." (8) One participant, from a more urban area, confirmed that they'd also noticed this discrepancy; "It's *ytterkantane* (the rural communities)

that take the impact. And the thing is..in a municipality like (this municipality), for example, most people live in the city. So you place the fish farms in small, rural communities." (10)

This was one topic where people truly expressed anger, they felt that this unequal distribution of the negative effects of aquaculture was incredibly unfair. "Any fish farms near (area)? They weren't gonna have that! And you know who lives in (area), it's these people sitting in the municipal government." (12) One participant didn't buy the municipality's official arguments for not placing fish farms in more densely populated areas; "In terms of population percentage, we had more signatures – in our protest against the (fish farm) in (our local bay) – than that of (area near the city). (...) They have 'greater needs for recreational areas' on that side of the city, compared to this side..we don't have that same need..that's how I interpret the reply. (...) There are far more people over there who are voters, that's how it is. That's how it really is." (11) While it might seem easy to dismiss this outrage over who does and who doesn't get industrial operations in their neighborhoods as good old NIMBYism (Not In MY Backyard), the participants' sense of injustice was not limited to their own region. The other topic emerging from coding was a strong **sense of injustice on the behalf of people in other countries,** where people are also impacted by Norwegian aquaculture.

"I was talking to an old fisherman who lives far out on a small island, by telephone," one participant began; "And he says to me: 'We're sitting here, discussing fish farming and the consequences of the aquaculture industry, for *this* fish, for *these* fjords. But we also know, that the raw materials for the fish feed, they have to..when they're fetching that, in Chile or Peru, or… They have to displace others.' Like..the Mapuche, an indigenous people in Chile, they've protested strongly against their farmlands..meaning where they make their livelihoods (...) – they're suddenly gonna become soy fields. Now, the Norwegian aquaculture industry has this argument that they use 'rainforest free' soy. But *Fremtiden i Våre Hender* (Norwegian environmental organization) have shown that those who live and work in areas near rainforests are displaced from the land they've cultivated, and pushed out into the rainforest. It's fine that the aquaculture industry's soy is..I can accept that technically, it's 'rainforest free', but is it ethically and morally responsible, what's going on? I can't see it. I can't see it that way." (1)

Another participant addressed this same issue, in the middle of reflecting on reasons why he felt closed containment pens might not suffice to make the industry sustainable: "(it wouldn't improve things for) the rainforest in Brazil, which is gonna feed this salmon. And I'm skeptical of these arguments that 'the world needs more food, so we need to produce more salmon'. I haven't..I don't think that..I haven't seen a single farmed salmon benefiting starving third world populations, I have no faith in that. Solidarity, meaning international solidarity, is a principle I value strongly. And which I'm not confident the aquaculture industry is contributing positively to." (8)

The soy in fish feed was addressed by several participants, but the use of pelagic fish meal and fish oil was also a topic. One participant was asking themselves whether the industry was 'sustainable'; "With the diesel they use to breed this salmon, how much diesel they use to transport that feed, and how much they've ruined for poor people elsewhere on the planet? No way. They're vacuuming the seas outside South America and Africa, places where people have been out in little boats, managed to sustain themselves, catching these little fish to eat, because they have a desperate, critical need for marine protein. (...) The aquaculture industry is enriching itself on these people's needs, and..and they're rude enough to use 'the world needs food'. Who the hell is the starving person that can afford to buy salmon?" (11) These excerpts indicate that residents of local communities in Arctic Norway are concerned with **justice in the distribution of environmental impacts of the aquaculture industry** – both in their own communities, and in solidarity with other communities inside and outside of Norwegian borders.

The social landscape in which the aquaculture industry has established itself is composed of myriad social structures, and diverse social groups with diverse needs, but these interviews suggest that some social factors are shared by many; residents want to be able to communicate with government and industry, to receive information, have actual influence on decision-making, trust their government, live in vibrant communities, experience an economic distribution that doesn't only benefit the few, and for there to be national and international environmental justice in the management of aquaculture operations. We now move on to the third category from the analysis of general themes in interview data; that of the cultural landscape.

5.1.3 The Cultural Landscape

We've already detailed earlier in this study that there are blurred lines between the four categories chosen; natural, social, cultural and emotional landscapes. Our natural environment impacts our emotions, our emotions alter our social structures, nature forms our culture, and onwards in perpetuity. It can sometimes be hard to pinpoint a factor when it appears to belong in several, if not all categories. Still, there's value in separating and specifying these themes and topics, as they allow us to reflect on each factor in isolation, as well as provide a clear understanding of how interconnected these categories are. The category of culture is perhaps the most challenging one to address. Much of what has already been said by participants earlier in this chapter is closely related to the cultural landscape they're living in. Traditions, like fisheries and travel by sea, are a cultural heritage that lives on in today's Arctic Norwegian societies. Children growing up on the beach, playing with seashells and becoming familiar with tiny creatures underneath the rocks – that's also culture. Through analyzing these interviews, we find several topics within the cultural realm; perceptions, concerns and stories that speak to the cultural landscape of these communities, and to how this landscape is impacted by the aquaculture industry.

The first overarching theme identified is that of **preserving and passing on local knowledge and tradition.** Participants wish for their descendants to know the culture they knew growing up, to experience some of the same connections to nature and to the community; "I can't fish on the other side there, because then I'm actually too close..to the fish farm. (...) they've now invaded and taken something that my family has benefited from for five generations. So we're five..or, really only four generations that have fished there. Because the fifth generation is now cut off from fishing there; my kids." (8) This feeling of locals **being expelled from traditionally used fishing spots, as well as fairways, beaches and shorelines** was prevalent in interview data, and has been addressed previously in this thesis. But how this expulsion affects someone's culture, and how it can prevent the passing on of traditional knowledge, those are important perspectives to expand on. One participant explained that fish farms both physically occupy local fishing spots *and* ruin the local wild fish populations. They described the consequences: "What

we're seeing is that people today..those fishing spots nearby, they disappear. People need to get bigger boats in order to keep fishing. Because they have to go further out to sea, to fish. (...) Some of the knowledge about the fisheries in our local fjords.. disappears." (11)

"My investment in this, when it comes to my own homestead, is how this industry keeps expanding to new areas," one participant explained; "And then you get to a point where you're bumping into recreational interests, and the need for those other things that are important in a person's life. Not least the relation between generations, where a grandpa is supposed to be able to take his grandchildren fishing, teaching them how to fish." (10) Another participant reflected on how much had changed, ever since a fish farm was placed in the bay outside their cabin; "When you know that before you'd..have a bunch of kids over, and then head out on the beach and swim and lie in the sun, and now..now there's nobody swimming out there. Now we take our kids and we drive away with them. Because you can't swim by the cabin anymore. And we'd stand..we were teaching our kids to stand on the cliffs and fish with rods, we can't do that now. Or take our boat right there, beyond those anchor points, sit there and fish for lobster. (...) Those things. You can't do those things anymore." (2)

Yet another participant recalled their own childhood, and how much of it was connected to the local shoreline; "And for us kids, right, our childhood..that was the beach. Loved being out there, every single day we'd be down by the beach, getting up to something. In the high tide and the low tide, out with a boat fishing, practicing setting out fishing lines as kids do, and..all that stuff. My childhood was down by the shore, so that's something that's still got to follow me. I could never live inland, inland in the woods, and..not seeing the ocean – I'd get claustrophobia or something." (9) Other traditional activities along the coastline were also brought up as important cultural anchor points for several participants, such as the importance of having accessible areas to for example get out on a boat; "You get a lot of people and a lot of activity from these *nærområdane* (local spots for recreation), because it's..well, everybody here has a boat, pretty much. Or several boats. Traditionally they are small boats, because that's what you need here. (...) And that ability to roam on the fjord, that's what's important, and along the coastline." (3) One participant explained that the fish farm's location had made it impossible to launch boats

from the shoreline next to their home. "So..we've been shut off from our boathouses, they are just decorative now". (5)

Another topic that appeared when coding interviews was how some perceived **aquaculture as a threat to traditional local businesses or industry, in particular fisheries and tourism**. One participant drew lines to the past; "What I'm seeing is that the trades..or, well, the ways of life for people have changed a lot. Both that..nobody is running a *kombinasjonsbruk* anymore..meaning combining fishing and farming. In my home..it was fishing and carpentry in the summer, spring and fall, and then fishing in the winter. That doesn't exist anymore, that model. So aquaculture has taken over a lot of the sea-based trade, there's no doubt about that." (4) Several participants observed how society has changed, away from a more traditional fisheries-based community, but they still expressed strong attachments to the traditional coastal culture that remains. "Something has happened. In my childhood and in my youth there were *fiskebruk* (warehouses for receiving and processing fish) everywhere. It's all gone. And of course, that means a lot of the local fishers also disappear. (...) Now some of these changes..they were starting to happen before the aquaculture industry came, so we'll have to understand that the current generation growing up, they're gonna live in a different way." (11)

However, this same participant continued their reflection on the future of the region; "I think that this industry, like a lot of industries, it'll crash and burn, sooner or later. Don't mind if it's sooner. And then what will we live off of? We've lived for thousands of years, at least hundreds of years, from the fish in the sea up here. Fish from northern Norway built all of Norway. They were prancing around in the valleys (down south), thinking they were big-time farmers, with their giant farmlands… Didn't make a single dime for Norway. What built Bergen, what built Trondhjem? The fish from Northern Norway..which they then exported out into the whole wide world." (11) The other traditional business that people specifically mentioned as being threatened by aquaculture, was tourism; "This island region, it has fantastic nature, exciting nature. Really just as exciting as the nature of the Lofoten Islands. So why in the world don't we have those levels of tourism? We've got almost none. And if we're gonna make it happen, it's using and being in this nature that's gonna draw people in. In that way, these fish farms destroy it all.

They're not beautiful, in the midst of nature. That's nothing to travel here from Germany to look at." (9)

This last participant points out something which brings us to the next segment within the topic of preserving and passing on local knowledge and tradition. Coastal communities in Arctic Norway have been using the coastal nature for recreation, for fishing, for hiking, and countless other purposes for a very, very long time. Participants explain that in order for them to preserve and pass on their cultural heritage of living close to their natural surroundings, **aquaculture must not pose a threat to the natural environments enabling traditional use of coastal nature**. One generation's experience of local culture might be entirely different from the next generation's experience, if a lot of that culture is attached to a natural environment that is rapidly and significantly altered. One participant made an interesting observation on what academia calls '*shifting baseline syndrome*'; how changes in our natural environment are less startling due to humans living short lives, and adapting quickly to change; "Because those coming after us, right – they don't know what has been, and they think this is how it should be. Which is scary." (13) Another participant touched on the same topic of how untouched nature can lose its value when we don't know what we've lost; "That strong feeling of..some things should be free, some things should be clean, some things should be the way we used to know them." said one participant; "The generational gap of this matters quite a lot to those of us who've grown up and seen that once upon a time..there was 'nothing' there. We'd row out and go over there with dad or grandpa, and fish, and… The new generation of youth are maybe a bit different, I don't know. But they're more used to it, they've grown up with it as..as *normal*." (10)

One traditional use of the natural environment that is highly culturally significant is **harvesting food from the sea.** Several participants have emphasized the importance of being able to continue their harvesting traditions, but also concerns that the aquaculture industry is both making it harder to access these harvesting areas, and also that emissions from fish farms pollute and damage edible wild species. We've covered a lot of this quite extensively in previous segments, from fish eating pellets to delousing agents killing shrimp – in this segment we'll focus on the way these changes are impacting the coastal culture more specifically. "The thing

is..this bay, it's not just a swimming spot. Actually that's what we've used it for the least. But we've used it to row out and catch fish. And we can't do that. (...) There's all that fish feed in their bellies, and..we don't eat the fish there. That possibility, to *drive matauk* (forage/hunt in the wild), or the *hygge*, or… You know when you're sitting in a rowboat, and you're listening to all those sounds, and then a kid catches a fish, or…yeah. Gone. Totally gone." (6) Other participants also felt these changes. One participant described how they used to fish in the sea right outside their house, before a fish farm was established in the bay: "I was fishing, and enjoying life, and..yeah. Caught enough to eat, caught cod right outside here with nice liver and roe, and..just went straight home and threw him in the pot. So any faster, more local food you won't find anywhere." (12)

Another avid fisher said; "Tell me, where did the haddock go? (...) You couldn't put out a line now even if you wanted to. So they've robbed us, those who were using the sea, robbed us of our fishing spots." (11) One participant expressed frustration that recreational fisheries are easily dismissed by the aquaculture industry; "And it's like that..they'll say; 'You're just a hobby-fisher!', right? 'You could go buy your fish at the store', while a commercial fisher – he's got a right to speak up, he's making a living, right? But they'll reply like that, if you start arguing with them, about fisheries. About how you enjoy fishing." (12) Some participants were clearly more attached to the culture of harvesting from the sea than others, but for those who were, for example, active recreational fishers, they seemed to feel as if a big part of their connection to the sea was at risk, as well as the future of the whole region. "They can talk all they want about how many jobs they're gonna..when it comes to – if these jobs are what destroys the possibility of future generations to access clean food from the sea, a tradition for thousands of years..every coastal population here in Norway, they've captured their own food, from the sea, right? And if *that* disappears, then some of the fundamental reasons for living in a rural place are gone." (6)

