

The FAO and transmission of global aquaculture soft law instruments
– A case study on Australian and Norwegian aquaculture perspectives and the role of the FAO

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The FAO as an international global policy actor for aquaculture management and governance sets out to provide nations with recommendations to help manage aquaculture operations across the globe in a sustainable manner. In their pursuit to help guide domestic policymakers they have produced a number of ‘soft law’ instruments to help facilitate progress towards achieving their goals. The thesis explores two developed nations of Australia and Norway who are heavily invested in aquaculture operations. The two case studies detail each country’s approach in management and investigate if the FAO is influential in policymaking or if the information exchange is valued in either country. The thesis asks what is the extent of the FAO efforts in transmission of science and policy advice for aquaculture, and is it effective and valued by national actors?

The Science Policy Interface concept was used to help illuminate the characteristics of information flow between the FAO and the two developed countries. Whilst theory on ‘epistemic communities’ was introduced to help understand how certain actors can hold power in shaping states interests. The concept of soft law was also explored to help find out if the instruments that the FAO produce are effective. By using these different, albeit related concepts, the research study aims to unpack the movement of science and how it is implemented within states.

The research study adopted a qualitative content analysis of the Australian and Norwegian strategies and plans to help illuminate the policy output for aquaculture management of each nation to see if it aligned with the FAO’s output. The analysis discovered both countries have strong growth targets for aquaculture into the future, however both countries acknowledge the need to adopt a regulatory framework that consults science and achieves sustainable management of aquaculture. Both countries place high importance on international cooperation and the study revealed in some cases it is mutually beneficial to ascribe to an international network.

With further analysis the study was able to conclude that the flow of information within the science policy interface moves both ways which produces an interdependent relationship between the FAO and Australia and Norway. Whilst the study also revealed that epistemic communities do hold some power in shaping states interests and soft law instruments can be useful at shaping states narratives towards sustainability of ocean resources.

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Joelle Roderick

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LIST OF ABBREVIATIONS

BGI – Blue Growth Initiative

CCRF – Code of Conduct for Responsible Fisheries

EAA – Ecosystem Approach to Aquaculture

EEZ – Exclusive Economic Zone

FAO – Food and Agricultural Organisation

SPI – Science Policy Interface

UN – United Nations

UNCLOS – UN Convention on the Law of the Sea

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CHAPTER 1 – INTRODUCTION

The sustainability of ocean and marine ecosystems are certainly on the agenda within international organisations. As governments face mounting pressures to conserve, protect, develop, and utilise the ocean all concurrently, they are then faced with some of the greatest challenges in contemporary environmental governance. More recently the ocean has been described as the “new economic frontier” or has been touted as the next “blue revolution”. It is evident that governments and industry see huge potential within the ocean to utilise the ocean space and extract or harvest its resources, and amongst those opportunities is aquaculture.

The aquaculture industry represents one of the fastest growing agricultural industries worldwide and is seen as an industry that can alleviate food security issues, as wild fish stocks are becoming exhausted. Whilst also making substantial contributions to national economies and providing significant employment opportunities for millions of people worldwide, especially in rural communities. The world has seen rapid growth in aquaculture and it is estimated that aquaculture production in 2018 reached an all-time high of 114.5 million tonnes and was valued at USD 263.6 billion (FAO, 2020f, p. 21). The fish products generated from aquaculture account for about 46 percent of total production of fish for human consumption (FAO, 2020f). Coastal aquaculture and mariculture which is conducted in the sea in a marine water environment combined produced 30.8 million tonnes (USD 106.5 billion) of aquatic animals in 2018 (FAO, 2020f, p. 26). In a short space of time we have been witness to intensive aquaculture production revolutionising the way humans consume marine resources. Whilst we see huge aquaculture expansion around the world, there are several environmental, social, economic, health, safety and ethical issues and conflicts that have evolved. Some environmental effects include destruction of local ecosystems from effluents seeping from aquaculture farming sites, contamination of wild fish stocks from escaped fish spreading disease and parasites. Environmental impacts from chemical use and drugs in the treatment of sea lice infestations. Contamination from fish food pellets and impacts of faeces from farmed fish causing sedimentation and changes in oxygen levels. Social conflicts have also arisen with other uses of the sea such as traditional fishers and recreational boaters feeling they are losing access to ocean spaces. Whilst aquaculture sites compete for ocean space with recreational users and in some case tourism operators, conflicts arise over aquaculture producing noise, odour, and visual impacts. Questions on how the industry will cope and adapt to climatic changes as well as reducing its ecological footprint. Ethical questions have also arisen from the use of genetic material being used to amplify aquaculture production as well as antibiotic use. These are just some of the impacts and issues that come from aquaculture farming and it is clear that the management and control of aquaculture is complex and requires effective governance and regulation.

In terms of the governance of coastal and marine aquaculture and addressing the challenges and disputes that occur, there is no negotiated international treaty currently. VanderZwaag (2016, p. 11) explains “aquaculture operations are largely regulated at the national level with each coastal state having the right to develop and control aquaculture activities within its offshore zones of jurisdiction”. So, with no specific treaty, countries are left with the task of establishing their own governance standards for aquaculture and sorting out the input of science in their decision making for policy. There is no global government, however several international organisations have emerged to promote sustainability of oceans and assist countries with policy and governance initiatives. These international organisations have developed various soft law instruments, principles, and approaches in their pursuit to guide domestic policymakers, and with the ultimate goal of achieving sustainable development. The Food and Agricultural Organisation (FAO) of the United Nations is widely recognised as an institution that has provided a large contribution to the global governance of aquaculture, however their success and effectiveness depends largely on domestic actors enforcement of their recommendations and commitments. The FAO sets out to aid global efforts to improve fisheries practices by raising awareness of issues and promoting sustainable practices in the conservation of the marine environment.

There are mixed opinions regarding international systems for governance and their efficiency and output of principles. Does the information exchange help and are international organisations effective in achieving their goals? Are they influencing policy decisions? Do states even care about international organisations and their output of science?

To consider the FAO’s role as a global policy actor what is it that they contribute and achieve as an international organisation? The main **research question** to be addressed is:

What is the extent of the FAO efforts in transmission of science and policy advice for aquaculture, and is it effective and valued by national actors?

Further on from this, the FAO does not hold the power to contract or enforce legally binding agreements, nor to apply sanctions against member states. So, if recommendations are only politically binding and domestic follow up is voluntary. **Why are soft law instruments used and can they be useful?**

The thesis examines the policy recommendations and soft law instruments launched by the United Nations Food and Agricultural Organisation (FAO) for aquaculture regulation and management. It looks at how the FAO as a global policy actor contributes to the discourse on sustainable aquaculture. The thesis then explores two developed nations of Australia and Norway who are heavily invested in aquaculture operation. The two case studies will detail each country’s approach in management and investigate if the FAO is influential in policymaking or if the information exchange is valued in either country.

The following section outlines the overall methodological framework which consists of a research design and methods along with data collection and data analysis procedures. The following research strategy will allow me to understand and compare the operation of Aquaculture within the two nations of Australian and Norway and analyse the governance and their structures, strategies, goals and policy implementation and draw comparisons. I have chosen Australia and Norway partly because I currently reside in Norway and my country of origin is Australia, therefore, it helps with ease of access to conduct interviews with key decision makers and governmental officials. By choosing two countries rather than one it will help to illuminate different institutional settings and help to provide further explanations or comparisons. By comparing it may help to reflect and find variation in different contexts. At first glance both countries have similar developed economies, and they are both democratic states with economies that rely on the extraction of natural resources. While geographically located at opposite ends of the world I hope to discover similarities and differences between the two countries as this research project progresses.

1.1 Research approach, framework, and methodology

The research was conducted as qualitative research with the aim of gaining a deep understanding of specific organisations. The strengths of qualitative studies are appropriate for research that is exploratory or descriptive, it helps the researcher to gain a deep and richer insight into the phenomenon under study. A comparative case study approach was chosen for the design of this thesis, to investigate two developed countries and illuminate their approaches towards sustainable aquaculture. Yin (2014, p. 16) defines a case study as “an empirical inquiry that; a) investigates a contemporary phenomenon within its real-life context, when b) the boundaries between phenomenon and context are not clearly evident, and in which c) multiple sources of evidence are used”. The thesis study involves a comparative case study of Australian and Norwegian policymaking for aquaculture sustainability, highlighting their approaches and decisions and an investigation of whether each country value the scientific input from the FAO. Yin (2014) argues that a multiple case study approach allows the researcher to explore differences between and within cases. Comparisons are then able to be drawn, however it is important that the researcher carefully choose and replicates cases in order for similar results to be predicted across cases or to highlight contrasting results.

The thesis adopts an abductive research strategy, a strategy that is useful in answering “what” and “why” research questions. Blaikie (2010, p. 92) posits that an abductive research strategy helps to understand social actors language, it’s meanings and motives and this strategy has two stages firstly to describe the activities and meanings and then derive categories and concepts that can be useful in understanding the problem at hand. Therefore, the abductive strategy seems to help the researcher to gain an “insider” view rather than imposing an “outsider” view. With the aim of uncovering “the

largely tacit, mutual knowledge, the symbolic meanings, intentions, and rules, which provide the orientations for their actions” (Blaikie, 2010, p. 89).

The data collection for the thesis consisted mainly of a qualitative content analysis of strategy and planning documents which is explained in further detail below. The plan included conducting several semi-structured interviews with policy decision-makers in both countries, however I was only successful in collecting data from Australian interviewees as my requests for interviews in Norway were declined. Requests for interviews were also sent to the FAO Fisheries and Aquaculture Department and Evaluation department with no response back.

Qualitative content analysis is a method that systematically analyses textual information, it involves focusing on a subject and context while highlighting variation and parallels. Halperin and Heath (2017, p. 345) explain that “researchers can get material on decision-making without interviewing the decision-makers”, so it is a rather unobtrusive method of data collection. Compared to semi-structured interviews that may produce biases and prejudices from the interviewee, content analysis helps to reduce bias and helps to methodically analyse official statements. In general it is more concerned with the “latent content”, the content that is “between the lines” and involves some form of systemization of chosen documents that “expose the meanings, motives, and purposes embedded within the text, and to infer valid hidden or underlying meanings of interest to the researcher” (Halperin & Heath, 2017, p. 346).

For this thesis research I chose four strategy and planning documents each from Australia and Norway, firstly I tried to find governmental documents that detailed aquaculture planning and strategy specifically but then broadened the search to include ocean strategies that included aquaculture. Whilst defining the categorisations of the data analysis, I then also included governmental documents on foreign and development policy for oceans. Following on from investigating each countries background and situation within the aquaculture industry documents were chosen that would give insight into each governments position on sustainable management of oceans and aquaculture in particular. For Australia, two documents from the federal government were chosen, the *National Marine Science Plan 2015-2025* developed by the Marine Science Committee and the *National Aquaculture Strategy 2017* developed by the Department of Agriculture and Water Resources in consultation with the National Aquaculture Council and State and territorial governmental departments. In addition, the *Sustainable Industry Growth Plan for the Salmon Industry* produced by the Department of Primary Industries, Parks, Water and Environment for the Tasmanian Government was chosen. The one-year review of this strategy was also chosen as both will give insight into the policy goals of a specific state within Australia, the State of Tasmania. For Norway two Norwegian ministry strategy reports were chosen, the 2017 Ocean Strategy “*New Growth, Proud History*” and the

updated version launched in 2019 titled “*Blue Opportunities*”. Both reports were presented by the Norwegian Ministry of Trade, Industry and Fisheries. In addition to these reports, two reports to the parliament were chosen, which were *Meld. St. 22 (2016-2017) The place of the Ocean’s in Norway’s foreign and development policy* and finally *Meld. St. 16 (2014-2015) Predictable and environmentally sustainable growth in Norwegian salmon and trout farming*.

In reviewing these documents and where some of them were quite substantial and cover a wide range of industries within the ocean space, some limitations were initiated in the content analysis. This is where previously established categorisations that were selected helped the coding step. When conducting a qualitative content analysis, it is usual to create a coding protocol and initiate a process of categorisation. “The protocol will reflect a set of decisions that ensures that the researcher will code things consistently throughout the text, in the same way every time” (Halperin & Heath, 2017, p. 349) Whilst categories were chosen for the analysis of the texts, there was allowance for categories to emerge out of the data during the analysis. For this thesis project, there were two main categories and they were purposely defined in a wide scope, in order to provide as much insight for answering the research questions. The main categories in this research are; firstly, all reference to a governance and policy approach and secondarily all references to science and any consideration to international cooperation and their agreements.

The first category, governance and policy approach, will include measures towards sustainable management of ocean resources looking out for similar approaches that are touted by the FAO, such as “Blue Growth Initiative”, “Ecosystem Approach to Aquaculture” or “Precautionary Principle”. The second category is references to science and cooperation with international organisation and their agreements to help determine if either nation care and value international input and if science input from boundary organisations is influential.

In March 2019 semi-structured background interviews were conducted over a two-day period in Hobart, Tasmania. The interviews took place with a senior research fellow and a research fellow from the University of Tasmania (UTAS). Whose interests involve governance, public policy, decision-making, institutional dimensions of marine social-ecological systems and political participation and the other who is knowledgeable about the Tasmanian aquaculture situation and is interested in improving linkages between science and decision makers in coastal areas. The following day two policy-officers were interviewed from the Tasmanian State Government within the Department of Primary Industries, Parks, Water and Environment who are part of the Marine Farming – Aquaculture section. This department oversees the planning and management for any Tasmanian aquaculture. All the interviews conducted in Hobart, Tasmania helped to gain insight and background on the planning

processes and challenges in aquaculture in the Tasmanian context. It also allowed me to form contacts that I could question further as the research project progressed.

Following on from these background interviews and as the research project progressed, a semi-structured interview guide was created (see appendix). A consent form was also created in line with the Norwegian personal data protection requirements. The project was registered with the Norwegian Centre for Research Data (NSD) prior to the interviews and was approved. All interview requests were sent over email, out of the 14 requests sent I had four responses. The low response rate could be attributed to the sensitivity of the topic and governmental officials being restricted to divulge information. As all respondents were located in Australia at the time and due to time differences decided to respond in writing. Below is a list of the Interviewees, in order to keep their anonymity as they specifically requested, names have been removed. The interview guide contained questions in regard to information requirements for decision making and questions about any affiliations with the FAO or familiarisations of FAO concepts, documents or attendance to FAO conferences. As mentioned earlier requests for interviews with the Ministry of Trade, Industry and Fisheries of the Norwegian Government was sent and a request to the Fisheries Directorate was also sent. Although I did receive a reply from both departments initially, it proved difficult to secure an interview. This could partly be due to Covid-19 pandemic at the time which restricted access.