Although the name of this category is 'the cultural landscape', it should not be confused with *kulturlandskap*, a Norwegian term for landscapes that to some degree are shaped by humans. Along the Arctic Norwegian coastline, we might see landscapes marked by boathouses, boat launching areas, large wooden structures holding massive amounts of dried cod, grazed beaches,

and other landscapes that are invariably marked by human presence. Several participants expressed that preserving traditional coastal landscapes, **preserving *kulturlandskap*,** is important for their sense of belonging, for their identity. "It's not exactly Alf Prøysen-land around here, go out into a field and chew on a straw," smiled one participant, referring to a famous Norwegian writer whose inland folklore is admittedly in stark contrast to the Arctic Norwegian landscape. "Here, it's the fjord, that's what it's about. Everybody lives very close to the fjord." (3) Another participant told of an encounter with a former mayor in their town, where the participant expressed frustration that the fish farms were visually disturbing in the familiar coastal landscapes: "They replied so rudely; 'You've gotta be able to deal with a couple of yellow buoys out on the sea.' (...) I mean, I grew up with buoys out on the sea. In my childhood there were 8-10..or at least 5-6 of them, belonging to different fishers who'd be out setting nets this time of year. But they didn't leave them there year after year. They were out for a few weeks, and then gone. That's how it was." (11) This impact of fish farms on the coastal *kulturlandskap* was also addressed by a participant from Vågsfjord; "This is a typical, old *kulturlandskap*. And there's no doubt, they came in like foreign elements, these fish farms. So that..it's one thing that they're in the way – disturbing our passage, plain and simple, for those of us who've traditionally been using these waters. But they're also..visually disturbing. (...) In that way, this landscape's quality has been reduced, its aesthetic quality. Of course..that's a part of my quality of life that has been taken away from me." (8)

The final topic identified as important in the cultural landscape, is that of **preserving cultural heritage, and cultural identity**. There's music, art, language, food, sports and a lot of other factors that combine to constitute one's cultural identity, and while most of these factors are not very easily related to the aquaculture industry, some participants expressed something akin to identity loss when their homes, cabins, recreational areas or fishing spots were suddenly adjacent to fish farming operations. When they lost the ability to fish, or take their kids to the beach, or watch the northern lights against dark skies, it shook the parts of their cultural identity that were connected to those habits. "I'm seeing more and more how this affects those living by the coast", said one participant, "Both in terms of their identity, and in general..the way you experience the coast and the sea." (7)

A very important aspect, which this thesis has not touched on, is the fact that Arctic Norway is home to, amongst others, a large Sámi and Kven population – indiogenous peoples native to Norway, Finland, Sweden and Russia. Their cultural landscapes are far beyond what this thesis has room to explore, and their unique relationship to the coast and coastal developments is likely to be as complex and fraught as the one described in this text. The reason for excluding the Sámi and Kven perspective from this study is simple; none of the participants available to be interviewed for this study identified as Sámi or Kven. Only one of the participants brought up Sámi culture in interviews, as someone who was closely connected to the Sámi community, but not of Sámi heritage. Regardless, what is clear is that Sámi and Kven cultural identity, much like the cultural identity of other northern Norwegians, is likely to be connected to natural landscapes, to ecosystem conditions, and to the preservation of traditional knowledge and activities.

As we conclude our findings in the cultural landscape, it's becoming obvious that as we move away from the categories of natural and social landscapes – whose indicators could mostly somehow be measured – don't place the fish farms on spawning grounds; invite all stakeholders to speak their mind – we're now touching on principles and indicators that are of a different kind. Culture is a broad term, and tradition is ever-changing. The fact that it's hard to work with these less tangible indicators, is precisely the reason why social and cultural sustainability is permitted to remain so vague in most public and company policies. The final category of this chapter is *the emotional landscape.*

5.1.4 The Emotional Landscape

In a society where reason, logic and habits guide so much of the public discourse, is there room for something as varied and unpredictable as emotions? Are our feelings related to sustainability? Can we hold companies and governments responsible for how their environmental impacts make us feel? The four categories of this sustainability framework overlap in myriad ways, but what distinguishes this final category from the rest, is that it concerns the sociocultural impact of the aquaculture industry on the *individual*. In our segment on the natural landscape, people were largely speaking on behalf of nature. In the social landscape, we heard stories that addressed

concerns for the current generation, for the development of a society that we're all part of. In the cultural landscape, people were primarily concerned on behalf of past generations; lest they be forgotten; and of future generations – who may not inherit the coastline we'd like them to. But in this category, where we'll examine the emotional landscape that these people are living in, people are also expressing concern for themselves as individuals; their mental health, their sense of security, their feelings of hope or hopelessness, their sense of place or their placelessness. If true sociocultural sustainability is a goal, can it ever be achieved unless people's emotional landscape is a pleasant place to be?

The first topic appearing when analyzing the data within this category is **sense of place**. As described earlier in the text, this concept relates to *place attachment*, and *place symbolism*. People are connected to specific places, and no substitute will do. Although I interviewed several people whose lives had been so impacted by living very close to fish farms that they expressed a constant and permeating distress, not a single person truly wanted to move somewhere else. They'd rather remain in their *place*, and grieve what it had become. "My family has lived here for 150 years. (...) All my reference-points belong to this area. So much of my identity is tied up to this place." (6) They continued; "When you'd get there..summer or winter, in the polar night (*mørketida*), arriving there..it was dark. When it's dark outside, it's dark. The ocean wasn't lit by the pens, by the flashing lights that make it look like an airport. It was dark, and very..you can still see – when it's totally clear, you can still see stars and northern lights and these things, but..it's not the same. It can't be the same. You don't have a black fjord, lying there. Or a mirror-like fjord, reflecting the light of the moon. Now it's..ugly constructions floating, and there are boats arriving, large feeding boats, and… It was just nature, it was just...positive. You know when you..when you arrive at a cabin in the mountains, a tent, or..time stops. You enter a different sense of time. Time doesn't exist in the same way in a place like that, whether it's your cabin or..the countryside, or..I'm sure you know what I'm talking about. And we still get that feeling sometimes, but it's..suddenly the silence is gone. You've lost that silence, the wonderful silence of these places." (6)

Another participant lived on a farm by the sea that had been in his family for almost 200 years. "When you read the old property registry, and the *bygdebok* (book records of local Norwegian history), it says about his farm that it's..well, it's north-facing and backwards and marshy and rocky and steep, and..there's just no end to the drawbacks. But, the book says; it's got enough forest for firewood, and it's well-located for year-round fishery. And this strait has been known to be rich in fish, all year long." (8) They continued; "When I decided to take over – because I didn't like the thought of this place slowly falling into ruin – I remember thinking that this place..it's pretty close to town, actually, but still so far away from people, out in the countryside. You've got elbowroom here, peace and quiet." (8) Then, the participant described how it all changed when a fish farm appeared in the fjord outside the house: "I remember thinking that I was just far enough away from town, 'I feel *safe* here, nobody's gonna come and invade my space here', I thought. Until they suddenly came." (6) This loss of a **sense of safety** is also seen in other participants with fish farms adjacent to their homes or vacation homes.

One participant lived right next to a large fish farm which had recently been *brakklagt* (a temporary halt in operation). "Every time a boat drives by, or I hear..it's like..dear God, there they come again. What's going on?" They had experienced a lot of stress during the almost 10 years the fish farm had been in daily operation, but described the uncertainty of not knowing when operations would recommence as almost equally stressful. "Just hearing the sound of a boat coming by – since they've been here for so long, and now it's suddenly quiet..suddenly *that's* somehow wrong too." (5) Another participant also expressed this feeling of being unsafe, of their *place* being at risk; "We were so naive that we thought we'd – I mean it never occurred to me that someone would be interested in destroying this place. Out here in no-man's-land, who would be interested in going there? Far from town, and… No natural resources to exploit, other than… So it never occurred to me. That this place could be threatened." (6) The word 'threatened' is key to this topic, but manifests in ways that are more or less immediately severe. Some of the participants interviewed expressed that their sense of safety was affected on a more personal level. Some participants had experienced unpleasant encounters with fish farm employees, ranging from being flashed by their high beams while driving, to more severe instances of threatening language and behavior. Due to concerns of anonymity, these quotes are

not included in this text, but they are an important – albeit presumably highly localized – challenge to address.

Before developing the interview guide that framed these interviews, a quantitative survey was conducted, to inform and shape the qualitative interview process. One question asked was "How much do you agree with this statement: My identity is tied to the nature in and around the ocean/ the fjord?" 52% of respondents agreed 'very much', while 33,5% 'agreed'. Looking at these excerpts, it seems clear that interview participants in these coastal communities feel the same way. They are attached to their places, their places have important and symbolic value to them, and anything 'threatening' their surrounding environment and landscapes is a threat to their *sense of place.* In fact, every single one of these interviews started with asking people about their *place.* The idea was that most people would feel comfortable talking about where they're from, where they live – casual chit-chat to create a soft opening to the interview process. But when asked to describe their place, one participant immediately began to tear up; "And that's how far we got, without crying…" (6) This brings us to our next theme within these emotional landscapes; *grief.*

Throughout these pages, we've already seen it. Sometimes it's explicit, like when one participant said that "people carry grief" (1); in this case the participant was talking about people grieving the lack of perceived democratic processes in the management of the aquaculture industry. Other times it's been more implicit, in the way people express themselves, their tone of voice, choice of words. When a participant says "there are no more starfish in the sea" (6), or that coalfish feeding on pellets will eventually "head down into the deep waters and die" (11) – and then pauses for a while before continuing – that's not unlikely to be an expression of sadness, even grief. The concept of **ecological grief** or *eco-grief*, as briefly outlined in the theoretical framework, is used to describe human grief in the face of ecological degradation or destruction. Forest fires, tornadoes, droughts, floods…there are many natural causes of ecological destruction. And these also cause humans to grieve. But the term eco-grief was coined by researchers who were looking primarily into the grief related to anthropogenic causes of environmental distress; climate change, deforestation, mining, overfishing, pollution, road

construction and other industrial operations located in natural environments – of which aquaculture is one example. This grief often manifests like other kinds of grief tend to do; in sorrow, in anger, in hopelessness and in tears.

"I was visiting this beach where I grew up. Where I used to walk around picking up *marfloge* (a small amphipod) (...), used to look underneath rocks, walk around holding a bucket filled with *tangsprell* (an eel-like fish)... Just being a little kid. So it's a beach I know really well. (...) A few years after they (the fish farm) got started there, I went there for St. John's Eve (*Sankthansaften*; a solstice/midsummer celebration). Me and my kids were boating from bay to bay, having a great time. (...) And I figured..I figured I'd go down on the beach and have a look. And..I turned over this rock. And then I turned..and then I had..I just..I walked all along that beach and turned over every single rock in my path. There wasn't a single *marfloge*. (...) So that was damn hard for me. I cried. Because it became so real. That it was actually completely ecologically ruined, already. And they're still in operation there, in that area." (1) This is grief. Through the death or disappearance of the small creatures on the beach, a greater sorrow manifests – perhaps because it indicates that more is lost, on other beaches elsewhere. That one's own kids, as well as future generations, might not have the same connection to the land, the same knowledge of species, the same ecological reference points.

Another participant explained that they were in a personal process of starting to understand the feelings that we might call eco-grief; "I've been, and I think a lot of us in this majority, western, European approach to nature..we keep a distance to nature, nature has been objectified, it's an object to us. But as I've said, in a Sámi perspective – which is where I now live my life – it's..totally different. There's a close connection. Where people are incredibly emotionally moved, by the windmills being put up in (area), for example. Which has been – and to some degree still is – hard for me to understand, you know? I mean this strong, emotional reaction to a sacred landscape being destroyed, forever. (...) That it runs so deep." (4) Another participant had a more personal, instinctive relationship with the concept of eco-grief. They talked of how they felt on the day the fish farm arrived next to their home. "It was seven years ago, this (month). No, what can I say, I… I was standing there, wailing, hitting the wall of the *naust* (boathouse)

and crying for my dad. Luckily he'd passed away a long time ago." (5) They continued their story, explaining how they've eventually resigned to the fact that the farm is there; "I risked everything so I could live here. But now I feel..amputated. Because the most important part of the property is destroyed. Because now there's a… Which is why we've agreed to let the forest grow thick down by the shore. So we don't have to see it. Hearing it is bad enough." (5)

This description, of feeling amputated by the changes happening in a place where you live, and will continue to live; this fits in with the concept of **solastalgia**. Longing for a place, while still being in that place – longing for how that place used to make you feel. Another participant also spoke to this; "I've had to move further and further north in order to fish. I used to have such nice times out here. Really enjoyable. I could see my house (from my boat). Now there's nothing. I can't stand fishing here anymore." (12) One participant delved into resignation, into the resigned acceptance of the changes that have altered their place ever since a fish farm started operating next to their home; "It was..it was incredibly..hard. That the government just took our *allmenning* (common good). And handed it out, privatized it and handed it out to capital interests. Without even talking to me. I felt..violated, plain and simple. So that was bitter, it really was. But it's done, and it's there, and there's nothing to do about it. It..will probably stay there. So..it's just how it is." (8) While some express their grief through sorrow, or through resignation, others feel more stressed, or even angry; "I can feel it, when there's so much noise coming from (the fish farm), my pulse quickens. (...) I get stressed. We were sitting on the porch, right, and we had this beautiful sunset… To sit there, and then suddenly they come thundering in…" The participant reflected on how these disturbances impacted them in their everyday life; "Then your..what's called your 'quality of life', that's ruined, destroyed. (...) They tried buying the house, you know. I told them to fuck off." (12) Another participant with a fish farm next to their property used the term 'grief' to describe their emotions, but also expressed anger; "It's hard. Really, really hard to live with. I've been able to distance myself a little bit, from..the worst of the grief, the heaviest grief. (...) But I'm furious, too. Luckily I'm not just sad." (6)

The emotional landscape identified through analyzing this interview data is complex, showing us how people's mental well-being is strongly affected by their surrounding natural environments,

by the social structures that manage their public lives, by their inherent sense of culture and tradition, and by their ability to develop a sense of place for themselves. There are differences within the study population. Those participants living in very close proximity to fish farms display a higher frequency of statements falling under the topics of eco-grief and solastalgia. Those who live at more of a distance to local fish farms are a little less sad, a little less angry, a little more hopeful. "I'm an optimist," said one participant, "If *I* could change my mind, expand my understanding and get involved with working for what's truly important..I think others can too." (4) Another participant reached out to nature, to their connection with their *place,* for hope and consolation in the face of environmental changes; "I was out on the sea here, Thursday afternoon. And I experienced something. It must have been 20 years since I last experienced this. I heard an oldsquaw (havelle). A bird that used to be common this time of year. It would lie out there in (the bay), you'd hear that characteristic sound. And on Thursday I actually heard it – I saw three birds. 'Well, well', I thought to myself, 'You're still here.'" (11)

6. Discussion

We recall from the very first chapter that this thesis operates from a main research question, supplemented by sub-research questions:

> ➢ **How can stakeholders measure the sociocultural sustainability of the Norwegian aquaculture industry?**
>> ○ *How do local residents perceive the aquaculture industry and its impact?*
>> ○ *How can these perceptions inform indicators of sociocultural sustainability?*

The second sub-research question was the origin of this entire study. The others have appeared throughout the process of gathering literature, preparing for fieldwork, conducting fieldwork and processing and analyzing the data collected. As emphasized several times earlier in this text, this study has been inductive and iterative throughout the entire process. So what has it found?

Well, we've been looking for ways to recognize, define and measure cultural and social sustainability in local communities in Arctic Norway impacted by the aquaculture industry. The findings from conducting in-depth interviews with members of these communities has generated

an enormous wealth of qualitative data, and more than a few pointers to precise measures that participants are missing. When Lindland et al. (2019) examined the attitudes of local residents and stakeholder groups towards Norwegian aquaculture, they concluded that people are not necessarily *for* or *against* the aquaculture industry – that what they want "is *sustainable* aquaculture" (p.1). This was also stated outright by several participants in my study – most of them just want the industry to be sustainable, environmentally, economically *and* socioculturally.

In chapter 2, we encountered the many-faceted and complex definitions of sustainability, and looked at how these definitions are changing from focusing primarily on direct environmental issues, to encompassing a broader, more holistic view of how we can meet "the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987, p. 15). There is strong evidence in interview data that this intergenerational perspective proposed by the Brundtland Commission is important to community members near Tysfjorden and Vågsfjorden, and many participants directly addressed their concerns that the aquaculture industry is altering both the natural and social environment in ways that will impact how their children, grandchildren and great-grandchildren are allowed to experience, use and connect with the places and ecosystems of these areas. But they also want sustainability *now*, in their own present, for their own use and enjoyment of these coastal areas.

While participants didn't use the terms social or cultural sustainability, they referred to sustainability repeatedly in interviews. In fact, this thesis was not intended to have sustainability as its primary theoretical foundation, but the way in which the term saturated conversations made me pivot fully towards the concept halfway through the fieldwork process. This indicates that the term has indeed become "a phrase that everyone pays homage to" (Lélé, 1991, p. 607), but my impressions from speaking with local residents near Tysfjorden and Vågsfjorden is that the second part of Lélé's prediction – that it would also be a term which 'nobody cares to define' – does not hold. On the contrary, participants had a broader and deeper sense of sustainability than I had perhaps expected. They pointed to environmental sustainability, yes, but also to social and cultural factors. Many saw the lack of environmental justice in how fish feed produced for the Norwegian aquaculture industry is affecting farmers in Brazil and fishers on the West African

coast, and declared these practices unsustainable. Economic sustainability was also addressed, and one participant stated outright that the kind of wealth accumulation seen in the aquaculture industry comes at the cost of both nature, people and *sustainability.*

Thus, sustainability is at the forefront of these participant's minds when they talk about the aquaculture industry – not some vague concept only existing in academic articles or on the websites of proactive businesses. My study echoed some of the findings by Krøvel et al. (2019) from chapter 2, especially that perceived environmental impact is *the* determining factor in how socially acceptable respondents perceive the industry to be. This holds true in my data, and several participants indicated that if the industry didn't affect the natural environment surrounding the fish farms, they could accept the industry's presence in their communities. However, this was not expressed by all, and did not appear to be a perspective shared by those who were living in very close proximity to the fish farms – these people were significantly bothered by noise, lighting and other disturbances in addition to the degradation of the marine environment. It might also be that environmental impacts as per today's operations are so severe, that participants are willing to accept a trade-off between sociocultural sustainability and environmental sustainability. Interview data shows that although participants always draw lines back to these environmental impacts, they also had clear and preconceived thoughts on the social, economic and cultural impact of the industry.

I did not recognize Krøvel et al.'s claim that conflicts between local communities and aquaculture industry are "not really about space" (2019, p. 6), or Bjørkan & Eilertsens's finding that commercial fishers perceived the industry as negative, while other residents were mostly positive towards industrial developments in their communities (2020). On the contrary, my findings indicate that participants in this study perceived the socio-economic value of aquaculture operations as insufficient to justify the environmental, social and cultural downsides. In chapter 2, Aanesen et al. (2018) concluded that households in Arctic Norway "make trade-offs between recreational activities and commercial developments in the coastal zone" (p. 157), another finding not replicated by my study around Vågsfjorden and Tysfjorden. Now, it is imperative to understand that the sampling methods of this study have undoubtedly impacted its

findings. Using purposive critical case sampling is a tool for finding information on very pointed perspectives within a population. My study looks specifically at negative impacts from the aquaculture industry on people living in very close proximity to active fish farm operations, and thus cannot be generalized to the wider populations of these areas. However, the perspectives of these participants are not unique within these communities, nor are they all that different from what Albrecht et al. found when examining how members of communities impacted by mining in Australia responded to changes in their natural environments. This study examined the concept of *sense of place* and *solastalgia* – the latter defined in chapter 4 as "the distress that is produced by environmental change impacting people while they are directly connected to their home environment" (2007, p. 95) – and Albrecht's accounts of conducting qualitative research in these communities generated passages that are eerily similar to the ones cited in chapter 5 of this thesis. One shared perspective is the feeling of having settled in a rural, quiet place, only to experience a sudden and discombobulating shift, towards living in an industrialized area. One of Albrecht's respondents describes their loss of "the silence, at night" (Albrecht, 2019, p. 56), a loss also lamented by several participants in my study.

These accounts stand in stark contrast to the recommendation by Aanesen et al. (2018) that policy makers should be reluctant to allow industrial expansion near larger towns and cities, and instead spread these operations across rural areas. Their study found that rural communities and smaller towns supported the expansion of marine industry such as aquaculture, while urban populations were more skeptical. The latter does align with statements from some of my participants, who have observed that fish farms are rarely located near larger towns or cities in their areas. However, they perceived this to be a result of centralized political power; areas with more voters were able to sway political opinion away from granting aquaculture localities in these areas. In their opinion, nobody wants a fish farm in their neighborhood, but rural populations are outnumbered, and powerless to halt an industrial expansion that both national and local government is promoting as crucial to the survival of rural coastal communities. As we recall from chapter 4, Engen et al. (2021) looked at environmental justice in coastal planning in Northern Norway, and found that the procedural justice in this planning process relied on participation and influence of local stakeholders, such as fishers. My interview data also indicate

that these factors are major roadblocks on the way to sociocultural sustainability. Local community members need to feel involved, heard and respected by the industry and by local and national government.

The question then becomes how one can ensure that both governmental structures and aquaculture companies work towards sociocultural sustainability in these communities. My research on social and cultural sustainability showed that while definitions are varied, most of them center around the idea of maintaining united communities within solid social structures, where equity, public participation, health, well-being and security are the measures of success. There is a shift away from the more 'old-school' social sustainability of the Brundtland era, where the focus was on what Colantonio calls 'hard' and easily measured criteria like employment and poverty lines, towards 'soft' criteria such as happiness and sense of place (Colantonio, 2009). My findings indicate that this shift is warranted, at least in the context of Norwegian aquaculture. No participants voiced concerns about poverty, on the contrary – they were quite concerned about the power or wealth, and how this power could potentially degrade and even destroy the natural landscapes that locals have been connected to for generations. What they did express, over and over, was how the industry impacted precisely these 'softer' criteria of social and cultural sustainability; their feelings of belonging, their daily enjoyment of being in their natural environments, their ability to pass traditional knowledge and skills onto the next generation. As Meadows (1998) showed us in chapter 4, our values inform the sometimes intangible factors that determine whether something is socially and culturally sustainable. But it is perhaps only by putting these values into words that we can begin to use them as a tool for sustainability.

The aim of this study has been a dynamic one, altered and re-defined throughout the process by new theory, new ideas, and primarily by the interaction with interview participants. Each interview left new perspectives to explore, and through transcription of the interview data, a deeper understanding of the subject matter and this study's role in the discourse became clear. As informants continued to address the same issues over and over again, a pattern of sociocultural neglect appeared. I began to wonder if decision-makers in government, or the aquaculture

industry itself, were actually working from a vision of social and cultural sustainability. As this thesis has shown in the preceding chapters, the environmental sustainability challenges of the industry are far better known, and more often addressed by both policy makers, research institutions, scientists and the industry itself. When looking at how governments and industries were committing themselves to sustainable practices, I became interested in how these commitments were measured. By looking at for example how governments tracked their progress in relation to the UN Sustainable Development Goals, I discovered Sustainability Indicators. As detailed in chapter 4, these are signs or symptoms of something that we are looking to measure. Arising from our values, they can also inform our values, by telling us that what we're measuring is important (Meadows, 1998). Who paid attention to the amount of steps they took every day until our digital devices started counting them? In this same way, we need to start measuring the social and cultural sustainability of housing projects, industrial operations, public policy and other decisions made with the intention to improve human lives – that often end up directly or indirectly reducing the quality of life of the very same people they were aiming to satisfy. My interview process had made it clear that this was a study on sociocultural sustainability, and the process of transcribing interviews brought forth the idea of creating a framework for sociocultural sustainability in Norwegian aquaculture. As we've seen in examining the theory on Sustainability Indicators in chapter 4, there have been attempts at building frameworks for measuring the social and even cultural sustainability of industry in general, and also of aquaculture in particular. However, I would argue that there is no clearly defined, indicator-based model of sociocultural sustainability for Norwegian aquaculture; a framework that provides tangible, realistic indicators for both government and industry to make informed decisions on regulations and practice. I knew this would be exploratory work, only beginning to examine the complexities of what such a framework would require. But exploratory work is important, and I embarked on a quest to begin extracting possible indicators from the vast amounts of interview data collected.

6.1 Defining a framework for sociocultural sustainability in Norwegian aquaculture

Through an iterative and inductive thematic analysis of the interview data collected, I began grouping topics (such as 'conflicts of interest') into themes (such as 'trust in local and national government'), and these themes into more overarching categories. These overarching categories shifted and morphed as they were filled with data, but eventually four distinct categories appeared; nature/physical places, social structures, culture and emotions. Inspired by Olwig's idea of a landscape as both a physical and social perception (1996), I then created the more uniform and complementary categories of the **natural** landscape, the **social** landscape, the **cultural** landscape and the **emotional** landscape. These are the four 'layers' in which sociocultural sustainability is formed. This manner in which I visualize them is inspired by Rockström and Sukhdev's 'Wedding Cake Model' (2016), where the UN sustainability goals are trisected, and displayed with the biosphere as the foundation on which the social structures rest, and the economy as resting on the social structure and the biosphere. Each 'cake layer' is divided into 'pieces', with each piece of the cake representing a sustainability goal. My model takes this visual conceptualization of categories and indicators, and adapts it to the concept of sociocultural sustainability, with the layers representing each category identified in my analysis. Before supplementing the model with principles and indicators from the barometer, let's have a look at the model in its preliminary version, so that we can keep it in mind as we move through the other parts of the framework:
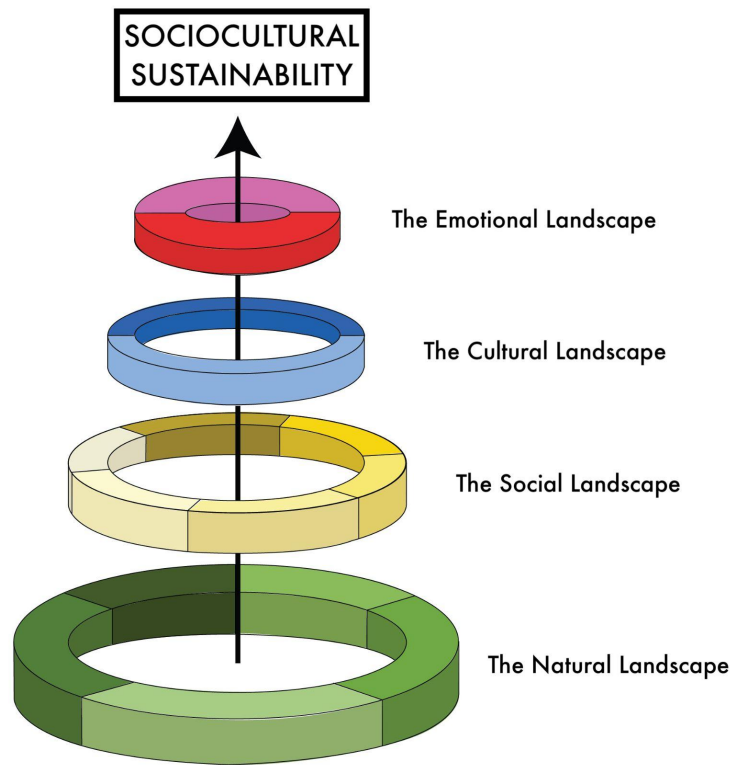
Figure 10: The Landscape Model of Sociocultural Sustainability: Preliminary version

This model envisions the category of *the natural landscape* as the foundation of the model. This is the sociocultural *setting* of the community within which the aquaculture industry seeks to establish itself (e.g.; the ocean, beaches, native species, existing settlements). On top of that layer, we add *the social landscape*. This is the sociocultural *structure* of the community (e.g.; laws, regulations, economics, jobs, organizations). On top of this, we layer the *cultural landscape* of the community, which contains the sociocultural *soul* of the community (traditions, knowledge, art, culturally important places). Finally, we add the *emotional landscape*, which constitutes the sociocultural *purpose* (sense of place, safety, joy, satisfaction). When we look at the model as a whole, we see the same inherent structure as in Rockström and Sukhdev's model; the natural landscape is the foundation on which the other layers rest. Each subsequent layer is 'built' on the previous layer; a pleasant social landscape depends on a pleasant natural landscape, and a pleasant emotional landscape is built on both nature, social structures and culture.