No.	Affiliation
1	Government Official, working for the Department of Agriculture, Water and the Environment, Australian Federal Government
2	State Government Official, aquaculture manager
3	State Government Official, aquaculture leader
4	State Government Official, marine farming manager

1.2 Thesis Outline

This thesis consists of eight chapters, below is a general outline of the research study.

Chapter 2 introduces the theoretical framework, which starts with introducing the concept of the Science Policy Interface which helps to describe the characteristics of scientific information use and flow of information. The chapter then introduced the theory behind “epistemic communities” to help understand how science communities operate, investigating if they hold any power in shaping knowledge for states. Lastly “soft law” was introduced to highlight the instruments used by these science communities to shape state behaviour. In **Chapter 3** a global perspective on aquaculture governance was introduced, highlighting what instruments are available help states to manage aquaculture. The FAO was introduced in this chapter and a description of how they operate and the instruments they promote to shape states policy output. **Chapter 4** introduced Australia’s aquaculture

industry and its policy and regulatory environment for aquaculture. Because Australia is made up of states and territories, the state of Tasmania was highlighted here to illuminate the governance at the state level. **Chapter 5** introduced the Norwegian context illuminating their policy and regulatory environment. **Chapter 6** presents the empirical findings of the research study, firstly the findings for Australia is presented and then Norway. **Chapter 7** presents a discussion of the results. Finally, **Chapter 8** presents the conclusion to this research study.

CHAPTER 2 – THEORY

The following section forms the theoretical backdrop of the thesis. Scientific information plays a valuable role in the search for solutions to policy problems in the ocean space. When searching for understanding of how scientific information is used and communicated, I found the concept of the Science Policy Interface. This concept helps to illuminate the flow of science information across the different levels from International organisations to domestic policy makers and other actors. I also introduce the concept of Epistemic communities, a theory explaining the role of experts and the forming of science communities that influence and shape policy formation. In the thesis I consider the FAO as a “epistemic community” and am interested to find out if they have some influence in shaping nations policy preferences and what are the benefits to this sort of community forming. Lastly, I introduce the concept of ‘soft law’, a term to describe non-binding instruments, here I am interested in investigating if the soft law instruments of the FAO have been implemented, are they effective for changing state behaviour.

2.1 Science Policy Interface

The concept of a Science policy interface has emerged to describe the alliance and collaboration between scientists and policymakers. In other terms it can be characterized by communication between information production (science) and information use (policy) (Soomai, 2015). The basic idea of an interface involves a boundary between two different systems, in this thesis I look at the boundary between the FAO and the policy outputs from two different developed countries and investigate what the role of expert information is in policy-making and decision making for sustainable aquaculture. When defining the concept of a Science Policy Interface, Van Den Hove (2007, p. 824) posits “they are social processes which encompass relations between scientists and other actors in the policy process, and which allow for exchanges, co-evolution, and joint construction of knowledge with the aim of enriching decision-making”. When understanding what the science policy interface is and how it operates MacDonald, Soomai, De Santo, and Wells (2016) characterise the science policy interface as operating at several scales; “geographic, institutional, political and temporal” and go on to explain that “it encompasses many social processes and may include traditional or local knowledge”... and... “furthermore, the information universe is multidimensional, and information flow may be nonlinear, which accounts for the complexity of activity at the science-policy interface”. MacDonald, Soomai, De Santo, et al. (2016) go on to explain that while information movement can follow a direct pathway from a published piece of research to the decision-making context it can move through various channels at varying paces (perhaps rapidly, in the case of social media) and can involve a variety of actors such as NGO’s, journalists and the interested public. When assessing scientific advice and its effectiveness in the science policy interface, three analytical

categories have been proposed; *credibility, relevance and legitimacy* (Cash et al., 2003; Koetz, Farrell, & Bridgewater, 2012). Cash et al. (2003) explains “*credibility* involves the scientific adequacy of the technical evidence and arguments. *Saliency* deals with the relevance of the assessment to the needs of decision makers. *Legitimacy* reflects the perception that the production of information and technology has been respectful of stakeholders' divergent values and beliefs, unbiased in its conduct, and fair in its treatment of opposing views and interests”.

Dimensions of the Science Policy Interface are conceptually illustrated in Figure 1 by MacDonald, Soomai, De Santo, et al. (2016). The illustration shows that the SPI is composed of many actors and factors that operate under the domains of science and policy. Conceptually, the bridge represents “numerous features regarding infrastructure that facilitate communication channels across the gap between the science and policy realms” (MacDonald, Soomai, De Santo, et al., 2016, p. 25). Information generated from research can be directed towards policy as science advice and in turn policy can communicate questions and problems that can be forwarded back to researches, MacDonald, Soomai, De Santo, et al. (2016, p. 26) also highlight that “policy can communicate questions or problems that researches can tackle and then forward new evidence back to the policy community”.

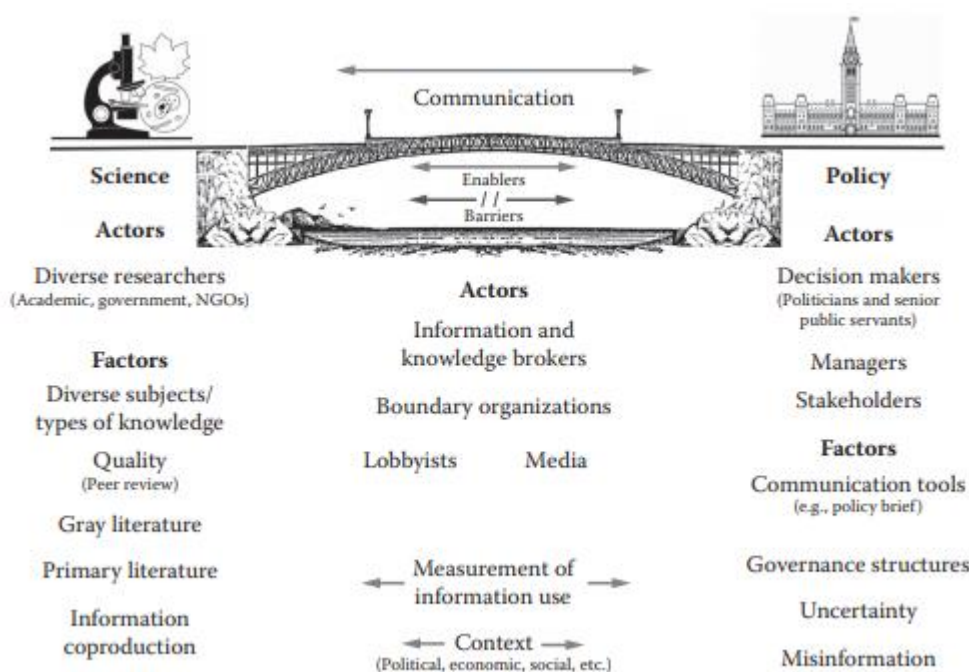


Figure 1: Bridging the science-policy interface: some of the actors and factors to consider. Retrieved from: MacDonald, Soomai, De Santo, et al. (2016)

Ultimately the role of scientific information is important in the search for solutions to environmental problems, the production, processing and use of information is increasingly vital in environmental governance. However in spite of growing knowledge about the stresses on the world's oceans and improvement in evidence based policy-making, many problems persist. MacDonald, Soomai, Santo, and Wells (2016, p. 7) suggests that there is “a gap or disconnect between the information produced and the information used in decision-making, which often limits its role in policy formulation and environmental management”.

2.2 Epistemic Communities

It is becoming more apparent that cross-boundary environmental regulation and cooperation is required as the global environmental agenda is increasing in complexity and interconnectedness. When assessing international policy coordination, it is theorized that cooperation amongst nations is more probable when policy makers share similar policy beliefs and principles. When looking at the role knowledge-based actors have in policy formation, there is evidence that policy makers are perhaps more likely to adhere to a consensual body of knowledge in order for a problem to be solved. Peter Haas argues that international policy coordination is more likely when scientific communities of experts – *an epistemic community* – emerges to influence states. An epistemic community as defined by Haas (1992, p. 3) is “a network of professionals with recognised expertise and competence in a particular domain and an authoritative claim to policy-relevant knowledge with that domain or issue-area”. Epistemic communities can be distinguished from four characteristics as described by Haas (1992, p. 3): Firstly, “a shared set of normative and principle beliefs”, which support a value basis for justification for social action; Secondly, “shared causal beliefs” which are based on collective analysis of the practices or events contributing to the policy problems and then which contribute to possible policy solutions; Thirdly, “shared notions of validity” meaning that the community has “internally defined criteria for weighing and validating knowledge in the domain of their expertise”; and Finally, “a common policy enterprise” described as “a set of common practices associated with a set of problems to which their professional competence is directed presumably out of the conviction that human welfare will be enhanced as a consequence”.

The epistemic community concept perhaps first emerged when the French philosopher Michael Foucault used the term ‘*episteme*’ when discussing knowledge and power and how it enables cohesion of a discourse and uniting of a community. Foucault made it clear that several ‘*episteme*’ may co-exist and interact at the same time, being parts of various power-knowledge systems. It has been asserted that Foucault’s use of *episteme* is similar to Thomas Kuhn’s notion of ‘*paradigm*’, where a collection of beliefs and assumptions form in an organisation of scientific worldviews and practices. Haas constructs his definition of epistemic communities on the constructivist assumptions that human

knowledge and understanding of reality is subjective and relative to the context they are involved in. Haas (2016, p. 184) explains that “ Constructivists look at mechanisms and consequences by which actors, particularly states, derive meaning from a complex world, and how they identify their interests and policies for issues that appear new and uncertain”.

The epistemic community theory places a greater emphasis on the role that science plays in regimes rather than states. An epistemic community can be seen as a transnational network of professionals with recognised skills and knowledge that share a set of causal beliefs and a set of practices, and whose influence and power lie in their specialist knowledge of issues being addressed. As policymakers search for truth to help in their policy formation, epistemic communities can be an influence and a possible provider of information and advice. Haas (1992, p. 4) posits that epistemic communities can influence state interests and preferences and can play an important role in shaping policy decisions at the domestic level. Haas argues that members of a transnational epistemic community can influence states and their decision makers “by illuminating the salient dimensions of an issue from which the decision makers may then deduce their interests”. This can in turn influence other states interests and their behaviour, which Haas (1992) explains can improve “the likelihood of convergent state behaviour and international policy coordination, informed by the causal beliefs and policy preferences of the epistemic community”. It is also possible that epistemic communities may provide innovation and maintenance towards the “social institutions” that manage international behaviour. Haas (1992) goes on to explain that this can result in continual influence to these institutions and help to establish patterns of cooperation on issues that are persistent, “even though systemic power concentrations may no longer be sufficient to compel countries to coordinate their behaviour” (Haas, 1992, p. 4).

For this thesis it is relevant to understand how the epistemic community of the FAO are influencing the creation and development of sustainable aquaculture policy within Australia and Norway. Within the global aquaculture chapter, the Fisheries and Aquaculture department of the FAO is described in more detail. There is an explanation of what their role is and what goals they set out to achieve in the promotion of sustainable marine resources. For this thesis study I assume that this department is operating as an “epistemic community” due to their ability to influence states.

2.3 Soft Law

Considering how epistemic communities can influence actors (in this case states), the notion of “soft law” is highly relevant to understand the characteristics of soft law instruments that may be in use by epistemic communities that can influence states.

When considering international law, traditionally the rule of the law is considered ‘hard’ and compulsory, a “binary phenomenon” (Soltvedt, 2017). Hard law is known to be characterised by precise legally binding obligations, whereas “soft law refers to norms that are deliberately non-binding in character” (Soltvedt, 2017, p. 75). There appears to be a diverse interpretation on how soft law is defined, however the notion of ‘soft law’ usually refers to non-binding guidelines that “lacks the possibility for legal sanctions” (Mörth, 2004, p. 1). Soft law is perceived as being easier to achieve and infringes less on sovereignty, it provides strategies for dealing with uncertainty and is seen to help facilitate compromises amongst different actors (Abbott & Snidal, 2000).

There are a range of soft law instruments that may include soft obligations to non-binding resolutions, codes of conduct, guiding principles, general comments and declarations that can be formulated. Friedrich (2013) suggests that “the name of an instrument only serves as a weak indicator of its actual content and function” as one organisation may label it a “code of conduct” and then “guidelines” by another. “Instruments that are called “codes of conduct” often contain guiding principles just as guidelines or declarations do, and “guidelines” may contain specific standards and best practices or remain relatively vague and lay down broad principles” (Friedrich, 2013, p. 15). Nevertheless, it appears soft law instruments are widely used in many fields and are useful when there is a need to form a collective agreement and action behaviour that is non-binding. States are less likely to want to enter into binding conditions, as they prefer the voluntary and flexibility of soft law instruments with the ability to avoid the accountability aspect.

In terms of soft law instruments being used by international organisations, Friedrich (2013, p. 3) explains that when international organisations use soft law instruments they may also “establish mechanisms designed to enhance compliance with non-binding instruments such as reporting mechanisms, capacity building and other forms of subtle pressure and persuasion”.

The collection of theories above forms the foundation for addressing the research questions of this thesis. Firstly, the Science Policy Interface concept will help to illuminate the characteristics of information flow between the FAO and Australia and between the FAO and Norway. The concept may help to discover some of the enablers and barriers to information flow at the science policy interface. The concept of epistemic communities was introduced, and this may play a key role in understanding how certain actors within the interface are shaping state interests. The Epistemic communities’ concept is relevant here to reflect on how state interests are shaped and if they hold any power. Lastly the concept of soft law was introduced to describe the instruments that the FAO produce for states, here I am interested in finding out if they are effective when used by international organisations to shape state behaviour. By using these different, albeit related concepts, the research study can unpack the movement of science and how it is implemented within states.