The model is attached to a sustainability barometer: a list of Sustainability Indicators (SI) that measure the sociocultural sustainability of Aquaculture operations in Arctic Norway. Milewski & Smith (2019) advised us in chapter 4 that "in order for SI to provide meaningful information on policy progress towards sustainability, SI must include a reference value (e.g. target, standard, norm, goal, benchmark) that, when measured, indicate movement towards or away from a stated objective, as well as providing the public with a measure of government accountability on policy narratives and initiatives" (p. 2). While working on this list of indicators, I understood why Milewski & Smith concluded that developing meaningful indicators for social sustainability in aquaculture remains a pressing challenge (ibid.). Although finding indicators was mostly an iterative process of constantly moving between theory, interview data and methodological structure, the selected indicators are not necessarily easily measured. Reference values will vary from community to community, and the concept of shifting baselines might make it hard to know what an acceptable standard is. For example, if people in a community have already lost access to several important fishing spots, will sociocultural sustainability be considered achieved simply by not further reducing access to other spots? Or should lost areas be restored to their original conditions, and opened to the public once more? And for that matter, what is 'their original condition' – what year in history are we looking to replicate?

These are complex questions, and unfortunately at a scale that this thesis cannot hope to fully address – in spite of its high word count! What it can do is present the indicators developed through this study. They are inspired by a combination of interview data, existing frameworks developed by others, Sustainability Indicator theory, and a vast amount of scientific and media discourse. These principles and indicators are not perfect. They stem from a limited amount of research, within a small sample population. However, I believe that they provide a recognizable starting point for developing localized frameworks, with specialized indicators ideally being developed in collaboration between stakeholders. Hawkes suggested that communities be allowed to develop their own indicators, based on shared history, values and aspirations (Hawkes, 2001), and this is a process that local governments could and should undertake before making decisions on further growth in the aquaculture industry. My intention is that this study and its resulting framework may serve as a toolbox for all stakeholders involved in decisions on

how, where and if the aquaculture industry may grow. Government agencies may use this information to develop truly sustainable policy and requirements for the aquaculture industry. The aquaculture industry may find in this framework a path towards more acceptance within the communities hosting them, so long as they accept that there is a definite cost to socioculturally sustainable communities. This is also a barometer *for* local communities, to provide them with a list of requirements, a list of demands, a list that attempts to recognize and make non-negotiable the inherent human need for social and cultural sustainability. I have called this barometer '*The Sociocultural Sustainability Barometer for Norwegian Aquaculture*'.

6.1.1 The Sociocultural Sustainability Barometer for Norwegian Aquaculture

The first category of the barometer is **The Natural Landscape**. This category is composed of five principles, each principle containing a set of indicators, with some indicators again accompanied by subordinate indicators. The Natural Landscape concerns the *sociocultural physical setting*; tangible factors within the natural environment that need to be addressed in order for the aquaculture industry to be considered socioculturally sustainable. Principles and indicators will be recognizable from chapter 5.1.1, where participants outlined their concerns related to emissions, local biodiversity, access to wild nature, disturbances from operations near homes and vacation homes, as well as coastal access for fisheries and recreation.

THE NATURAL LANDSCAPE

1. **Clean coastal and marine environments**
    1.1. No aquacultural emissions of nutrient salts, feces, medications or fish feed
    1.2. No aquacultural emissions of microplastics, copper or other production waste
    1.3. Removal and/or mitigation of existing aquacultural emissions and littering
    1.4. The industry assumes a special responsibility for keeping beaches and other coastal areas near fish farms clean and safe
2. **A rich and native biodiversity**
    2.1. Viable populations of native species

2.2. No aquaculture localities in known fishing areas, spawning grounds or important migration routes for wild species

2.3. No genetic introgression between wild and farmed species

3. **Wild coastal landscapes**

   3.1. Planning authorities must retain sizeable and continuous areas along the coastline where industry is not part of the landscape, especially in populated areas

   3.2. Preservation of coastal nature where there is silence; without noise, lights and other disturbance from industry

4. **Shielded zones around homes**

   4.1. Aquaculture localities should not be placed where existing homes or vacation homes are bothered by lights, noise or other disturbances from the industry

      4.1.1. If aquaculture localities are already located in shielded zones, these disturbances must only happen within normal working hours

      4.1.2. If new aquaculture localities are placed in shielded zones, landowners must be compensated for lost property value

5. **Coastal access for fisheries and recreation**

   5.1. Consideration of fairways for fishing vessels and recreational vessels

      5.1.1. Aquaculture localities should not block safe fairways

      5.1.2. Aquaculture localities should be clearly marked on nautical charts, including anchor points

   5.2. No aquaculture localities in shielded zones for recreation, such as beaches, playgrounds, docks or other community meeting points

---

The second category of the barometer is **The Social Landscape**. This category is composed of 6 principles, each with their subordinate indicators. These principles concern the *sociocultural structure*; the formal and informal structures that shape society, and which need to operate in certain ways in order for sociocultural sustainability to be achieved in a community hosting aquaculture industry. The principles and indicators are drawn from chapter 5.1.2, where participants spoke of wanting better communication between them, the industry and the government, as well as wanting more genuine influence in planning processes, better trust in

government processes, prosperous local communities, economic justice and environmental justice.

THE SOCIAL LANDSCAPE

1. **Open communication**

   1.1. Active communication of the public planning process, e.g. through town hall meetings, informational letters, media campaigns

   1.2. Neighbor notices to all nearby landowners well ahead of launch, expansion or discontinuation of aquaculture operations

   1.3. Updated information on launch, operation, expansion and discontinuation of aquaculture operations should be public and easily accessible to all municipal residents

2. **Local influence**

   2.1. Relevant stakeholders (e.g. neighbors, fishermen's associations, outdoor recreational organizations, environmental organizations) should be consulted in the planning of new aquaculture localities, as well as the expansion or relocation of existing localities.

   2.2. Hearing testimonies and objections should be heavily weighted in planning decisions on aquaculture localities

   2.3. There should be expert and local consensus on land-use for aquaculture

3. **Trust in local and national government**

   3.1. Open and transparent processes around the planning of aquaculture localities

      3.1.1. The government should communicate process requirements and case information using comprehensible, common language

   3.2. The aquaculture industry, other industry and private people should be treated equally under the law

      3.2.1. No establishment of aquaculture infrastructure until permits have been fully processed

   3.3. Strict measures to avoid conflicts of interest in the planning process

4. **Vibrant and viable local communities**

   4.1. Locally anchored industry

<blockquote>

4.1.1.Ownership and management of aquaculture industry should primarily be locally anchored

4.2. The industry should not decrease the attractiveness of a community to neither tourists or residents

</blockquote>

5. **Economic justice**

   5.1. All aquaculture companies should be subject to resource rent taxation

6. **Environmental justice**

   6.1. A fair societal distribution of negative and positive consequences from aquaculture industry

   6.2. Aquaculture companies have a responsibility to ensure that their operations follow principles of environmental, economic and social justice – domestically and internationally

   6.2.1.Fish feed should only contain ingredients that are harvested or produced in environmentally and socially sustainable manners

   6.2.2.Norwegian aquaculture companies should work to ensure social and cultural sustainability in their international value chains

---

The third category is **The Cultural Landscape**, and is composed of 2 principles, with accompanying indicators that focus on the *sociocultural soul* of the community; the traditions, music, art, skills and culturally important places that make a community unique and rooted in history. Principles and indicators are extracted from chapter 5.1.3, where participants addressed challenges the aquaculture industry may pose to the preservation and continuation of local knowledge and traditions, and to preserving cultural identity.

THE CULTURAL LANDSCAPE

1. **Preservation of local knowledge and tradition**

   1.1. Aquaculture industry should not exclude people from traditional fishing areas, fairways, beaches or skerries

   1.2. Aquaculture industry should not threaten the roles of traditional businesses in the coastal culture, e.g. coastal fisheries and tourism

1.3. Aquaculture industry should not pose a threat to the natural environments enabling traditional use of coastal nature

    1.3.1.The ability to harvest or catch food along the coast should not be restricted or affected by pollution, emissions or genetic introgression in native species caused by aquaculture

2. **Preservation of cultural identity**

2.1. Preservation of cultural landscapes

    2.1.1.Aquaculture industry should not destroy or degrade traditional coastal cultural landscapes, e.g. cultivated land, grazing land, coastal heathlands (*kystlynghei*) and hayfields (*slåttemark*)

2.2. Preservation of cultural heritage

    2.2.1.Aquaculture industry should not destroy or degrade culturally important areas or constructions, e.g. traditional fishing villages (*fiskevær*), fishermen's cabins (*rorbuer*), boathouses, summer barns *(sommerfjøs)*, combination houses (*kominasjonshus*) and fish processing plants (*fiskebruk*)

2.3. Aquaculture industry should not threaten Sámi or Kven cultural heritage

---

The fourth and final category is **The Emotional Landscape**, and is also composed of 2 principles, with sub-indicators for topics that speak to the *sociocultural purpose* of a community; feeling safe, feeling happy, feeling connected to one's surroundings both physically and spiritually. Principles and indicators are adapted from interview data analyzed in chapter 5.1.4, where participants spoke of feelings that arise in the meeting point of the aquaculture industry and the local community.

THE EMOTIONAL LANDSCAPE

1. **A sense of place**

1.1. The aquaculture industry and local government should cooperate with local residents to map and shield places of particular importance to the local community

1.2. Aquaculture industry should not threaten people's sense of safety

    1.2.1. Neighbors of aquaculture localities should have running access to plans for operation, as well as any fallowing periods or discontinuation

    1.2.2. All parties should work for an open and civil communication between aquaculture employees and members of the local community

2. Thriving

2.1. The aquaculture industry and local government should measure the industry's success by the general thriving and mental health of local community members

    2.1.1. Frameworks for assessing eco-grief or solastalgia can be used to conduct such measurements

---

6.1.2 The Landscape Model of Sociocultural Sustainability in Norwegian Aquaculture

Now that we've established the principles and indicators for each category, we can complete the landscape model of sociocultural sustainability in Norwegian aquaculture, with the adapted indicators based on the findings in this study. The hope is that these two components; the model and the barometer, will work together as whole to provide a framework that can serve as a starting point for local stakeholders to map out the general and specific sociocultural needs of their community, in terms of their unique natural, social, cultural and emotional landscapes. The finalized model of sociocultural sustainability in Norwegian aquaculture, with our selected indicators for the Tysfjord and Vågsfjord areas applied, looks like this:
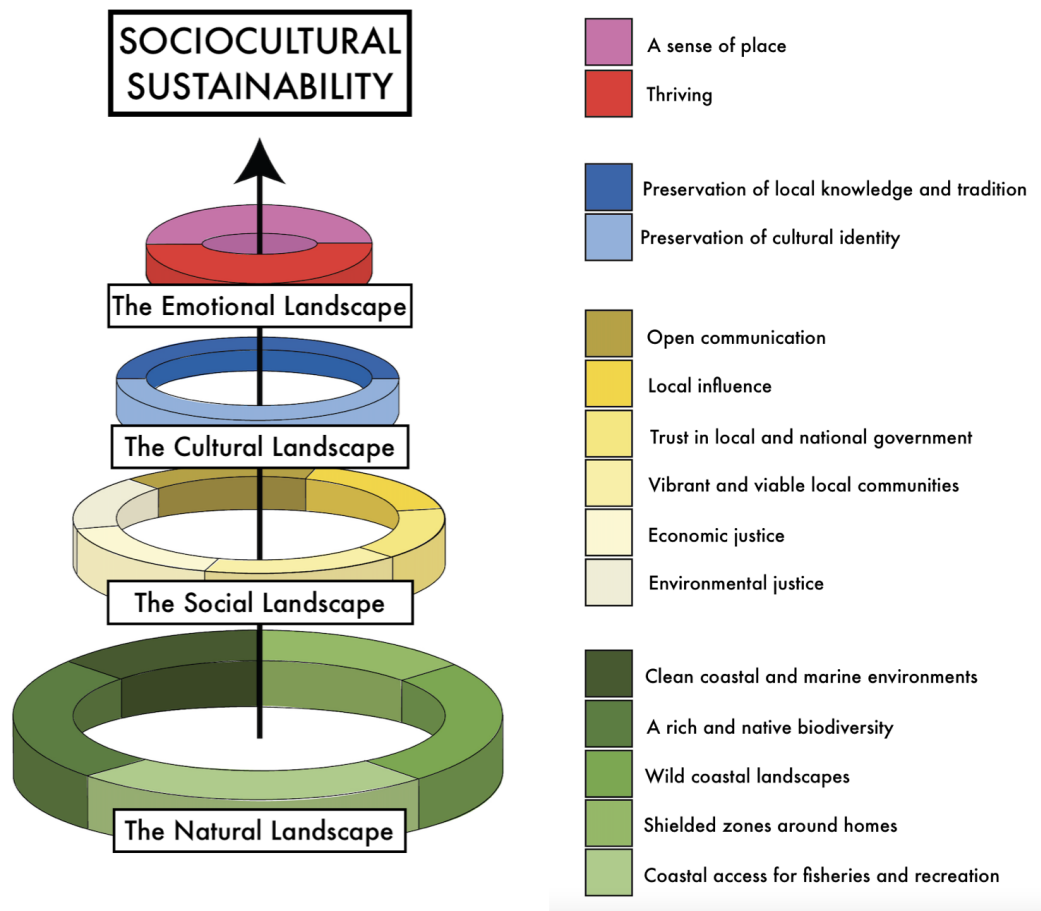
Figure 11: The Landscape Model of Sociocultural Sustainability in Norwegian Aquaculture

7. CONCLUSION

For rural municipalities, particularly in the sparsely populated region of Arctic Norway, the establishment of aquaculture farms has been touted as key to maintaining and increasing settlement and productivity. These rural areas, which previously depended more on coastal fisheries both for economic and social activity, often find themselves divided on the issue of aquaculture investments in their communities. On the one hand, aquaculture is an extremely profitable venture, which brings industrial activity, infrastructure investments and an increase in local jobs. On the other hand, the industry has proven environmentally degrading effects, the pens and surrounding infrastructure are visually and physically imposing, emissions from the

pens might harm local fishing resources, there are conflicts of interest with recreational use of the coastline, and the aquaculture companies are frequently criticized for not contributing adequately to their host municipalities.

Bjørkan & Eilertsen remind us that there are socio-political factors limiting the feasibility of the five-fold increase towards 2050 as projected by the Norwegian government. They identify social legitimacy as one of the major obstacles, meaning that there is a need for aquaculture operations to have broad public acceptance — and this is hard to achieve due to some of the perceived environmental, social and societal impacts of aquaculture operations. They identify a "divide between what the formal authority and popular opinion support" (2020, p. 105276). My findings confirm this divide, at least within the narrow scope of this study. There are several sociocultural factors to consider before deciding if, how and where the aquaculture industry can grow in the ways the Norwegian government intends for it to do. A few days before this thesis was submitted, the biannual results of the Traffic Light System were released. Most of the coastline was given the green light to increase production by as much as 6 %. This is part of the government's path towards 2050, a path that will mean more fish farms along the entire Norwegian coastline, and especially in the Arctic region.

Will these farms be placed in rural neighborhoods? In important fishing zones, or spawning grounds? Will they take up safe fairways, pushing small vessels out to sea? Will they be allowed to release their waste unfiltered into the marine environment around the pens? Will the farmed fish escape and pollute the genetic pool of the already threatened wild salmon stock? And will these changes mean that the ways in which Arctic Norwegians have used and enjoyed the coast for thousands of years are equally threatened? My study has hoped to display some of the ways in which the current aquaculture industry is operating in ways that are socially and culturally unsustainable. There is a critical need for more research on sociocultural sustainability in general, and aquaculture's sociocultural impacts in particular. With more time, more resources and perhaps more diligence, this study would have benefited from including far more perspectives – from people working in the industry, from communities where the industry provides critical employment and economic prosperity, from people benefiting from the indirect

jobs created by the aquaculture industry, and from people who feel that the future of Arctic Norway is entirely dependent on the kind of economic and social activity that aquaculture creates. It is also imperative to map out the Sámi and Kven perspectives on how the aquaculture industry impacts traditional livelihoods, cultural heritage and sociocultural identity. In addition, this study found a serious lack of research into the economic sustainability of the Norwegian aquaculture industry.

In conclusion, this thesis proposes the collaborative development of criteria to define and measure sociocultural sustainability in communities impacted by aquaculture, and the mandatory implementation of measures to improve they ways in which today's aquaculture industry is impacting and altering the Norwegian coastal culture. Much is done by simply protecting the natural ecosystems on which we all depend, and by ensuring the well-being of native species – lest we forget that we are one of them.

8. REFERENCES

Aanesen, M., Falk-Andersson, J., Vondolia, G.K., Borch, T., Navrud, S. and Tinch, D. (2018). Valuing coastal recreation and the visual intrusion from commercial activities in Arctic Norway. *Ocean & Coastal Management*, 153, pp.157–167. doi:10.1016/j.ocecoaman.2017.12.017.

Aanesen, M., Mikkelsen, E. (2020). Cost-benefit analysis of aquaculture expansion in Arctic Norway, *Aquaculture Economics & Management*, 24:1, 20-42, DOI: 10.1080/13657305.2019.1641570

AboutAmazon.com (n.d.). *Sustainable Operations*. Available at: https://www.aboutamazon.com/ planet/sustainable-operations.

Abrudan, L.-C., Matei, M.-C. and Abrudan, M.-M. (2021). Towards Sustainable Finance: Conceptualizing Future Generations as Stakeholders. *Sustainability*, 13(24), p.13717. doi:10.3390/su132413717.

Ahmed, N. and Thompson, S. (2019). The blue dimensions of aquaculture: A global synthesis. *Science of The Total Environment*, [online] 652, pp.851–861.

Albrecht, G., Sartore, G.-M., Connor, L., Higginbotham, N., Freeman, S., Kelly, B., Stain, H., Tonna, A. and Pollard, G. (2007). Solastalgia: The Distress Caused by Environmental Change. *Australasian Psychiatry*, 15(1), pp.95–98. doi:10.1080/10398560701701288.

Albrecht, G. (2019). *Earth emotions: New words for a new world*. Ithaca London Cornell University Press.

Amundsen, H. (2015). Place attachment as a driver of adaptation in coastal communities in Northern Norway. *Local Environment*, 20(3), pp.257–276. doi:10.1080/13549839.2013.838751.

Asche, F., Roll, K.H., Sandvold, H.N., Sørvig, A. and Zhang, D. (2013). Salmon Aquaculture: Larger companies and increased production. *Aquaculture Economics & Management*, 17(3), pp.322–339. doi:10.1080/13657305.2013.812156.

AsplanViak.no (n.d.) *Sosial bærekraft*. Available at: https://www.asplanviak.no/tjenester/sosial-baerekraft/

Bailey, J. (2014). Looking for sustainable solutions in salmon aquaculture. *Etikk i praksis - Nordic Journal of Applied Ethics*, (1), pp.22–40.

Bailey, J. L., Eggereide, S. S. (2020). Mapping actors and arguments in the Norwegian aquaculture debate, *Marine Policy*, Volume 115, 103898, ISSN 0308-597X, https://doi.org/10.1016/j.marpol.2020.103898.

Barentswatch.no. (n.d.). *BarentsWatch*. What impact does Norwegian aquaculture have on the environment, the economy and society? Available at: https://www.barentswatch.no/havbruk/?lang=en

Barrett, G., Caniggia, M.I. and Read, L. (2002). 'There are More Vets than Doctors in Chiloé': Social and Community Impact of the Globalization of Aquaculture in Chile. *World Development*, 30(11), pp.1951–1965.

Ben-Eli, M.U. (2018). Sustainability: definition and five core principles, a systems perspective. *Sustainability Science*, [online] 13(5), pp.1337–1343.

Bjørkan, M. and Eilertsen, S.M. (2020). Local perceptions of aquaculture: A case study on legitimacy from northern Norway. *Ocean & Coastal Management*, 195, p.105276. doi:10.1016/j.ocecoaman.2020.105276.

Billing, S. L. (2018). Using public comments to gauge social licence to operate for finfish aquaculture: Lessons from Scotland. *Ocean & Coastal Management*, 165, pp.401–415. doi:10.1016/j.ocecoaman.2018.09.011.

Brulle, R.J. and Pellow, D.N. (2006). ENVIRONMENTAL JUSTICE: Human Health and Environmental Inequalities. *Annual Review of Public Health*, 27(1), pp.103–124. doi:10.1146/annurev.publhealth.27.021405.102124.

Bullard, R. D. (1996) Environmental Justice: It's More Than Waste Facility Siting. Social Science Quarterly , September 1996, Vol. 77, No. 3 (September 1996), pp. 493-499

Bryman, A. (2012). *Social Research Methods*. 4th ed. Oxford, Uk: Oxford University Press.

Cernea, M.M. (1993). Culture and organization: The social sustainability of induced development. *Sustainable Development*, [online] 1(2), pp.18–29. doi:10.1002/sd.3460010207.

Chetty, R., Grusky, D., Hell, M., Hendren, N., Manduca, R. and Narang, J. (2017). The fading American dream: Trends in absolute income mobility since 1940. *Science*, 356(6336), pp.398–406. doi:10.1126/science.aal4617.

Chiu, R.L.H. (2004). Sociocultural sustainability of housing: a conceptual exploration. *Housing, Theory and Society*, 21(2), pp.65–76. doi:10.1080/14036090410014999.

Colantonio, A (2009) Social sustainability: A review and critique of traditional versus emerging themes and assessment methods. In: Horner, M, Price, A, Bebbington, J, et al. (eds) Second International Conference on Whole Life Urban Sustainability and Its Assessment. Loughborough: Loughborough University, pp. 865–885.

Coor.no, (n.d.) *Hva er sosial bærekraft?* Available at: https://www.coor.no/barekraft/sosialt-ansvar/hva-er-sosial-barekraft/

Corbin, J.M. and Strauss, A.L. (1990). Grounded Theory Research: Procedures, Canons and Evaluative Criteria. *Zeitschrift für Soziologie*, 19(6). doi:10.1515/zfsoz-1990-0602.

Corbin, J.M. and Strauss, A.L. (1998). *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*. 4th ed. Los Angeles: Sage.

Cunsolo Willox, A., Harper, S.L., Ford, J.D., Landman, K., Houle, K. and Edge, V.L. (2012). 'From this place and of this place:' Climate change, sense of place, and health in Nunatsiavut, Canada. *Social Science & Medicine*, [online] 75(3), pp.538–547. doi:10.1016/j.socscimed.2012.03.043.

Cunsolo, A. and Ellis, N.R. (2018). Ecological grief as a mental health response to climate change-related loss. *Nature Climate Change*, 8(4), pp.275–281. doi:10.1038/s41558-018-0092-2.

Cunsolo, A., Borish, D., Harper, S.L., Snook, J., Shiwak, I., Wood, M. and The Herd Caribou Project Steering C (2020). 'You can never replace the caribou': Inuit Experiences of Ecological Grief from Caribou Declines. *American Imago*, 77(1), pp.31–59. doi:10.1353/aim.2020.0002.

De Fine Licht, K. and Folland, A. (2019). Defining 'Social Sustainability': Towards a Sustainable Solution to the Conceptual Confusion. *Etikk i praksis - Nordic Journal of Applied Ethics*, (2), pp.21–39. doi:10.5324/eip.v13i2.2913.

Detsosialebarometeret.no (n.d.) *Velkommen til det sosiale barometeret!* Available at: https://detsosialebarometeret.no/

Engen, S., Hausner, V., Mikkelsen, E., Gundersen, H., Christie, H., Falk-Andersson, J., Espinasse, J., Lennert, A.E., Olsen, E. og Fauchald, P. (2020). Bærekraftig kyst: utvikling av et Kystbarometer for Nord-Norge. NINA Rapport 1736. Norsk institutt for naturforskning.

Engen, S., Hausner, V.H., Gurney, G.G., Broderstad, E.G., Keller, R., Lundberg, A.K., Murguzur, F.J.A., Salminen, E., Raymond, C.M., Falk-Andersson, J. and Fauchald, P. (2021). Blue justice: A survey for eliciting perceptions of environmental justice among coastal planners' and small-scale fishers in Northern-Norway. *PLOS ONE*, 16(5), p.e0251467. doi:10.1371/journal.pone.0251467.

Etikan, I., Musa, S.A. and Alkassim, R.S. (2016). Comparison of Convenience Sampling and Purposive Sampling. *American Journal of Theoretical and Applied Statistics*, 5(1), pp.1–4. doi:10.11648/j.ajtas.20160501.11.

FAO. 2020. *The State of World Fisheries and Aquaculture 2020. Sustainability in Action*. Rome. Available at: https://www.fao.org/3/ca9229en/ca9229en.pdf#page=20

Fiskeridirektoratet.no. (n.d.). *Akvakultur: Kartverktøyet.* Available at: https://portal.fiskeridir.no/portal/apps/webappviewer/index.html?id=87d862c458774397a8466b148e3dd147

Ferd.no, (n.d.) *Sustainability*. Available at: https://ferd.no/en/real-estate/sustainability/

Folkehelseinstituttet. (2020). Sosialt bærekraftige lokalsamfunn. *FHI.no*. Available at: https://www.fhi.no/hn/folkehelse/artikler/sosialt-barekraftige-lokalsamfunn/.