CHAPTER 3 – GLOBAL AQUACULTURE

The ocean covers two thirds of planet earth and represents one of humankind's most important global commons. The system of governing the ocean is vast and complex and a range of initiatives have been developed that endeavour to manage the ocean at various levels of governance. In terms of coastal and marine aquaculture there is no specific international treaty that has been negotiated to meet the challenges it raises. "Aquaculture operations are largely regulated at the national level with each coastal state having the right to develop and control aquaculture activities within its offshore zone of jurisdiction" (VanderZwaag, 2016). However as VanderZwaag (2016) explains, a complex mix of international agreements, documents and initiatives have emerged to promote sustainable aquaculture. The overarching global governance document to manage the ocean is the 1982 UN Convention on the Law of the Sea (UNCLOS). This document "establishes the overall rights and responsibilities of states in approving and regulating offshore activities including aquaculture" (VanderZwaag, 2016). Often referred to as the constitution for the sea, it was adopted in 1982 after nine years of negotiations at the third UN convention on the Law of the Sea (UN, 2012). This widely accepted convention operates as a framework that deals with almost all aspects of ocean governance. The UN (2012) describes "In short, the Convention is an unprecedented attempt by the international community to regulate all aspects of the resources of the sea and uses of the ocean, and thus bring a stable order to mankind's very source of life". The UNCLOS agreement aims to recognise:

"a legal order for the seas and oceans which will facilitate international communication, and will promote the peaceful uses of the seas and oceans, the equitable and efficient utilization of their resources, the conservation of their living resources, and the study, protection and preservation of the marine environment" (UN, 1982).

Within the treaty there are many aspects included such as: "Navigational rights, territorial sea limits, economic jurisdiction, legal status of resources on the seabed beyond the limits of national jurisdiction, passage of ships through narrow straits, conservation and management of living marine resources, protection of the marine environment, a marine research regime and, a more unique feature, a binding procedure for settlement of disputes between States" (UN, 2012). The UNCLOS provisions on *Protection of the Marine Environment* are widely acknowledged, however aquaculture is not specifically outlined in the convention, due to the topic not being highly recognised and being of international significance at the time of its enactment. However as explained by Roderburg (2011) certain parts of the convention are sufficiently broad enough to include certain aspects of aquaculture.

Various principles have emerged to support and promote sustainable aquaculture from international agreements, declarations, and codes. The FAO has been a major contributor for international guidance for aquaculture development and management. In the following section I will introduce the FAO and

some of the soft law instruments and concepts they have produced to manage and promote sustainable aquaculture management.

3.1 The Food and Agricultural Organisation (FAO)

The FAO is an intergovernmental organisation and a specialised agency of the United Nations (UN). On the 16th October 1945, 34 governments convened to sign the constitution for a permanent FAO and today the organisation consists of 194 member states and works in over 130 countries worldwide (FAO, 2015). Its current directive is to achieve food security, promote social stability and to contribute to the growth of the global economy via improving development in agriculture, forestry, fisheries and land and water resources. The FAO acts as a global knowledge network to distribute information and research, providing recommendations and policies to promote sustainable use and conservation of natural resources. The organisation serves both developed and developing nations and acts as a neutral forum where all nations meet on equal terms to negotiate and debate policy. Using the expertise of its staff the FAO “collect, analyse, interpret and disseminate information” (FAO, 2017a) FAO supports national and international action and cooperates with governments to assist them in fulfilling the obligation arising from their acceptance of the recommendations of the FAO (FAO, 2017a).

The FAO has its headquarters in Rome, Italy and has a decentralised network of offices regionally and sub-regionally, as well as country offices spread over 130 countries. The organisation is currently headed by the Director-General Qu Dongyu from China and is comprised of a number of different departments including the Fisheries and Aquaculture Department (FAO, 2020a).

Over the years the FAO has achieved some progress towards their goals, in the report '70 Years of FAO (1945-2015) they highlight many of their achievements and greatest challenges since inception. One of their greatest achievements in the FAO's eyes included the 'Code of Conduct for Responsible Fisheries', whilst other achievements included 'The Committee on World Food Security', 'The green revolution in Asia', 'The Treaty on Plant Genetic Resources for Food and Agriculture' and the 'Guidelines on the Tenure of Land, Fisheries and Forests' were among their top ten achievements. Their greatest challenges for the organisation were listed as; Eradicating hunger and achieving food security; Feeding a growing population; Climate change in Agriculture; Management of sea and ocean resources; and promoting conservation and sustainable use of land ecosystems (FAO, 2015).

3.2 Fisheries and Aquaculture Department of the FAO

The Fisheries and Aquaculture Department of the FAO is comprised of one division and six branches, namely, Fishery Policy, Economics and Institutions Branch; Aquaculture Branch; Product, Trade and Marketing Branch; Statistics and Information Branch; Fishing Operations and Technological Branch; and Marine and Inland Fisheries Branch. The Fisheries and Aquaculture department employs over 200 staff and consultants in its central office and works on approximately 280 fisheries and aquaculture projects each year (FAO, 2020d). The role of the department is to support and strengthen global governance to all FAO member countries in implementing responsible fisheries, placing “emphasis on reconciling social and economic development with environmental performance – to all fisheries and aquaculture policies” (FAO, 2020d). The Fisheries and Aquaculture department current mandates include:

- “Develop methodology, assess and monitor the state of wild resources and elaborate resources management advice.
- Monitor and advise on the development and management of aquaculture.
- Collect, analyse and disseminate information on the sector (capture and aquaculture production, trade, consumption, prices, fleet, employment).
- Provide socio-economic analysis of fisheries and aquaculture and assist in the elaboration of development and management policies and strategies and institutions.
- Monitor and advise on technology development, fish processing, food safety and trade.
- Ensure skilled resourcing and effective delivery of FAO’s Strategic Objectives in the field of marine and inland capture fisheries, aquaculture and food systems, and provide leadership to the FAO Blue Growth Initiative
- Support and assist a network of regional fishery commissions and promote aquaculture networks” (FAO, 2020d).

The Committee on Fisheries (COFI) is a subsidiary body of the FAO Council that represents a global inter-governmental forum that discusses major international fisheries and aquaculture issues (FAO, 2020c). COFI was formed in 1965 and the committee meet biennially to review FAO’s fishery and aquaculture programs and their implementation. The committee conduct regular reviews of fishery and aquaculture problems and ascertain appropriate solutions. Membership to COFI is open to any FAO member or non-member that is eligible to be an observer, “Representatives of the UN, UN bodies and specialized agencies, regional fishery bodies, international and international non-governmental organizations participate in the debate, but without the right to vote” (FAO, 2020c). COFI established a sub-committee for aquaculture in 2001 to specifically address aquaculture matters. The COFI sub-committee provides a forum to identify and discuss issues requiring action such as increasing sustainability, food security, economic development and poverty alleviation (FAO, 2020b).

Over the years the FAO have introduced a wide range of technical and policy guidelines and management tools grounded in the 1982 UN Convention on the law of the Sea (UNCLOS), which provides the legal basis for Aquaculture management.

3.2.1 The Code of Conduct for Responsible Fisheries (CCRF) attempts to cooperate on a global basis in formulating international rules and standards of behaviour for responsible fisheries. The CCRF is a voluntary code of conduct that is intended to apply comprehensively to both members and non-members of the FAO. The code was unanimously adopted in 1995 by the FAO conference and is set to provide “a necessary framework for national and international efforts to ensure sustainable exploitation of aquatic living resources in harmony with the environment” (FAO, 1995). While CCRF is slanted mostly towards fisheries management and development, in 1997 it was expanded to include aquaculture and aims to provide general principles and a specific article (Bankes, Dahl, & VanderZwaag, 2016). Article 9 of the code does specifically address four main themes for aquaculture development. Firstly, it focuses on responsible development of aquaculture in areas under national jurisdiction and urges states to apply various measures including; administrative frameworks and appropriate legal measures, states should apply evaluation of the effects of aquaculture and regularly update development strategies and plans, establish effective environmental assessments and ensure local communities are not adversely affected by aquaculture developments (FAO, 1995, p. 23). Secondly Article 9 advises responsible development of aquaculture within the transboundary ecosystem and urges nations to cooperate and consult in order to promote sustainable practices, respecting neighbouring states when non-indigenous species are introduced, each state should be monitoring the impacts and inputs used in aquaculture, whilst also establishing information networks to disseminate data and facilitate cooperation and planning for aquaculture at the national, subregional, regional and global level (FAO, 1995, p. 24). A third area concentrates on the use of aquatic genetic resources for aquaculture, urging states to conserve genetic diversity, minimizing harmful effects of introducing non-native species or genetically altered species. States should take steps to minimise any effects of escaped farmed fish such as disease on wild fish stocks. Again international cooperation is urged by states on this matter (FAO, 1995, p. 24). Lastly, responsible aquaculture at the production level is encouraged. States should adopt effective farm and fish health management practices with “minimal use of therapeutants, hormones and drugs, antibiotics and other disease control chemicals” (FAO, 1995, p. 25) States should regulate chemical use and ensure the disposal of waste is not hazardous, to inhibit harm to human health and the environment.

The Code of Conduct at a general level, calls for a wide application of a ‘precautionary approach’ to the management of living aquatic resources, encouraging states to adhere to management practices that involve public participation and the involvement of fish farmers in policy formation and implementation processes. The year 2020 marks the twenty-fifth anniversary of the code and the FAO reflects on the implementation of the code thus far and concludes that “As a universally adopted and

applicable policy instrument, the Code has been a facilitator of change, catalysing cooperation at the local, regional and global levels” (FAO, 2020f, p. 95)

3.2.2 Ecosystem Approach to Aquaculture

The FAO define the Ecosystem Approach to Aquaculture (EAA) as “a strategic approach to development and management of the sector aiming to integrate aquaculture within the wider ecosystem such that it promotes sustainability of interlinked social-ecological systems” and furthermore describes it as “a strategy for the integration of the activity within the wider ecosystem such that it promotes sustainable development, equity, and resilience or interlinked social-ecological systems” (FAO, 2008). The EAA emerged from discussions with aquaculture experts around the world and the FAO when a workshop was held in the Belares Islands in May 2007, where the focus was to shift the planning and management of aquaculture towards greater sustainability. Discussions were influenced by the positive experience of the Ecosystem Approach for Fisheries (EAF) (Brugère, Aguilar- Manjarrez, Beveridge, & Soto, 2019). Originally the EAF had been developed as a tool to support the implementation of the CCRF and was developed to promote “the sustainable exploitation of capture fisheries worldwide (Brugère et al., 2019). The FAO initiated the meeting in response to “explicit requests from member countries in 2006 “to improve the management and enhance the socio-economic impacts of aquaculture” (Brugère et al., 2019). The EEA is guided by three main principles as described by the FAO (2008):

Principle 1: “Aquaculture development and management should take account of the full range of ecosystem functions and services, and should not threaten the sustained delivery of these to society”

Principle 2: “Aquaculture should improve human well-being and equity for all relevant stakeholders”

Principle 3: “Aquaculture should be developed in the context of other sectors, policies and goals”

The EEA approach advocated by the FAO recommends management measures to assist policy-making in ensuring environmental, social and economic sustainability of the aquaculture sector. In short the FAO generally advise that “policies should be generated from a participatory process, they should be adaptive, transparent and open to the general public; they must ensure and promote people consciousness of the value of ecosystem approach. They should also reconcile temporal scales facing the fact that aquaculture growth/development and governance capabilities have been moving at two different speeds” (FAO, 2008, p. 25). Management measures should also aim to adopt a ‘precautionary approach (PA) and ‘adaptive management’ (AM). The PA to aquaculture production

“exercises prudent foresight to avoid unacceptable or undesirable situations, taking into account that changes in ecosystems could be slowly reversible, difficult to control and not well understood” (FAO, 2008, p. 25) Whilst the AM approach is describes as an “iterative process of taking actions, evaluating the consequences of those actions, and adjusting future actions in light of changed conditions” (FAO, 2008, p. 25)

Brugère et al. (2019) conducted a review of the EAA ten years on since it was introduced by the FAO, and investigated how the EAA has been used, talked about, adopted and implemented. Their analysis discovered that the EAA “has brought the broad principles of sustainable development to the attention of the aquaculture sector” and although it has “triggered improvements”, they weren’t able to prove that decision-makers and planners have embraced the EAA principles to address “complex institutional issues”(Brugère et al., 2019). They concluded that the Blue growth concept had “greater corporate and media appeal and may be more attractive to decision-makers and policy makers than the ecosystem-based management” and suggested that the EAA will need to “produce incentives for implementation at the national level” (Brugère et al., 2019).

3.2.3 Blue Growth Initiative

At the 2012 Rio+20 Conference, a United Nations conference on Sustainable Development in Rio de Janeiro the concept of a ‘blue economy’ emerged. The concept aimed to emphasize “conservation and sustainable management, based on the premise that healthy ocean ecosystems are more productive and a must for sustainable ocean-based economies” (FAO, 2014a). In support of this shift, the Blue Growth Initiative (BGI) was launched by the FAO with the aim to “maximise economic and social benefits while minimizing environmental degradation” (FAO, 2017b). The FAO has communicated that the goals of the BGI are closely aligned with the 2030 Agenda for Sustainable Development (supported by the Sustainable Development Goals - SDGs) and that the BGI is likened to the principles of the ‘Green Economy’ however the BGI concept emphasises the three pillars of sustainable development – economic, environmental and social (FAO, 2018a).



Figure 2: **Blue Growth Initiative and the SDGs** Retrieved from: (FAO, 2017b)

The FAO explain that they intend to use the BGI to “further harness the potential of oceans, seas and coasts” and “assist countries in developing and implementing blue economy and growth agendas” (FAO, 2014a). The FAO envisage that the BGI will help to improve the following:

- “Eliminate harmful fishing practices and overfishing and instead **incentivize approaches which promote growth, improve conservation, build sustainable fisheries** and end illegal, unreported and unregulated fishing
- “Ensure tailor-made measures that **foster cooperation between countries**
- Act as a **catalyst for policy development**, investment and innovation in support of food security, poverty reduction, and the sustainable management of aquatic resources” (FAO, 2014a).

The FAO have stated that they will implement the BGI within aquaculture to “promote policies and good practices for farming of fish, shellfish and marine plants in a responsible and sustainable manner” (FAO, 2014a). The FAO have produced number of reports and brochures in regards to promoting the BGI with the main aims of ensuring long term food security through supporting smaller scale fisheries and the development of sustainable aquaculture particularly in Small Island Developing States (SIDS) (FAO, 2014b). The FAO have also promoted the BGI as a tool to contribute to ‘resilient communities’ especially benefiting women, youth, indigenous groups and migrants (FAO, 2018b, 2019). The FAO have stated that “The Blue Growth Initiative seeks to balance the sustainable management of aquatic resources with economic and social benefits for local communities through

traditional knowledge and practices, capacity development and knowledge sharing, food security and nutritional benefits, and an increased voice in resource management and policymaking. Blue Growth will support Indigenous Peoples in achieving the 2030 Agenda across multiple SDGs and targets” (FAO, 2018b).