Foote, K. and Azaryahu, M. (2009). Sense of Place. *International Encyclopedia of Human Geography.* 10. 96-100. 10.1016/b978-008044910-4.00998-6.

Forseth, T., Barlaup, B.T., Finstad, B., Fiske, P., Gjøsæter, H., Falkegård, M., Hindar, A., Mo, T.A., Rikardsen, A.H., Thorstad, E.B., Vøllestad, L.A. and Wennevik, V. (2017). The major threats to Atlantic salmon in Norway. *ICES Journal of Marine Science*, 74(6), pp.1496–1513. doi:10.1093/icesjms/fsx020.

Foy, G. (1990). Economic sustainability and the preservation of environmental assets. *Environmental Management*, 14(6), pp.771–778. doi:10.1007/bf02394171.

Føre, H.M. and Thorvaldsen, T. (2021). Causal analysis of escape of Atlantic salmon and rainbow trout from Norwegian fish farms during 2010–2018. *Aquaculture*, 532, p.736002. doi:10.1016/j.aquaculture.2020.736002.

Galway, L.P., Beery, T., Jones-Casey, K. and Tasala, K. (2019). Mapping the Solastalgia Literature: A Scoping Review Study. *International Journal of Environmental Research and Public Health*, 16(15), p.2662. doi:10.3390/ijerph16152662.

Hannesson, R. (2015). World Fisheries in Crisis? *Marine Resource Economics*, 30(3), pp.251–260. doi:10.1086/680443.

Hawkes, J (2001) The Fourth Pillar of Sustainability: Culture's Essential Role in Public Planning. Australia: Common Ground Publishing Pty Ltd.

Hersoug, B. (2021). Why and how to regulate Norwegian salmon production? – The history of Maximum Allowable Biomass (MAB). *Aquaculture*, 545, p.737144. doi:10.1016/j.aquaculture.2021.737144.

Heuch, P.A., Bjørn, P.A., Finstad, B., Holst, J.C., Asplin, L. and Nilsen, F. (2005). A review of the Norwegian 'National Action Plan Against Salmon Lice on Salmonids': The effect on wild salmonids. *Aquaculture*, 246(1-4), pp.79–92. doi:10.1016/j.aquaculture.2004.12.027.

Higginbotham, N., Connor, L., Albrecht, G., Freeman, S. and Agho, K. (2006). Validation of an Environmental Distress Scale. *EcoHealth*, 3(4), pp.245–254. doi:10.1007/s10393-006-0069-x.

Hofstad, H. and Bergsli, H. (2017): Folkehelse og sosial bærekraft, en sammenlikning og diskusjon av begrepsinnhold, målsettinger og praktiske tilnærminger, NIBR-rapport 2017:15, Oslo: By- og regionforskningsinstituttet NIBR, OsloMet.

Hovland, E., Dag Møller, Haaland, A., Kolle, N., Bjørn Hersoug, Gunnar Nævdal and Vik, S. (2014). *Over den leiken ville han rå norsk havbruksnærings historie*. Bergen Fagbokforlaget.

Hydro.com (n.d./a). *Sustainability at Hydro*. Available at: https://www.hydro.com/en-NO/sustainability/

Hydro.com (n.d./b). *Social*. Available at: https://www.hydro.com/en-NO/sustainability/our-approach/social/

Hydro.com (n.d./c). Annual Report 2021. Available at: https://www.hydro.com/Document/Doc/Annual%20Report%202021%20ENG.pdf?docId=578763

Hydro.com (n.d./d). GRI index 2021. Available at: https://www.hydro.com/Document/Doc/GRI%20index%202021.pdf?docId=579308

Hydro.com (n.d./e) *Hydro's GRI Reporting compared to the SASB standard*. Available at: https://www.hydro.com/en-NO/sustainability/sustainability-reporting/hydros-gri-reporting-compared-to-the-sasb-standard/

IPCC, 2022: *Climate Change 2022: Impacts, Adaptation, and Vulnerability*. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press. In Press.

Johnsen, P.F., Erraia, J., Fjose, S., Blomgren, A., Fjelldal, Ø., Robertsen, R. and Nyrud, T. (2020). *Nasjonale ringvirkninger av sjømatnæringen i 2019*. Rapport. Menon-publikasjon nr. 98/2020.

Johnsen, I.A., Harvey, A., Sævik, P.N., Sandvik, A.D., Ugedal, O., Ådlandsvik, B., Wennevik, V., Glover, K.A. and Karlsen, Ø. (2021). Salmon lice-induced mortality of Atlantic salmon during post-smolt migration in Norway. *ICES Journal of Marine Science*, 78(4), pp.1555–1555. doi:10.1093/icesjms/fsab035.

Simon, J.L. (1996). *The Ultimate Resource 2*. Princeton, N.J.: Princeton University Press.

Kaltenborn, B.P., Linnell, J.D.C., Thomassen, J. and Lindhjem, H. (2017). Complacency or resilience? Perceptions of environmental and social change in Lofoten and Vesterålen in northern Norway. *Ocean & Coastal Management*, 138, pp.29–37. doi:10.1016/j.ocecoaman.2017.01.010.

Kapital.no. *Norges 400 rikeste*. Available at: https://kapital.no/kapital-index/norges-400-rikeste

Krøvel, A.V., Gjerstad, B., Skoland, K., Lindland, K.M., Hynes, S. and Ravagnan, E. (2019). Exploring attitudes toward aquaculture in Norway – Is there a difference between the Norwegian

general public and local communities where the industry is established? *Marine Policy*, 108, p.103648. doi:10.1016/j.marpol.2019.103648.

Kudryavtsev, A., Stedman, R.C. and Krasny, M.E. (2012). Sense of place in environmental education. *Environmental Education Research*, 18(2), pp.229–250. doi:10.1080/13504622.2011.609615.

Kuhlman, T. and Farrington, J. (2010). What is Sustainability? *Sustainability*, 2(11), pp.3436–3448.

Lee, R., Castree, N., Kitchin, R., Lawson, V.A., Anssi Paasi, Philo, C., Radcliffe, S., Roberts, S.M. and Withers, C.W.J. (2013). *The SAGE handbook of progress in human geography*. Los Angeles, California: Sage.

Lélé, S.M. (1991). Sustainable development: A critical review. *World Development*, 19(6), pp.607–621.

Lincoln, Y.S. and Guba, E.G. (1985). Naturalistic inquiry. *International Journal of Intercultural Relations*, 9(4), pp.438–439. doi:10.1016/0147-1767(85)90062-8.

Lindland, K.M., Gjerstad, B., Krøvel, A.V. and Ravagnan, E. (2019). Governing for sustainability in the Norwegian aquaculture industry. *Ocean & Coastal Management*, 179, p.104827. doi:10.1016/j.ocecoaman.2019.104827.

Liu, Y. and Bjelland, H. (2014). Estimating costs of sea lice control strategy in Norway. *Preventive Veterinary Medicine*, 117(3-4), pp.469–477. doi:10.1016/j.prevetmed.2014.08.018.

Liu, Y., Olaf Olaussen, J. and Skonhoft, A. (2011). Wild and farmed salmon in Norway—A review. *Marine Policy*, 35(3), pp.413–418. doi:10.1016/j.marpol.2010.11.007.

Maraña, M and Al, E. (2011). *Culture and Development : Evolution and Prospects*. Bilbao Unesco Etxea D.L.

Martine, G. and Alves, J.E.D. (2015).Economy, society and environment in the 21st century: three pillars or trilemma of sustainability? *Revista Brasileira de Estudos de População*, 32(3), pp.433–460. doi:10.1590/s0102-3098201500000027p.

Mason, J. (1996). *Qualitative researching*. Sage Publications, Inc.

Meadows, D. (1998). Indicators and Information Systems for Sustainable Development. Hartland/VT: Sustainability Institute.

Mensah, J. (2019). Sustainable development: Meaning, history, principles, pillars, and implications for human action: Literature review. *Cogent Social Sciences*, [online] 5(1). doi:10.1080/23311886.2019.1653531.

Mikkelsen, E., Myhre, M.S., Robertsen, R. and Winther, U. (2021). Making a Web-Portal With Aquaculture Sustainability Indicators for the General Public. *Frontiers in Sustainable Food Systems*, 5. doi:10.3389/fsufs.2021.644314.

Milewski, I. and Smith, R.E. (2019). Sustainable aquaculture in Canada: Lost in translation. *Marine Policy*, 107, p.103571. doi:10.1016/j.marpol.2019.103571.

Ministry of Trade, Industry and Fisheries. (2014a). Press release – *Growth in the Aquaculture Industry* (Nr: 36/2014: Pressemelding – *Regjeringen vil sikre vekst og konkurransekraft i havbruk*), 01.04.2014. Nærings- og Fiskeridepartementet.

Ministry of Trade, Industry and Fisheries. (2014b). Draft White Paper – *Growth in the Norwegian Salmon and Trout Aquaculture Industry* (Høringsnotat – *Melding til Stortinget om vekst i norsk lakse- og ørretoppdrett*). Nærings- og Fiskeridepartementet.

Ministry of Trade, Industry and Fisheries. (2017). Press release – *The traffic light system is launched.* (Pressemelding – *Regjeringen skrur på trafikklyset*), 30.10.2017. Nærings- og Fiskeridepartementet.

Misund, B., Osmunden, P., Tveterås, R., Folkvord, B., Nystøyl, R. and Rolland, K.H. (2020). *Grunnrenteskatt i havbruk - Et kunnskapsgrunnlag.* Faglig sluttrappport til Fiskeri- og havbruksnæringens forskningsfinansiering (FHF) prosjekt 901526.

Mohai, P., Pellow, D. and Roberts, J.T. (2009). Environmental Justice. *Annual Review of Environment and Resources*, 34(1), pp.405–430. doi:10.1146/annurev-environ-082508-094348.

Morelli, J. (2011). Environmental Sustainability: A Definition for Environmental Professionals. *Journal of Environmental Sustainability*, [online] 1(1), pp.1–10. doi:10.14448/jes.01.0002.

Nash, C.E. (2011). *The history of aquaculture*. Ames, Iowa: Wiley-Blackwell.

Naylor, R.L., Hardy, R.W., Buschmann, A.H., Bush, S.R., Cao, L., Klinger, D.H., Little, D.C., Lubchenco, J., Shumway, S.E. and Troell, M. (2021). A 20-year retrospective review of global aquaculture. *Nature*, 591(7851), pp.551–563. doi:10.1038/s41586-021-03308-6.

Norwegian Ministry of Fisheries and Coastal Affairs. (2005). *Aquaculture Act*. Act of 17 June 2005 no. 79 relating to aquaculture. Available at: https://www.regjeringen.no/globalassets/ upload/kilde/fkd/reg/2005/0001/ddd/pdfv/255327-l-0525_akvakulturloveneng.pdf

NRK.no. (2021). "Skattesjokk for oppdrett: - Knekker ryggen på det lokale eierskapet." Published 10.12.2021. Available at: https://www.nrk.no/norge/skattesjokk-for-oppdrett_-_-knekker-ryggen-pa-det-lokale-eierskapet-1.15755953

Nøstvold, B. H., Svorken, M., Ødegård, A. M., Andersen, R. K. & Young, J. A. (2019). Social Sustainability in Norwegian Fisheries – Evolution and Resilience in Fleet and Industry. Report 16/2019. Tromsø: Nofima AS

Oceanhealthindex.org. (n.d.) Ocean Health Index. What is the ocean health index? Available at: https://oceanhealthindex.org/about/

OECD. (2021). *OECD Review of Fisheries Country Notes*. January 2021.

Olafsen, T., Winther, U., Olsen, Y., Skjermo, J. (2012) *Value created from productive oceans in 2050*. Royal Norwegian Society of Sciences and Letters (DKNVS) and Norwegian Academy of Technological Sciences (NTVA) (Ed.) SINTEF Fisheries and Aquaculture.

Olaussen, J.O. (2018). Environmental problems and regulation in the aquaculture industry. Insights from Norway. *Marine Policy*, [online] 98, pp.158–163. doi:10.1016/ j.marpol.2018.08.005.

Olwig, K.R. (1996). Recovering the Substantive Nature of Landscape. *Annals of the Association of American Geographers*, 86(4), pp.630–653. doi:10.1111/j.1467-8306.1996.tb01770.x.

Osmundsen, T.C., Amundsen, V.S., Alexander, K.A., Asche, F., Bailey, J., Finstad, B., Olsen, M.S., Hernández, K. and Salgado, H. (2020). The operationalisation of sustainability: Sustainable aquaculture production as defined by certification schemes. *Global Environmental Change*, 60, p.102025. doi:10.1016/j.gloenvcha.2019.102025.

Paisley, L.G., Ariel, E., Lyngstad, T., Jónsson, G., Vennerström, P., Hellström, A. and Østergaard, P. (2010). An Overview of Aquaculture in the Nordic Countries. *Journal of the World Aquaculture Society*, 41(1), pp.1–17. doi:10.1111/j.1749-7345.2009.00309.x.

Pappas, E. (2012). A New Systems Approach to Sustainability: University Responsibility for Teaching Sustainability in Contexts. Journal of Sustainable Education, 3, 1-21.

Pfahl, S. (2005). Institutional sustainability. *International Journal of Sustainable Development*, 8(1/2), p.80. doi:10.1504/ijsd.2005.007376.

Pickard, S. (2021). 'You are stealing our future in front of our very eyes.' The representation of climate change, emotions and the mobilisation of young environmental activists in Britain. *E-rea*, (18.2). doi:10.4000/erea.11774.

Purvis, B., Mao, Y. and Robinson, D. (2018). Three pillars of sustainability: in search of conceptual origins. *Sustainability Science*, [online] 14(3), pp.681–695. doi:10.1007/s11625-018-0627-5.

Robertsen, R., Iversen, A., Nyrud, T., Hogrenning, E., Erraia, J., Fjose, S. and Grønnvik, O. (2022) *Ringvirkninger av havbruk, fiskeri og fisketurisme i Troms og Finnmark*. Rapport. Nofima.

Rockström, J., Steffen, W., Noone, K., Persson, Å., Chapin, F.S.I., Lambin, E., Lenton, T.M., Scheffer, M., Folke, C., Schellnhuber, H.J., Nykvist, B., de Wit, C.A., Hughes, T., van der Leeuw, S., Rodhe, H., Sörlin, S., Snyder, P.K., Costanza, R., Svedin, U. and Falkenmark, M. (2009). Planetary Boundaries: Exploring the Safe Operating Space for Humanity. *Ecology and Society*, [online] 14(2). doi:10.5751/es-03180-140232.

Seafoodsource.com. (n.d.). *Norway breaks seafood export records in 2021 | SeafoodSource*. Available at: https://www.seafoodsource.com/news/supply-trade/norway-breaks-seafood-export-records-in-2021

Simon, J. L. (1996). *The Ultimate Resource 2*. Princeton, N.J.: Princeton University Press.

SNL. (n.d./a) Store Norske Leksikon. *Tysfjorden*. Available at: https://snl.no/Tysfjorden

SNL. (n.d./b) Store Norske Leksikon. *Tysfjord (tidligere kommune)*. Available at: https://snl.no/Tysfjord_-_tidligere_kommune

SNL. (n.d./c) Store Norske Leksikon. *Harstad.* Available at: https://snl.no/Harstad

Soini, K. and Birkeland, I. (2014). Exploring the scientific discourse on cultural sustainability. *Geoforum*, 51, pp.213–223. doi:10.1016/j.geoforum.2013.12.001.

Somogyi, Z. (2016). A framework for quantifying environmental sustainability. *Ecological Indicators*, 61, pp.338–345. doi:10.1016/j.ecolind.2015.09.034.

Spangenberg, J.H. (2005). Economic sustainability of the economy: concepts and indicators. *International Journal of Sustainable Development*, [online] 8(1/2), p.47. doi:10.1504/ijsd.2005.007374.

SSB. 1991. Fiske og oppdrett av laks m.v. (Fishing and rearing of salmon, etc.). SSB, Oslo. Statistisk Sentralbyrå, Oslo.

SSB. 2020. *Aquaculture (terminated in Statistics Norway)*. SSB, Oslo, 29.10.2020. Statistisk Sentralbyrå, Oslo.

Stortingsmelding. St.meld. Nr.71, 1979–1980. Available at: https://www.stortinget.no/no/Saker-og-publikasjoner/Stortingsforhandlinger/Lesevisning/?p=1979-80&paid=3&wid=f&psid=DIVL62

Tacon, A.G.J. and Metian, M. (2009). Fishing for Aquaculture: Non-Food Use of Small Pelagic Forage Fish—A Global Perspective. *Reviews in Fisheries Science*, 17(3), pp.305–317. doi:10.1080/10641260802677074.

The Norwegian Directorate of Fisheries. (2021). *Key figures from Norwegian Aquaculture Industry 2020.* Report. 08.07.2021. Fiskeridirektoratet.

Tidwell, J.H. (2012). *Aquaculture Production Systems Tidwell/Aquaculture Production Systems*. Oxford, Uk Wiley-Blackwell.

UN General Assembly, (2015). *Transforming our world: the 2030 Agenda for Sustainable Development*, 21 October 2015, A/RES/70/1, available at: https://www.refworld.org/docid/57b6e3e44.html

UNCED. (1992). United Nations Conference on Environment & Development, Rio de Janeiro, Brazil, 3 to 14 June 1992. Agenda 21. Available at: https://sustainabledevelopment.un.org/content/documents/Agenda21.pdf

UNESCO. (1945). "Constitution of the United Nations Educational, Scientific and Cultural Organisation." Available at: http://unesdoc.unesco.org/images/0013/001337/133729e.pdf

UNESCO. (2001). UNESCO Universal Declaration on Cultural Diversity. 2 November 2001.

United Nations. (2017). *Global indicator framework for the Sustainable Development Goals and targets of the 2030 Agenda for Sustainable Development.* Department of Economic and Social Affairs.

WCCD. (1995). Our Creative Diversity: Report of the World Commission on Culture and Development. By the World Commission on Culture and Development. Paris: UNESCO, 1995.

WCED. (1987). World Commission on Environment and Development. *Our common future*. Oxford, Oxford University Press.

White, K., O'Neill, B and Tzankova, Z. (2004). *At a crossroads: Will aquaculture fulfill the promise of the blue revolution?* SeaWeb Aquaculture Clearinghouse.

White, M.A. (2013). Sustainability: I know it when I see it. *Ecological Economics*, 86, pp.213–217.

Wiersum, K.F. (1995). 200 years of sustainability in forestry: Lessons from history. *Environmental Management*, 19(3), pp.321–329.

Wiktor-Mach, D. (2018). What role for culture in the age of sustainable development? UNESCO's advocacy in the 2030 Agenda negotiations. *International Journal of Cultural Policy*, 26(3), pp.312–327. doi:10.1080/10286632.2018.1534841.

Yankelovich, D. (1972). Corporate Priorities: A Continuing Study of the New Demands on Business (Stanford, CT: Yankelovich Inc)

Åm, H. (2021). A critical policy study on why introducing resource rent taxation in Norwegian salmon aquaculture failed. *Marine Policy*, 131, p.104692. doi:10.1016/j.marpol.2021.104692.

9. APPENDIX

9.1 Qualitative Interview Guide

9.2 Information document/form of consent

9.3 Quantitative survey results

Intervjuguide for semi-strukturerte kvalitative intervjuer

Alle deltagere signerer skriftlig fullmakt (opptak, bruk av informasjon, bruk av bilder, etc.)

Spørsmål:	*Utbroderende/oppfølgingsspørsmål:*
Kan du fortelle litt om heimplassen din?	Hvor lenge har du bodd her? Hvor lenge har din familie hatt tilhørighet i området? Har du alltid bodd her, eller flytta hit/tilbake hit?
Kan du beskrive beliggenheten der du bor?	Bor du ved kysten/Hvor langt fra kysten? Naturnært? Hvor tettbygd/utbygd er området?
Hvordan bruker du kystlinja i dag?	Rekreasjon, fiske, bading, turer, visuelt? Har din bruk endret seg over tid? → Hvis ja – tanker om hvorfor?
Hvordan er din tilgang til kysten/fjorden?	Er det langt til kystlinja? Er kystlinja privatisert? (Utbygd, skilt/gjerder) Hvilke faktorer begrenser din tilgang?
Er det oppdrettsvirksomhet i ditt nærområde?	Hvor lenge har virksomheten vært der? Hvor synlig er virksomheten for deg? Påvirker virksomheten din bruk av kystlinja?
Hvordan opplever du oppdrettsvirksomheten i hverdagen?	Visuelt, lyd, lys, sosiale konsekvenser, økonomi, tilgang til naturområder?
Hvilke endringer har oppdrettsvirksomhet bidratt til på ditt hjemsted?	Hvilke endringer er positive? Hvilke er negative?
Hva betyr kysten og havet/fjorden for deg?	Identitet, tilknytning, historie?
Hvilke følelser har du registrert hos deg selv i forbindelse med endringer langs kystlinja?	Hvor inngripende er disse følelsene i din hverdag? Hvor ofte føler du…? Hvor sterkt føler du…? Varierer disse følelsene i frekvens/styrke? Hvis ja – hva påvirker variasjonen? (Årstid, nye anlegg, mediedebatt, e.l.?)
Hvordan har endringer av kystlinja påvirket ditt forhold til ditt nærområde?	Hva føler du om framtiden til ditt nærområde? Hva føler du om framtiden til landsdelen?
Hva gjør deg optimistisk for framtiden til din region/ditt nærområde?	Vitenskap, endringer i tenkning, nye ideer, generasjonsskifte, lovendringer?

Vil du delta i forskningsprosjektet

"A coastline altered by aquaculture:
Socio-cultural impacts in Arctic Norway"?

Du inviteres herved til å delta i et forskningsprosjekt i forbindelse med en masteroppgave i internasjonale miljøstudier (30 studiepoeng), hvor forskningen skal se på hvordan befolkningen i arktiske norske kystsamfunn kan oppleve endringer i kystlandskapet i forbindelse med oppdrettsvirksomhet, og om deres opplevelser av disse endringene faller innenfor definisjoner av *solastalgi* og/eller *økosorg*.

I dette skrivet finner du informasjon om målene for prosjektet og hva eventuell deltakelse vil innebære for deg.

Formål
Formålet med prosjektet er å få innsikt i hvordan oppdrettsnæringa har endret kystlinja i norske arktiske kystsamfunn, og hvordan disse endringene kan påvirke mennesker som lever tett på oppdrettsvirksomhet. Jeg vil analysere og sammenligne svar fra totalt 20 respondenter fordelt på to nordnorske kystkommuner, og se på forskjeller og likheter. Forskningsspørsmålene handler om opplevelsen av endringer i kystlinja, og hvordan disse opplevelsene påvirker stedsidentitet og følelser i hverdagen. Videre ser jeg på hvorvidt oppdrettsvirksomhet skaper endringer i hvordan man forestiller seg fremtiden på hjemstedet.

Hvem er ansvarlig for forskningsprosjektet?
Norges Miljø- og Biovitenskapelige Universitet (NMBU) er ansvarlig for prosjektet.

Hva innebærer det for meg å delta?
Hvis du velger å delta i prosjektet, innebærer det at du blir intervjuet av en masterstudent ved NMBU. Det vil ta deg ca. 1 time, og intervjuet finner ideelt sett sted på din hjemplass. Intervjuet inneholder spørsmål om hvordan du opplever oppdrettsnæringas påvirkning langs kysten i din hjemkommune, både sosialt, kulturelt og emosjonelt. Det tas lydopptak og notater under intervjuet.

Det er frivillig å delta
Det er frivillig å delta i prosjektet. Hvis du velger å delta, kan du når som helst trekke samtykke tilbake uten å oppgi noen grunn. Alle opplysninger om deg vil da bli anonymisert. Det vil ikke ha noen negative konsekvenser for deg hvis du ikke vil delta, eller senere velger å trekke deg.

Ditt personvern – hvordan vi oppbevarer og bruker dine opplysninger
Vi vil bare bruke opplysningene om deg til formålene vi har fortalt om i dette skrivet. Vi behandler opplysningene konfidensielt og i samsvar med personvernregelverket.
- Student og veileder vil ha tilgang ved behandlingsansvarlig institusjon
- Navnet og kontaktopplysningene dine vil bli erstattet med en kode som lagres på egen navneliste adskilt fra øvrige data.

Hva skjer med opplysningene dine når vi avslutter forskningsprosjektet?

Prosjektet skal etter planen avsluttes 15. mai 2022. Personopplysninger anonymiseres ved prosjektslutt.

Dine rettigheter
Så lenge du kan identifiseres i datamaterialet, har du rett til:
- Innsyn i hvilke personopplysninger som er registrert om deg
- Å få rettet personopplysninger om deg
- Å få slettet personopplysninger om deg
- Å få utlevert en kopi av dine personopplysninger (dataportabilitet)
- Å sende klage til personvernombudet eller Datatilsynet om behandlingen av dine personopplysninger.

Hva gir oss rett til å behandle personopplysninger om deg?
Vi behandler opplysninger om deg basert på ditt samtykke.

På oppdrag fra *Norges Miljø- og Biovitenskapelige Universitet (NMBU)* har Norsk Senter for forskningsdata AS (NSD) vurdert at behandlingen av personopplysninger i dette prosjektet er i samsvar med personvernregelverket.

Hvor kan jeg finne ut mer?
Hvis du har spørsmål til studiet, eller ønsker å benytte deg av dine rettigheter, ta kontakt med:

Katharina Karlsen Hessen *(masterstudent)*
- E-post: katharinh@nmbu.no)
- Telefon: 977 17 608

Norges Miljø- og Biovitenskapelige Universitet (NMBU) ved Poul Wisborg *(veileder/ prosjektansvarlig)*
- E-post poul.wisborg@nmbu.no

Vårt personvernombud: Hanne Pernille Guldbrandsen
- E-post: personvernombud@nmbu.no
- Telefon: 402 81 558

NSD – Norsk senter for forskningsdata AS
- E-post: personverntjenester@nsd.no
- Telefon: 555 82 117

Med vennlig hilsen,

Katharina Karlsen Hessen,
Masterstudent i Internasjonale Miljøstudier ved NMBU

Samtykkeerklæring

Jeg har mottatt og forstått informasjon om prosjektet *"A coastline altered by aquaculture: Socio-cultural impacts in Arctic Norway"?,* og har fått anledning til å stille spørsmål.

Jeg samtykker til:

- Deltagelse på intervju
- Lydopptak av intervjuet
- Eventuell bruk av landskapsbilder fra mitt hjemsted, etter avtale med intervjuansvarlig.