More recently the concepts of ‘blue economy’ and ‘blue growth’ have become more contested, as various definitions of blue growth emerge, Eikeset et al. (2018) explains that often the ‘blue growth’ goals are not commonly agreed upon and “For some, blue growth revolves around maximizing economic growth derived from marine and aquatic resources, but for others it means maximizing inclusive economic growth derived from marine and aquatic resources and at the same time preventing degradation of blue natural capital”. Barbesgaard (2018) questions if Blue Growth is the “saviour or ocean grabbing” and argues that blue growth policy proposals “do not restore ‘ocean health’, but rather recast control of an access to blue resources, with major impacts on small-scale users, whilst large-scale, capital-intensive uses continue”, then goes on to add that “blue growth-associated policy proposals follow ‘win–win–win’ rhetoric and ‘selling nature to save it’ reasoning, relying on and promoting market-based mechanisms, under the assumption that the leveraging of self-interest and dangling the ‘nature capital can see’ in front of financial actors will pave the way toward sustainability” (Barbesgaard, 2018). Voyer, Quirk, McIlgorm, and Azmi (2018) elucidate that the FAO’s BGI concept is often framed as “Oceans as livelihoods’ and “is linked closely with ensuring long term food security”. Whilst other interpretations of the blue economy concept include “Oceans as natural capital”, “Oceans as a driver of innovation” and “Oceans as good business”. In another exploration of the discourses behind Blue Growth and the Blue Bioeconomy arising in the Faroe Islands, Bogadóttir (2020) finds that the underlying ideologies of growth “create a landscape with expanding production facilities and expanding infrastructure, powered and fuelled through increasing resource extraction and use. Rather than leading to a reduction in energy and material throughput, these ideologies are maintaining and forging new resource-intensive dependency paths for Faroese society”. Ultimately Bogadóttir (2020) questions the blue growth and blue bioeconomy concepts viability and legitimacy.

Summary

This chapter attempts to provide an overview of some of the regulatory instruments available at the global level for governing aquaculture within the ocean. I highlighted the UNCLOS agreement which sets out an overarching legal framework for ocean governance with the aim to establish rules for use of the ocean and the approach to address issues as a whole world. I then presented the FAO and the range of instruments that they have developed, such as the Code of Conduct for Responsible Fisheries, the code outlines rules, responsibilities, and norms for states to adhere to. The chapter then outlined “approaches” and “initiatives” towards aquaculture governance, such as the “Ecosystem Approach for Aquaculture and the “Blue Growth Initiative”. These are all top-down governance mechanisms designed to help states manage their jurisdictions and natural resources. This thesis attempts to explore if any of these approaches and initiatives have been influential or effective in the national context.

CHAPTER 4 – AUSTRALIAN AQUACULTURE

The Commonwealth of Australia is a sovereign country comprising the mainland of the Australian continent, the island of Tasmania and several smaller islands. It is the largest country in Oceania and the world's sixth-largest country by total area. The population of 25 million (ABS, 2020) is largely urbanised and mostly concentrated along the eastern seaboard. Indigenous Australians inhabited Australia for about 65,000 years prior to European settlement until Dutch explorers arrived in the early 17th century, and then in 1770 Great Britain settled a colony in New South Wales via penal transportation. The population grew steadily and by the time of the 1850's gold rush, most of the continent had been explored and an additional five self-governing crown colonies established. On the 1st January 1901, the six colonies federated and formed the Commonwealth of Australia. Since then Australia functions as a federal parliamentary constitutional monarchy, comprising of six states and ten territories. Australia is a highly developed country, with the world's 14th largest economy it produces the world's tenth-highest per capita income (Australian Government, 2020). Australia sits at 6th highest ranked on the human development index and the country generally ranks highly in the quality of life (UNDP, 2019, p. 22)

As an island continent, Australia has sovereign rights over a vast area of ocean and has the fourth largest maritime jurisdiction in the world, the area covers tropical to Antarctic waters with an exclusive economic zone (EEZ) and continental shelf of approximately 18.5 million km² (Haward & Vince, 2008). The Australian marine domain is dominated by a number of commercially productive fisheries, significant offshore oil and gas production areas and globally important marine environments. Haward and Vince (2008, p. 87) explain that “the policies and management of Australia's ocean and coastal areas have been shaped by the historical development of the nation, domestic politics and the influence of developments in international oceans governance”. The coastal areas have been harvested by Australia's indigenous people for thousands of years and when European settlement occurred more concerted efforts to farm the sea arose. In 1864 Australia saw the first salmonids introduced, however this introduction was more for recreational use than a commercial activity (Haward, 2016). The commercial aquaculture industry for salmonids really developed in the mid 1980s in Tasmania (see following case study of Tasmanian Aquaculture) There are wide range of aquaculture products that Australia currently harvests, but the Atlantic salmon industry in Tasmania is by far the most profitable for the country.

The aquaculture industry has become an increasingly significant element of Australian fishery production. In 2016-17 the value of commercial fishery and aquaculture production reached [AUD]\$3.06 billion. The wild-caught fisheries sector was valued at [AUD]\$1.7 billion and the aquaculture sector is shown to be growing and contributed [AUD]\$1.3 billion to total fisheries production (ABARES, 2018). “The increasing value of the aquaculture sector is largely the result of

increased Tasmanian salmonid production. Salmonids were the single most valuable species group produced in Australia in 2016–17 with a farmgate production value of [AUD]\$756 million” (ABARES, 2018, p. 10).

Aquaculture operations are a major source of employment and economic turnover within regional areas around Australia. The industry is seen to make major contributions to community development and economic impact in regional areas with flow-on effects of smaller to medium size businesses operating to support the aquaculture industry. Evidently the economic benefit adds to the debate and conflict of salmon farming in the area, where debates occur between the economic benefits over the environmental issues (Haward, 2016).

The legal and policy framework for Australian aquaculture is shaped by the federal political system. Existing aquaculture operations are being regulated and controlled by local, state, and Northern Territory (NT) governments (see figure 1). The legal and policy framework governing Aquaculture operations in Australia is considered rather fragmented as some states have aquaculture legislation whilst others regulate aquaculture under broader fisheries legislation. The state and territory regulation covers licensing, land use and planning and food safety (DAWR, 2017).



Environmental Regulatory Framework for aquaculture in Australia

Figure 3: Source: Haward (2016).

Commonwealth legislation

Whilst the National government has responsibility for regulating aquaculture in Commonwealth waters it is also involved through sustainability assessments, quarantine and biosecurity, food quality and safety, market access and trade and increasingly involved in environmental management of the industry. The national government also supports aquaculture operations via national programmes for research and development and economic forecasts. (DAWR, 2017). Haward (2016) explains that “the Commonwealth retains important influence in Australian aquaculture and is likely to be directly drawn into the policy domain in any future developments in offshore farming”.

In terms of the responsibility for environmental regulation of the aquaculture industry, including the approval of aquaculture developments and ongoing monitoring and compliance, it is generally a matter for state and NT governments. However, in some cases the Australian government Department of the Environment and Energy takes on a regulatory role where the operation is likely to affect a matter of national environmental significance such as the Great Barrier Reef in Queensland. This is where the Environment Protection and Biodiversity Act 1999 (EPBC Act) comes into play and is the Australian Government’s main piece of environmental legislation. The EPBC Act entered into force in July 2000 and provides the legal framework to manage and protect matters of ‘national environmental significance’ including World and national Heritage properties, Ramsar wetlands of international importance, nationally threatened animal and plant species and ecological communities, migratory species and commonwealth marine areas (DEE, 2013). The Australian governments department of Environment and energy states that: “The EPBC Act aims to balance the protection of crucial environmental and cultural values with society’s economic and social needs by creating a legal framework and decision making process based on the guiding principles of ecological sustainable development (DEE, 2013).

State Legislation

As previously mentioned, aquaculture operations within Australia are regulated at the state or territory level as part of a broad fisheries act (such as in the states of New South Wales, Victoria, Queensland, Western Australia and the Northern Territory). However in Tasmania and South Australia there is specific legislation directed at aquaculture operations (Haward, 2016). South Australia is the only state that has a specific aquaculture act. See following table for the array of different fisheries and aquaculture regulation in Australia.

AUSTRALIAN STATE/TERRITORY	AQUACULTURE REGULATION
New South Wales	New South Wales Fisheries Act 1935 and Fisheries Management Act 1994, which is the responsibility of Department of Primary Industries
Western Australia	Fish Resources Management Act 1994 and is managed by the Department of Primary Industries and Regional Development, Fisheries Department.
Queensland	Mainly via the Planning Act 2016, however there are numerous other acts that may relate to aquaculture operations within the states regulatory framework. The Department of Agriculture and Fisheries administer aquaculture planning and management.
South Australia	Governs the aquaculture industry via regulations detailed in The Aquaculture Act 2001, Aquaculture Regulations 2016 and the Fisheries Management Act 2007. The Department of Primary Industries and Regions SA is responsible for the administration.
Northern Territory	NT Fisheries Act 1998 and is administered by the Department of Primary Industry and Resources.
Victoria	Fisheries Act 1995 and is administered by the Victorian Fisheries Authority within the Department of Environment, Land, Water and Planning.
Tasmania	Living Marine Resources Management Act 1995 and the Marine Farming Planning Act 1995 and is the responsibility of the Department of Primary Industries, Parks, Water and Environment.

4.1 The Case of Atlantic Salmon Aquaculture in Tasmania

As previously explained the Atlantic Salmon aquaculture production for Australia is located within Tasmanian waters. “The operations are based on cages located in estuaries and inshore areas with related on-shore facilities close to the cages” (Haward, 2016, p. 178). The productivity of the aquaculture sites is influenced by climate, as the state has hot and dry summers, the increased water temperature constrains the growth of the fish (Haward, 2016). The introduction of Atlantic Salmon to Tasmania first occurred in the late 1970s. Salmon that had been originally imported into the state of New South Wales for recreational sport fishing in lakes associated with hydroelectricity production, provided the original source of stock for Tasmanian production (Haward, 2016). With the successful experimental farming, the commercial industry grew quickly and Haward (2016, p. 179) explains that “after an initial expansion phase the industry has consolidated to three main companies – Tassal, the Huon Aquaculture Group and Petuna”. The management of Tasmanian aquaculture is regulated by state legislation and regulation. The *Marine Farming Act 1995* (MFPA) and the *Living Marine Resources Management Act 1995* (LMRMA) provide the overarching legislative framework. Individual marine farms are authorised by a Marine Farming Licence under the LMRMA. The licences specify what species may be farmed within a location or lease area and under what conditions. Due to increasing complaints over the marine farming industry in Tasmania and

increasing concern over a lack of robust regulatory framework, the government recently decided to introduce what is said to be tougher environmental regulation of the industry. The new laws hand over the day-to-day environmental regulation of finfish farming from the Department of Primary Industries, Parks, Water and Environment (DPIPWE) secretary to the Environmental Protection Authority (EPA). The Tasmanian government introduced a new regulation act in December 2017. The new *Finfish Farming Environmental Regulation Act 2017* (Finfish Act) sets out the legal structure giving power to the Director of the Environmental Protection Authority (EPA) with an independent statutory role for the environmental regulation of the state's marine and freshwater farming industry. Essentially the transfer of power over the regulation and compliance of the industry has moved from the Minister for Primary Industries and Water, the Secretary of the Department of Primary Industries, Parks, Water and Environment (DPIPWE) and the Director of Inland Fisheries to just one agency, the EPA (EPA, 2017). The main difference to the new regulation of the Finfish Act is the new legal instrument, an Environmental Licence (EL). To operate a marine fish farm in Tasmania, a person must hold an Environmental Licence under the *Environmental Management and Pollution Control Act 1994* (EMPCA) or a Marine Farming Licence under the *Living Marine Resources Management Act 1995* (LMRMA). The Environmental Licence specifies conditions for the operation of the farming activity and "the licence may be varied, transferred, suspended or cancelled" (EPA, 2017, p. 1). In terms of the overall planning and development framework for marine farming within the state of Tasmania, this has remained largely unchanged with the recent changes in regulations. However, in an instance where a planning process requires a specific environmental matter to be addressed the EPA must be notified of key decisions. The EPA explains that it "will have new powers to require environmental management matters to be addressed in marine farming development plans and plan amendments. The legislation also provides for the declaration of finfish marine farming exclusion zones" (EPA, 2017, p. 2).

Even though the regulatory arrangements are in place for Tasmania Aquaculture, the industry has been controversial especially amongst the local community. For some members of the community the aquaculture industry is seen as immensely important in steering the regional economy and generating rural employment, whereas other members of the community are particularly concerned at the environmental impacts the industry produces. As well as impacts to ecological systems there are also "concerns about human health, access to waterways, noise associated with fish farming, concerns about workplace health and safety, use of freshwater resources, and questions about the sustainability of wild fisheries on which the industry depends for inputs" (Leith, Ogier, & Haward, 2014, p. 279). Whilst concerns about environmental aspects occur, the regulatory system has also been criticised, Haward (2016, p. 179) explains that "community groups have criticised a perceived lack of transparency in environmental monitoring. This criticism centres on the potential conflict of interest of the governmental department as both regulator and promotor of the industry".

CHAPTER 5 - NORWEGIAN AQUACULTURE

Norway is officially the Kingdom of Norway and its territory comprises of the western and northern most portion of the Scandinavian Peninsula, the remote island of Jan Mayen and the archipelago of Svalbard. Norway also lays claim to a section of Antarctica known as Queen Maud Land. Norway's current population is 5,372,355 million (Norway, 2020b) which inhabit a total area of 385,205 square kilometres. Norway is a constitutional hereditary monarchy and power is divided between the parliament, the cabinet and supreme court. Norway is administrated on two levels by counties and municipalities. The indigenous Sami people who inhabited northern parts of Norway do have a certain amount of influence over traditional territories via the Sami Parliament and the Finnmark Act. Norway is considered to have one of the most developed democracies in the world and ranks the highest in human development in the world according to the UNDP (2019).

Norway shares a long eastern border with Sweden and borders Russia and Finland to the North-East. The country has the second longest coastline in the world after Canada, including all the islands the length of Norway is 100,915km (Berg, 2015). The coastline faces the North Atlantic Ocean and the Barents Sea, and with such an expansive coastline it has invariably meant that Norway has strong economic roots that stem around the sea. The Norwegian ocean aquaculture industry had modest beginnings in the 1960s after World War II when for the first time a rainbow trout was successfully transferred to the sea water, during this period the first successful transfer of Atlantic Salmon also occurred (FAO, 2020e). The industry then saw significant growth in the 1970s when the first cage was constructed which proved to be safer and provide more optimal conditions compared to onshore tanks (FAO, 2020e). Along with the sheltered coastline and the gulf stream providing reliable and stable water temperature the Norwegian aquaculture industry has seen significant growth over the years. Today Norway is one of the largest producers of salmon aquaculture in the world and in 2019 produced 1,445,586 million tonnes of fish from aquaculture production, Salmon has the largest share of production at 93.9% and in 2019 it saw 1,357,304 million tonnes of salmon produced (Norway, 2020a). Today some of the biggest producers of salmon operate out of Norway (Marine Harvest, Lerøy Seafood and SalMar) alongside a number of smaller plant operations. In 2016 the FAO estimated that Norway exports 95 percent of their total production of aquaculture which ends up in more than 130 different countries worldwide (FAO, 2020e). Myklebust (2016, p. 338) explains that “the industry has evolved from small and local family-owned activities into a modern high-technology industry.” Today the industry is regarded as essential for employment and ‘value creation’ of the ocean (Norwegian Government, 2017b). In 2014 the Norwegian government announced they envisage a five-fold increase in production to the Norwegian Salmon and Trout industry by 2050 (Norwegian Government, 2014). However, the industry has seen a number of challenges and conflicts along the way, such as difficulties with lice infestations and escapees of farmed fish contaminating the wild stock. The industry also has challenges in containing emissions of nutrients and sludge from the

aquaculture sites, contaminating local ecosystems. The industry competes for ocean space, and conflicts are seen to arise when there are various interests in the same place such as recreation, conservation and other economic activities. Myklebust (2016, p. 338) explains “today the balance between use and conservation raises particularly difficult questions for Norwegian legislators and administrative authorities”.

Norwegian Management and Regulation of Aquaculture

At present the executive power in Norway is separated between the national government and regional and local authorities, 18 counties and 422 municipalities. Myklebust (2016) explains that “all three levels of administration are important in connection with marine spatial planning and processing applications for aquaculture”. The national government has the overall responsibility via reports to the Parliament, national guidelines and national expectations for aquaculture spatial planning (Myklebust, 2016). There is an expectation from the national government that planning for fisheries and aquaculture remains in an ‘environmentally sustainable framework’ at the local and regional level. It is a requirement that National and regional plans and guidelines must be taken into account in the course of municipal planning. Myklebust (2016) explains that “In Norway it is primarily the local authorities (municipalities) that have the responsibility to make legally-binding area plans, both onshore and offshore, pursuant to the Planning and Building Act (PBA)”.

Within Norway a licence is needed in order to be involved in the aquaculture industry in accordance to the **Aquaculture Act 2006 (AA)**. To receive a licence, companies have to go through two steps. The first is a formal application to the Norwegian Directorate of Fisheries to be allowed to qualify for the bidding process and then the next step is an auction through the county municipality, where they assign the licence to the location. The current Norwegian Aquaculture Act entered into force on the 1st January 2006. The new act replaced the Fish Farming Act and Sea-Ranching Act from 1985 where the focus and mission were to ensure that the industry became a profitable and viable district industry. While the new act aims to ensure the industry’s profitability and competitiveness within a sustainable development framework and ensure value creation for the coast. “The law is managed by the Ministry of Trade, Industry and Fisheries, but the responsibility for the various provisions of the law are largely delegated to the Directorate of Fisheries and the regional county level” (Myklebust, 2016, p. 339). There are a number of other Acts and agreements that are involved in the regulation and management of aquaculture; The **Pollution Control Act (PCA)** is managed by the Ministry of Climate and Environment and the Environment Directorate, however implementation of the law in matters relating to a discharge is largely delegated to the county governor. A permit under the PCA is a necessary condition for obtaining a permit under the AA. Every decision to establish or expand an aquaculture activity requires a discharge permit. The condition for obtaining such permission is that the benefits of

the project outweigh any disadvantages. The **Food Safety Act 2003**, is the main act that regulates animal health, food safety and quality, whilst also addressing the production, processing and distribution of foodstuffs, including aquaculture production and fish processing (FAO, 2020e). The Ministry of Fisheries and Coastal Affairs has the responsibility to administer the act in regards to the safety and health of aquatic animals, while the Norwegian Food Safety Authority is the governmental body that is given management and enforcement powers pursuant to the act. The Act in relation to **Prevention of Cruelty to Animals 2003** is of importance for the aquaculture sector, by prescribing basic principles for the managing and treatment of animals, including fish. Whilst Norway is not part of the European Union (EU), there are several EU directives that apply to Norwegian governance of aquaculture. Via the EEA agreement, the SEA, EIA and Water Framework directives apply. Myklebust (2016, p. 354) explains “these directives are intended to ensure requirements for processes, participation and openness, but also ecosystem-based management and evaluation of sustainable development” and goes on to add that both the SEA and EIA directives both require environmental impact assessments.

Traffic Light System

The Traffic Light System (TLS) is a new management system that regulates the production capacity of Atlantic salmon in the Norwegian Aquaculture sector. The TLS came into effect on the 30th of October 2017. The system is based on grouping the Norwegian coast into production areas, environmental indicators and the traffic light system for growth. This means that each of the 13 identified production zones get either a green, amber, or red light. A red light means production capacity needs to be reduced, a yellow light means that production will remain unchanged and stable, whilst a green light means areas will open for growth. Currently the assessment criteria is based on factors like salmon lice impact on wild salmonids and economic conditions. The new regulations are an effort to allow the industry to grow in areas where it is environmentally sustainable.

CHAPTER 6 – EMPIRICAL FINDINGS

6.1 Australia

6.1.1 National Marine Science Plan 2015-2025: Driving the development of Australia's blue economy

Summary, aims and objectives

The Marine Science Plan for Australia was launched on the 11th August 2015 at Australia's Parliament House and was in response to a position paper in 2013 *Marine Nation 2025: Marine Science to Support Australia's Blue Economy*. The government, 23 research institutions and universities were gathered and consulted in its development, in the process more than 500 scientists were involved in the process. The Australian government saw increasing global focus on 'blue economic' growth and felt it was timely to consider the value of revisiting the scope and intent of Australia's Ocean Policy. The intention was to develop a "decadal plan to focus investment on the biggest development and sustainability challenges facing Australia's marine estate, and the highest priority science needed to tackle these challenges and fulfil our blue economy's potential" (Australian Government, 2015, p. 5). The plan expresses that the Australian Government intends to collaborate and communicate when dealing with the seven main challenges that have been outlined:

- "maintaining marine sovereignty and security
- achieving energy security
- ensuring food security
- conserving our biodiversity and ecosystem health
- creating sustainable urban coastal development
- understanding and adapting to climate variability and change
- developing equitable and balanced resource allocation" (Australian Government, 2015, p. 7)

The plan acts as a call to action for the nations marine scientists as well as anyone working with governments, industry, and communities to maximise the resources of the ocean but also to sustainably protect them. A goal expressed within the plan includes "Improve the scientific evidence and the available decision-support tools for those managing the impacts of multiple and cumulative drivers and pressures on marine systems" (Australian Government, 2015, p. 28). This goal acknowledges the complexity that policy-makers are faced with when there are competing and complex challenges and the need to take into account many different aspects in the decision-making process, such as "agriculture and industrial development, invasive species, climate change, population growth, coastal urban expansion and changing social attitudes" as well as "strong cultural beliefs, such as Indigenous rights" (Australian Government, 2015, p. 28)

Category 1: Governance and Policy Approach

Within the plan, the Australian government believes the blue economy approach can help realise “triple-bottom line” values. The value of the economy, environment and social goals can be reached “by striking the right balance between reaping our ocean’s economic potential and the need to safeguard their longer term health” (Australian Government, 2015, p. 7).

In terms of the fisheries sector the plan expresses to “decrease seafood imports – double aquaculture value, export IP – manage risk and mitigate impact of extreme events, sea level rise and increased temperatures – Increase fisheries value through sustainable practice” (Australian Government, 2015, p. 15) and then in terms of policy making the plan is to “increase efficiency and speed of regulatory decision-making – increase marine management coherence – reduce contested decisions – balance competing stakeholder use – evidence base for environmental regulations” (Australian Government, 2015, p. 15).

The plan placed emphasis on developing support for decision-making and improving the scientific evidence base. Acknowledging the need to help decision makers manage the impacts and the multiple conflicts and pressures. The government pledges to design “decision-support tools that translate knowledge and data into useful information for effective decision-making”. The tools need to take into account “social and economic consequences and the social acceptability of impacts are adequately taken into account when making decision” (Australian Government, 2015, p. 28). Another goal is to develop solutions for “repairing ecosystems and design ecosystem-friendly marine structures” (Australian Government, 2015, p. 28). Here they advocate “knowledge of ecosystem resilience” particularly for the design and construction of aquaculture developments. More generally a “best-practice approach” for managing ecosystems is suggested.

Category 2: Reference to Science: Consideration of International cooperation and agreements

The plan expresses that the Australian government places importance on international collaboration and that Australian marine science “must be collaborative, integrated and internationally engaged” (Australian Government, 2015, p. 19). The plan highlights past collaboration with the FAO and explains that “Australian scientists have pioneered the development and adoption of risk-based approaches for ecologically sustainable fisheries and aquaculture management systems” (Australian Government, 2015, p. 19). This holistic approach is explained to deal with “ecological, social and economic components of the system” and that the FAO has since adopted this system. Whilst “other international bodies have also adopted the tools and frameworks as the basis for third-party certification schemes to demonstrate the sustainability of fisheries and to ensure the ongoing public confidence” (Australian Government, 2015, p. 19).

6.1.2 National Aquaculture Strategy 2017

Summary, aims and objectives

In 2017 the Australian government launched the National Aquaculture Strategy which covers the period from 2017 to 2027. The plan was developed in consultation with State and NT governments and the aquaculture industry. The main target outlined in the strategy was the aim that the Australian aquaculture industry double the current value to \$2 billion per year by 2027 (Australian Government, 2017, p. VI) In order for this to happen in a 10 year period, production of aquaculture will need to increase by 7 per cent each year, and the government believes this is a conservative target.

Category 1: Governance and Policy Approach

The strategy report acknowledges that the responsibility of implementing the priorities is up to multiple jurisdictions. Their implementation will be subject to each state or territory relevant policy objectives, priorities and resources and each jurisdiction are not bound by these actions. In Essence the 2017 National Aquaculture Strategy for Australia sets no bounding requirements for state, NT governments and industry, instead it is labelled as a blueprint or guide to continue to expand the industry. The national aquaculture strategy 2017 promotes actions that state government and industry stakeholders should adopt in order to achieve a doubling in the value of the aquaculture industry by 2027 to around AUD\$2 billion (Australian Government, 2017). Within the strategy eight priorities were outlined at “supporting the growth of a strong, competitive, resilient, profitable and ecological sustainable aquaculture industry.” (Australian Government, 2017, p. 4)

The eight actions include:

1. “Promoting an efficient regulatory framework modelled on established best practice that is transparent and removes unnecessary burden on business
2. Maximising the benefits of innovation in aquaculture through targeted research, development and extension.
3. Developing and improving market access for Australian aquaculture products domestically and internationally, capitalising on Australia’s clean and green image
4. Understanding and managing the biosecurity risks through a coordinated approach to protect the aquaculture industry and the Australian environment.
5. Improving public perception and understanding of Australian aquaculture as a sustainable industry producing safe and healthy products.
6. Continuing to improve the environmental performance of aquaculture, including identifying opportunities for optimising environmental performance through adoption of cost-effective strategies
7. Encouraging and promoting investment in Australian aquaculture.

8. Improving the training and education for the aquaculture workforce and ensuring future employment needs of the industry are met.”

Category 2: Reference to Science: Consideration of International cooperation and agreements

The National aquaculture strategy does refer to the FAO, in particular the “State of world fisheries and aquaculture 2016” report, and the United Nations UNCLOS agreement. The report refers to the global situation on world seafood consumption, drawing attention to FAO’s forecast that aquaculture will account for more than half the world’s fish production by 2021. Therefore, Australian aquaculture should grow to meet the “global seafood demand”. In terms of the development of the strategy over 100 stakeholders were consulted including “state and NT governments, indigenous committees, research bodies, environmental non-governmental organisations and over 60 industry bodies and operators” (Australian Government, 2015, p. 3), however there is no explicit mention of any international organisational involvement. When I contacted the department of

6.1.3 Tasmanian Government Sustainable industry growth plan for the salmon industry (December 2017) and One-Year Review (January 2019)

Summary, aims and objectives

In December 2017 the Tasmanian government presented a sustainable industry growth plan for the salmon industry which sets out to describe the governments vision and priorities for the industry. The report acknowledges that the salmon industry is an integral part of the State’s revenue and that the government wants to ensure ongoing sustainable growth. The government views that the aquaculture industry “is inextricably linked to the economic prosperity of Tasmania” (Tasmanian Government, 2017, p. 8). The vision for the industry includes three main aims, firstly to continue economic and jobs growth via a sustainable growth path that also hopes to drive productivity and innovation. Secondly, they aim to produce public confidence in the industry, “by increasing transparency and industry accountability for environmental management, and by the introduction of a clear and robust mechanism for expansion” (Tasmanian Government, 2017, p. 4). Thirdly the aim is “to be the most environmentally sustainable salmon industry in the world by continuing to improve environmental performance through industry driven innovation, coupled with appropriate environmental monitoring and regulation” (Tasmanian Government, 2017, p. 4). In January 2019 the Tasmanian government reviewed their growth plan and its vision for the industry and updated their growth target from \$1 billion by 2030 to become a “\$2 billion industry by 2030” (Tasmanian Government, 2019, p. 2). The report detailed the governments progress on their original initiatives, and highlighted in particular their progress towards the following; the maintenance of public confidence in the salmon industry, improving the efficiency, effectiveness and transparency of the industry’s environmental regulation,

and the effectiveness of its biosecurity systems and the governments support towards industry growth were all reviewed.

Category 1: Governance and Policy Approach Recommendations

The strategy document outlines strong growth targets for the industry with the intention that the industry will continue to be an enormously important driver for the economy. However, the government also acknowledge the need to support sustainable growth and to ensure strong environmental performance.

“the government’s role in the future of the industry is to partner constructively with industry and the community to create the right environment for growth through two mechanisms: first, ensuring that access to public natural resources is on terms that encourage the industry to meet world’s best standards of sustainable farming practices, research, development and innovation, and effective biosecurity; and second, facilitating a robust, appropriately resourced and independent planning and regulatory system” (Tasmanian Government, 2017, p. 4)

The strategy goes onto outline the vision to develop a “Tasmanian Salmon Industry Scorecard”, that helps to benchmark the industry against international best practice (Tasmanian Government, 2017, p. 5). The strategy report discusses that the original planning framework was based on a “global model”, however after rapid growth in the industry recently the government sees the need to update the existing legislation and maintain public confidence. The report discusses some mechanisms they intend to introduce such as “Grow and No-Grow Zones” and the commitment to future expansion into oceanic rather than estuarine waters. The government also supports proposals to allow states to regulate marine farming outside state waters (Tasmanian Government, 2017, p. 16). The government also report to develop a competitive tender process where “the government will set the criteria – environmental, social and economic – and ensure that equity is achieved and monopoly avoided” (Tasmanian Government, 2017, p. 17).

Category 2: Reference to Science: Consideration of International cooperation and agreements

The strategy report does make mention of the importance of research cooperation and highlights the “partnering with world-class scientific institutions” such as the University of Tasmania’s, Institute for Marine and Antarctic Studies (IMAS) and Australia’s Commonwealth Scientific and Industrial Research Organisation (CSIRO) Marine and Atmosphere department. (Tasmanian Government, 2017, p. 9) Within the plan the government makes a commitment to continuously improve regulatory systems and state that “it is time to recommit to staying abreast of the best global practices” (Tasmanian Government, 2017, p. 20)

The report does not make mention any associations with international bodies, the government does feel “the plan provides an ideal opportunity to bring together representatives of the whole industry – salmon growers, ancillary industries and scientific community” (Tasmanian Government, 2017, p. 23) making reference to the importance to consult science in the planning process.

Within the review document the government makes mention of “forming relationships internationally that can provide beneficial learnings for all parties. This includes ongoing engagement with countries including Canada, Scotland, Norway” (Tasmanian Government, 2019, p. 6).

6.2 Norway

6.2.1 The place of the Ocean’s in Norway’s foreign and development policy - Meld. St. 22 (2016-2017)

Summary, aims and objectives

On the 24th March 2017 a white paper from the Solberg Government was presented to the parliament from the Ministry of Foreign Affairs. The paper was approved the same day and it was the first time a Norwegian government had presented a white paper on the place of the ocean in Norway’s foreign and development policy. The main aim of the paper was to highlight opportunities within the ocean for Norway along with the challenges and to investigate how foreign and development policy can be implemented, whilst also promoting the achievement of the UN Sustainable Development Goals (SDGs) (Norwegian Government, 2017a, p. 5). The Norwegian government states that it is actively promoting a transition to a greener Norwegian economy, along with the need to ‘safeguard biodiversity’ but also making the most of the opportunities for economic development in the ocean areas. The white paper states that “the oceans are a key focus area in Norwegian foreign and development policy, and highlights three priority areas: sustainable use and value creation, clean and healthy oceans, and the role of the blue economy in development policy” (Norwegian Government, 2017a, p. 6)

Category 1: Governance and Policy Approach

The white paper highlights that Norway places high importance on international cooperation for ocean interests, stating “no nation can solve ocean-related problems alone. Good cooperation mechanisms are needed at both global and regional levels”. However, it acknowledges that international cooperation will be strongly influenced by shifting power and emerging geopolitical changes and interests. How Norway values international cooperation is evident below:

“Good multilateral cooperation by well-functioning institutions is of great importance for managing present and future challenges, and for realising the potential of ocean-based

resources in a sustainable fashion. The system of international institutions that has emerged is itself a determining factor in how the global community governs and manages the world's oceans. It forms part of the prism through which Norwegian ocean interests are viewed, and the institutions are important arenas for promoting Norwegian interests and positions. They can also be important partners in addressing particular issues. As a significant actor in a wide range of ocean affairs, Norway is well positioned to influence how such institutions are designed and what their priorities are. Often such influence will be most effective when exercised in cooperation with countries that share Norway's interests".

In terms of aquaculture management, it is indicated that Norway values "**knowledge-based management**" and that "environmental protection is a prerequisite for further growth". Further stating that "the marine resource act is an important tool for managing fisheries soundly and meeting their international obligations, including the protection of biodiversity. The act includes principles requiring public administration to regularly assess whether a fishery is sound or action must be taken. The assessments emphasise an **ecosystem-based approach**, and measures imposed must be consistent with the precautionary principle" (Norwegian Government, 2017a, p. 48).

Category 2: Reference to Science: Consideration of International cooperation and agreements

The document focusses on international cooperation, detailing where Norway fits in to the international policy arena. Throughout the document it explicitly states that Norway appreciates International cooperation and is seen of high importance. The report draws attention to the UNCLOS, stating that "the principles set out in the Convention on the obligation to protect and preserve the marine environment and the right to exploit natural resources, and its regional approach to marine management are particularly important" (Norwegian Government, 2017a, p. 9). It is evident that Norway values cooperation with multilateral, regional and bilateral partnerships and they believe that "Coordination and cooperation between international institutions is needed if we are to succeed in managing ocean-related challenges" (Norwegian Government, 2017a, p. 9). There is reference to the United Nations and the FAO as being important institutions in the governance of oceans and in terms of the FAO they explicitly state that the FAO partnership is of benefit for fisheries and aquaculture:

"In fisheries and aquaculture a key role is played by the UN Food and Agriculture Organization (FAO). FAO focuses on global food security and is an important arena in the forging of international conventions, such as the Port State Measures Agreement, and norms and guidelines related to fisheries and aquaculture. The work done in FAO to strengthen sustainable global management of fisheries resources is important for Norwegian ocean interests. Norway has had a long and close partnership with the organisation." (Norwegian Government, 2017a, p. 32)

In terms of specific fishery and aquaculture management the government acknowledge the FAO and states that “FAO does important work to strengthen sustainable global management of fisheries resources” (Norwegian Government, 2017a, p. 51). They draw attention to the budgetary contribution Norway makes on a fixed basis to the FAO as well as extra funding for particular initiatives. FAOs technical guidelines were acknowledged, and in some cases Norway has contributed support by providing professional expertise and finance in the development phase. The Government stated explicitly that it intends to “maintain and strengthen cooperation with the Food and Agriculture Organization on sustainable marine resource management” (Norwegian Government, 2017a, p. 53).

6.2.2 Predictable and environmentally sustainable growth in Norwegian salmon and trout farming – Meld. St. 16 (2014-2015)

*Please note this report is written in the Norwegian language and has be translated by the author of this thesis

Summary, aims and objectives

On the 20th March 2015, a white paper from the Solberg government was presented to the parliament by the Ministry of Trade, Industry and Fisheries. The paper was approved the same day and investigated how Norway can increase “value creation” based on predictable and sustainable growth and improved environmental adaptation within the aquaculture industry. The report highlights that the salmon industry has had strong growth since 1980 and Norway now exports salmon to over 100 countries. The report details that since 2005 the industry has seen a global shortage of salmon on the market leading to extraordinarily high prices and high profits for farmers. Norway recognises the opportunity for growth within the market and wants to facilitate optimal conditions for growth. The report starts out citing the Nobel Prize winning economic professor Finn E, Kydland and refers to his theory on “time consistency of economic theory”. If authorities have many different instruments at their disposal and are not clear as to how they will manage the aquaculture industry, this creates unpredictability for the industry’s operating conditions, therefore resulting in less investment. The main aim of the document is to outline a predictable long-term policy for growth in the aquaculture industry.

Category 1: Governance and Policy Approach

The report discusses that unpredictable growth policy may hinder further development of new technology and innovative solutions that are needed to address sustainability challenges. It is suggested that a policy that includes predictable growth will ensure that the Norwegian aquaculture industry remains a world leader. By promoting predictable growth it will provide solid investment in the industry as well as growth in in technology and innovation for the industry and in turn benefit coastal communities. A predictable growth policy that also takes into account the environmental challenges will strengthen the industry's competitiveness. The report suggests that if the aquaculture

industry is to be subject to a predictable growth policy, it must be determined how much environmental impact society can accept. The Government believes that environmental sustainability must be the most important prerequisite for regulating further growth in the aquaculture industry. When looking at the environmental footprint of farming salmon it is acknowledged that it does have affects “There is broad political agreement that a certain imprint must be accepted, but that production must take place within an environmentally sustainable framework. Compared with food production on land, the production of farmed fish leaves a relatively small footprint, both in terms of land use, resource use and emissions of, for example, greenhouse gases” (Norwegian Government, 2014).

Category 2: Reference to Science: Consideration of International cooperation and agreements

The report highlights environmental sustainability as being a prerequisite for growth and draws attention to the UN world commission on Environment and Development. Highlighting their definition of sustainability as “development that satisfies today's needs without reducing the chance that future generations will have their needs met” (Norwegian Government, 2014) The report goes on to highlight Norway’s commitment to international and regional obligations such as the Convention on Biological Diversity (CBD) and the Convention on Migratory Species (Bonn Convention) that may have impact on the management of the aquaculture Industry. Regional commitments include the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR). The Norwegian Government (2014) commit that through control and supervision via the aquaculture administration that any environmental impact from Norwegian operations will be kept within an acceptable framework that international environmental agreements and society can accept.

6.2.3 The Norwegian Government’s Ocean Strategy, *New growth, Proud History* (2017)

Summary, aims and objectives

The Norwegian government’s ocean strategy was presented on the 9th May 2017 and the responsible ministries for the strategy within the government was the Norwegian Ministry of Trade, Industry and Fisheries and the Norwegian Ministry of Petroleum and Energy. Firstly the report highlights the long and proud traditions that Norway has with the sea and claims that Norway is now “one of the world’s leading ocean economies” and “one of the world’s largest and most advanced seafaring nations” (Norwegian Government, 2017b, p. 6). The report highlights that the ocean represents a source of growth and opportunities for the entire coastline of Norway and that strong local industries are vital in maintaining strong local communities. The goal of the government is “for Norway to be the top ocean-based economy” (Norwegian Government, 2017b, p. 6) and in order to reach that goal it is acknowledged that Norway must use its existing knowledge and expertise within the ocean in order to grow and maximise its advantage. Norway imagines that this will be achieved by “facilitating blue

growth through green restructuring” (Norwegian Government, 2017b, p. 8). Another goal of the government is for Norway to become the ocean economy the world looks to, and to become the preferred partner to collaborate with on ocean matters internationally.

The strategy report highlights three main ocean industries as being most important for Norway: the petroleum industry, the maritime industry and the seafood industry. “The Seafood industry comprises fisheries, fish farming (aquaculture), and seafood processing and export, as well as suppliers of equipment” (Norwegian Government, 2017b, p. 13). The strategy identifies that the world has a growing population that is projected to have continued growth in the future and that the ocean resources are important in order to provide enough food for the growing population, whilst also meeting nutritional needs and global food security goals. Aquaculture is recognised as being an important part in meeting these needs. The Norwegian Government (2017b, p. 29) estimates a “six-fold increase in revenue for the marine industries towards 2050”, and aquaculture will represent a large portion of this growth if the current challenges in aquaculture are managed and that climate change is not more dramatic than expected.

Category 1: Governance and Policy Approach

The main overarching goals and objectives for management and regulation of the ocean industries that are outlined in the strategy include:

- “facilitate further development of the ocean industries and the development of new, profitable ocean industries within a sustainable framework
- make sure legislation does not hamper innovation and the transfer of technology and experience across industries, and
- strive to secure technology neutral regulations that help promote technological development” (Norwegian Government, 2017b, p. 35)

In terms of aquaculture management and regulation the strategy promotes “sustainable growth and value creation” and the expert committee for green competitiveness advocate that any potential growth must be developed sustainably and that any “management, industry and technology are developed on biological terms” (Norwegian Government, 2017b, p. 50). The government aims to facilitate “predictable growth” within the fish farming industry, asking authorities to control any growth in consideration for the environment.

The report highlights the governments new growth system for aquaculture, which was decided on 17th January 2017. The plan for growth is that the fish farming industry “follows nature’s lead” and “this means that the impact of farming on wild salmon must be kept within acceptable limits” (Norwegian Government, 2017b, p. 53). In order to deal with escapees, salmon lice and disease-related challenges the Norwegian government advocates binding agreements with the industry. A “letter of intent” has

been signed with industry representatives, where the industry assumes obligation for any escaped fish or meet finance removal. Regional municipalities will be rewarded if they make more areas available for the industry, the government believes that they will then experience greater positive effects by opening up to the industry in their regions, the government has established an aquaculture fund where large portions will be forwarded to municipalities as a “reward” for opening up (Norwegian Government, 2017b, p. 53). The report also details Norway’s approach to development of the aquaculture industry with the aim to solve environmental challenges such as escaping and salmon lice. “Green Licences” and a development permit scheme were used to promote innovation and moving aquaculture production offshore.

Category 2: Reference to Science: Consideration of International cooperation and agreements

Within the strategy report there are two sections dedicated to ‘International research collaboration’ and ‘International policymaking’. The report highlights that knowledge of the ocean is fundamental because, “there is great variations in the ecosystems, and knowledge of these is vital for releasing the potential for value creation in the ocean industries, and to ensure sustainable growth”. Furthermore “increased knowledge of various relationships in the ocean, biodiversity, and the function and resilience of the ecosystems, is a necessary foundation for future value creation and sustainable growth (Norwegian Government, 2017b, p. 63). In order to increase knowledge of ecosystems and the environmental situation, the government acknowledge that monitoring and data collection is required. However, they point out that efficient exchange of marine data is lacking and that in order to secure the environmental situation, international solutions are required.

In terms of International research collaboration, the report highlights that Norwegian research communities do participate in extensive international research and this is important for developing the ocean economy.

“Good international ocean research collaboration is important in order to contribute to high quality research, to secure a good, shared knowledge base for administering resources, and to secure the knowledge base for developing international guidelines for offshore business activity” (Norwegian Government, 2017b, p. 79)

However, they mainly see this research collaboration as a “door opener” to drive new business development and new market opportunities and important in order for Norwegian technology becoming the International standard.

The report highlights that there is increased international focus on blue growth possibilities, and the government aims to continue existing international research cooperation. It appears the main arenas for international research and cooperation is with UNESCOs oceanographic commission, IOC (The Intergovernmental Oceanographic Commission), The EU research and innovation program: Horizon

2020, JPI Oceans (European countries), The International Council for the Exploration of the Sea (ICES) and the Arctic Council.

In terms of International judicial collaboration, it is acknowledged that Norway benefits from joint regulation and regulatory collaboration as it is a relatively small open economy. “The framework for the ocean industries is largely determined internationally, and Norwegian authorities are active advocates for uniform global requirements”. As this sort of cooperation “ensures free trade through open markets, and to making strict requirements to safety, environment and social standards” (Norwegian Government, 2017b, p. 96)

“Norwegian regulations for the ocean industries are largely based on international negotiated regulations and are in compliance with international regulations. At the same time, it is important to preserve the option of implementing necessary regulations within the framework of our international legal obligations, in order to attain legitimate, national goals” (Norwegian Government, 2017b, p. 97)

The strategy report does draw attention to the UN sustainability goals and the obligations listed in the Paris agreement stating that “It is necessary to regard climate, environment, economy, and society as a whole and in line with the UN sustainability goals and obligations in the Paris agreement” (Norwegian Government, 2017b, p. 30)

6.2.4 Blue Opportunities – The Norwegian Government’s updated Ocean Strategy 2019

Summary, aims and objectives

The updated version of Norway’s Ocean Strategy entitled “Blue Opportunities” was launched 3rd June 2019 and aims to provide an updated status report to Norway’s 2017 ocean strategy “New Growth, Proud History” but also addresses future goals and plans. The plan highlights the immense opportunities in the ocean space for Norway, where it will help to generate further sustainable job creation and value creation in the ocean industries. Norway intends to be a “leading ocean nation” and they see that the “oceans will continue to be a vital basis for jobs, value creation and welfare throughout Norway, and they can also be part of the solution to the world’s environmental and climate related challenges” (Norwegian Government, 2019, p. 6). The strategy emphasizes that the most serious environmental problem for Global seas as well as Norwegian Seas is climate change, the loss of marine biodiversity, pollution, and marine litter. The report draws attention to the UN Sustainable Development Goals (SDGs) and believes that a “sound ocean policy” and a “sustainable ocean economy” are important for achieving the UN goals. In terms of aquaculture the government intends to facilitate further sustainable growth in the seafood industry and offshore aquaculture is seen as a possible way to “increase salmon exports and exports of new technology and knowledge” (Norwegian Government, 2019, p. 15).

Category 1: Governance and Policy Approach

The strategy outlines key policy principles as follows:

- i) “To strengthen and further develop the Law of the Sea
- ii) To promote the conservation and sustainable use of marine ecosystems
- iii) To contribute to knowledge-based management
- iv) To support the implementation of international instruments
- v) To work towards an integrated approach to ocean management that will facilitate the developments of a sustainable ocean economy” (Norwegian Government, 2019, p. 15)

The government continues to highlight the importance of sound management and a predictable framework. **Ecosystem-based management** is promoted, along with governance structures that must include sound scientific basis for plans and decisions, and that must support research and technology development. Regulatory frameworks must be enforced, and international cooperation is essential. The strategy highlights that local planning and management is important, counties and municipalities play an important role in preparing plans and they must strike a balance between conservation and sustainable use of different areas, whilst facilitating business development. The government aims to distribute power and build society from below, giving more responsibilities to local county authorities for regional industrial and skills policy. Aiming to encourage the creation of more jobs, economic growth and balanced population development in rural areas. Expression of the aim to establish a forum for systematic dialogue on ocean issues between the government, the counties, the Sami parliament and representatives of coastal municipalities, with the purpose of facilitating dialogue and understanding various approaches to blue growth was included.

Category 2: Reference to Science: Consideration of International cooperation and agreements

The updated version of the Norwegian governments ocean strategy again included focus on international cooperation and ocean diplomacy. There is a strong focus on the 2030 agenda for sustainable development and the 17 Sustainable Development Goals (SDGs), specifically acknowledging SDG 14 which is a call on the world to conserve and sustainably use the oceans, seas, and marine resources for sustainable development. The government believes that a strong ocean policy and “sustainable ocean economy” will help achieve the SDG’s. The government acknowledge that the world needs to act together to find joint solutions and in terms of international cooperation, the government explicitly states “Norway is playing an active role in the development of International regulatory frameworks” (Norwegian Government, 2019, p. 6). The report states that Norway is following “knowledge-based, integrated and responsible ocean management” and alongside this they also encourage an international framework for sustainable ocean management.

In terms of international cooperation, the report makes mention of several associations and highlights its strong cooperation with the United Nations. The UN bodies they specifically mention that they believe are important forums include:

- International Maritime Organisation (IMO)
- **Food and Agriculture Organisation (FAO)**
- UN Environment Programme (UNEP)
- International Seabed Authority (ISA)
- UN Educational, Scientific and Cultural Organisation (UNESCO)
- UN Committee of Experts on Global Geospatial Information Management (UN-GGIM)

The Strategy mentions Norway support of the Action Platform for Sustainable Ocean Business, an initiative of the UN Global Compact. This initiative is to help guide businesses to achieve the 17 SDGs and apply the 10 compact principles from the UN Global Compact. Norway has established three streams to achieve this: “mapping ocean governance and regulation, identifying opportunities for sustainable growth, and establishing basic principles for sustainable economic activity in the oceans”. The report on Mapping Ocean Governance and Regulation as prepared by DNV-GL (2018) acknowledges the FAO and its relevance to aquaculture development. It highlights the **CCRF** and associated technical guidelines, the **Blue Growth Initiative** and the FAO’s specific guidance and initiatives to promote sustainable aquaculture as key guidance instruments to achieving SDGs.

The report also details Norway’s research cooperation with the EU and the UN Decade of Ocean Science, Horizon 2020 is Norway’s largest single initiative to cooperate internationally on Research and Innovation. Acknowledges the importance to cooperate in research offered by the UN Decade of Ocean Science for Sustainable Development (2021-2030) In order to help generate knowledge that can be used to achieve the SDGs.

Throughout the report the Norwegian government reference the UN and their association, Norway wants to “contribute to international developments in sustainable ocean management through active participation in UN ocean processes...through ocean dialogues with selected countries” (Norwegian Government, 2019, p. 47).

CHAPTER 7 – DISCUSSION

Summary of findings

In this section I will present a summary of findings for both Australia and Norway and draw some comparisons and differences.

For Australia two commonwealth documents were analysed, the 2015 National Marine Science Plan and the 2017 National Aquaculture plan. Both documents detailed strong aspirations for growth within the ocean. The Australian government wishes to grow Aquaculture to a \$2 billion industry by 2027. Both plans acknowledge the need to grow any ocean industry sustainably and in terms of governance approaches discussed, the government advocates a “best-practice approach” and the need of “knowledge of ecosystem resilience” towards managing the ocean environment and aquaculture. Whilst also implementing “cost-effective strategies” and an “efficient regulatory framework”. The Marine Science Plan detailed the Australian government’s aspirations to shift towards a “blue economy” however the “highest priority science” is needed to help tackle challenges that arise. This plan also expressed the high importance for international collaboration and the need to be “internationally engaged”.

There was evidence that Australia has collaborated with the FAO in the past and when I questioned a federal government official it was explained that "the FAO Code of conduct for responsible fisheries is an important reference for all fisheries and aquaculture policy in Australia, but it is hard to directly attribute the content of Australia's 2017 National Aquaculture strategy to the code or other FAO guidance on aquaculture". It was also explained that "Australia was closely involved in the drafting of the code (which is now over 25 years ago), and much of the national and state-based fisheries and aquaculture policy is consistent with the code. At the national level, fisheries policy was drafted in the late 1980s and this was put into effect in the early 1990s, which embodied policies, concepts and principles which were/are consistent with the eventual code". Also adding that "fisheries legislation, Australia (nationally and through the states and territories) has a range of environmental and planning legislation that meets similar requirements or objectives to those in FAO guidance".

Within the Tasmanian context where the largest aquaculture industry is situated within Australia, the Tasmanian government expressed an even stronger growth target compared to the national target, which was to grow the aquaculture industry to a \$2 billion industry by 2030. The government is particularly concerned with the public perception of the industry and wishes to produce public confidence in the industry. One of the aims expressed by the government is “to be the most environmentally sustainable salmon industry in the world by continuing to improve environmental performance through industry driven innovation, coupled with appropriate environmental monitoring

and regulation”. In terms of governing the industry the government expresses that they wish to “meet world’s best standards of sustainable farming practices” by seeking appropriate research and innovation. Facilitated by a “robust” and “independent” regulatory and planning system. The Tasmanian government does refer to research institutions, but they are Australian based. They wish to “consult science” within the planning process and seek out “best global practices” and have committed to develop a “Tasmanian Salmon Industry Scorecard” with the goal to benchmark them against international best practice.

Within the Norwegian context two white papers that were presented to the parliament were analysed. Firstly, Meld. St. 22 investigated how foreign and development policy can be implemented within the ocean space. The other parliamentary report was Meld. St. 16 an investigation into increasing “value creation” and developing “predictable” aquaculture policy to facilitate growth. Within the Meld. St. 22 report the Norwegian government advocates for “knowledge based” management and mentions the “ecosystem-based approach” and “precautionary principle” towards aquaculture management. Whilst the Meld. St. 16 report discusses the need to determine the environmental impact society can accept in relation to managing aquaculture. The government wants sustainable regulation of the environment as a prerequisite to any growth within the industry. In terms of reference to science and consideration of international cooperation and agreements, the report Meld. St. 22 was scattered with references to international cooperation indicating Norway places it as a high priority. The report highlighted that FAO is a valued partner and that Norway has had a long and close partnership with them and that FAO helps to strengthen sustainable global management of fisheries. Going forward the Norwegian government expressed the intention to maintain and strengthen cooperation with the FAO. Within the Meld. St. 16 report the government explained that Norwegian aquaculture should be kept within an acceptable framework that meets international environmental agreements.

Lastly the recent ocean strategies for Norway were investigated, “New growth, Proud History” was produced in May 2017 and the updated version “Blue opportunities” was produced in 2019. Norway expressed that they wish to “facilitate blue growth through green restructuring” and become the preferred partner to collaborate with on ocean matters internationally. The updated ocean strategy further reiterated that Norway wants to be a “leading ocean nation”, whilst also strongly emphasising the need to meet the UN’s Sustainable Development Goals. Both reports expressed the Norwegian’s government intention to cooperate internationally and support implementation of international instruments. Within the “New growth, Proud History” report the government estimated a “sixfold increase” for revenue for industries within the ocean space towards 2050, highlighting that aquaculture will be a big part of the increased revenue. The most recent ocean strategy report highlighted climate change as a serious environmental problem that will affect global seas as well as have consequences for Norwegian seas. In terms of a governance approach the government expressed that new development must be achieved within a “sustainable framework” and for aquaculture

specifically it must “follow nature’s lead” and that impacts on wild salmon stocks must be kept within an acceptable limit. “Ecosystem-based management” is promoted alongside governance structures that include a sound scientific basis for plans and decisions. There was also reference to “blue growth” with aims to encourage more job growth and economic growth with the ocean industries. In terms of references to science and consideration of international cooperation both reports placed strong emphasis on the need to cooperate and collaborate internationally. As Norway is a relatively small open economy, it acknowledged that it benefits from joint regulation and regulatory collaboration and is an active advocate for “uniform global requirements”. This global cooperation then goes onto ensure free trade via open markets and ensuring strict requirements to safety, the environment and social standards. The Norwegian government expressed that they believe they are in compliance with international regulations. The most recent ocean strategy expressed the strong association with the United Nations and highlighted the FAO as being an important forum to be a part of. Norway intends to participate in international research going forward and wish to contribute to international developments in sustainable ocean management via participating in UN processes.

When comparing the findings between Australia and Norway there are lots of similarities and some differences. Both countries have strong growth targets to grow their aquaculture industries but recognise growth needs to be done sustainably and within acceptable limits. Both countries place high importance on international cooperation and want to consult science in the process of developing policy and regulation for the industry. There was evidence that both countries have been involved with the FAO and are aware of FAO’s soft law instruments. In my opinion Norway is more integrated with the FAO compared to Australia, but that does not mean Australia doesn’t value or are not aware of FAOs guidance. It just appears that Norway is more involved and participate in FAOs conferences and are more engaged. The Norwegian government expressed the opinion that the cooperation with the FAO and other international organisations is mutually beneficial, as the cooperation also protects Norway’s interests as it is a way to be involved internationally and shape and influence decisions globally. Within Australia the federal government largely hands over most of the control to the states and territories to manage their jurisdictions, therefore the National Aquaculture Plan for Australia operates as a blueprint and it is up to the states and territories to implement the priorities and each jurisdiction is not bound by the strategy proposal. The analysis within the local context in Tasmania discovered that the local government there wishes to address the perception of the aquaculture industry amongst locals and intends on improving “public confidence”. Also within the Tasmanian context it appears that the government consults with local research institutions and less with international institutions. In Norway, the governance of Aquaculture appears fragmented as well, there is a division of responsibility between the central government and the regional and local authorities, with key tasks assigned to different authorities.

Overall, it appears Australia and Norway do value international cooperation and science output from international organisations and both countries include elements of FAOs objectives and guidance within their planning and legislation.

Discussion of the Results

When accessing how the Science Policy Interface is operating between the FAO and Australia and Norway, there is evidence to the exchange of information between the FAO and Australia and the FAO and Norway. The FAO operates as a boundary actor that contributes to the dissemination of science information onwards to both countries and helps to bridge the divide between science and policymaking. Here I would argue that although there is a connection of information flow between the FAO and the two nations, there is some evidence that the information produced by the FAO is perhaps less utilised at the local level within Australia. When I interviewed state and territory managers of aquaculture within Australia there was confirmation that information from the FAO was not heavily used or referred to, and that decision making is largely influenced by stakeholders within the industry. Potentially this is evidence to suggest that although information is utilised by both countries, the information is either not reaching grassroots state managers or is not as valued in the local policy-making process.

The empirical findings produced evidence that the science policy interface between the FAO and the two nations is characterised by information exchange that goes both ways, so even though the FAO operates as a science provider, in turn the FAO values science information produced by Australia and Norway. In my opinion the FAO see Norway as a “model nation” in ocean management and often refers to Norway as an example nation who they believe often adopt best practices. There was also evidence from Australia that their risk-based approaches for managing fisheries and aquaculture sustainably in the past had then gone onto influence the FAO and adopt characteristics of the same approach to influence other countries policymaking approaches.

Ultimately, the FAO is just one piece of the science policy interface that operates to bridge the science-policy gap between scientific knowledge and policymakers. However, I would declare that they are an important actor globally that exists to help solve policy problems within the ocean space.

Within this thesis I assume that the FAO is operating as an epistemic community, and throughout the exploration of this study I searched for evidence that the FAO is helping to influence policy formation within nations, specifically in Australia and Norway. Throughout my analysis of strategy documents, I was able to find evidence of FAO rhetoric, such as “blue growth”, “ecosystem-approach” and “precautionary principle” in both national policy approaches towards aquaculture management. Therefore, this evidence provides one indicator of influence upon states and their formation of policy

preferences towards sustainable aquaculture, which indicates evidence of influence and effectiveness of the FAO as an international policy coordinator. In terms of what that influence looks like I would like to refer back to Haas (1992) explanation on how knowledge-based experts function. He describes epistemic communities as being good at; “articulating the cause-and-effect relationships of complex problems, helping states identify their interests, framing the issues for collective debate, proposing specific policies, and identifying salient points for negotiation”. There is evidence of these same attributes within the FAO as they set out to frame policy problems to be easily digested by state actors. Overall I would argue that the FAO does hold some power in policy formation for states, and as Haas (1992, p. 3) explains; “control over knowledge and information is an important dimension of power and that the diffusion of new ideas and information can lead to new patterns of behaviour and prove to be an important determinant of international policy coordination”.

In terms of soft law instruments being used in either nation that have been developed by the FAO, there is some evidence of use, both Australia and Norway contain the legal context and policy framework to support the FAOs policy preferences. As mentioned in the findings both countries place high importance to international cooperation and both countries adopt similar rhetoric to the FAO on sustainable management of aquaculture. Both countries make mention of policy approaches that are in alignment with the output of soft law instruments touted by the FAO.

The Norwegian government declares “no nation can solve ocean-related problems alone” and also asserts that they are “active advocates for uniform global requirements”, highlighting the need for global and regional cooperation mechanisms. There is evidence by participating in international cooperation it is mutually beneficial for Norway as they acknowledge emerging geopolitical challenges and shifting power. By collaborating internationally, Norway in turn helps to protect its own interests and is then in the position to have influence towards the priorities within the global governance space for ocean management. I would argue here that it has characteristics of an interdependent relationship, the FAO takes cues from Norway and Australia as they are members and donors (via funding) therefore they can in turn influence the FAO.

The thesis study discovered that both nations value international cooperation and are aware of the FAO’s soft law instruments with some indicators of use within both countries. This leads to a discussion on the benefits of International organisations implementing soft law instruments. The main benefit I see is that it helps countries to progress down a sustainable path in management of their sovereign resources. The soft law instruments help to set out principles and guidelines, charting a path for countries to follow. There is also benefit in an instrument being less binding as it may mean that states are then more likely to participate with international guidance, it also means that the FAO can take on a more proactive role rather than taking on a reactive role. There is opinion that soft law can be dismissed as “mere symbolic action” and “strong on promises and weak on commitment”

(Jacobsson, 2004). However, as Jacobsson (2004) argues; soft law can be effective when member states commit to it, just like hard law commitments can lack implementation by member states if they are not committed. Soft law can serve a range of functions, it can lead to collaborative action in areas in which a community are lacking in legal competence or a binding decision lacks political support (Jacobsson, 2004). Most of all I would argue that soft law instruments contribute to subtle effects in policy changes within nations, they can lead to subtle impacts on national debates and steer national discourses. It can change the way nations conceptualise policy principles, shaping countries narratives and therefore producing a global narrative towards sustainable aquaculture.

While there is evidence of implementation of FAO soft law instruments being used amongst member states (Australia and Norway), I then considered FAO's effectiveness as an organisation. Are they helpful for states, and do they influence national decision-making? This leads to a broader discussion on effectiveness more generally. When considering effectiveness, it is about considering if the goals of the commitments have been achieved. Does the FAO deliver desired outcomes? As I progressed through this research project, I discovered the complexities behind measuring effectiveness. Mitchell (2009) provides three indicators of measuring influence, firstly 'outputs', meaning the policy each nation adopts, whilst other indicators of influence include measuring 'outcomes', that involves measuring behaviour change and another measure is 'impact', this involves measuring environmental improvement. As Haas (2016) explains "it is difficult to measure or obtain good evidence about the extent of environmental change, much less the extent directly attributable to conscious efforts. Accurate, confident long-term data that is regionally specific and is based on the same indicators is hard to come by, as is good data on national compliance". This is where he suggests that it is much easier to rely on "proxies associated with effective behaviour". This involves finding cases where effective governance occurs and then suggests "assessments look at outputs over outcomes". Mitchell (2009) also confirms that the measurement of output helps to identify "fingerprints" from international organisations within national legislative or regulatory language that quotes or references IO's. This research project made some attempt at measuring the output of Australia and Norway's ocean and aquaculture strategies and within both countries documents I was able to find FAO "fingerprints" within the national documentation to produce some evidence of influence. However, I would argue although this shows a small indicator of influence, further study is required to obtain a bigger picture of influence by the FAO on Nations.

CHAPTER 8 – CONCLUSION

The objective of this thesis was to examine the policy recommendations and soft law instruments launched by the FAO for aquaculture management and regulation. Investigating if the science output by the FAO is effective and valued by national actors. The thesis explored the global aquaculture environment, highlighting the FAO as a strong actor that disseminates science for states. The thesis then took on an exploration of two case studies of Australia and Norway. Examining each nations strategy and plans for the ocean and aquaculture detailing each country's approach in management. Investigating if the FAO was influential towards national policymaking or if the information exchange is valued in either country.

The thesis used a theoretical framework to help illuminate the movement of science across the science policy interface, exploring the characteristics of information flow between the FAO and the two developed nations. Whilst theory on 'epistemic communities' was introduced to help understand how certain actors can hold power in shaping states interests. The concept of soft law was also explored to help clarify if the instruments that the FAO produce are effective. By using these different, albeit related concepts, the research study aimed to unpack the movement of science between the FAO and nations.

Within the research study the analysis discovered that both countries place high importance on international collaboration and cooperation and the partnership with the FAO was highlighted within both countries. The study also revealed that both countries have strong growth targets to grow their aquaculture production, however, both countries expressed the need to use the best available science to maintain a sustainable regulatory framework for aquaculture production.

When applying the lens of the Science Policy Interface concept the study discovered that the information flow is going both ways between the FAO and the two nations. It was argued that this information exchange is mutually beneficial for both the FAO and the nations, producing characteristics of an interdependent relationship. When investigating the international collaboration between the FAO and the two nations it was argued that each nation is in the position to be able to help protect its own interests and therefore comes from a position of influence. It was argued that when the FAO takes cues from Norway and Australia as they are members and donors (via funding) therefore they can in turn influence the FAO.

Within the thesis the FAO was considered as operating as a 'epistemic community', potentially shaping the policy formation of each nation. Through searching for evidence of FAOs concepts,

approaches, and principles the study was able to find evidence of FAO rhetoric, therefore providing some evidence of influence upon states and power to shape states policy formation.

The thesis argued that soft law instruments are useful in guiding state behaviour, as it helps nations to progress down a sustainable management path. The soft law instruments that the FAO tout help to set out principles and guidelines, charting a path for countries to follow. Whilst also helping to lead to collaborative action for ocean and aquaculture management.

Overall, the research study found evidence that the flow of information within the science policy interface is operating in both directions. The epistemic community of the FAO does hold some power to shape states interests and 'soft law' instruments can provide some use at shaping national policy formation. Even though each country needs to steer its own course towards sustainable aquaculture, there is some evidence that International Organisations can help chart the journey.

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APPENDIX A

Interview Guide for Decision-Makers (Managers and Policymakers)

1. What is your role within the department?
 - a) What is your role in the policy and decision-making process for aquaculture management?
How long have you acted in this role?
2. Currently, what are the main issues within your jurisdiction relating to sustainable aquaculture management?
3. The use of scientific information and recommendations
 - a) What information do you require for decision-making? Where do your data sources for decision-making come from? Is the information from local, national or international sources?
 - b) How is scientific advice used within the department for decision-making? Which publications are used and what scientific reports are frequently used?
 - c) Who do you consult or collaborate with to obtain scientific advice? Are there any research affiliations or collaborations? Who do you mostly rely on for scientific information or advice?
 - d) Do you use any FAO publications in your work? If so, how are they used and which publications have been used?
 - e) Are you familiar with the following FAO concepts or code of conduct related to aquaculture management? The Ecosystem Approach to Aquaculture, The Blue Growth Initiative or The Code of Conduct for Responsible Fisheries. If so, have these concepts or recommendations been useful in the planning and decision-making process?
4. How do senior decision-makers seek out information? In your opinion, what are the main sources of information that is relied upon and what influences the decision-making and planning processes and outcomes?
5. How is information communicated within the department?
 - a) Is there any formal protocol for information production and dissemination within the department? Where are reports distributed?
 - b) Is there any procedures involving receiving or exchanging information from scientists or other organisations at different levels? I.e., International, national or regional?
 - c) Does the department take part in opportunities for communication? And at what level is the interaction? I.e., International, national or regional conferences?
 - d) How do scientists and policymakers interact? Which groups or actors do you share information with and how do you share the information?
6. Does the department have any affiliation or association with the FAO?
 - a) Are there any reporting lines back to the FAO?
 - b) Does anyone within the department attend FAO conferences?
 - c) Have any FAO concepts been adopted by the planning department?
 - d) Is there any interaction or knowledge exchange with the international community? If so, please detail any interactions.

APPENDIX B

Interview Guide: FAO

- 1) What is your role within the FAO and how long have you fulfilled this role?
- 2) In regards to following FAO concepts and guidelines: Ecosystem Approach to Aquaculture, Blue Growth Initiative and Code of Conduct for Responsible Fisheries
 - a) What is the intended purpose of your organisation's publications relating to sustainable aquaculture?
 - b) Are requests for information made from Norway and Australia (in particular Tasmania) and who requests the information? Scientists, Policymakers, Aquaculture industry NGO's?
 - c) What is the process by which the FAO distributes scientific information? Who are the reports distributed to in Norway and Australia (in particular Tasmania) and in what format are they distributed?
- 3) Assessing the use of scientific information distributed by the FAO?
 - a) Does your agency keep a record of requests for aquaculture management publications made from Norway and Australia?
 - b) Is there any evidence of use of the FAO's publications on sustainable aquaculture management in Norway and Australia? And is the evidence tracked?
- 4) What are the opportunities to communicate FAO's scientific information to policymakers?
 - a) What steps are taken to promote the awareness of FAO publications for sustainable aquaculture management? Are there any formal mechanisms for communication of information?
 - b) What events present opportunities for communication? How do scientists and policymakers interact?
 - c) In your opinion, are there any barriers that prevent the dissemination of information to member countries? In particular Norway and Australia.

APPENDIX C

CONSENT FORM FOR RESEARCH PARTICIPATION

University of Stavanger

Study program: Master in Energy, Environment and Society

You are being invited to participate in a research project being conducted by Joelle Roderick, a Masters student at the University of Stavanger, Norway in the faculty of Social Sciences. I am planning towards conducting a masters research study in regards to the role expert information has in policy-making for sustainable aquaculture management. This master's research is supervised by Andreas Østhagen, Senior Research Fellow, Fridtjof Nansens Institute.

This letter has information about the research project and the main purpose of conducting the study, what I will ask you to do if you choose to participate, and how the information about you will be handled if you choose to be interviewed.

The purpose of the research study is to investigate the role of expert scientific information in the development of aquaculture policy decisions and management. The main objective of the research is to determine how and if at all do policy recommendations from international organisations concerning sustainable aquaculture practices influence related national policy in selected developed countries. I want to ascertain the role of science in policy-making decision in Norway and Australia and gauge the level of influence the FAO has on either country on shifting towards sustainable aquaculture management.

You are being asked to participate in the research study to obtain your expert insights and will be asked to provide me with data based on your experience. If you agree to participate, you will be interviewed for approximately 45 minutes and will be asked questions relating to the use and influence of scientific information for policy-making decisions.

Depending on preference the interview can take place over the phone or responses via online/paper can be received. If an interview takes place, I would like to audio-record the interview to make sure information is received accurately. The audio recordings will be kept on my personal computer and they will only be used by me. If you prefer not to be audio-recorded, notes can be taken instead.

The project is due to end August 2020 and all audio material will be erased when the censorship of the thesis is completed. With your permission, your responses to questions may be included in the final thesis report. Your anonymity will be guaranteed as any responses used will not be attributed to you.

Participation in the project is voluntary. If you chose to participate, you can withdraw your consent at any time without giving a reason. All information about you will then be made anonymous. There will be no negative consequences for you if you chose not to participate or later decide to withdraw.

Your rights

So long as you can be identified in the collected data, you have the right to:

- access the personal data that is being processed about you
- request that your personal data is deleted
- request that incorrect personal data about you is corrected/rectified
- receive a copy of your personal data (data portability), and
- send a complaint to the Data Protection Officer or The Norwegian Data Protection Authority regarding the processing of your personal data

What gives us the right to process your personal data?

We will process your personal data based on your consent.

Based on an agreement with University of Stavanger, NSD – The Norwegian Centre for Research Data AS has assessed that the processing of personal data in this project is in accordance with data protection legislation. If you have questions about the project, or want to exercise your rights, please contact the following:

myself: j.roderick@stud.uis.no or by telephone: +47 970 21 557

Data Protection Officer at the University of Stavanger via email: personvernombud@uis.no

NSD – The Norwegian Centre for Research Data AS, by email: personverntjenester@nsd.no or by telephone: +47 55 58 21 17.

Yours sincerely,

Joelle Roderick
(UiS Masters Student)

CONSENT FORM

I have read the explanation about this study above. I have been given the opportunity to discuss it and my questions have been answered to my satisfaction. I hereby consent to take part in this study. I realize that my participation is voluntary and that I am free to withdraw from the study at any time.

Please indicate whether you agree to audio recording of the interview (as applicable):

- I agree to audio recording of the interview.
- I do not agree to audio recording of the interview.