Jeg samtykker til at mine opplysninger behandles frem til prosjektet er avsluttet, omtrentlig 15. mai 2022.

(Signert av prosjektdeltaker, dato)

Rapport fra «Oppdrettsvirksomhet i møte med kystsamfunn»

Innhentede svar pr. 15. juni 2022 02:54

- Leverte svar: **178**
- Påbegynte svar: **0**
- Antall invitasjoner sendt: **0**

Med fritekstsvar
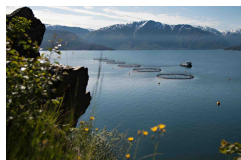
Denne spørreundersøkelsen skal brukes i forbindelse med en masteroppgave ved fakultetet for landskap og samfunn på Norges Miljø- og Biovitenskapelige Universitet (NMBU), hvor fokuset er på sosio-kulturelle konsekvenser av oppdrettsvirksomhet.

Dine svar vil utgjøre en del av datagrunnlaget som analyseres i oppgava, og som informerer videre forskning på temaet. Ingen personupplysninger samles inn utover de som er oppgitt i selve spørreskjemaet.

Aldersgruppe:

Svar	Antall	Prosent	
18-35	30	**16,9 %**	
35-60	100	**56,2 %**	
60-90+	48	**27 %**	

Kjønn:

Svar	Antall	Prosent	
Kvinne	58	**32,6 %**	
Mann	120	**67,4 %**	
Annet	0	**0 %**	

Bosted (antall innbyggere):

Svar	Antall	Prosent	
Lita bygd (0-200)	51	**28,7 %**	
Bygd (200-500)	80	**44,9 %**	
Liten by (5000-20 000)	29	**16,3 %**	
Mellomstor by (20 000-100 000)	18	**10,1 %**	
Stor by (100 000+)	3	**1,7 %**	

Hvor langt fra nærmeste kystlinje (hav eller fjord) bor du?

Svar	Antall	Prosent	
Ser kysten fra mitt bosted	147	**82,6 %**	
Bor en kort spasertur fra kysten	32	**18 %**	
Bor en lengre spasertur fra kysten	3	**1,7 %**	
Må kjøre/busse for å komme til kysten	4	**2,2 %**	

Hvor ofte ferdes du langs kystlinja (båt, svømming, til fots, sykkel, kajakk, osv.)?

Svar	Antall	Prosent	
Daglig	93	**52,2 %**	
Ukentlig	70	**39,3 %**	

Svar	Antall	Prosent	
Månedlig	14	**7,9 %** ▬	
Sjeldent/aldri	4	**2,2 %** ▪	

Har din bruk av kystlinja endret seg over de siste 5-15 årene?

Svar	Antall	Prosent	
Ja, bruker den mindre	38	**21,3 %** ▬	
Ja, bruker den mer	49	**27,5 %** ▬	
Nei, bruker den like mye/like lite	89	**50 %** ▬▬	
Har ikke bodd nær kystlinja i over 5 år	3	**1,7 %** ▪	

Hvilke av disse faktorene opplever du at begrenser din bruk av kystlinja?

Flere alternativer kan velges.

Svar	Antall	Prosent	
Bratt/utilgjengelig område (naturlig utilgjengelig)	32	**18 %** ▬	
Private inngrep (bygg, gjerder, skilt)	45	**25,3 %** ▬	
Offentlige inngrep (bygg, gjerder, skilt)	26	**14,6 %** ▬	
Oppdrettsnæringa	82	**46,1 %** ▬▬▬	
Fiskerinæringa	7	**3,9 %** ▪	
Andre næringer enn fiskeri og oppdrett	7	**3,9 %** ▪	
Egen helse	18	**10,1 %** ▬	
Dårlig tid	44	**24,7 %** ▬	
Ikke spesielt interessert i å bruke kystlinja	5	**2,8 %** ▪	
Ingen av de overnevnte faktorene begrenser min bruk av kystlinja	45	**25,3 %** ▬	

Av de samme faktorene, hvilke TO faktorer opplever du at i størst grad begrenser din bruk av kystlinja?

Kun to alternativer kan velges.

Svar	Antall	Prosent	
Bratt/utilgjengelig område (naturlig utilgjengelig)	28	**15,7 %** ▬	
Private inngrep (bygg, gjerder, skilt)	36	**20,2 %** ▬	
Offentlige inngrep (bygg, gjerder, skilt)	19	**10,7 %** ▬	
Oppdrettsnæringa	72	**40,4 %** ▬▬▬	
Fiskerinæringa	4	**2,2 %** ▪	
Andre næringer enn fiskeri og oppdrett	2	**1,1 %** ▪	
Egen helse	12	**6,7 %** ▬	
Dårlig tid	42	**23,6 %** ▬	
Ikke spesielt interessert i å bruke kystlinja	6	**3,4 %** ▪	
Ingen av de overnevnte faktorene begrenser min bruk av kystlinja	45	**25,3 %** ▬	

Hvor langt fra nærmeste oppdrettsanlegg bor du?

Svar	Antall	Prosent	
Ser/hører oppdrettsanlegg fra mitt bosted	78	**43,8 %** ▬▬	
Bor en kort spasertur fra oppdrettsanlegg	31	**17,4 %** ▬	
Bor en lengre spasertur fra oppdrettsanlegg	30	**16,9 %** ▬	
Må kjøre/busse for å komme til et oppdrettsanlegg	44	**24,7 %** ▬	

Hvor lenge har oppdrettsvirksomhet vært tilstede i ditt nærområde?

Svar	Antall	Prosent	
Oppdrettsvirksomhet er ikke tilstede i mitt nærområde	8	**4,5 %** ▫	
Oppdrettsvirksomhet er planlagt, men ikke startet	11	**6,2 %** ▫	
I under 5 år	5	**2,8 %** ▫	
5-10 år	30	**16,9 %** ▭	
I over 10 år	47	**26,4 %** ▭	
I over 20 år	83	**46,6 %** ▭	

Opplever du at oppdrettsvirksomhet endrer din tilgang til og/eller bruk av nærområdet ditt?

Svar	Antall	Prosent	
Ja, i stor grad	46	**25,8 %** ▭	
Ja, i noen grad	37	**20,8 %** ▭	
Ja, men i liten grad	15	**8,4 %** ▫	
Nei	71	**39,9 %** ▭	
Nei, det er ikke oppdrettsvirksomhet i mitt nærområde	9	**5,1 %** ▫	

Hvilke av disse opplever du i forbindelse med oppdrettsvirksomhet i ditt område?

Flere alternativer kan velges.

Svar	Antall	Prosent	
Støy fra drift	38	**21,3 %** ▭	
Støy eller andre forulempelser fra transport	16	**9 %** ▫	
Ubehagelig belysning	41	**23 %** ▭	
Forsøpling i vann eller på land	72	**40,4 %** ▭	
Utslipp av organisk eller kjemisk avfall	80	**44,9 %** ▭	
Endret tilgang til fiskefelt eller annen fangst/høsting	88	**49,4 %** ▭	
Endring i dyre- og/eller plantelivet i området	60	**33,7 %** ▭	
Endret tilgang til rekreasjonsbruk (bading, båtliv, turgåing, o.l.)	49	**27,5 %** ▭	
Endret utsikt/visuell forurensning	67	**37,6 %** ▭	
Opplever ingen av de overnevnte faktorene i forbindelse med oppdrettsvirksomhet i mitt område	54	**30,3 %** ▭	
Det er ikke oppdrettsvirksomhet i mitt nærområde	7	**3,9 %** ▫	

Av de samme faktorene, hvilke TO faktorer opplever du som mest skadelige/inngripende i forbindelse med oppdrettsvirksomhet i ditt område.

Kun to alternativer kan velges.

Svar	Antall	Prosent	
Støy fra drift	7	**3,9 %** ▫	
Støy eller andre forulempelser fra transport	3	**1,7 %** ▫	
Ubehagelig belysning	8	**4,5 %** ▫	
Forsøpling i vann eller på land	40	**22,5 %** ▭	
Utslipp av organisk eller kjemisk avfall	59	**33,1 %** ▭	
Endret tilgang til fiskefelt eller annen fangst/høsting	43	**24,2 %** ▭	
Endring i dyre- og/eller plantelivet i området	41	**23 %** ▭	
Endret tilgang til rekreasjonsbruk (bading, båtliv, turgåing, o.l.)	13	**7,3 %** ▫	
Endret utsikt/visuell forurensning	17	**9,6 %** ▫	
Opplever ingen av de overnevnte faktorene i forbindelse med oppdrettsvirksomhet i mitt område	51	**28,7 %** ▭	
Det er ikke oppdrettsvirksomhet i mitt nærområde	10	**5,6 %** ▫	

I hvilken grad føler du at oppdrettsvirksomhet (planlagt eller eksisterende) har påvirket deg negativt?

Svar	Antall	Prosent	
I svært stor grad	42	**23,6 %**	
I stor grad	35	**19,7 %**	
I noen grad	23	**12,9 %**	
I liten grad	17	**9,6 %**	
Har ikke blitt negativt påvirket	60	**33,7 %**	
Det er ikke oppdrettsvirksomhet i mitt nærområde	5	**2,8 %**	

Hvor enig er du i denne uttalelsen:

"Min identitet er knyttet til naturen i og rundt havet/fjorden."

Svar	Antall	Prosent	
Svært uenig	5	**2,8 %**	
Uenig	0	**0 %**	
Litt enig	21	**11,8 %**	
Enig	63	**35,4 %**	
Svært enig	90	**50,6 %**	

Hvor enig er du i denne uttalelsen:

"Inngrep i og rundt havet/fjorden påvirker eller vil påvirke min identitet."

Svar	Antall	Prosent	
Svært uenig	20	**11,2 %**	
Uenig	23	**12,9 %**	
Litt enig	37	**20,8 %**	
Enig	49	**27,5 %**	
Svært enig	48	**27 %**	

Hvor enig er du i denne uttalelsen:

"Inngrep i forbindelse med oppdrettsvirksomhet påvirker eller vil påvirke min identitet."

Svar	Antall	Prosent	
Svært uenig	35	**19,7 %**	
Uenig	29	**16,3 %**	
Litt enig	27	**15,2 %**	
Enig	41	**23 %**	
Svært enig	46	**25,8 %**	

Hvor enig er du i denne uttalelsen:

"Inngrep i forbindelse med oppdrettsvirksomhet påvirker eller vil påvirke hva jeg føler for mitt nærområde/min nærnatur."

Svar	Antall	Prosent	
Svært uenig	33	**18,5 %**	
Uenig	28	**15,7 %**	
Litt enig	20	**11,2 %**	
Enig	29	**16,3 %**	
Svært enig	68	**38,2 %**	

I forbindelse med eksisterende eller planlagt oppdrettsvirksomhet i ditt nærområde, hvilke av disse følelsene har du registrert hos deg selv?

Flere alternativer kan velges.

Svar	Antall	Prosent	
Sinne	71	**39,9 %** ▭	
Glede	29	**16,3 %** ▭	
Frustrasjon	82	**46,1 %** ▭	
Tilfredshet	15	**8,4 %** ▫	
Sorg	53	**29,8 %** ▭	
Optimisme	47	**26,4 %** ▭	
Pessimisme	41	**23 %** ▭	
Håp	22	**12,4 %** ▫	
Skuffelse	72	**40,4 %** ▭	
Likegyldighet	8	**4,5 %** ▫	
Stolthet	31	**17,4 %** ▫	
Avmakt	71	**39,9 %** ▭	
Lettelse	7	**3,9 %** ▫	
Avsky	45	**25,3 %** ▭	
Det er ikke oppdrettsvirksomhet i mitt nærområde	6	**3,4 %** ▫	
Opplever ingen av disse	10	**5,6 %** ▫	

Hvor ofte opplever du negative følelser/sinnsstemninger i forbindelse med eksisterende eller planlagt oppdrettsvirksomhet?

Svar	Antall	Prosent	
Daglig	38	**21,3 %** ▭	
Ukentlig	38	**21,3 %** ▭	
Månedlig	20	**11,2 %** ▫	
Sjeldent	23	**12,9 %** ▫	
Aldri	55	**30,9 %** ▭	
Det er ikke oppdrettsvirksomhet i mitt nærområde	5	**2,8 %** ▫	

I forbindelse med oppdrettsvirksomhet i ditt nærområde -- registrerer du noen av disse tankene/følelsene hos deg selv?

Flere alternativer kan velges.

Svar	Antall	Prosent	
Mindre positiv oppfatning av mitt nærområde	51	**28,7 %** ▭	
Endret følelse av tilhørighet	21	**11,8 %** ▫	
Mindre glede ved bruk av mine nære uteområder	67	**37,6 %** ▭	
Mer bekymret for framtiden til mitt nærområde	83	**46,6 %** ▭	
Tanker om å flytte fra mitt nærområde	18	**10,1 %** ▫	
Bekymringer for økt oppdrettsvirksomhet i mitt nærområde	84	**47,2 %** ▭	
Følelser av tap og sorg	43	**24,2 %** ▭	
Nedstemthet i møte med kystlinja	34	**19,1 %** ▫	
Jeg opplever ingen av de nevnte tankene/følelsene	63	**35,4 %** ▭	
Det er ikke oppdrettsvirksomhet i mitt nærområde	8	**4,5 %** ▫	

Takk for din deltagelse!

Del gjerne spørreundersøkelsen med noen du tror den har relevans for.

Eventuelle kommentarer til undersøkelsen: