



Universitat Autònoma de Barcelona

ADVERTIMENT. L'accés als continguts d'aquesta tesi queda condicionat a l'acceptació de les condicions d'ús establertes per la següent llicència Creative Commons:  http://cat.creativecommons.org/?page_id=184

ADVERTENCIA. El acceso a los contenidos de esta tesis queda condicionado a la aceptación de las condiciones de uso establecidas por la siguiente licencia Creative Commons:  <http://es.creativecommons.org/blog/licencias/>

WARNING. The access to the contents of this doctoral thesis it is limited to the acceptance of the use conditions set by the following Creative Commons license:  <https://creativecommons.org/licenses/?lang=en>

Ph.D. Thesis

**The Political Ecology of Marine Finfish
Aquaculture in Europe:
Discourses, Implicit Assumptions, Commodity
Frontiers and Environmental Justice**

Irmak Ertör

Supervisors:

Dr. Miquel Ortega Cerdà

Prof. Dr. Begüm Özkaynak

Prof. Dr. Isabelle Anguelovski

Tutor:

Prof. Dr. Giorgos Kallis

Institute of Environmental Science and Technology (ICTA)
Autonomous University of Barcelona (UAB)

30 May 2017

Abstract

Aquaculture is the fastest-growing food-production sector globally—since the 1970s, its share in total seafood production has increased uninterrupted. In the context of falling captures and endangered fish stocks, aquaculture has been proposed as the solution for supplying the rising global seafood demand. This trend has transformed the practices of seafood production from capture to farming, while opening new frontiers for capital with new types of investments and socio-technical innovations.

In this thesis, I contribute to understanding this transformation and the resulting uneven social and ecological production relations. By focusing on the case of Europe, I address the question of how and why marine finfish aquaculture transforms the relations of seafood production and marine governance. Adopting a range of qualitative methodological approaches informed by political ecology, my analysis has three objectives: (i) to analyze discourses on European aquaculture and uncover the way they relate to processes of enclosure and commodification of marine areas; (ii) to identify socio-environmental conflicts related to fish farms in Europe and examine them through the lens of environmental justice; and (iii) to explore the geographic, spatial, and taxonomic expansion of commodity frontiers associated with intensive marine aquaculture.

The research findings presented in this thesis suggest that marine finfish aquaculture shapes and transforms marine spaces and production relations through the continuous expansion of capital into new commodity frontiers and the enclosure of marine commons, enabled by dominant discourses like growth imperative. By seeking further capital accumulation, the transformation from capture fisheries to intensive marine aquaculture changes social and ecological relations within marine area. The resulting reconfiguration of access to and control over marine commons excludes a variety of social actors, and leads in turn to socio-environmental conflicts related to fish farms informed by environmental justice demands. I claim that such a continuous expansion underpins how capital produces nature, space, and socio-ecological regimes with the intention of overcoming accumulation crises related to declining stocks and capture fisheries through further enclosing and commodifying marine areas.

Through these findings, this thesis contributes to literatures on the political ecology of aquaculture as well as to broader theoretical debates on enclosures, agrarian and socio-environmental change and on neoliberal environmental governance.

Keywords: seafood production, marine finfish aquaculture, intensive marine aquaculture, marine enclosures, socio-environmental conflicts, environmental justice, commodity frontiers, Europe, Turkey

Resumen

La acuicultura es el subsector productivo agroalimentario con mayor crecimiento desde los años setenta. Su porcentaje en la producción alimentaria marina ha crecido de manera ininterrumpida. En un contexto de capturas decrecientes y stocks pesqueros en riesgo, la acuicultura ha sido propuesta como la solución a la creciente demanda de productos pesqueros. Esta tendencia ha transformado las prácticas de producción marina, pasando de la pesca a la granja, al tiempo que ha ofrecido nuevas fronteras para la entrada del capital a través del desarrollo de inversiones e innovaciones socio-tecnológicas.

Esta tesis trata de contribuir a una mejor comprensión de esta transformación y de las relaciones sociales y ecológicas desiguales producidas por ella. Se centra en el caso europeo, y plantea la pregunta de cómo y por qué la acuicultura transforma las relaciones de producción en el ámbito marino y su gobernanza. Se han usado diversas metodologías cualitativas, en el marco de la ecología política, y se han abordado tres objetivos: (i) analizar los discursos europeos acuícolas e identificar de qué manera se relacionan con los procesos de confinamiento y mercantilización del medio marino; (ii) identificar los conflictos socioambientales relacionados con las granjas acuícolas en Europa desde la perspectiva de la justicia ambiental; y (iii) explorar la expansión geográfica, espacial y taxonómica de las fronteras extractivas asociadas a la acuicultura marina intensiva.

Los resultados de la investigación sugieren que la acuicultura de peces marinos condiciona y transforma los espacios y relaciones productivas marinas a través de la expansión continua del capital, la extensión a nuevas fronteras extractivas y el confinamiento de bienes comunes. Un proceso que es facilitado por los discursos dominantes como por ejemplo el imperativo al crecimiento. A través de la búsqueda de vías para una mayor acumulación del capital, la transformación de la pesca a la acuicultura intensiva marina cambia las relaciones sociales y ambientales en el medio marino. La reconfiguración resultante del acceso y el control sobre los comunes marinos excluye a diversos actores, y esto a su vez genera conflictos socioambientales y demandas de justicia ambiental relacionados con las granjas acuícolas. La investigación señala que esta expansión produce nuevos regímenes naturales, espaciales y socioeconómicos con la intención de superar las crisis de acumulación del capital vinculadas al decrecimiento de los stocks y capturas pesqueras, y se produce por medio del confinamiento y la mercantilización del medio marino.

A través de la investigación realizada, esta tesis contribuye a la literatura de ecología política vinculada a la acuicultura así como a los debates teóricos más amplios asociados a los confinamientos, el cambio agrario y socioambiental y la gobernanza ambiental neoliberal.

Palabras clave: producción marina, acuicultura pesquera marina, acuicultura intensiva marina, confinamientos marinos, conflictos socioambientales, justicia ambiental, fronteras extractivas, Europa, Turquía

Resum

L'aqüicultura és el subsector productiu agroalimentari amb més creixement des dels anys setanta. El seu percentatge en la producció alimentària marina ha crescut de manera ininterrompuda. En un context de captures decreixents i estocs pesquers en risc, l'aqüicultura ha estat proposada com la solució a la creixent demanda de productes pesquers. Aquesta tendència ha transformat les pràctiques de producció marina, passant de la pesca a la granja, alhora que ha ofert noves fronteres per a l'entrada del capital a través del desenvolupament d'inversions i d'innovacions sociotecnològiques.

Aquesta tesi tracta de contribuir a la millor comprensió d'aquesta transformació i de les relacions socials i ecològiques desiguals produïdes. Es centra en el cas europeu, i planteja la pregunta de com i per què l'aqüicultura transforma les relacions de producció en l'àmbit marí i la seva governança. S'han fet servir diverses metodologies qualitatives, en el marc de l'ecologia política, i s'han abordat tres objectius: (i) analitzar els discursos europeus aquícoles i identificar de quina manera es relacionen amb els processos de confinament i mercantilització del medi marí; (ii) identificar els conflictes socioambientals relacionats amb les granges aquícoles a Europa des de la perspectiva de la justícia ambiental; i (iii) explorar l'expansió geogràfica, espacial i taxonòmica de les fronteres extractives associades a l'aqüicultura marina intensiva.

Els resultats de la investigació suggereixen que l'aqüicultura de peixos marins condiona i transforma els espais i les relacions productives marines a través de l'expansió contínua del capital, l'extensió a noves fronteres extractives i el confinament de béns comuns. Un procés que és facilitat pels discursos dominants com ara l'imperatiu del creixement. A través de la recerca de vies per a una major acumulació de capital, la transformació de la pesca cap a l'aqüicultura intensiva marina canvia les relacions socials i ambientals en l'àmbit marí. La reconfiguració resultant de l'accés i el control sobre els comuns marins exclou diversos actors, i això al seu torn genera conflictes socioambientals i demandes de justícia ambiental relacionats amb les granges aquícoles. La investigació assenyala que aquesta expansió produeix nous règims naturals, espacials i socioeconòmics amb la intenció de superar les crisis d'acumulació del capital vinculades al decreixement dels estocs i captures pesqueres, i es produeix mitjançant el confinament i la mercantilització del medi marí.

A través de la investigació realitzada, aquesta tesi contribueix a la literatura d'ecologia política vinculada a l'aqüicultura així com als debats teòrics més amplis associats als confinaments, el canvi agrari i socioambiental i la governança ambiental neoliberal.

Paraules clau: producció marina, aquicultura pesquera marina, aquicultura intensiva marina, confinaments marins, conflictes socioambientals, justícia ambiental, fronteres extractives, Europa, Turquia

Preface

My PhD experience is richer than the chapters contained in the thesis. The core chapters are based on manuscripts prepared for publication in international journals (*Marine Policy*, *Environmental Politics* and the *Journal of Agrarian Change*). In addition to that, my PhD years involve various collaborations and both academic and non-academic publications.

The first important collaboration that has strongly influenced my PhD training is the ENTITLE (European Network of Political Ecology) project. When I began my doctorate, I was an Early Stage Researcher of this Marie Curie ITN project working in ENT Environment and Management. Being part of ENTITLE, I participated in numerous specialized intensive courses and summer schools, including on commons, conflicts and disasters; social movements; and institutions, justice and democracy. These courses provided me with an important theoretical background in political ecology as well as with methodological tools regarding research design, publication, and dissemination.

Beyond training, the project created a dedicated group of senior and young scholars in support and solidarity with each other and engaging in debates and conversations. The outcomes of the ENTITLE project in which I participated include the book *Political Ecology for Civil Society*, a collaborative writing project (coordinated, written and edited by ENTITLE members) that aimed to elaborate key concepts and debates with an accessible language for non-academic audience. I contributed to the chapter on 'Environmental Conflicts' co-authored by Maria Jesus Beltrán, Marien González Hidalgo, and Creighton Connolly. As part of ENTITLE, I have also written a 'policy brief' on 'Aquaculture development in Europe: Fish farm conflicts, relevant social actors and their demands'. The document was submitted as a project deliverable to the European Commission and disseminated to a wider group of contacts from NGOs, researchers, and policy-makers working on fisheries and aquaculture. Lastly, a further outcome of the ENTITLE project is a collaborative or 'horizontal' journal article in progress in which I am involved, aiming to produce a comparative analysis of 'commodity booms' in different sectors.

Although the formal EU Project is over, the group continues to exist through ENTITLE Collective, whose key ongoing project is ENTITLEblog (<https://entitleblog.org>). The blog aims "to inspire and contribute to radical thought towards more egalitarian socio-ecological futures" and to foster debate and collaboration among academics and activists interested in political ecology. I hope that ENTITLE Collective will enable me to take my PhD further by facilitating other collaborative research projects.

Throughout the years of my PhD, I have also worked as the editorial coordinator of the journal *Ecología Política*, co-published by Fundació ENT and Icaria Editorial. This helped me to follow up-to-date research and debates in (primarily Spanish-speaking) political ecology. I continue to collaborate with this journal as a member of the Editorial Board.

Moreover, working in Fundació ENT enabled me to become part of the NGO network ‘Seas at Risk’ (SAR) and a ‘participant observer’ of debates around European aquaculture development. Members of SAR generously accepted to be interviewed and exchanged with me their opinions and contacts. Additionally, participating in workshops and meetings has given me deeper insights into issues related to European aquaculture. Through my involvement in Fundació ENT and SAR, I have become a member of the recently established ‘Aquaculture Advisory Council’, as an NGO representative. This will enable me to follow and further challenge European aquaculture discourses, policies, and policy-making structures.

Another outcome of my PhD years has been my involvement in the ‘COST Action’ on Ocean Governance for Sustainability. This network held its first conference in Bremen in March 2017, where I presented my research on the expansion of marine commodity frontiers in intensive aquaculture. For the next three years, my participation in this network and in the Fisheries Governance Working Group will open the way for future collaborations such as joint publications and a possible short-term research visit.

Finally, since I wanted to continue to collaborate with my home country, Turkey—where I first encountered political ecology thanks to many colleagues and comrades—, and contribute to the development of political ecology there, I have been publishing (both academically and non-academically) in Turkish as well. In November 2015, I presented my research in a conference organized in Bilgi University, Istanbul. With three colleagues from this conference, I co-edited a special issue on political ecology in the Turkish language, social sciences journal *Toplum ve Bilim* (published in December 2016), in which I also published my research. With the same purpose, I gave a seminar in November 2016 in the Ataturk Institute for Modern Turkish History at Bogazici University—where I had received my MA degree—and shared part of my research on the political ecology of fisheries and aquaculture, with a special focus on Turkey. Finally, I am currently contributing to the Marine Atlas project of the Heinrich Böll Foundation, by enriching it with cases from Turkey.

Acknowledgements

On the initial pages of many theses, one usually reads the gratitude of a PhD student to the people who prevented him/her from quitting this tough and, at times, painful task. Surprisingly, I have never thought of quitting my PhD. This may be partly due to my obsession with not quitting anything if I have already begun. But mostly, and much more importantly, this is because I was surrounded by wonderful people who helped me to stay far from such a point of exhaustion, suffering, and disappointment. This reminds me once again that I need to give very warm and big thanks to all the people involved in this process.

First of all, I owe a huge thank you to my dear family—especially my mother Gönül, my father Salih, my sister Pinar, and my grand-aunt Mehpare (who unfortunately passed away before seeing my sister and I become ‘doctors’)—for being there in each difficult and enjoyable moment of my life, for always being an infinite source of support, and for helping me to find the courage to follow my ideals.

I cannot thank enough my three supervisors—Miquel, Begüm, and Isabelle—for their support and guidance with my thesis and for making my PhD enjoyable. All three share a very humane and caring way of working with others, which I have always enjoyed and appreciated. Miquel has been an amazingly supportive (and productive) supervisor from the beginning. He has shared generously his knowledge and opinions but has also been open to learning with me, as we discussed thousands of times thousands of details of this thesis; and he always kept his nice and motivating laugh in our meetings. Begüm has been like a wise sister and a reliable friend, who has always been ready to share any moment, any accomplishment or challenge, and to support me as much as possible personally, academically and politically—working together in EJOLT; my last minute application to ENTITLE; and our participation in BÜKOOP, BÜSAS and Political Ecology Working Group in Turkey are some ‘bullet points’ of a long list leading to a strong sense of trust and confidence. Despite joining the team at a later stage, Isabelle has been a very friendly, respectful, supportive and rigorous supervisor. I am grateful for having known her better; and I appreciate her way of improving the work of others, taking care of many things and people at the same time, and for recognizing her colleagues’ academic and human qualities.

I would like to thank my tutor Giorgos who was also the coordinator of the ENTITLE project; and all my interviewees for their time and their willingness to share their opinions and experiences. Moreover, I acknowledge the financial support provided by the People Programme (Marie Curie Actions) of the European Union’s Seventh Framework Programme, under REA agreement No 289374—‘ENTITLE’ for the initial phase of my research.

The ENTITLE project has been a central part of my personal and academic life throughout these years (in Barcelona and elsewhere). I have learned very much from the people in the network in a great environment of comradeship; it has been priceless to be surrounded by people with a high sense of academic and political solidarity.

The Political Ecology Collective born out of ENTITLE remains an important reference for my academic and activist life. I have also enjoyed sharing and discussing others' work and mine in the ENTITLE Writing Group in Barcelona; I have appreciated the comments and support we have provided mutually to each other.

I must mention the names of at least some of the people who have helped me enjoy the long days (and years) in the Biblioteca Nacional, the Dipòsit de les Aigües, and in other streets, squares or places of Barcelona: my *jermanita* Marien, who supported me a lot especially in the last months of thesis writing; my trusted sports partner, friend and comrade Melissa; my short-term flat-mate and long-term reliable friend Diego, who kindly helped to revise my English; Rita, who has always been the best at reminding me that 'one has to enjoy her PhD'; my Greek neighbor Panagiota, for her spanakopitas and lively spirit; our historian Santi, for many discoveries and for making the most boring and difficult moments bearable and enjoyable; Daniela; Luis; Lucía A.; Camilo; Lucha; Sara M.; Sara G.; Paola; Geovanna; Dídac; Petra; Raúl; Mar G., Mariana; Filka; Bea; Christos; and many others. I am grateful to all ICTA members for such an activist and interdisciplinary environment with so many great people and so much interesting research. I am also grateful to Salvatore, Giorgos V., Jonah, Martí, Chus, Julie, Daniel B., Diego B. and Maria H. for numerous shared moments.

I am greatly indebted to my colleagues at ENT in Vilanova i la Geltrú, who have generously helped me understand better and engage with where I have been living (through participating in *batalles de caramels* during *Carnaval* and in *calçotadas i xatonadas*, among other things). I have always enjoyed their presence and openness. In several instances, they proved to be like a family while I worked there and afterwards.

Many thanks to my dear flat-mate Marianne for supporting me, especially over the last months, with her delicious pastries and her smiling face. She always reminded me that work is not everything; that moments of disappointment in the PhD period are normal, and that we have to face them with great calm, good friends, and some good wine. I am very grateful for the opportunity to have known her in these last years and for feeling 'at home' by living together with a real sister.

Another person I would like to express my gratitude to—for having contributed to this thesis and accompanied me in this journey—is Fikret. He has supported me since the last years of my bachelor in the Economics department of Bogazici University first by demonstrating that another economics was possible. Later on, as a supervisor in my Master, he made it possible for me to engage with political ecology, although it was formally difficult to do so. His support and solidarity in difficult moments, as well as the motivation and (sometimes very challenging) feedbacks he has generously provided have been invaluable.

I owe a big thanks to the Political Ecology Working Group in Turkey for initiating my interest in political ecology and for providing a scholar-activist environment for sharing and debating research. I have always appreciated being part of it and their friendship and solidarity. I would like to thank Ethem, Cem, Ekin, Serkan, Olcay, Melis G., Orkun, Alev, Ali Kerem, Ezgi Ç., Mine and all others for their continuous support and the shared moments. Additionally,

thanks to my comrades Pelin, Baybars and Ulus, with whom I have enjoyed more the life and the cooperativist movement in Barcelona.

I am grateful to my friends from the Agro-ecological Consumption Cooperative *La Sardineta* for being a big family (of sardines) helping each other in a neighborhood next to the sea. Long nights of *Festa Major*, where we worked hard and enjoyed until 4 o'clock in the morning; events we organized like *CineForum* that included debates on cooperatives and food sovereignty; and our participation in projects like SegleXX, Casa Barceloneta 1761, and urban gardening have all been very enriching, and helped me connect deeply to my neighborhood, Barceloneta.

Thanks to BÜKÖOP members, for having inspired my involvement in the food sovereignty movement; to BÜSAS, for triggering my curiosity about the sea with scuba and free diving, biodiversity projects, and very strong friendships; to Elif, for insisting that I participate in BÜSAS and also for sharing everything over these years; to Gökçe, for designing the beautiful cover of my thesis; and to Banu for last-minute great ideas; and to all for sharing the same passion for the sea.

I thank my dear high school friends from IEL for supporting me with my academic issues; Müge, for being 'my lawyer'; Emma for her Spanish and Catalan revision; İbo for helping out with last formatting; and Laia and Fede for their long-term support.

Special thanks to Santi, for sharing our love for Barceloneta and Barcelona (whose streets have always told us numerous stories enriching their history and present); for facing together many doubts, challenges and difficulties; and never stopping to learn and enjoy both recent and old things...

I am thankful for the supportive hand or smile and the solidarity of all friends, colleagues, and comrades in difficult personal and political moments, which has prevented me from feeling alone on this path. I also thank all my friends sending me some fresh breeze from the sea when I was feeling tired.

Finally, I would like to thank and remember Ela, Aina, and Nicol, who passed away this last year very sadly and unexpectedly. All three were amazing people.

Last but not least, thanks to all the fish in the sea...

*Som peixos petits, però juntes ens menjarem el gran.
Perquè tenim gana...
Perquè tenim gana de canviar granet a granet el nostre entorn.*

Table of Contents

1 Political Ecology of Marine Finfish Aquaculture: An Introduction	15
1.1 Background and Research Motivation	15
1.2 Research Aims and Research Questions	19
1.2.1 Thesis rationale and aims	19
1.2.2 Research questions	19
1.3 Literature Review: Social Science Studies on Aquaculture	20
1.3.1 Defining the gap	20
1.3.2 New horizons	23
1.4 Theoretical Framework	25
1.4.1 Political ecology as a research field	25
1.4.2 The political ecology of aquaculture	26
1.5 Research Methodology	28
1.5.1 Case and site selection strategy	28
1.5.2 Data collection and analysis methods	30
1.5.2.1 Discourses on European aquaculture	32
1.5.2.2 Socio-environmental conflicts related to fish farms	33
1.5.2.3 Expansion and intensification of marine finfish aquaculture in Turkey	34
1.6 Summary of the Main Argument	35
1.7 Structure of the Thesis	36
2 Unpacking the Objectives and Assumptions Underpinning European Aquaculture	39
2.1 Introduction	39
2.2 Theorizing Aquaculture Development Using a Polanyian Lens	41
2.2.1 Embeddedness	41
2.2.2 Enclosures	42
2.2.3 Fictitious commodities	42
2.3 Methodology	43
2.4 Discourses on European Aquaculture	46
2.4.1 Exploring the objectives of European aquaculture	48
2.4.1.1 Job creation vs. profitability	48
2.4.1.2 Food security vs. profitability	50

2.4.1.3	Environmental sustainability vs. profitability	51
2.5	Unpacking the Assumptions Underpinning European Aquaculture	
	Discourses	53
2.5.1	Wild fish and farmed fish as perfect substitutes	54
2.5.2	The (sustainable) growth imperative	55
2.5.3	Wild fish as a public, farmed fish as a private resource	57
2.5.4	Stakeholder participation	58
2.6	Conclusion	59
3	Political Lessons From Early Warnings: Marine Finfish Aquaculture Conflicts	
	in Europe	63
3.1	Introduction	63
3.2	Theory	65
3.3	Material and Methods	67
3.4	Results	69
3.4.1	Conflicts	69
3.4.2	Actors	73
3.4.3	Arguments	75
3.4.3.1	Distribution	75
3.4.3.2	Recognition and participation	77
3.4.3.3	Capabilities	79
3.5	Discussion	81
3.6	Conclusion	84
4	Expansion of Marine Finfish Aquaculture in Turkey: The Next-to-last	
	Commodity Frontier?	85
4.1	Introduction	85
4.2	Theorizing Marine Commodity Frontiers	89
4.3	Aquaculture Commodity Frontiers in Turkey	93
4.4	Commodity Widening and Spatial Expansion	96
4.5	Commodity Deepening and Intensification of the Capitalist Model	100
4.5.1	Growing companies, growing farms	101
4.5.2	Intensifying production through vertical integration	103
4.5.3	Changing uses of capture fish	104
4.6	Commodity Marketing and the Expansion of Market Power	107
4.6.1	Direct subsidies	109

4.6.2	Opening new markets: exports, trade relations and conflicts over existing markets	110
4.6.3	Promoting consumption and demand	111
4.6.4	Species and product diversity: taxonomic expansion and innovations in processing and packaging	113
4.7	Conclusion: Maturing and Expanding Marine Commodity Frontiers	114
5	Discussion and Concluding Remarks	117
5.1	Overview of Empirical Findings and Arguments	117
5.2	Synthesis: Growth Imperative, Silenced Voices and Enclosures	120
5.2.1	The 'growth imperative' in aquaculture	120
5.2.2	Dominant discourses versus silenced voices	124
5.2.2.1	'Market logic'	125
5.2.2.2	'Aquaculture as a panacea'	126
5.2.2.3	Silenced voices in participation and environmental governance	127
5.2.3	Marine enclosures	129
5.3	Future Research and Policy Implications	132
5.3.1	Limitations and future research	132
5.3.2	Policy implications and concluding remarks	135
5.3.2.1	Policy implications	135
5.3.2.2	Concluding remarks	138

1 Political Ecology of Marine Finfish Aquaculture: An Introduction

1.1 Background and Research Motivation

*"The land is limited. It's difficult to produce on square meters.
That's why we produce in the sea in cubic meters."*
(Interviewee representing a marine finfish aquaculture firm, 2016)

The research motivation of this thesis emerges from the logic embedded in the quotation above. The understanding of the sea as an unlimited space and resource and of aquaculture production as going 'beyond the natural capacity [and limits] of the environment' has motivated me to analyze how this logic materializes and transforms the relations of seafood production and marine governance.

Aquaculture has been traditionally practiced for thousands of years relying on diverse forms of seafood production and co-existed with different uses in land, freshwater, marine or estuary areas (FAO 1988). However, intensive marine aquaculture¹ in fish farms as a new seafood production practice—classified as 'a new industry' by the OECD at the end of 1980s (Barton & Staniford 1998)—came to the fore at the second half of the twentieth century. Increasing demand for seafood driven by population growth, rising incomes, urbanization, and international trade has boosted the aquaculture sector globally (FAO 2016). In the 1970s, the industry had already begun intensifying as well as expanding into new areas, and choosing 'high value and exportable species' for farming (FAO 1988). Thus, over the past three

¹ Intensive marine aquaculture is a broad category referring to the intensive farming of aquatic species in the sea. It is based on productive technology requiring external inputs, particularly feed but also seed, labor, capital and management (FAO 1998). Throughout this thesis, I mainly focus on 'marine finfish aquaculture', that is, intensive fish farming in floating cages in the sea. However, I also use the term 'intensive marine aquaculture' as a broader category that contains marine finfish aquaculture (as well as intensive shrimp aquaculture in marine areas) in order to refer to the intensive mode of production.

decades², aquaculture has become the fastest-growing food-production industry, increasing in volume at an average annual growth rate of 8.6% globally (FAO 2014; Bush & Marschke 2014; Belton & Bush 2014).

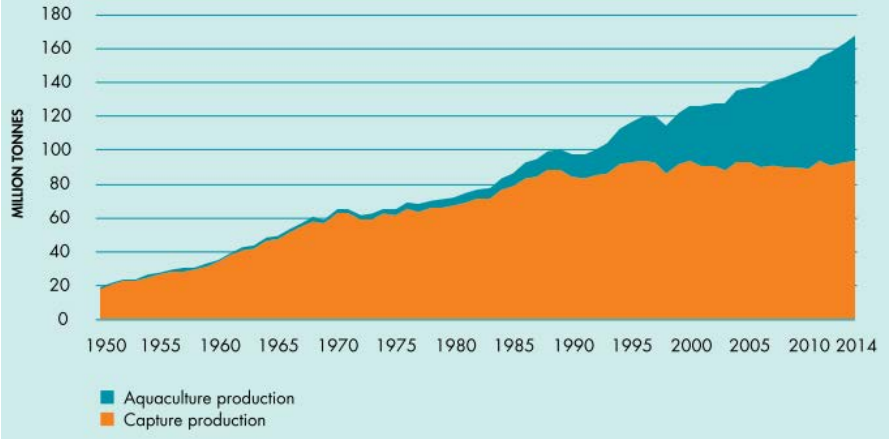


Figure 1.1. Global seafood production shares (Source: FAO 2016)

In this period, the share of aquaculture production in total seafood supply has risen rapidly and steadily (see Figure 1.1.): The contribution of global aquaculture to world seafood production increased from 13.4% in 1990 to 42.2% in 2012. Currently, it provides almost half of all fish for human consumption. Moreover, scenarios for 2030 foresee a further rise, whereby aquaculture’s supply of fish destined for direct human consumption will reach more than 60% of total production (FAO 2014, 2016). This change in the shares of total production has not only been due to the growth of the aquaculture sector, but also to the stagnation and—in some cases—decline of global captures. Currently, 28.8% of the global fish stocks is overexploited, and 61.3% is fully exploited (FAO 2014, p.37); any increase in the captures of the latter would lead to their overfishing as well.

The increasing contribution of aquaculture to seafood supply entails an important transformation of production and of the social, ecological, and political relations in which it is embedded. In the context of falling captures, endangered fish stocks, and rising consumption and demand, aquaculture is promoted “as a promised solution,

² The growth rate was even higher at the end of 1980s: 10.8% between 1980 and 1990, 9.5% between 1990 and 2000, and 6.2% between 2000 and 2012 (FAO 2014).

substitute or support to declining wild fish stocks” (Saguin 2016, p.573), in other words, as a ‘technological fix’ (Longo & Clark 2012) or ‘panacea’ (Barton & Staniford 1998). This trend necessarily transforms the practices of seafood production from capture to farming, while opening new frontiers for capital with new types of investments and socio-technical innovations. The global aquaculture boom has had and continues to have fundamental implications on a range of spaces and social actors at the nexus of production, distribution, and consumption as well as on the structure of the global agro-food system (Belton & Bush 2014).

The main aim of this thesis is to understand this transformation in seafood production as well as the resulting uneven social and ecological relations. I will track this transformation by focusing on the case of Europe—the largest importer of seafood products globally in terms of volume (EUMOFA 2016)—and address the question of how and why marine finfish aquaculture transforms relations of seafood production and the governance of marine areas.

Despite continuous high growth of the sector at a global level, aquaculture in Europe has instead experienced stagnation in the last decade, registering a 1.14% growth in volume at the end of 2000s (JRC 2012). In order to reverse this trend and boost the sector’s growth while reducing the gap between European seafood production and consumption, European authorities (including the European Parliament, the European Council, and the European Commission) have issued a range of incentives, guidelines, and communications. Moreover, ever since the approval of the first EU aquaculture strategy in 2002 (EC 2002a; EC Fisheries and Aquaculture 2017) they have promoted a series of initiatives, such as the Blue Growth initiative. Launched in 2012, Blue Growth is a Communication of the European Commission that included aquaculture as one of its five axes, aiming to stimulate its long-term growth (EC 2012a). This has suggested that the development model for the aquaculture industry and the ensuing policies and strategies in Europe would incorporate and reproduce an approach prioritizing mainly the goal of economic growth, as observed in the development of fisheries and other sectors under global capitalism (Fløysand *et al.* 2010; Campling *et al.* 2012; D’alisa *et al.* 2014). Influenced by the high levels of

consumption³ and imports—supplying 52.5% of total seafood consumption in Europe (EUMOFA 2016)—, European authorities have aimed primarily at increasing production.

My thesis focuses specifically on the marine finfish aquaculture segment of European aquaculture for two reasons. First, my initial interviews and a review of gray literature and secondary sources showed that this is currently the most actively promoted aquaculture subsector in Europe, due to its higher growth⁴, competitiveness, and profitability expectations (compared to freshwater and shellfish aquaculture). Therefore, the most significant transformation of seafood production in Europe will most likely take place in this segment. Second, seafood consumption in the European Union is “dominated by marine finfish products with estimated 13.9 kg per capita in 2009” (JRC 2012, p.31). Faced with the stagnation of capture fisheries and high levels of consumption of marine finfish species, European policy-makers have identified the development of marine finfish aquaculture as the key strategy for reducing the imports and filling the gap between production and consumption.

In the context of a globally and rapidly growing food production industry, and given the efforts in Europe to promote it, the tendencies briefly sketched above point to the importance of analyzing how the European marine finfish aquaculture transforms relations of seafood production and the governance of marine areas. The analysis of how this transformation materializes in a different—encircled—marine space with new (human and non-human) actors aims to contribute to our understanding of increasingly uneven relations around seafood production and the global food system more broadly.

³ European seafood consumption level is around 25.5 kg per capita/year, which is above the world average of around 20 kg per capita/year (EUMOFA 2016; FAO 2016).

⁴ During the stagnation period of European aquaculture sector, marine finfish aquaculture was the only segment that has maintained a positive growth rate in volume (3.1%) as opposed to freshwater and shellfish aquaculture with growth rates of -0.49% and -2.4%, respectively. The growth rates correspond to the period between 2006 and 2010 (JRC 2012).

1.2 Research Aims and Research Questions

1.2.1 Thesis rationale and aims

The overall purpose of my research is to understand the social, economic, political, and ecological processes that accompany the transformation of seafood production taking place in different geographical areas, affecting diverse species, and involving different social and political actors.

The thesis has four main aims. First, in order to contribute to the understanding of how and why marine finfish aquaculture transforms the practices, spaces, and relations of seafood production and marine governance, I investigate the “fastest-growing form of agriculture” (Clausen & Clark 2005, p.422) by focusing on Europe and exploring the discourses on European aquaculture and prevailing environmental governance. Second, I seek to enhance our understanding of social and ecological changes related to fish farming and the resulting inequalities regarding access to and control over marine commons. Third, I aim to examine the commodification of marine areas and resources linked to the expansion and intensification of marine finfish aquaculture under the global capitalist relations of agro-food system.

Finally, as this fast transformation leads to abrupt socio-ecological changes (in both marine and terrestrial spaces) involving a wide range of human and non-human actors, I aim to contribute to its critical analysis in order to construct an alternative understanding (Perreault *et al.* 2015) of the processes related to seafood production and its multifaceted transformation. This could contribute to creating a different imaginary towards socio-environmental justice and structural political change.

1.2.2 Research questions

In this thesis, through focusing on the case of Europe, I will address the following overarching research question: *How and why does the intensification of marine finfish aquaculture transform relations of seafood production and marine governance?*

Specifically, building on different theoretical approaches in political ecology, I shall

address the following research questions (each of which informs one of three core chapters of the thesis):

1. How are the main themes, (policy) problems, and objectives represented in discourses on European aquaculture? What assumptions underlie this representation, and which voices are silenced in this process? (See Chapter 2)
2. How do the environmental justice demands of different social actors shape the socio-environmental conflicts related to fish farms in Europe? (See Chapter 3)
3. How and why do commodity frontiers expand within the marine finfish aquaculture sector? How do aquaculture firms and State policies enable such an expansion in the case of Turkey? (See Chapter 4)

I will answer these questions in the following three empirical chapters (Chapters 2, 3, and 4) in order to contribute to my overall purpose of understanding social, economic, political, and ecological processes that accompany the transformation of seafood production.

In the next two sections, I will identify the gap in social science studies on aquaculture, present the theoretical framework that guides my analysis, and explain how I contribute to the literature on the political ecology of aquaculture.

1.3 Literature Review: Social Science Studies on Aquaculture

1.3.1 Defining the gap

Until the end of 1990s, the research on aquaculture was mostly dominated by food engineers, economists, biologists, and industry representatives (Barton & Staniford 1998). Thus, the literature on aquaculture usually engaged with technical, biological, and economic aspects of how to produce (more) farmed fish more efficiently (Coull 1993; Lee *et al.* 2003; Irz & McKenzie 2008; Nielsen 2012). There was a clear gap of social science studies focusing on the social, political, economic, and ecological

dimensions and outcomes of aquaculture development—even though globally the sector had already shown a remarkable expansion and growth, and its impacts had been felt throughout the world. Indicating this ‘net deficit’ in the literature, Barton and Staniford (1998), for instance, underlined the lack of geography research on both fisheries and aquaculture by comparing the studies of fisheries to those related to forestry, agriculture, manufacturing, and services sectors published in four main economic geography journals: they illustrated that the articles on fisheries were only two out of 304 articles.

However, aquaculture, especially with its recently intensified production through intensive marine aquaculture, is not a purely technical development nor has solely ecological impacts: It is embedded in social and political relations that, like in other productive sectors, need social science analysis (Bailey 1996). The book *Aquacultural development: Social dimensions of an emerging industry*, edited by Bailey *et al.* (1996), was one of the first attempts to extend geography research on aquaculture and to engage with questions of property, labor, and the role of the State. Although initially limited in number and detail, from 1990s onwards, aquaculture began to attract more interest from social scientists; and the presence of critical social research in the broader literature on aquaculture slowly increased (Belton & Bush 2014). This early research focused on issues such as social justice and social movements (Meltzoff & LiPuma 1986; Bailey 1988); challenging aquaculture development discourses and policies in the global South (Harrison 1996; Kelly 1996); and studying the industry’s environmental sustainability and global political economy (Barton 1997).

Two decades later, even though aquaculture production supplied around half of the total global seafood production, Belton and Bush (2014) argued that the literature gap identified by Barton and Staniford (1998)—the ‘net deficit’ in research on aquaculture within geography—still exists. Analyzing the publications in the top 50 geography journals ranked by the ISI (Institute for Scientific Information) between 1991 and 2012, Belton and Bush (2014) identified 47 articles on aquaculture—only six of which corresponded to the 1991-2001 period. They claim that there are still important gaps—such as ‘everyday’ geographies of aquaculture production and consumption in the global South or the production of different species—that need

further geography and political ecology research.

Nevertheless, I find two limitations of Belton and Bush's claim (2014) with regards to the possibilities of expanding the literature. First, although I agree that 'everyday geographies of aquaculture production' in the global South is an important area of research, the 'domestic consumption' they point to does not always mean local consumption (by producer communities) or production relations in a subsistence economy. Rather, they usually include privatization of common areas for the benefit of (local, regional or national) elites, and commodification of marine areas and resources (see Saguin 2016). Therefore, 'everyday geographies' of aquaculture are not exempt from global export relations (in terms of how food system operates) and struggles over the control of food production. Thus, power relations related to production and diverse actors with diverging interests with regard to the transformation of seafood production have to be uncovered in different geographical areas—in both the global South and North, and in relation with each other.

Secondly, although this research is not always published in geography journals, a great deal of recent political ecology and geography literature already focuses on the socio-political and ecological dynamics, social actors, power relations, everyday geographies and agrarian change related to aquaculture production in the global South—though indeed mostly focusing on shrimp or salmon production (Vandergeest *et al.* 1999; Hall 2003; Hall 2004; Beitzl 2012; Bustos-Gallardo 2013; Saguin 2016). Therefore, a further gap I identified and aim to address regards the lack of critical political ecology, political economy, and geography research focusing on production in the global North, especially in Europe. In order to uncover power relations along the production-trade-consumption axis, Europe (and global North more generally) shall not be considered solely as a point of consumption. Rather, similar political, social and ecological relations of production and control over food systems have to be analyzed also in the global North and Europe, in order to understand the multifaceted local and global transformation of seafood production relations and spaces. In the current context of rising global demand for seafood and capitalist expansion, my research will contribute to producing comprehensive analysis of a wider set of

questions about development, socio-environmental change, and politics.

1.3.2 New horizons

Critical social science and Political Ecology studies have paid a scant attention to European and Mediterranean aquaculture in the literature. However, in order to understand the broader picture of how intensive marine aquaculture transforms the relations of seafood production; different ways of environmental governance, industrial organization, changing socio-ecological conditions and power relations in different geographical places require in-depth research. In that sense, Europe should not be considered only as a point of consumption; but all production, distribution and consumption processes and relations have to be taken into account.

During my research, I identified the common presumption that aquaculture production in Europe takes place without significant social, political, and environmental problems. Several social actors including national or European-level policy-makers, sector representatives, and some NGOs considered that the main problem regarding European aquaculture was the economic stagnation of the sector and the high levels of imports with lower production quality. In this thesis, I argue that this perception obscures the role and responsibility of European social actors as well as the impact of neoliberal policies and—global and regional—trade relations on the overexploitation of fisheries and on the commodification of marine areas and resources through fish farms.

In this thesis, through focusing on Europe, I contribute to the literature in five main ways: First, I emphasize continuously changing dynamics of the transformation of seafood production and expansion of capitalist production by analyzing Europe not only as a unit of consumption, but also of production. Second, I identify and problematize the assumption that the European seafood production, as opposed to production in the global South, is developing ‘sustainably’ and without significant socio-ecological problems and conflicts. Third, I uncover a tendency in European aquaculture policy to reproduce the socially, ecologically, and politically undesired outcomes and uneven relations already witnessed in different places of the world.

Fourth, I show the parallelism between the expansion and intensification of fisheries—including the historical (and ongoing) expansion and overfishing of European fish fleet (Campling 2012)—and the development of intensive marine aquaculture. This helps me to highlight how the socio-ecological and political failures already associated with neoliberal fisheries policies—that have led to collapse of fish stocks in many regions and socio-ecological and political crises in capture fisheries—are likely to be repeated in aquaculture policies. Fifth, by building on the previous points, I offer insights into, and derive lessons for, future fisheries and aquaculture policies in Europe.

Moreover, in this thesis, I address two specific gaps identified by Belton and Bush (2014). First, they make the point that around three quarters of geography and political ecology studies focus on three farmed species—salmon, shrimp and pangasius—that account only for 9% of total global aquaculture production. Therefore, the aquaculture of a wide range of species and related processes are understudied. However, the biophysical characteristics of different species pose challenges but also provide opportunities for the transformation of seafood production. Therefore, I address this limitation by researching conflicts related to the farming of different species (Chapter 3) as well as by focusing on the expansion of sea bass and sea bream production (Chapter 4).

Second, Belton and Bush (2014, p.8) point out the need to investigate “agrarian and social-ecological changes accompanying the rapid spatial expansion, commoditization, and shifting material conditions of production [of different species]”. They also recommend focusing not only on the production of export crops, but also on production for domestic or intra-regional markets. In my research, I address this issue by focusing on the “local-specific processes and material realities” (ibid., p.12) of the under-studied European aquaculture, in order to understand and explain its geographical, spatial, and taxonomic expansion.

Furthermore, I claim that critical social science and political ecology should pay more attention to the interaction of marine finfish aquaculture production with capture fisheries and fish stocks. This is a critical task for a variety of reasons: First, it would

allow us to build on existing research on the political ecology of fisheries. Second, it would help us to identify and deconstruct the presumption that aquaculture is the solution for stagnating captures and the best way to meet the increasing demand for fish. Instead, I agree with Mansfield (2011, p.413) that “the contemporary rise of aquaculture is an effort on the part of the seafood industry to escape the contradictions of capital that create crisis in capture fisheries”. Therefore, my thesis analyzes aquaculture discourses (Chapter 2) and socio-environmental conflicts related to fish farms (Chapter 3), in order to uncover similar crises in aquaculture (as well as deepening crises in capture fisheries), and to highlight failures in European policies and policy-making procedures.

1.4 Theoretical Framework

In this thesis, I adopt a political ecology lens to address my research questions. In this section, I will give a brief account of political ecology as a broad field of investigation and then discuss specifically literatures on the political ecology of aquaculture.

1.4.1 Political ecology as a research field

As a field of investigation, political ecology has a wide range of theoretical underpinnings. It has been defined as bringing together the principles of political economy and ecology (Blaikie & Brookfield 1987; Peet & Watts 1996) and as analyzing power relations in society-environment interactions (Greenberg & Park 1994), with a special focus on access to and control over resources (Watts 2000). Adopting one or more of these approaches, a range of political ecology studies focus on commons and their governance; socio-environmental conflicts; power relations linked to class, gender, and race; social movements; disaster capitalism; and socio-ecological transformations and struggles for bottom-up democracy (Beltrán *et al.* 2016). Political ecology studies share a common focus on human-nature interactions and processes of socio-environmental change and highlight that these changes are ‘political’ by uncovering the underlying inequalities (Robbins 2004). This approach

guides my analysis of aquaculture development throughout this thesis.

Moreover, political ecology scholarship engages with a wide range of issues at the society-environment nexus; it incorporates diverse theoretical approaches and geographical foci as well as perspectives and terminologies coming from social movements and activists; and it comprises sub-fields such as urban, feminist, and indigenous/decolonial political ecology (Bryant 2015).

Perreault *et al.* (2015) identify three main common commitments of political ecology scholarship—theoretical, methodological, and political. The first is defined as the theoretical contribution to “critical social theory and a post-positivist understanding of nature and the production of knowledge about it, which views these as inseparable from social relations of power” (ibid, p.7). It is seen as a rejection of a positivist understanding of society and ecology as well as an alternative closely linked to radical scholarship. The second commitment refers to employing in-depth, open-ended, ethnographic, qualitative research methods, which can be supported with quantitative methods and document analysis to understand better “the place-based, historically sedimented social relations of production and exchange, and environmental practices” (ibid, p.7). The last is defined as a “normative political commitment to social justice and structural political change” (ibid, p.8), which aims to contribute to more egalitarian socio-ecological futures and radical politics. Throughout my research, I share the theoretical, methodological, and political commitments of political ecology that are all very relevant for my objectives in this thesis.

1.4.2 The political ecology of aquaculture

Political ecology provides a conceptual framework for analyzing a range of issues related to marine aquaculture, including: enclosure of marine commons; control by aquaculture firms over marine areas and resources; social and environmental impacts and socio-ecological conflicts; and labor issues and controversies (Hadjimichael *et al.* 2014). Additionally, political ecology literature—although not always focusing exclusively on aquaculture—has analyzed the access to marine

commons, neoliberalization of seafood production, and neoliberal environmental governance (see Pontecorvo 1988; Weeks 1992; Helgason & Pálsson 1997; Barton & Staniford 1998; Vandergeest *et al.* 1999; Mansfield 2004; Clausen & Clark 2005).

Three main strands of political ecological research on aquaculture inform my thesis. The first one looks closely at the transformation of fisheries (Longo & Clark 2012; Campling *et al.* 2012; Bresnihan 2016). It offers a critical analysis of the privatization, neoliberalization, and commodification of marine commons—though mostly focusing on fisheries. It points out the ‘Tragedy of the Commodity’ (Longo & Clausen 2011; Longo *et al.* 2015) or ‘Tragedy of the Few’ (Hadjimichael *et al.* 2014) associated with these processes, and the intensifying ‘metabolic rift’ in marine metabolism (Clausen & Clark 2005). I build on this line of research in order to uncover how discourses on European aquaculture transform seafood production, enable the privatization of common marine areas, and establish a neoliberal governance model for fisheries and aquaculture (see Chapter 2). I adopt post-structural discourse analysis based on Bacchi’s WPR (What is the Problem Represented to be?) approach—informed by a Polanyian focus on embeddedness, enclosures, and fictitious commodities—in order to unveil and discuss discourses on European aquaculture and their underlying assumptions. This analysis contributes to understand the transformation of seafood production through dominant environmental governance approaches.

The second strand of political ecology research on aquaculture focuses on conflicts—usually in global South—and on ecologically unequal exchange (Cruz-Torres 2000; Hall 2003; Beitzl 2012; Veuthey & Gerber 2012; Martinez-Alier 2001; Barton & Fløysand 2010). Some of these studies adopt an environmental justice framework (Page 2007; Joyce & Satterfield 2010), while others focus on neoliberal environmental governance mechanisms and their contradictions (Bustos-Gallardo 2013) or adopt a class perspective (Adduci 2009). My analysis of aquaculture conflicts (see Chapter 3) enters into a dialogue with this line of political ecology research. I use Schlosberg’s (2007, 2013) ‘environmental justice’ framework to analyze socio-environmental conflicts related to fish farms in Europe, by not only focusing on distribution, recognition, and participation aspects—like usual environmental justice studies on fish farms (see Page 2007; Joyce & Satterfield

2010)—but also by incorporating the capabilities approach to the study of such conflicts. In doing so, I highlight the relevance of socio-environmental conflicts related to fish farms in Europe in terms of ecologically unequal exchange, environmental justice, and the decision-making structures.

The third line of political ecology research focuses on changing socio-ecological relations under capitalism, primarily following Moore's (2015) conceptualization of capitalism as a 'world-ecology' (Bustos-Gallardo & Irarrazaval 2016). This literature uncovers how capital expands into new commodity frontiers in marine areas (see Campling 2012 on fisheries; Saguin 2016 on aquaculture). Similar research also conducts comparative analysis in order to explain the variation in industrial organizations and socio-ecological conditions in different geographical places (Hall 2004)⁵. My thesis extends this line of political ecology literature by examining how commodity frontiers expand within the intensive marine aquaculture sector in Turkey (see Chapter 4). It contributes to the analysis of agrarian change and commodification of marine areas and resources as well as of the expansion strategies employed by capital in both production and consumption.

1.5 Research Methodology

In my research, I adopt a range of methodological tools derived from political ecology. This section details my case selection strategy and my main data collection and analysis methods.

1.5.1 Case and site selection strategy

In selecting case studies for my research, I benefited from my participation in ENT Foundation, an NGO that works on fisheries policies and campaigns against

⁵ Further studies contributing to the political ecology of aquaculture, with which I do not fully engage in my thesis, focus on issues such as: the health of farmed fish (Mansfield 2011); certification mechanisms (Vandergeest & Unno 2012; Bush *et al.* 2013; Havice & Iles 2015); genetically-modified salmon (Longo *et al.* 2015); ocean grabbing (Bennett *et al.* 2015); food value and commodity chains (Jespersen *et al.* 2014; Lim & Neo 2014); resilience thinking in agrarian and transitions theory (Bush & Marschke 2014); and politics of migration and crop booms in Southeast Asia (Hall 2011).

overfishing. Through ENT Foundation, I was able to make contact with several European NGOs, which gave me the opportunity to employ participant observation methods. As a member of 'Seas at Risk', a European NGO platform working on fisheries and aquaculture, I could participate in international workshops organized by CEFAS (Centre for Environment, Fisheries and Aquaculture Science) and the European Commission that aimed to establish guidance on the development of sustainable aquaculture in Europe. Through collaborating with Seas at Risk and participating in such meetings, I gained insight into a variety of public debates related to aquaculture that are sometimes difficult to grasp from a detached academic position. This enabled me to better identify the social actors forming part of these debates; different types of aquaculture and related challenges and opportunities; and European policy-making strategies and their participation and governance models. Additionally, direct participation enabled me to better understand different political actors' perspectives and perceptions about the current and future development of European aquaculture.

As the first case, I chose to analyze European discourses on aquaculture. I sought to improve understanding of, and debate around, the main themes, objectives, and implicit assumptions—and the ways in which they consciously or unconsciously silence other voices—in these discourses through conducting a critical discourse analysis of key written documents. In order to uncover the current environmental governance of aquaculture, I aimed to reveal and debate dominant discourses, tensions among different objectives, and their underlying assumptions in order to open space to wider political debates.

As a second case study, I chose to investigate socio-environmental conflicts related to fish farms in Europe. The need for such a study emerged in different phases of my participant observation period. Facing the usual claims of sector representatives and policy-makers that in Europe there were no relevant socio-environmental conflicts related to fish farms—but only some NIMBY (Not-In-My-Backyard) reactions—, I decided to conduct a thorough analysis of existing conflicts. This analysis had two objectives: first, to detail the localities of such conflicts, the social actors and groups involved—such as fishers, tourism sector representatives, and NGOs—, and their

demands; and second, to connect these conflicts through identifying their shared (environmental justice) demands, in order to criticize the dominant approach treating them as isolated, selfish, and politically irrelevant reactions.

Third, in order to examine the expansion of marine finfish aquaculture industry, I decided to research the under-studied European-Mediterranean region. Specifically, I chose to focus on Turkey, for three reasons. First, although Turkey is a 'late-comer' in marine finfish aquaculture production, it has experienced a remarkable growth in recent years, becoming the main exporter of sea bass and sea bream to Europe. This resulted in trade conflicts over control of markets between European and Turkish aquaculture producers. Second, Turkey is situated on the eastern periphery of Europe and its Common Fisheries Policy sharing partly the same marine area in the Eastern Mediterranean and Black Sea. Although it is not obliged to comply with European legislations; as an EU accession country, it is highly affected by (and in turn affects) European fisheries and aquaculture and trade policies. Therefore, it is a good case for illustrating the geographical expansion of capital within the marine finfish aquaculture sector, and the transformation of seafood production from capture fisheries towards aquaculture. Third, while the production of salmon in Norway has been studied widely in political ecology, the production of sea bass and sea bream (in other words, 'the salmon of the Mediterranean'⁶) has received scant attention. Yet, the intensification in the production of different farmed species indicates that capitalist relations related to marine finfish aquaculture expand not only geographically, but also taxonomically.

1.5.2 Data collection and analysis methods

In this thesis, I adopt qualitative research methods. Table 1.1. shows how each research question is addressed through a distinct case study and data collection and analysis methods, corresponding each to one of the thesis's core chapters. In the rest of this section, I describe the specific methods adopted for each case study.

⁶ See the discussions of European Aquaculture Society and European Aquaculture Technology & Innovation Platform comparing salmon and sea bass and sea bream production (2014): www.feap.info/shortcut.asp?FILE=1287

Table 1.1. Research questions, methods, and outputs

Research Question	Study Focus	Data collection methods	Data analysis methods	Output
<p>1. How are the main themes, (policy) problems, and objectives represented in discourses on European aquaculture? What assumptions underlie this representation, and which voices are silenced in this process?</p>	<p>Critical discourse analysis of key European documents related to European aquaculture policies and strategies</p>	<ul style="list-style-type: none"> • Most relevant 34 written documents published by different European socio-political actors • Participant observation 	<ul style="list-style-type: none"> • Discourse analysis of texts with the help of Atlas-Ti software • WPR approach to discourse analysis 	<ul style="list-style-type: none"> • Chapter 2 • Article published in <i>Environmental Politics</i>
<p>2. How do the environmental justice demands of different social actors shape socio-environmental conflicts related to fish farms in Europe?</p>	<p>Identification and analysis of socio-environmental conflicts related to fish farms in Europe</p>	<ul style="list-style-type: none"> • 27 in-depth interviews • Systematic review based on keyword search from the SCOPUS database • Participant observation 	<ul style="list-style-type: none"> • In-depth case study • Open-coding methods • Analysis of secondary data 	<ul style="list-style-type: none"> • Chapter 3 • Article published in <i>Marine Policy</i>
<p>3. How and why do commodity frontiers expand within the marine finfish aquaculture sector? How do aquaculture firms and State policies enable such an expansion in the case of Turkey?</p>	<p>National level analysis of the growth and expansion of marine finfish aquaculture in Turkey</p>	<ul style="list-style-type: none"> • Fieldwork in Istanbul, Izmir, Adana and Mugla • 22 in-depth interviews • Ethnographic field notes • Participant observation 	<ul style="list-style-type: none"> • In-depth case study • Open-coding methods • Analysis of secondary data 	<ul style="list-style-type: none"> • Chapter 4 • Article submitted to the <i>Journal of Agrarian Change</i> (under revision)

1.5.2.1 Discourses on European aquaculture

In order to address my first research question, I have conducted a critical discourse analysis of key European aquaculture policies, strategies, and reports (see Chapter 2). According to Hajer and Versteeg, discourse analysis strengthens studies on environmental policy by highlighting the role of language in politics (2005, p.175). I have adopted a Foucauldian-informed post-structuralist method, the WPR (What is the Problem Represented to be?) approach developed by Bacchi (2009). This approach seeks to identify not only the main themes and objectives in discourses, but also the tensions among them. Moreover, post-structuralist discourse theory postulates that “our ways of talking [and interacting] do not neutrally reflect our world, identities, and social relations, but rather, play an active role in creating and changing them” (Jorgensen & Phillips 2002, p.1). Bacchi’s WPR approach enabled me to analyze the “taken-for-granted assumptions that lodge in government policies and policy proposals by interrogating the problem representations it uncovers within them” (Bacchi 2009, p.xv). Specifically, it helped me to uncover the assumptions underlying European aquaculture discourses as well as the voices they silenced. I have undertaken this approach since “the taken-for-granted delimits the field of possibilities for thinking and acting, its unmasking can open up a political field to other possibilities” (Jorgensen & Phillips 2002, p.186).

I analyzed 34 key written documents establishing a European approach to aquaculture production. These included: European aquaculture planning or strategy documents; European Commission guidelines for sustainable aquaculture; European Parliament policy documents, decisions, and legislations; and position papers and reports of European NGOs and the European aquaculture industry. I analyzed these texts (a total of 2588 pages) using Atlas-Ti software for their categorization and codification, which enabled me to identify the most common statements and discourses. Additionally, it helped me to determine the intensity and frequency of various words or statements; to explore the relations between identified codes (debated, contradictory, incoherent discourses, or alternative proposals); and to

uncover different ways to frame discourses around the same topic. In this way, I could identify the main themes and objectives in these discourses as well as their underlying assumptions.

I analyzed documents published from 2009—when the European Commission launched the Communication ‘Building a sustainable future for aquaculture: A new impetus for the strategy for the sustainable development of European aquaculture’ (EC 2009)—to mid-2014, when the new European Commission was elected. This was a period of intense legislative activity in the EU common aquaculture policies, which was appropriate for such a discourse analysis especially to identify what kind of an aquaculture development model in Europe is debated and promoted by the sector, policy-makers and NGOs in Europe.

1.5.2.2 Socio-environmental conflicts related to fish farms

I carried out the analysis of socio-environmental conflicts related to fish farms in Europe (Chapter 3) in two main steps.

First, I conducted a systematic review of academic articles based on keyword search from the SCOPUS database. In order to detect socio-environmental conflicts in Europe, I reviewed 2,597 articles published in the last two decades. Out of these, I selected 213 articles that dealt with socio-environmental or socio-economic issues, and conducted a more detailed review to identify articles providing specific information about conflicts related to marine finfish aquaculture in Europe. Through this process, I identified 12 conflicts related to fish farms in Europe, noting (when sufficient detail was available) their sites, the species produced, the social actors involved, and their demands.

As a second step, I have conducted 27 semi-structured in-depth interviews with key social actors, including European NGO members, researchers, activists, people involved in local conflicts, aquaculture sector representatives, and European or national public officials from 12 European countries. I initially identified informants

through my contacts with NGOs, activists, academics or sector representatives, and then adopted a 'snowball' sampling technique to access further relevant interviewees. These in-depth interviews enabled me to detect 14 conflicts—two of which were the same conflicts detected by keyword search. Identifying a higher number of conflicts through in-depth interviews also indicated the underrepresentation of these conflicts in published research. Furthermore, these interviews offered insights into different social actors' arguments and perceptions regarding problems related to marine finfish aquaculture.

1.5.2.3 Expansion and intensification of marine finfish aquaculture in Turkey

For the research on the growth and expansion of marine finfish aquaculture in Turkey (see Chapter 4), I first participated in a national aquaculture symposium in September 2015, and then conducted a fieldwork in four cities in Turkey in late 2015 and 2016. During this fieldwork, I conducted 22 interviews with 30 social actors in Ankara (the capital and home to the various Ministries); Istanbul (Turkey's biggest metropolis with important trade connections); and Mugla and Izmir, the largest provinces for marine aquaculture production. Interviewees included: representatives from the General Directorate of Fisheries and Aquaculture (attached to the Ministry of Food, Agriculture and Livestock); the Ministry of Environment and Urbanization; small-scale and large-scale aquaculture producers; aquaculture producer organizations in Ankara, Izmir, and Mugla; fish feed producers; consultants in the aquaculture sector; scientists and academics working on issues related to seafood production; marine biologists; non-governmental organizations and civil society organizations; environmental litigation lawyers; small-scale and industrial fishing cooperatives; and industrial fishers.

I recorded the interviews and took ethnographic field notes, which I then transcribed and coded through open-coding methods. I have analyzed this data by identifying and categorizing the main themes associated with the expansion of intensive marine aquaculture in Turkey, with a focus on its drivers and resulting social and ecological relations of production. Together with the data gathered from secondary sources, the

interviews enabled me to uncover how marine intensive aquaculture expanded in Turkey as well as the strategies employed by aquaculture firms. I focused specifically on the marine finfish aquaculture boom in Turkey in the last 15 years and its effects on relations of production, consumption, and trade.

Throughout my research, in addition to the methods detailed above, I reviewed gray literature consisting of European (or national) aquaculture planning, strategy or policy documents, guidelines and legislations; reports and newsletters of the European aquaculture sector; publications and statistics of FAO and EU; position papers, reports, and press releases of NGOs; websites of social movements opposing fish farms; and local or regional newspaper articles.

My thesis analyzes developments mostly taking place in the last two decades. This focus is consistent with the recent promotion of marine finfish aquaculture in Europe, with the legislative intensity of relevant European common aquaculture policies and strategies, and the tendency of capital to expand into marine finfish aquaculture. Focusing on this time frame enabled me to uncover the recent political processes around the development of European aquaculture aiming at overcoming the stagnation faced in these decades.

1.6 Summary of the Main Argument

The main argument of this thesis is that European intensive marine finfish aquaculture shapes and transforms marine spaces and production relations based on dominant discourses and their underlying assumptions as well as through the continuous expansion of capital into new commodity frontiers—enabled by enclosing marine commons. By seeking to expand capital accumulation, intensive aquaculture transforms both seafood production practices from capturing to farming and social and ecological relations with marine areas and commons. In reconfiguring access to and control over marine commons, this transformation excludes a variety of social

actors, leading in turn to socio-environmental conflicts related to fish farms, whereby a range of social actors and groups resist enclosure through advancing environmental justice demands. I claim that such a continuous expansion underpins how capital produces nature, space, and socio-ecological regimes with the intention of overcoming rather than the social and ecological crises related to declining stocks and capture fisheries, primarily the crisis of decreasing profits by further enclosing and commodifying marine areas.

1.7 Structure of the Thesis

The rest of this thesis is organized as follows: In Chapter 2, I examine dominant discourses on European aquaculture. I uncover the main themes, objectives, and the tensions in these discourses, and unveil their underlying assumptions. I discuss the findings of the analysis through adopting a Polanyian theoretical lens focusing on (marine) enclosures, embeddedness, and fictitious commodities. I argue that aquaculture discourses and the taken-for-granted assumptions underlying them lead to a disembedded understanding of aquatic space and resources, thereby facilitating their privatization through enclosures.

In Chapter 3, I analyze the socio-environmental conflicts related to fish farms in Europe by building on Schlosberg's theoretical framework on environmental justice. I examine the localities of conflicts, the social actors involved in them, and their demands. I argue that resistance to fish farms in Europe is not limited to NIMBY (Not-In-My-Backyard) reactions or purely conservationist motivations. Rather, it entails a complex set of claims linked to the environmental justice demands of various social actors, comprising distribution, recognition, participation, and capabilities aspects. In this chapter, I also highlight the political relevance and significance of these conflicts and their potential to mainstream constructive and transformative proposals for the seafood production model.

In Chapter 4, I investigate the expansion of intensive marine aquaculture by drawing on Jason Moore's theoretical approach on the expansion of 'commodity frontiers'. Based on the analysis of the recent growth and expansion of the sector in Turkey, I examine how commodity frontiers expand geographically, spatially, and taxonomically within the intensive marine aquaculture sector. I claim that this expansion is enabled by particular strategies of aquaculture firms aiming at increasing and intensifying both production and consumption, which in turn leads to the commodification of new marine areas and resources.

Lastly, in Chapter 5, I discuss my empirical findings and arguments by linking them to broader debates on the growth imperative, dominant discourses and environmental governance models, and marine enclosures. Here, I discuss my main empirical and conceptual contributions, identify future research lines in the political ecology of aquaculture, and reflect on the policy implications of my findings.

Taken together, the findings presented in this thesis contribute to research on the political ecology of aquaculture as well as to broader theoretical debates on enclosures, agrarian and socio-environmental change in marine areas and neoliberal environmental governance—thus improving our understanding of the global aquaculture boom, the related transformation of seafood production, and the resulting uneven social and ecological relations.

2 Unpacking the Objectives and Assumptions Underpinning European Aquaculture

2.1 Introduction

Capture fisheries, an important food source, are facing stagnation worldwide, while consumption levels continue to rise. Consequently, aquaculture has become one of the fastest growing food-production industries, increasing in volume at an average annual growth rate of 8.6% globally over the past three decades. Currently, almost half of all fish for human consumption comes from aquaculture (FAO 2016). Although different methods of aquaculture traditionally coexisted in land, freshwater, marine, or estuary areas; its recent global expansion has been especially remarkable in intensive marine aquaculture segment with advanced technology, increased labor productivity, and capitalization, which have transformed seafood production in notable ways (Longo *et al.* 2015).

Aquaculture in Europe, however, has not kept pace with the global growth, but rather has stagnated or declined in the last decade (JRC 2012). Although European Union (EU) authorities do not have direct competences over aquaculture development, they have been seeking to reverse this trajectory over the past 15 years (EP 2014) through ‘soft law policies’ – incentives, guidelines, communications – and adopting a broad series of initiatives ever since the approval of the first EU aquaculture strategy in 2002 (EC 2002a; EC Fisheries and Aquaculture 2017). The EU was especially active between 2009 and 2014, as evidenced by the new Aquaculture Strategy (EC 2009), a new Common Fisheries Policy (OJ 2013) with a specific section on aquaculture, the associated European Maritime and Fisheries Fund (OJ 2014), and a Communication called ‘Blue Growth opportunities for marine and maritime sustainable growth’ that considers aquaculture as one of the axes for European economic growth in marine areas (EC 2012a).

In this context of a growing food-production industry and efforts to promote it, analyzing how and why the transformation of EU aquaculture occurs becomes essential. While socio-environmental and political ecological studies on aquaculture in Europe are still scarce (see Ridler 1997; Freitas *et al.* 2007; Mente *et al.* 2007; Christiansen 2013), EU aquaculture policies are being developed in a complex sociopolitical framework (CEFAS 2014; SAR 2014; Tatenhove 2016). As Bailey underlines (Bailey 1996), aquaculture is not a purely technical development, but at the same time a socioeconomic operation that needs similar social science analysis like other production processes. As a result, identifying the representations of policy problems related to aquaculture in Europe and the issues that have not entered into debates become critical in the development of these strategies and policies.

To answer these questions, I conducted a discourse analysis of current EU-driven aquaculture policies and strategies by drawing on Bacchi's WPR (What is the Problem Represented to be?) approach (Bacchi 2009). I discuss the results through the theoretical lens of the economic sociologist (and historian), Karl Polanyi. Similar theoretical approaches have been used in relation to terrestrial space and environmental policy discussions around it (Peluso 2007; Layfield 2008; Coffey 2016). Here, I explore its validity for aquatic space and the development of European aquaculture. My objectives are to: identify the problem representations in EU aquaculture discourses by interrogating the main themes, objectives and tensions among them; unveil and problematize implicit assumptions according to the Polanyian framework; and open up discussion space for silenced voices and alternatives and thus enrich political debates. Hence, I aim to contribute to understanding the link between the expansion of aquaculture and enclosures of aquatic resources (Hall 2003; Clausen & Clark 2005; Saguin 2016), as well as to the European discussion on aquaculture in a key moment where new EU aquaculture policies are being implemented.

The next section presents the Polanyian theoretical framework and the literature on the socioecological embeddedness of economic activities and enclosures of (aquatic) resources (Polanyi 2001[1944]). The third section explains the

methodology used in discourse analysis. The fourth and fifth sections present, analyze, and discuss the results by unpacking the objectives and assumptions underpinning European aquaculture according to the Polanyian theoretical framework. I conclude by summarizing the results, highlighting the need for an aquaculture model embedded in social and ecological relations, and underlining the essential political debates to develop relevant socio-environmental policies.

2.2 Theorizing Aquaculture Development Using a Polanyian Lens

Here, I explore how Polanyi's theoretical framework on social (and ecological) embeddedness, enclosures, and fictitious commodities is reflected in European aquaculture discourses (Polanyi 2001[1944], 1977; for emphasis on ecology see, Longo *et al.* 2015, p.194). The Polanyian framework is especially relevant in the interrelated analysis of the social, economic, ecological, and political dimensions of a growing and transforming socioeconomic activity based on biophysical resources. Here, I will briefly present these concepts to facilitate the following discussion.

2.2.1 *Embeddedness*

The Polanyian framework offers key insights about how the economic sphere is increasingly being perceived as separate from the social, political, and ecological spheres, which has meant an economy disembedded from socio-ecological relations and institutions (Polanyi 2001[1944]). Polanyi rejected this presumption claiming that "economic systems, as a rule, are embedded in social relations" (Polanyi 2001[1944], p.279). He argued that a disembedded approach that sought to organize nature and society according to the rules of market economy, i.e. "an economic system controlled, regulated, and directed by market prices" (Polanyi 2001[1944], p.71), "could not exist [...] without annihilating the natural and human substance of society" (Polanyi 2001[1944], p.3), which in turn would be contested by society.

2.2.2 Enclosures

The Polanyian framework takes a close look at the evolution of enclosures, and the privatization of commonly used forestry lands by fencing-off biophysical terrestrial spaces. Polanyi argued that this is how land-based enclosures transformed common spaces into private property, which made further capital accumulation possible. However, this process relied on an understanding of economy as being disembedded from society, and brought with it several social and political problems (Polanyi 2001[1944]). Yet enclosures are not only limited to fenced-off pieces of land. Drawing on this approach, I scrutinize marine enclosures, and the role aquaculture plays in privatizing especially marine areas and transforming seafood production (for marine enclosures see Mansfield 2004, 2007; Longo *et al.* 2015; Bresnihan 2016).

Moreover, scholars recently have developed the idea of non-physical enclosures. These ‘new enclosures’ are a set of techniques and ways for managing environmental problems such as overexploitation, contamination, and habitat degradation or destruction through market-based instruments and economic valuation (Mansfield 2004; Heynen & Robbins 2005; Cotula 2013; Bresnihan 2016). They limit different options related to environmental governance to a subset of measures that transform commons into private properties. With these new enclosures, the prevailing approach to environmental governance converges to a ‘market society’ approach, in which the society is organized according to the needs and rules of market mechanism.

2.2.3 Fictitious commodities

Polanyi defined commodities as “objects produced for sale on the market” (Polanyi 2001[1944], p.75). Based on this definition, he argued that while self-regulating market mechanism intends to assign the role of a commodity to any productive relationship—since “self-regulation implies that all production is for sale on the market and that all incomes derive from such sales” (ibid, p.72)—, several social and natural products and relations are not commodities, but are treated as ‘fictitious commodities’ by the market society. These are: nature, under the name of land; man,

under the name of labor; and money, a token of purchasing power. However, none may be considered commodities since—like the land or the sea—they were produced neither for sale nor by humankind (ibid, pp.75–76, p.136; for fisheries see Helgason & Pálsson 1997; Mansfield 2007).

By building on the Polanyian framework, I aim to analyze how these concepts intersect with the discourses in European aquaculture policies and strategies. In efforts to go beyond “a one-sided account of ecological problems that effectively naturalize and universalize capitalist relations of production” (Bresnihan 2016, p.10), I analyze the European aquaculture discourses and related approaches to environmental governance.

2.3 Methodology

My study follows both qualitative and semi-quantitative methods, drawing on a discourse analysis approach. Discourse analysis is usually defined as methods and theories for studying the types of words, concepts, and language used in different social contexts, and may focus on textual analysis, analysis of speeches, or non-verbal aspects of interaction and communication (Wetherell *et al.* 2001). Despite differences in their analytical focus, scale, or how they perceive ideology, all discourse analysis approaches share an interest in language and subject, and their relations (Jorgensen & Phillips 2002).

According to Hajer and Versteeg, discourse analysis strengthens studies on environmental policy by highlighting ‘the role of language in politics’ (Hajer & Versteeg 2005, p.175). Here, I follow a post-structuralist approach to discourse analysis (for different post-structuralist currents, see Laclau & Mouffe 1985; Wodak & Fairclough 1997—for critical discourse analysis; and Wetherell *et al.* 2001—for discursive psychology, cited in Jorgensen & Phillips 2002), according to which “our ways of talking [and interacting] do not neutrally reflect our world, identities, and

social relations, but rather, play an active role in creating and changing them” (Jorgensen & Phillips 2002, p.1).

Specifically, I draw on Bacchi’s WPR (What’s the Problem Represented to be?) approach to investigate how policy ‘problems’ related to European aquaculture policies and strategies are represented, which premises are taken for granted, and which voices are silenced in this process (Bacchi 2009). Building on Foucauldian post-structuralist approach to discourse analysis (Foucault 1984, 1991a), Bacchi provides the necessary tools for analyzing “taken-for-granted assumptions that lodge in government policies and policy proposals by interrogating the problem representations it uncovers within them” (Bacchi 2009, p.xv). “As the taken-for-granted delimits the field of possibilities for thinking and acting, its unmasking can open up a political field to other possibilities” (Jorgensen & Phillips 2002, p.186), which is my aim in this chapter. Following Bacchi’s WPR approach, I explore these particular questions (Bacchi 2009, p.xii):

(i) what’s the ‘problem’ represented to be in [aquaculture] policy?; (ii) what presuppositions or assumptions underlie this representation of the ‘problem’?; (iii) how has this representation of the ‘problem’ come about?; (iv) what is left unproblematic in this problem representation and where are the silences; can the ‘problem’ be thought about differently?; (v) what effects are produced by this representation of the ‘problem’?; and (vi) how and where has this representation of the ‘problem’ been produced, disseminated and defended and how could it be questioned, disrupted and replaced?

My analysis engages not only with the official policy discourse but also with a broader discursive space that incorporates different sociopolitical actors who follow a ‘European-level’ perspective in the governance of aquaculture and establish ‘European-level’ discourses. I chose this approach because European political institutions—including the European Parliament, the European Commission, and the European Council—intend to develop common EU policies and strategies in aquaculture, although the competence to actually develop aquaculture is left to the Member States. Consequently, I examined documents published by different actors that had a European focus and were linked to the official consultation, participation,

and decision-making processes of EU common aquaculture policies (see Appendix 2.2. for the list of analyzed documents).

The analyzed information sources comprised of 34 written documents, including: European aquaculture planning or strategy documents; European Commission guidelines for sustainable aquaculture; European Parliament policy documents, decisions, and legislations; and position papers and reports of European NGOs and the European aquaculture industry. They were the primary documents establishing a European approach to aquaculture production that represented the perspectives of different social actors. In addition, I analyzed discourses related to three main segments of European aquaculture (marine finfish, freshwater, and shellfish), because most documents covered them all—though usually in separate sections—and came up with general proposals and strategies (EC 2009; STECF 2012). However, I noticed a special emphasis on marine finfish aquaculture in most of the documents and thus based my discussion mainly on this segment.

The information sources cover documents published from 2009, when the European Commission launched the Communication ‘Building a sustainable future for aquaculture: A new impetus for the strategy for the sustainable development of European aquaculture’ (EC 2009) to mid- 2014, when the new European Commission was elected. This period corresponds to a special period of intense legislative activity in the EU common aquaculture policies.

For the analysis, I codified and categorized the 34 documents (a total of 2588 pages) using Atlas-Ti software. First, I read all the documents fully and identified relevant sentences or paragraphs—quotes. Next, I summarized quotes into shorter and more general sentences—codes. Finally, I categorized all codes under 19 code families that represented broader semantic concepts such as ‘sustainability’, ‘actors and stakeholders’, and ‘market’.

The codification and categorization process enabled me to ascertain which statements and discourses were most common in these documents. Additionally, it

helped determine the intensity and frequency of various words or statements, and pointed out different ways to frame discourses around the same topic. For instance, ideas about the sustainability of European aquaculture products were found in different documents: in the form of a fact taken for granted, an objective, or a prediction.

Thereafter, I examined how the codes in each family were related, to determine whether those in the same family followed a unique line of argument on aquaculture development or whether they represented debated, contradictory or incoherent discourses, or alternative proposals. To this end, I explored the contradictory and associated codes in all documents and identified the varied positions of different actors and how they framed their arguments. This step allowed a broader analysis in obtaining relational results.

In the results and discussion below, I first present the most commonly stated themes, secondly identify and discuss objectives, and lastly unveil the implicit assumptions taken for granted in discourses on European aquaculture. This enables me to examine the ‘problem represented to be’ in EU aquaculture policies, and the assumptions underlying this representation. The discussion also touches on the debates lacking in aquaculture discourses and where the silences are, and elaborates on alternative representations of the ‘problem’.

2.4 Discourses on European Aquaculture

To understand the key elements in the discourses on European aquaculture, I first coded and identified the main themes addressed in the 34 examined documents and obtained a total of 2636 quotes grouped under 356 codes. Next, I categorized all codes into 19 code families based on the most relevant concepts (see Appendix 2.1.). Below, Table 2.1. lists the 15 most encountered codes and how often they were repeated, which corresponds to 685 out of 2636 total entries. Although the number of

times a code was repeated does not directly imply level of importance, it offers a sense of the intensity of discussed or promoted themes.

Codes		Repetition
C1	Competitiveness of European aquaculture (with imports, in global markets) should be enhanced.	74
C2	There are problems of competition over space (spatial planning will be promoted to solve it).	72
C3	Reducing administrative burden is an objective.	62
C4	Aquaculture may negatively affect the environment (escapees, disease outbreaks, pollution, resource use, habitat damage, compromised fish welfare, nutrients, reducing water quality, benthic impacts, and eutrophication).	58
C5	Labeling and adequate information for consumers should be established.	54
C6	Level playing field (with imported products, fishing sector, and/or among EU countries) will be promoted.	51
C7	Coordinated spatial planning is an objective.	47
C8	Simplifying licensing procedures is an objective.	47
C9	European aquaculture aims to produce healthy, safe, and quality products.	44
C10	Achieving sectoral growth (through competitiveness and innovation) is the main objective.	38
C11	Stakeholder participation and provision of appropriate information to the public will help to improve sector's image and governance.	32
C12	Aquaculture contributes to food supply, food security, and economic growth.	30
C13	Aquaculture should be recognized as an equal user of water resources (at the same level as fisheries and tourism).	30
C14	Fish oil and fish meal in feeds can be replaced by vegetables, but they are essential components considering the health and welfare of farmed fish and safety to the consumer.	29
C15	Accurate, complete, reliable, and comparable data should be obtained.	27
	TOTAL	685
	ALL ENTRIES	2636

Table 2.1. Most detected codes and their frequencies

As seen in Table 2.1., most statements express either certain objectives that social actors hope aquaculture development will achieve, or challenges it faces and strategies to overcome them. Meanwhile, the links and tensions among the discourses are as important as the main themes, and are addressed below through an

examination of the objectives of European aquaculture.

2.4.1 Exploring the objectives of European aquaculture

In the analyzed documents, the main objectives of European aquaculture were achieving profitability by enhanced competition, job creation, food security, and sustainability, and each was related to the broader objective of (sustainable) growth (Appendix 2.1.). However, a more in-depth perusal of these objectives is necessary in order to understand the problem representations and the proposed development model, and examine the coherence or tensions between them.

2.4.1.1 Job creation vs. profitability

The most repeated—74 times—statement concerned objectives related to improving the competitiveness of European aquaculture (code C1, Table 2.1.), usually in association with industry growth, increased employment, and decreased imports or increased exports. The second most frequently mentioned—38 times—objective was to achieve sectoral growth, through competitiveness and innovation (C10), with a vision that aquaculture will grow and contribute to closing the gap in European seafood production.

The growth objective was frequently mentioned in line with assuring long-term secure employment (EC 2009; EP 2009a, 2014). According to the EU employment policy, for any sectoral policy, the “contribution in employment represents a non-negotiable component in terms of job creation and especially in less privileged regions” (EAS 2011, p.10). In the analyzed documents, targets and predictions about the aquaculture industry and its potential for future job creation varied. Some presume a potential increase of between 3000 to 4000 full-time equivalent jobs (STECF 2013a, 2013b); while EC’s expected figure in 2002 was between 8000 to 10,000 (EC 2002a; EP 2014). Meanwhile, the industry’s vision is “supporting more than 150,000 direct jobs [by 2030]” (FEAP 2012, p.35), which is almost double the current numbers, i.e. 85,000 direct employees that corresponds to about 40,000 full-

time equivalent jobs (EU 2014).

However, various factors influence the relationship between the sector's growth and direct job creation.⁷ First, different types of aquaculture have different labor requirements (EP 2009b; JRC 2012; STECF 2013c). This point, combined with the current noticeable concentration in the most profitable aquaculture subsectors—usually with higher labor productivity—implies that sectoral growth does not necessarily lead to significant increases in job creation. In other words, while increasing employment in Europe is an objective that legitimizes discourses promoting industry growth, how they link is not straightforward.

The promotion of marine finfish aquaculture is a very fitting case in point. Reports by The Joint Research Centre argue that capital-intensive marine finfish aquaculture with increasing labor productivity is profitable and has potential to compete in global markets, but faces limits of expansion and environmental problems (JRC 2012, p.11; STECF 2013c, p.47). While this is currently the most important and growing subsector involving high levels of technology and labor productivity, its capacity to contribute to employment is limited (EC 2009; JRC 2012); rather, “intensification in the marine segments is eroding the potential for job generation” (JRC 2012, p.23).

Additionally, although employment in remote areas is considered important, strategies usually focus on marine finfish instead of establishing an employment strategy for shellfish aquaculture, despite the fact that some 64.8% of jobs in Europe are found in this segment while marine finfish aquaculture accounts for only 9.4% of employment (JRC 2012). Discourse analysis implies that there are “conflicting priorities over economic development”, i.e. whether to emphasize job creation or a competitive industry (EP 2009b, p.85). Consequently, the discursive claim that job creation objective presupposes aquaculture growth does not always appear properly

⁷ Due to lack of data (EC 2009), an analysis of indirect job creation exceeds the scope of this discussion.

grounded, and policies fail to sufficiently address these conflicting priorities.

Due to these factors combined with the lack of transparent information and reliable data (C15) to form the basis of the existing growth and development scenarios, it cannot be taken for granted that a higher growth and profitability of the sector would directly lead to a significant rise in employment.

2.4.1.2 Food security vs. profitability

The second tension among objectives appears within food security discourses promoting the growth of European aquaculture. Currently, 54.9% of all fish consumed in Europe is imported, which is considered a very high dependency rate (EUMOFA 2014). Accordingly, a primary aim of the proposed policies is to ensure Europe's food security by increasing internal supply. Actors like The European Economic and Social Committee claim that European aquaculture can and should grow, and become less dependent on imports (EESC 2013; FEAP 2014). The overall objective is to increase the seafood supply within the EU, close the gap between seafood demand and supply, and decrease reliance on imports.

The key discussion here is to what extent the proposed production model contributes to food security. First, it is not clear whether food security discourses in the EU target everyone's access to seafood, or prioritize production and sale of more seafood at higher prices and for larger profits. This contradiction can be found in aquaculture policies of the EU that propose niche-market production of more expensive goods (such as caviar), an export-oriented vision, a focus on value-added secondary processing of imported raw materials, and prioritization of protein-dependent intensive marine finfish aquaculture (EC 2009, 2011; EP 2009b; JRC 2012; STECF 2012, 2013b).

Encouraging export-oriented production and the internationalization of demand in order to increase competitiveness is incompatible with production for local consumption, and does not comply with the aims of achieving food security and

improving access to fish. EP documents claim that “the process of globalization continues to drive rapid expansion of value chains across international boundaries, particularly in the seafood sector. For many countries, [...], these markets have now become more significant than domestic markets” (EP 2009b, p.27). Proposals to invest in lower-cost non-EU countries (ibid, p.94) prioritize the competitiveness and profitability objectives which could clash with the food security objective. Moreover, regarding the ecological dimension of food security, aquaculture has to ensure it does not deteriorate marine resources, habitats, and species in order to contribute to food security (MCS 2013).

2.4.1.3 Environmental sustainability vs. profitability

Aquaculture is considered a socioeconomic activity that can be undertaken in an environmentally sustainable way. Yet the examined documents also underline aquaculture’s potential and observed negative impacts on the environment in Europe (C4): escapees, disease outbreaks, pollution, resource overuse, habitat damage, compromised fish welfare, nutrients, reduced water quality, benthic impacts, and eutrophication (EC 2011, 2013; EATIP 2012; CEFAS 2014; FEAP 2014).

Another point highlighted in the examined documents is that European aquaculture aims to produce healthy, safe, and high-quality products (C9). Some claim that EU aquaculture production already addresses environmental and social concerns, and that the high quality of EU aquaculture products should contribute to (local and) social acceptance and bring a competitive advantage (EC 2013). Others state that producing high-quality products is costly, and emphasize the challenges the sector faces in order to compete with imports (EP 2009b; STECF 2013a). Indeed, since environmental sustainability measures in some cases require important investments that increase costs, profitability may be affected by environmental politics.

The debate on the extent to which different subsectors of EU aquaculture achieve which aspects of environmental sustainability and quality is ongoing (EP 2009b). First, there is no clear definition of how to measure aquaculture sustainability (SAR

2014). Secondly, implementing environmental policies is seemingly irregular in EU aquaculture; according to audited projects, “Member States⁸ gave insufficient consideration to environmental and health policies” (European Court of Auditors 2014, p.24), and “the European Fisheries Fund did not provide significant support for environmental sustainability in practice” (ibid, p.14). In addition, the term ‘quality’ is used quite ambiguously, and can refer to product quality (in terms of its taste, health, processing level, hygiene), production system quality (in terms of technology, controls, animal welfare), or production quality with respect to the ecosystem (in terms of inputs, waste treatment, food conversion ratio, and carrying capacity).

If taken in a broader sense, quality is linked to the sustainability discussion mainly on the basis of carrying capacity and protein dependency. This is valid especially in the production of carnivorous species—those most demanded by European consumers—primarily produced by the marine finfish segment. Although some EC and EP documents and the industry state that aquaculture may decrease pressure on fish stocks (EP 2009b; STECF 2012; EC 2012a; OJ 2013), NGOs are concerned about the dependence on marine protein and its link to overfishing (IFOAM 2010; SAR 2014). Several studies highlight that “a large part of the fish captured to produce fish meal and oil could be better used for direct human consumption” (EP 2009b, p.76). While the fish oil and fish meal in feeds can be replaced by vegetables, and the industry is working to improve the feed conversion ratio—to require less fish meal and fish oil in the production of farmed fish; both—especially fish oil (SAR 2015)—are recognized as essential components in the health and welfare of farmed fish and consumer safety (C14). Therefore, “improving efficiency [which is needed to increase profitability] does not necessarily lead to fewer demands on ecosystems” (Longo *et al.* 2015, p.168).

To summarize, my analysis unveiled three key tensions among the main objectives of the discourses on European aquaculture that need to be problematized and discussed

⁸ The audited projects are from France, Italy, Poland, Portugal, Romania, and Spain.

for the overall strategy on aquaculture. My study indicates that whenever main objectives have conflicting priorities, the dominant discourses promote enhancing industry growth, competitiveness, and profitability with an ‘economistic’⁹ perspective (Polanyi 1977). As Longo *et al.* claim, especially with the global shift toward capital-intensive marine aquaculture, fish is perceived primarily “as a means to accumulate capital rather than sources of physiological sustenance. Their harvest is manipulated to facilitate this process—i.e. to make it more economically efficient” (Longo *et al.* 2015, p.34). Moreover, analyzed discourses include not only conflicting views or tensions but also certain assumptions that are taken for granted when strategies, policies, and development models are being generated. The following section uncovers and analyzes these implicit assumptions.

2.5 Unpacking the Assumptions Underpinning European Aquaculture Discourses

In this section, I engage in a broader analysis of the discourses on European aquaculture to unveil the main implicit elements they contain. As Bacchi suggests, after analyzing and interrogating the representation of the ‘problem’, I focus on “what presuppositions or assumptions underlie this representation” (Bacchi 2009, p.48). In other words, through discourse analysis, I highlight the assumptions that made “those ‘promises’ and policies [possible]” (*ibid.*, p.xix), and discuss them primarily based on the Polanyian theoretical framework. Furthermore, I will underline “what is left unproblematic in this problem representation and where the silences are” (*ibid.*, p.xii), and discuss different ways to think about the ‘problem’.

⁹ Polanyi (1977) uses the term ‘economistic fallacy’ in reference to the assumption that all economic systems and behavior can be reduced to a calculative behavior that is dominant in a market society.

2.5.1 Wild fish and farmed fish as perfect substitutes

The first important implicit assumption taken for granted in most discourses is that wild and farmed fish are perfect substitutes. Aquaculture is usually promoted as a substitute, a technological fix, or a complement to stagnating and declining wild fish stocks (Longo & Clark 2012; Islam 2014; Saguin 2016). However, this view sees fish and other aquatic resources as items lying on the counters in a fish market, and as ‘fictitious commodities’ (Polanyi 2001 [1944], p.76) that are not part of natural cycles and socio-ecological relations, but rather “objects produced for sale on the market” (ibid, p.75). I contest this view and claim that the social, economic, and ecological functions of aquaculture differ from those of capture fisheries. Building on Hall’s argument that capital- and input-intensive shrimp aquaculture in ponds transformed shrimps from ‘fictitious’ to ‘real commodities’ (Hall 2003, p.252), I argue that aquaculture products cannot be considered as pure ‘objects produced for sale’ because their production does not occur in isolation from social and ecological processes, but is rather embedded in them.

Wild and farmed fish have different social and ecological impacts, although they are bought and sold on the same market (see lifecycle assessments including socioeconomic indicators, Pelletier *et al.* 2007; Kruse *et al.* 2009). Their impact on social metabolism—society–nature interaction—where the economy is “embedded in the environment, open to the entry of energy and materials and to the exit of waste” differs as well (Martinez-Alier 2009, p.64). As Clausen and Clark (Clausen & Clark 2005, p.436) state:

...aquaculture represents not only a quantitative change in the intensification and concentration of production; it also places organisms’ life cycles under the complete control of capitalist ownership. This new industry boasts of having ownership from ‘egg to plate’ and substantially alters the ecological and human dimensions of a fishery.

Furthermore, industry representatives and public authorities usually consider aquaculture production more advantageous due to its flexibility in responding to consumer demands. While aquaculture products are considered a controllable

resource—so not only a perfect substitute but even a ‘better’ product with no seasonal changes (STECF 2012, p.61)—aquaculture itself is promoted as a means that can substitute ‘a declining fishing industry’ (EC 2009, p.26). This presumes that capture fisheries have natural limits whereas aquaculture production does not, since it is “rearing or cultivation of aquatic organisms beyond the natural capacity of the environment” (EC 2012b, p.7). However, aquaculture production relies on natural cycles and carrying capacity, and the feed and water used for it depends on the regenerative capacity of environment. In particular, the production of carnivorous species relies on feed, the components of which mainly depend on capture fisheries. Thus, rather than being a substitute, aquaculture production is dependent on the existence of wild stock. In addition, capture fisheries and aquaculture differ in terms of social acceptance and public perception, which is also reflected in consumer choices.

2.5.2 The (sustainable) growth imperative

The second implicit assumption is linked to the (sustainable) growth imperative, which is taken for granted by most social actors and not questioned in debates on aquaculture. Here, I examine various aspects of this assumption.

First, there is no agreed upon definition of ‘sustainability’ in aquaculture (SAR 2014). It is defined on the basis of three pillars—social, environmental, and economic—in official EU documents (EC 2009; STECF 2012; CEFAS 2014), but the representation of each pillar embodies problems. The focus on the different aspects forming the social pillar, for instance, is not well balanced. Job creation usually receives more emphasis compared with other constituents such as social cohesion, social acceptance, and participation in democratic decision-making. The environmental pillar lacks consensual definition, especially in relation to adopting an ecosystem-based approach (EC 2013). Finally, economic sustainability is usually understood as continuous industry growth, while other factors like working conditions, labor-related discussions, and wealth distribution are usually neglected. Also unclear is whether the objective is to ensure sustainable ‘growth’—meaning, continuous industry

growth—or the socioeconomic and environmental ‘sustainability’ of the sector, since the terms are used interchangeably.

Second, it is not clear what has to grow—the volume of aquaculture production, the GDP (Gross Domestic Product) of EU countries, companies’ turnovers and profits, or accessibility of seafood—and how growth will be sustainable in all three dimensions. Furthermore, the pursuit of growth emerges from deeper assumptions, such as people’s need to consume an increasing quantity of fish, and that the sector has to grow infinitely.

Many documents point to the increased demand for and consumption of seafood due to population growth, falling prices, and the perception that seafood is healthy (STECF 2013b). Europe is already the largest global market for fish (*ibid.*); annual average consumption in the EU is around 24.5 kg per capita whereas the world average is around 20 kg per capita (EUMOFA 2016). Although how much seafood a healthy diet should contain is questioned (Béné *et al.* 2016), and it is uncertain whether higher seafood consumption would mean all people’s access to nutritious fish protein, there is a general promotion of seafood consumption.

In terms of industry growth, an important—albeit currently absent—debate would be to focus on its limits, so as to be able to question the desired types and extent of aquaculture growth by considering social, economic, and ecological boundaries (Meadows *et al.* 2004; Rockström *et al.* 2009; D’Alisa *et al.* 2014). As Longo *et al.* argue, “the growth imperative of capitalist development is a major driver of environmental degradation, [. . . and . . .] the privatization of ocean commons and the advance of capitalist aquaculture serve as means to further profit often at the expense of planetary systems” (Longo *et al.* 2015, p.174). Furthermore, there is no discussion of how this growth in volume—in the context of around 88 million tons of food wasted annually in the EU (EC Food Waste 2017)—and the resultant profits would be distributed. As in other economic sectors, discussions of growth for the sake of growth, its allocation, and the limits of natural resources have to be addressed in debates on the development model of European aquaculture.

2.5.3 Wild fish as a public, farmed fish as a private resource

The third issue taken for granted without being problematized is the perception of farmed fish as a private, and wild fish as a public, resource (EESC 2013). This indicates a critical difference between the two sectors and modes of production. As opposed to capture fisheries, intensive marine aquaculture transforms common resources into private ones (Saguin 2016). The Federation of European Aquaculture Producers confirms this:

... contrary to popular belief, 'Brussels' does not have the same level of control over aquaculture as it does for fisheries. This is mainly because EU fisheries stocks are a 'public good' that is managed at the European level, while aquaculture is predominantly a private professional activity where the stocks are the property of the operator (FEAP 2012, p.25).

EC documents also reveal that “aquatic organisms remain the property of the natural or legal person throughout the rearing and cultivation stage, up to and including harvesting” (EC 2009, p.9; 2012b, p.7). Proposals such as “introducing a right to transfer and mortgage aquaculture licenses which permits a license to be transferred between private parties without any public approval or additional license” (EP 2009a, p.83) envisage an even more intense privatization: as documented in enclosures and privatization of fisheries with Individual Transferable Quotas (Helgason & Palsson 1997; Mansfield 2004).

Consequently, aquaculture has to be seen as the privatization of public resources. Although it is admitted that aquaculture sites are often situated “in public domain areas, requiring governmental leases” (FEAP 2012, p.12), which embodies the privatization of aquatic areas and resources by increasingly fewer capitalized companies with a greater control on resources (Clausen & Clark 2005), this issue does not appear in debates on EU aquaculture. As a result of this transformation, previously public areas and resources are enclosed as private property (Longo & Clausen 2011). In other words, Mansfield’s observations (Mansfield 2004, p.324) on the governance of fisheries are valid in the context of transforming seafood production through enclosures in aquaculture: “... putting property at the center of

fisheries' problems is a neoliberal, market-based approach to ocean governance, [which] starts from a particular economic logic that takes economic rationality (meaning individual profit maximization) as a given”.

2.5.4 Stakeholder participation

There is an overarching assumption that participatory processes are already well established in the EU, which guarantees pluralistic participation. Thus, whenever official EU procedures for participation are followed, it is presumed that all social actors will be able to participate. To problematize this assumption, I looked at the design and implementation phases of EU aquaculture policies separately.

In the design phase, the lack of open and integrated discussions on the ‘problem represented to be’ in EU aquaculture policies—that incorporate the tensions among objectives and implicit assumptions analyzed above—limits efforts to move beyond a formal participation process, such an effort being necessary to ensure true participation. Such discussions are essential to shift the focus from passing policies in order to solve ‘problems’ to initiating debates on the kind of aquaculture model desired. This requires not only consulting stakeholders but also co-elaborating or co-making politics with them (Subirats 2011). The lack of such an approach usually excludes relevant stakeholders who disagree with the pre-designed ‘problems’. Conflicts along these lines are already contested by several countermovements around the world (Hamouda *et al.* 2005; Adduci 2009), and European authorities recognize that “a failure to respond to these challenges will undoubtedly lead to social and political stress and danger of serious conflicts over access to resources or distribution of benefits” (EP 2009b, p.129).

Meanwhile, in the implementation phase, problems arise because actors involved in policy implementation—where EU institutions do not have direct competences—differ from those involved in the design. For instance, local and regional authorities mostly were not included in EU policy definitions, even though they are crucial to the implementation phase. While the “application of environmental impact assessment

rules at the local level” is considered an obstacle to aquaculture growth and development in some documents (EP 2009a, p.29), others emphasize that “time should be taken to allow for open consultation across all stakeholders and users, [where] local communities and authorities should be included” (CEFAS 2014, p.56). Efforts to achieve two frequently mentioned aims—decreasing the administrative burden and simplifying licensing procedures (C3 and C8)—should not lead to dismissing or undermining the importance of participation at the local and regional levels, since this may increase already existing conflicts in Europe (Ertör & Ortega 2015).

To sum up, on the basis of the four main implicit assumptions I uncovered and analyzed following the WPR approach to discourse analysis and the Polanyian theoretical framework, I argue that the ‘problem represented to be’ in the discourses on European aquaculture adopts an ‘economistic’ perspective (Polanyi 1977) that pursues a disembedded understanding of aquaculture and facilitates the privatization of aquatic spaces and resources through enclosures. Taking these assumptions for granted not only leads to economic, social, and ecological failures but also blocks participatory processes, even in the initial stage. As a result, pluralistic debates on alternative models of aquaculture development cannot proceed.

2.6 Conclusion

Through the study of 34 reports, policy and strategy documents related to European aquaculture published by key sociopolitical actors, I identified and interrogated the key themes, debates, and objectives in the discourses on European aquaculture. I found the main objectives of European aquaculture to be enhancing profitability and competition, job creation, food security, and environmental sustainability; I subsequently discussed the coherence of these objectives and the tensions inherent to them.

Second, my analysis unveiled and problematized four significant implicit assumptions in the discourses on European aquaculture: wild fish and farmed fish are perfect substitutes; (sustainable) growth is an imperative for EU aquaculture; wild fish is a public resource while farmed fish a private one (without considering this transformation in seafood production as privatization); and stakeholder participation is already enabled by following the formal EU procedures. These, the most common assumptions taken for granted in European aquaculture discourses, have not been openly discussed while developing related strategies and policies. As a result, debates questioning these assumptions and alternative models for aquaculture development are silenced.

While the WPR (What is the Problem Represented to be?) approach to discourse analysis provided an analytical framework to explore the problem representations in European aquaculture discourses and to challenge taken-for-granted truths, the Polanyian theoretical framework allowed me to discuss these implicit assumptions by establishing the link between my results and the broader literature on privatization of marine space and resources through enclosures and relevant environmental policy debates.

The WPR approach does not claim to make comparative policy studies nor does it generate quantitative results or provide universal answers to how to make policies. It does, however, permit more in-depth analysis of political discourses and their underlying assumptions, which helped me to give voice to silenced debates and open the political field of environmental governance to different possibilities.

Consistent with the Polanyian framework, I stressed that taking these implicit assumptions for granted leads to a disembedded understanding of aquatic space and resources, and facilitates their privatization through enclosures. I contested the claim that aquaculture production offers a solution to stagnant capture fisheries by exceeding environmental limits, and argued that aquaculture production is embedded in social and ecological relations.

For European aquaculture to achieve participatory, just, and sustainable development, its objectives, strategies, and policies have to be problematized and discussed by all relevant social actors. By uncovering what lies beneath prevalent discourses, and extending the debate on related objectives while highlighting the need to improve the strategies, processes, and policies on aquaculture in Europe, I have enriched discussions of environmental policies and aquaculture. Such discussions are crucial for the future development of European aquaculture, especially because the implementation of key European aquaculture policies is already underway.

3 Political Lessons From Early Warnings: Marine Finfish Aquaculture Conflicts in Europe

3.1 Introduction

The increasing demand for fish products and the stagnation of fish captures have boosted aquaculture at a global scale (FAO 2012). Yet despite significant growth of the sector at a global level, aquaculture in Europe has instead experienced stagnation in the last decade (JRC 2012). In order to reverse this trend, European authorities including the European Parliament, the European Council and the European Commission are encouraging the growth of the sector (EC 2012a). The recently approved Common Fisheries Policy (CFP) reform (OJ 2013) and the associated European Maritime and Fisheries Fund (EMFF) are expected to set up a framework that changes the current pattern. At the national level, multiannual national strategic plans for aquaculture based on the EU Strategic Guidelines (EC 2013) will be approved in 2014 by the European Commission as a tool to overcome what have been identified as the most important barriers for aquaculture growth: limited access to space and licensing, industry fragmentation, limited access to seed capital or loans for innovation in a risky context, pressure from imports, long and time-consuming administrative procedures and red tape (EC 2012c).

What underlies most of the previous barriers is the “difficulty to integrate environmental policy with a viable aquaculture economy, due to concerns related to the environmental impact of aquaculture” in Europe (STECF 2012, p.13). This integration is especially contentious in the case of marine finfish aquaculture. The experience in other parts of the world shows that accelerated growth of fish farms may lead to important socio-environmental conflicts that decrease, or even in some cases stop the expected growth in finfish aquaculture (Noakes *et al.* 2003; Adduci 2009; Barton & Floysand 2010).

In the last two decades, European finfish aquaculture has also been embroiled in several socio-environmental conflicts, which to date have not been widely investigated. This is mainly because they have been considered either as spurious or as Not-In-My-Backyard (NIMBY) complaints, i.e. local actors' opposition against the establishment of aquaculture facilities only in their neighborhood, usually criticized for following 'irrational and selfish' demands¹⁰.

However, conflicts may arise when the institutional and political framework fails to address different actors' demands. Studying conflicts in this sense might become a way to unearth the issues that are not accurately covered in current European policies or that are not materialized in the implementation process.

Therefore, in this chapter, I identify the main finfish aquaculture conflicts that took place in the last two decades in Europe, and analyze their characteristics by focusing on actors involved, their arguments, and their link to environmental justice. By doing so, I investigate whether these conflicts in Europe actually stem from NIMBY claims and hence are negligible and/or whether there are lessons that can potentially be incorporated into future European policies to ensure: (i) social acceptance of aquaculture activities and (ii) a socially, politically and ecologically desirable development of European aquaculture. This is especially relevant in a period in which new regulations and legislations on marine use are on the horizon.

The chapter is structured as follows. Section 3.2 reviews the literature on socio-environmental conflicts and elaborates environmental justice theory in-depth, which is used as an analytical framework to study the identified conflicts (Schlosberg 2007, 2013). Subsequently, Section 3.3 outlines the sources of information and describes the qualitative methods used in this study. Section 3.4 illustrates all detected conflicts, their locations, actors involved and their arguments by analyzing their relation with environmental justice concerns. Sections 3.5 and 3.6 highlight the

¹⁰ For a discussion on the limitations of the NIMBY concept see Economic & Social Research Council (2006): http://geography.exeter.ac.uk/beyond_nimbyism/deliverables/bn_wp1_3.pdf

lessons derived and underline the need to incorporate them into European policies.

3.2 Theory

Environmental justice as a term was first used in the United States to draw attention to the unequal distribution of environmental risks and burdens, the so-called 'environmental bads' (Schlosberg 2013) driven by policies discriminating 'people of color' (Bryant & Mohair 1992; Bullard 1990). Grassroots resistance movements, which led to the emergence of the concept (Schlosberg 2013), were mainly against the dumping of industrial and toxic waste in marginalized neighborhoods.

With the concept's evolution, not only the distribution of environmental bads or risks, but also of environmental goods and services, including fairness in access to commons, alongside the recognition and participation in decision-making became central. All of these steps contributed to a wider and pluralistic understanding of environmental justice that goes beyond distributional aspects alone. Indeed, Schlosberg based the theorization of the concept on the analysis of different types of grassroots movements and their environmental justice claims, and thus defined four dimensions of environmental justice: distributive justice, recognition, participative (procedural) justice and capabilities (capacities) (Schlosberg 2007, 2013). Although distribution, recognition and participation aspects of environmental justice framework have been more frequently employed to analyze aquaculture conflicts, the capabilities aspect has not received the same attention (see Page 2007; Joyce & Satterfield 2010).

In the context of this study, distributive justice refers to how risks, benefits and costs—be it social, economic or ecological—of marine finfish aquaculture activities are distributed among various actors. Recognition is associated with the question of whether different actors are considered and consulted as relevant stakeholders for any decision related to fish farms. Participative justice means to be able to participate

effectively in decision-making process. This is not only restricted to having the right to participate or being consulted, but also whether there are well-established inclusive participatory mechanisms through which actors can make their voices heard. The capabilities aspect (Schlosberg 2007, 2013; Sen 1990) is linked to the extent to which aquaculture activities generate a risk to (or support) the integrity and proper functioning of individuals and coastal communities. This embraces a range of basic needs, sustaining one's livelihood, culture and socioeconomic activities, and social, economic, and political rights.

Schlosberg's framework of environmental justice is employed to elaborate this analysis for several reasons. First, this analytical framework has already been successfully applied to conflict studies related to other sectors such as forestry and mining (Gerber 2011; Urkidi & Walter 2011). Secondly, through a plural understanding of the concept, i.e. complementing the distributional aspect with recognition, participation and capabilities, it enables a comprehension of the wide range of demands encountered in these conflicts. Thirdly, this perspective emphasizes that theorizing from movement experience is suitable for studying conflicts since such an approach brings theory and practice together. Fourthly, the framework emphasizes justice both at individual and community levels. This is very useful for the aim of this chapter since the analysis includes different groups within various communities, who did not only have claims for individual justice, but also for the social cohesion and broader functioning of their communities. Finally, this approach helps to structure the information in a way that enables considering the transformative policy aspiration in these conflicts. In this way, based on the data and the methodology explained in the next section and with the following results, the paper underlines their significance for policy-making and the aquaculture-related research agenda.

3.3 Material and Methods

Socio-environmental conflicts related to the use of nature and waste disposal have been widely studied (Gerber 2011; D'Alisa *et al.* 2012; EJOLT 2014). This body of literature includes studies on aquaculture-related conflicts from all over the world (Adduci 2009; Barton & Floysand 2010; Islam 2014; Hamouda *et al.* 2005; Martinez-Alier 2001; Naylor & Burke 2005). This chapter builds upon such research in order to identify and explain socio-environmental conflicts related to marine finfish aquaculture in Europe over the last two decades because each information source pointed to an intensification of conflicts in this period. With this purpose, the research relies on three main sources of information, i.e. peer-reviewed articles obtained from the SCOPUS database—the largest abstract and citation database of peer-reviewed literature, gray literature, and 27 semi-structured in-depth interviews.

I studied peer-reviewed articles within the SCOPUS database through examining the articles—including their title and abstract—to detect the combination of the following two keywords: (i) aquaculture and conflict, (ii) aquaculture and Europe, (iii) aquaculture and the country name—Spain, France, Norway, Greece, and Italy. I selected these five countries for the keyword search because they have the greatest volume of marine finfish aquaculture production in Europe. Accordingly, I reviewed 2597 articles, out of which I selected 213 articles due to their relation to socio-environmental or socioeconomic studies on aquaculture. I refined the latter group in order to identify studies providing specific information on marine finfish aquaculture conflicts in Europe. Additionally, I incorporated corresponding references in these articles into the analysis to have a wider coverage of the existing peer-reviewed literature. Although the most relevant articles studying socio-environmental conflicts in the SCOPUS database were limited in number and detail, they helped to identify 12 conflictive cases, their places, actors involved and their arguments.

Secondly, I employed a review of gray literature including documents and statistics published by FAO and EU, reports and press releases of NGOs (SAR 2014; SWAN &

Coastwatch 2013; WWF 2014; Green Warriors of Norway 2011), EU legislation and guidelines, documents about Common Fisheries Policy, national or European strategy documents, websites of movements (Save Bantry Bay 2014; GBPG 2014) opposing fish farms, and some local or regional newspaper articles to complete the information I obtained from peer-reviewed articles. Following the discussions held in meetings, congresses and conferences, in which many aquaculture sector representatives, public authorities and researchers participated, facilitated the comprehension of the most common discourses and up-to-date debates.

<i>Scopus database</i>			<i>Grey literature</i>	<i>In-depth interviews</i>
<i>Keywords</i>	<i>Number of articles</i>	<i>Relevant articles</i>		
<i>Aquaculture+Europe</i>	792	53	<i>Reports of NGOs</i>	<i>Baltics/Sweden: NGOs, researchers</i>
<i>Aquaculture+Conflict</i>	197	33	<i>FAO reports</i>	<i>Belgium/Brussels: NGOs, aquaculture sector representative, European public administration representatives</i>
<i>Aquaculture+Spain</i>	334	30	<i>EU reports</i>	
<i>Aquaculture+France</i>	274	22	<i>EU Legislations</i>	<i>Cyprus: researcher</i>
<i>Aquaculture+Norway</i>	373	27	<i>EU Guidelines</i>	<i>France: NGO</i>
<i>Aquaculture+Greece</i>	113	15	<i>CFP reform</i>	<i>Greece: researcher, NGO</i>
<i>Aquaculture+Italy</i>	234	13		<i>Ireland: NGO</i>
<i>Aquaculture+UK</i>	280	20		<i>Netherlands: NGO</i>
				<i>Norway: NGOs, activists, association of hunters and anglers, environmental agency</i>
				<i>Portugal: researcher, NGO</i>
				<i>Scotland: NGO</i>
				<i>Spain: researcher, NGO, sector representative</i>
				<i>United Kingdom: NGO</i>

Table 3.1. Sources of information

The third part of data collection was based on semi-structured in-depth interviews. In this phase, I conducted interviews with NGOs, researchers, activists, local people, aquaculture sector representatives, and European or national public administrations.

They enabled me to detect other conflicts and provided a way to acquire more details about those I already had identified. Between February and September 2013, I conducted 27 semi-structured interviews with stakeholders from 12 countries (Table 3.1.). The selection of countries for interviews aimed to cover the most representative countries in Europe in terms of marine finfish aquaculture production. The interviewees were individuals who were involved in conflicts or experts working on aquaculture in specific regions. I recorded the interviews whenever possible, and if not, I took detailed notes for the transcription that followed. These enabled insights into different actors' arguments to uncover how they perceive problems related to marine finfish aquaculture. I detected fourteen conflicts through interviews, two of which I already had obtained from the literature review.

I combined, rearranged, and analyzed the information from these three sources using the environmental justice framework proposed by Schlosberg (2007, 2013), detailed in the theory section. Accordingly, I mapped out several opposing actors, and for each case, I examined the connection of their demands with environmental justice concerns.

3.4 Results

This section is organized under three subsections. The first illustrates all identified conflicts and their link to environmental justice dimensions, the second focuses on actors, while the third emphasizes actors' arguments and analyzes their environmental justice claims.

3.4.1 Conflicts

Through my research, I uncovered 24 cases of different intensities of conflicts related to marine finfish aquaculture in the following ten countries: Cyprus, France, Finland, Greece, Ireland, Malta, Norway, Scotland, Spain, and Portugal. These are usually associated with the sector's expansion in terms of number and size of cages,

increasing marine space allocation problems among different uses, and technological and structural changes affecting marine environment and governance at the local scale (Gouletquer & Le Moine 2002; Mente *et al.* 2007; Phyne 1997; Tiller *et al.* 2012).

I detected a larger fraction of conflicts, i.e. 6 out of 24, in Norway; followed by Greece, Ireland, and Scotland with three cases each. They are illustrated below in Table 3.2.¹¹ with actors involved in each of them and their arguments in relation to environmental justice dimensions (for explanations, see Section 3.4.3). The ‘species’ column in the table indicates which species are produced in each fish farm, and another column gives information on when the conflict started.

The type of aquaculture implemented on each site and the species produced in fish farms are important factors affecting conflicts. The examples in Table 3.2. refer to two main categories of finfish production: In conflict cases I detected in Scotland, Ireland, and Norway, the predominant marine finfish aquaculture species is salmon, followed by trout and codfish; while in Greece, Cyprus, and Spain, sea bass and sea bream are the most common species.

The fact that aquaculture production and associated debates are concentrated on salmon production in Norway, Scotland, Ireland and Great Britain affects the mobilization of actors such as wild salmon anglers and river owners in that geographical space. Meanwhile, sea bass and sea bream production in Greece, Cyprus and Spain contributes to the opposition of small-scale fishers, who have traditionally fished in the same area, and of local populations, a considerable part of which perceives coastal capture fisheries as an important source of their sociocultural life and livelihood and aquaculture as a risk for these practices.

¹¹ The information source, through which the conflict is detected, is indicated with (I.) for interviews and with (L.) for keyword search from peer-reviewed articles. The reference list of the numbers corresponding to peer-reviewed articles (L.) is provided in Appendix 3.2.

Countries	Site	Actors								Species	Start of conflict	Arguments				
		Fisherm.	Tourism	Local pop.	Env'l NGOs	Public adm.	Researchers	AQC sector	Energy sector			Other	Distributive	Recognition	Participation	Capabilities
Cyprus (L.)	Liopetri	X		X							Sea bass, sea bream	1990s	X	X	X	X
Cyprus (L.)	Limassol				X							Early 2000s			X	X
France (L.) [30]	Charentais Sounds		X		X			X shellf.	X Indust.			End of 1990s, early 2000s	X			
Finland (L.) [38]	Aland Islands			X summ. houses		X					Salmon, rainbow trout	End of 1990s		X	X	X
Greece (L.) [31]	South Evoikos	X	X	X							Sea bream, sea bass		X			
Greece (L.)	Inousses Island	X		X	X						Sea bream, sea bass	2010s	X	X		
Greece (L.)	Chios, Lagkada	X		X	X	X					Sea bream, sea bass	2000s	X	X		
Ireland (L.)	Galway Bay	X	X	X	X	X			X		Salmon	2011	X		X	X
Ireland (L.)	Bantry Bay	X	X	X	X				X		Salmon	Early 1990s in general	X			
Ireland (L.) [32]	General/Ballyvaughan, Lough Swilly	X	X		X						Salmon, trout	1990	X			
Malta (L.) [40]		X	X					X Offshore windf.	X Bunkering			2009	X			
Norway (L.) [35]		X	X Recreational Fishing								Salmon		X			
Norway (L.) [33]		X		X							Salmon	Beg. 1990s 2000s	X			X
Norway (L.) [41]		X	X Anglers	X Anglers	X	X Municipalities			X Food Qualt. Mov.		Salmon		X		X	
Norway (L.)	Hardangerfjord	X		X	X		X	X	X		Salmon, trout	1990s	X	X	X	X
Norway (L.)	Floro, Osterfjord				X	X					Salmon	End of 2000s	X		X	X
Norway (L.)	Alta				X	X					Salmon	End of 2000s			X	X
Portugal (I. & L.) [42]	Sado Estuary				X	X	X				Gilt head bream, European sea bass, common sole			X		
Portugal (L.)	Algarve, Olhio	X											X	X	X	

Countries	Site	Actors								Species	Start of conflict	Arguments					
		Fisherm.	Tourism	Local pop.	Env'l NGOs	Public adm.	Researchers	AQC sector	Energy sector			Other	Distributive	Recognition	Participation	Capabilities	
Scotland (L.) [32]	General/ Scalpay and Skye, Western Isles	X	X	X						X	Navigation	Salmon		X	X	X	X
Scotland (L.) [43]			X	X				X				Salmon, trout			X	X	
Scotland (I.)	General/Loch Etive		X	X	X			X	X			Salmon, rainbow trout	2000s	X	X	X	
Spain (I. & L.) [44]	Galicia	X		X	X			X					End of 2000s	X	X	X	
Spain (I.)	Canarias		X											X			

Table 3.2. Conflicts related to marine finfish aquaculture in Europe (Source: Own creation based on the empirical findings)

3.4.2 Actors

A thorough analysis of the conflicts reflects the existence of various actors resisting marine finfish aquaculture in Europe. The most relevant actors are small-scale fishers, local populations, environmental NGOs, tourism sector representatives, local or regional public administrations, researchers, fish consumers, energy sector representatives, producers of different aquaculture types, representatives of other sectors, and recreational users—including a wide range of activities like sailing, diving or recreational fishing. The most common actors involved in the cases I analyzed are small-scale fishers, local populations and environmental NGOs, as detected in 15, 14, and 14 (out of 24) cases respectively.

As the most frequently detected actor, small-scale fishers, appear in eight countries (Table 3.2.). They usually claim that they are highly affected by fish farms since the marine area they use, the wild stocks they catch, or the ecosystem they depend on are subject to changes as a result of fish farms (Green Warriors of Norway 2011). Moreover, in some cases they feel that their livelihood and socioeconomic activity is under threat, whenever their fishing areas get restricted or they have to compete with cheaper aquaculture products.

Local populations include residents of towns close to a fish farm, local people who use the marine area for recreational purposes such as swimming, diving, angling or navigation, summerhouse owners, as well as young or retired people in villages who desire to enjoy the landscape and water quality. I found them as active actors in seven countries (Table 3.2.). In these conflicts, inhabitants that are mobilized with their local organizations usually led to a greater visibility of the opposition (e.g. the Norwegian Association of Hunters and Anglers, river owners, fishing cooperatives).

I detected environmental NGOs in eight countries (Table 3.2.). They generally base their opposition on environmental conservation objectives. In some cases, they do not work in collaboration with other social actors. These conflicts arose mostly due to the NGOs' perception of the incompatibility of fish farms' operation with ecologically

important areas like natural parks and marine protection areas or with the habitat of vulnerable species (e.g. Sado Estuary, Limassol). However, in most cases, environmental NGOs have been collaborating with other actors since generally social and environmental demands have been intertwined and consistent with environmental protection objectives.

In many cases, various alliances consisting of several recreational and professional users take place. Different actors cooperate, although they may be mobilized with different motivations based on a variety of social and environmental concerns (see Section 3.4.3). These coalitions usually lead to a greater visibility of conflicts through remarkable organizations, petitions, surveys, or demonstrations (see conflicts in Galicia, Galway Bay and Loch Etive) that enable the actors to make their voices heard. For instance, the actors in Loch Etive conducted a local survey, the result of which found that 89% of people living in the closest neighborhoods to the proposed fish farm were against this project. Through their opposition webpage (Friends of Loch Etive 2014), they were able to amplify their demands by reaching more people through an improved transmission of information and the organization of petitions.

Moreover, my research demonstrated that in most cases small-scale fishers and local populations adopt a similar attitude towards fish farms since fishers are usually an integral part of the local community. In some conflicts in Norway, Greece and Spain, fishers collaborated with the two other mostly detected actors, i.e. local populations and environmental NGOs. In general, the local tourism sector perceived aquaculture also as a risk; thus, its representatives positioned themselves on side of the opposing groups, in many cases entailing local people and environmental NGOs. Other alliances manifest the collaboration of environmental NGOs, scientists, local administrations, and actors that enjoyed the common use of the sea for fishing, sailing, kayaking, walking, photography, nature conservation, and tourism purposes (e.g. Bantry Bay).

In a nutshell, the research indicates that not only one specific group of people, but rather a diverse set of actors and organizations have come into conflict with marine finfish aquaculture activities in the past. Moreover, coalitions of actors imply that in

some cases, they strongly react to existing fish farms or to their expansion. The next subsection elaborates actors' arguments and their link to aspects of environmental justice.

3.4.3 Arguments

Considering the diversity of cases and contexts, there is not a single argument around which opponents mobilize against marine finfish aquaculture. In general, a number of concerns are associated with the following extensive list of factors: nutrition load; chemical use; escapees facilitating disease transmission and genetic interaction with wild species; high amount of fish protein used for the production of carnivorous fish; negative physical impacts of infrastructure; animal welfare and species' preservation; inappropriate selection of the location of fish farms; competition over the use of space; lack of a clear and participatory decision-making procedure; the absence of transparent information; the protection of local culture, social cohesion and tradition; and equitable access to natural resources and livelihood (SAR 2014; SWAN & Coastwatch 2013; Mente *et al.* 2007; Peel & Lloyd 2008) (I1, I9, I11, I13, I18).

My analysis of various actors' arguments showed that diverse aspects of environmental justice considerations arise in different conflict cases. The demand for distributive justice is the most commonly observed among opposing actors' arguments (in 19 out of 24 cases). However, all of the four dimensions of environmental justice emerge to a certain extent in different conflicts, as I explain below with examples.

3.4.3.1 Distribution

Demands for distributive justice usually underline the need for an equitable distribution of environmental risks, burdens and benefits among different groups of society. In my study, this argument emerged in various forms linked to the uneven allocation of resources in terms of access to fish and marine space, and distribution of risks, burdens and benefits of fish farms. Demands include the restoration of marine

environment, contribution to local economy and social development, and compensation for environmental damage or for income loss.

In cases where small-scale fishers are important actors, the demand for distributive justice was present. For instance, in Inousses Island, Greece, fishers and local people expect a greater contribution from fish farms to local development since, according to them, the amount paid by the company to the municipality for the use of the marine area is very low, and the export-oriented production does not benefit local people (I12). The same complaint exists in some cases in Norway, where NGOs and researchers claim that local municipalities collect a very small amount of tax from fish farms, leading to an unjust distribution of benefits (I15, I19).

Another common concern is that the aquaculture producers do not compensate the fishers for the negative external costs imposed on them (Liu *et al.* 2011). NGOs in Norway, for instance, mention that especially in the beginning of 1990s there was a drastic sea lice problem, because of which all angling and professional netting activities of wild salmon had to be stopped in Hardanger region (I15, I19). This put an uneven social and economic burden on fishers, recreational users and local people, while it did not affect fish farmers at the same amount. Consequently, many actors began to call for distributive justice in terms of compensation for the environmental damage the fish farms had done. After the pressure of angler societies, river owners and environmental organizations, Mattilsynet (The Norwegian Food Safety Authority) forced the sector to take measures in order to recover the damaged fish stocks by realizing sea lice treatment in the existing fish farms. However, compensation was insufficient, and was not distributed among all actors, but mainly paid to river owners (I15).

The distributive justice aspect covers several NGOs' and local people's claims about the unequal distribution of risks as well (Friends of the Irish Environment 2014; GAAIA 2014). Opposing groups, especially in salmon producing regions (see Norway, Scotland, UK and Ireland), use arguments about negative health effects of eating farmed salmon due to the poor quality feed, and the intensive use of chemicals and

antibiotics that are transmitted into human body by eating farmed salmon (Green Warriors of Norway 2011) (I15, I20, I27).

A shared argument in most cases is that distributive concerns and associated conflicts have been accelerated in Europe by structural changes in finfish aquaculture industry. The increase in the scale of farms, export-oriented production, and the concentration of ownership are facts that exacerbate distributive conflicts because they are perceived to be linked to a significant decrease of the sector's contribution to local economies and connection to local communities (Tiller *et al.* 2012). This has been argued in different types of conflicts detected in South Evoikos Gulf in Greece, Charentais Sounds in France, Ireland, Scotland and Norway (Gouletquer & Le Moine 2002; Mente *et al.* 2007) (I13, I26, I19).

3.4.3.2 Recognition and participation

The recognition aspect refers to whether some groups of society are considered to be relevant actors for decisions on the development of fish farms. The exclusion of some actors from decision-making or counting their opinion as inferior or irrelevant leads to injustices. The participation dimension of environmental justice is closely related to recognition, since lack of recognition directly leads to injustice in participation. However, although some groups are recognized as actors, decision-making system may be established in a way that precludes some groups' participation, which depends on at what level and by whom the decision is made.

In the conflicts detected in Finland, Scotland, Greece and Spain, actors explicitly highlight their demands for recognition and participation. In Finland, summerhouse residents have been complaining about not being included in the stakeholder consultation process, while in Scotland, local fishers, the tourism sector and local population felt that their opinions were ignored (Varjopuro *et al.* 2000; Phyne 1997; Friends of Loch Etive 2014) (I26, I27). In Greece and Spain, local people and fishers claimed that local needs were not considered during decision-making, and injustices occurred through the absence of their recognition and participation (I12, I24).

Socio-environmental conflicts related to marine finfish aquaculture in Europe occur between different levels and bodies of public administration as well. Conflicts between public authorities, concerns on where the decision is made, and overruling of local decisions are perceived injustices related to participation, i.e. procedural injustice, as encountered in Greece, Ireland and Norway. In Greece, the local municipality of Lagkada came into conflict with the higher municipal authority of Chios, to which Lagkada belongs administratively (I12). The Lagkada municipality and the inhabitants it represents feel that they were isolated, and that local public administration's view was not taken into account by the Chios municipality, although there has been a great opposition since 2000s against fish farms mainly because of environmental degradation. This implies that the local public authority is not recognized as a real decision-making body, and hence the available means of participation at the local level remain inadequate.

The marine finfish aquaculture projects in Galway Bay, Ireland, led to a quite visible conflict involving protests, marches and petitions. The Irish Sea Fisheries Board (BIM)—a public institution—applied itself to construct Europe's biggest salmon farm in Galway Bay in order to lease it out to other operators. NGOs argue that if instead of a government body, a private firm had applied for such a farm, it would never be able to receive the license for such massive production (GBPG 2014) (I13). Hence, their claim indicates that direct involvement of public authorities for the implementation of fish farms risks weakening the procedural rights of other stakeholders and generates a debate on participative justice.

The Alta case, Norway, illustrates conflicts between different public administrations as well. The owner of one fish farm already possessed several farms, but still desired to double his production in these locations. Local politicians were against this intensification and rejected the proposal. Following that, the owner appealed to regional politicians, who also opposed the intensification. Afterwards, the fish farmer applied to the directorate of fisheries, which overruled the local and regional political authorities and granted him the necessary permission. The NGO representative

commented (I18): “when we put this in correlation with other cases, we see the difficulty to stop the fish farms' expansion to new locations, and the impossibility to stop growth in already existing ones, as democracy has no way of stopping [them].” His comments clearly hint at the participatory and procedural problems and the lack of a clear, democratic and inclusive decision-making mechanism in which all actors' opinions would count.

3.4.3.3 Capabilities

The environmental injustices related to capabilities occur in various ways. In the analyzed cases where especially small-scale fishers are active actors, there are concerns regarding social functioning, that is, the capabilities of fishing communities as they become threatened with the gradual loss of their socioeconomic activity, culture and livelihood and sometimes with displacement. Elaborating on the case of South Evoikos Gulf, Mente *et al.* (2007) develop the argument that the aquaculture sector has expanded at the expense of other social and economic activities, negatively affecting the community structure. In this case, local people and fishers claim a disruption of their activity and disturbance of their environment, which places greater costs on them while decreasing their capabilities and their coherent individual and collective functioning.

The capabilities approach is related to the extent to which actors are indeed able to influence decisions as well. In the case of information asymmetries, different levels of power are embedded in social and economic relations, and privileged people likely have a greater access to the means of influencing the final decision. Usually, socially and economically powerful organizations with greater experience and knowledge and “better informed, better educated citizens with good contacts and the time and money to devote to political involvement will dominate the process” (Tiller *et al.* 2012, p.1092). In Greece, for example, environmental NGOs and fishers argue that aquaculture is supported by politically powerful individuals, who are prioritizing economic benefits at the expense of social coherence and environment. However, local people do not possess the means to influence the process, i.e. they are not

capable of affecting the final decision (I11).

Related to previous concerns, 'silencing' arguments are present in some conflictive cases in Ireland, Cyprus and Norway. In Galway Bay, the public body applying for the license of a fish farm was meanwhile responsible for issuing fishing licenses. Thus, NGOs claim that fishers are not capable of showing their opposition since they are afraid that they could lose their licenses or would not be able to renew them if they come into conflict with the public authority (I13). In Liopetri, Cyprus, the interviewee reported that local newspaper's coverage of related news and support for opposition sharply stopped when it was sold to the fish farm owner (I9). In Limassol, Cyprus, the aquaculture company opened a court case against the NGO representative since he publicly declared negative consequences of fish farm's operation. The company lost the court case in the end, and the NGO representative was found innocent, but the company's attempt remained as an attempt (and pressure) to silence voices. Moreover, in Floro, a local fish farm operator applied for permission for a new location. In this case, local authorities were against opening up another area. The owner of the fish farm then threatened the local fish slaughter company with stopping the delivery of farmed salmon, which was reported by the local newspaper as involving a possible layoff of 100 employees. Local authorities thus felt obliged to grant the permission, although they were initially opposed (I18).

These cases demonstrate that owners of marine finfish aquaculture facilities are in some cases able to impose their own will, and both the stakeholders and their official local representatives may become unable to implement their decisions. People's discontent in these cases is related to the disruption of capabilities and participation aspects of environmental justice in two ways. First, they are silenced whenever they are not able to express their position democratically and have a social and political stance on the debate. Secondly, their participation does not become real even if they have been recognized as participants in decision-making—whenever their official representatives cannot implement their decisions.

To sum up, the results indicate that the conflicts are not restricted to a few local

opposing actor groups that are against marine finfish aquaculture developments, but rather they include numerous stakeholders with varying perceptions and concerns. Furthermore, the demands are not solely based on ecological aspects, instead they are strongly linked to environmental justice dimensions which are politically relevant and might have significant policy implications.

3.5 Discussion

Higher stakes and increasing interest in the marine finfish aquaculture sector combined with recent European policies aimed at its growth imply a need for detailed socioeconomic, ecological and political analyses. In this context, shedding light on a considerable number of socio-environmental conflicts in Europe is of great importance, as well as focusing on their policy implications when new legislation and strategic plans are under development. In this chapter, I illustrated that marine finfish aquaculture sector in Europe—just like its counterparts throughout the world—does not operate conflict-free, and unearthed the actors and their arguments. This will also help to derive lessons for new policies and their coherent application.

The results first illustrated that numerous conflicts related to marine finfish aquaculture exist in Europe. Interestingly, most of these conflicts were not identified in the literature, and they could only be detected by carrying out interviews with the actors involved. While covering the biggest database of peer-reviewed articles enabled me to detect 12 conflicts, 27 in-depth interviews with key actors pointed to 12 additional cases. This shows that the relevance of aquaculture conflicts in Europe remains under addressed in the peer-reviewed literature.

Secondly, the arguments employed in these conflicts demonstrated that conflicts are not a result of pure conservationist concerns, neither of purely local selfish complaints; rather, they are strongly related to environmental justice claims. Yet, some sector and public administration representatives usually consider these

debates and opposition as NIMBY attitudes. This perspective labels local movements as NIMBY reactions and blame them for intending to block fish farm projects. However, in this chapter, I instead assert that this approach underrates local movements and ignores the significance of these conflicts with respect to their social and political relevance and potential to include constructive and transformative proposals.

Indeed, opposition movements that I spotted often demand the use of best available techniques and practices such as the establishment of closed containers instead of open cages; sustainable sourcing of feed; labeling and monitoring systems; and an even, transparent and participatory governance (SAR 2014; Liu *et al.* 2011; Peel & Lloyd 2008). Moreover, environmental justice arguments are used to call for a just distribution of burdens, benefits and risks generated by marine finfish aquaculture activities; for recognition of relevant stakeholders; for adequate access to information and tools to effectively participate and influence decision-making processes; and for an enhancement of the capabilities and social functioning of individuals and communities.

In fact, many debates on fish farms in Europe are related to how decisions are made. In this chapter, I underline the existence of a variety of actors and point to the importance of a wide participation among all stakeholders—those who can affect or are affected by marine aquaculture activities. In some cases, the results showed that several stakeholders were ignored at the initial step of aquaculture planning which directly hindered participation. The lesson to be derived is that regional or national interest should never ignore the local level of decision-making—and instead directly jump to higher levels—since this is the level at which the projects will actually be implemented. These facts point to the need for designing and enabling inclusive participatory decision-making procedures that ensure: (i) timely and public provision of transparent, clear and adequate information so that each stakeholder can properly evaluate different development options, (ii) allocation of public funds for public research and for supporting best practices directed to environmentally and

socially desirable outcomes serving collective needs, and (iii) prioritization of local needs and concerns.

All of the above transformative arguments are of paramount importance for forthcoming aquaculture policies as in some cases decision-making authorities tend towards eliminating any obstacle to aquaculture unless there are strong conflicts (Mente *et al.* 2007). In line with this, the efforts to decrease the administrative burden of the sector have to be carefully analyzed. There are two issues related to this objective that shall be distinguished from each other. First, in many countries, several actors complain about the complex and unclear character of application and decision-making structure. In many cases, it is not clear where to apply for a new farm or for complaints about its impacts, neither which public body has what authority. Its clarification and simplification would be beneficial for each stakeholder in order to improve the discussion and participation. Secondly, there is the issue of long application periods necessary to obtain a license in Europe. These long periods can be a result of the former, i.e. they may be due to the complex set of bureaucratic requirements, which do not function properly. However, in many cases, it can also be a result of the need for public consultation, which is crucial to ensure participation and inclusion of several concerns, best practices and social acceptance.

Finally, the present study remarks that there are already notable conflicts with a potential to become even stronger, unless the policies encouraging the expansion of marine finfish aquaculture cover all social and environmental aspects. As a consequence, while avoiding the emergence of conflicts—through well-designed public policies—may not be seen as a priority for the European finfish aquaculture industry in the context of stagnation (Whitmarsh & Wattage 2006), it may become a very relevant issue also for the sector for the aim of ensuring its sustainable development. Therefore, early warnings made by these conflicts should be seriously taken into account in order to prevent the expansion and spread of conflicts and to derive lessons for developing appropriate policies.

3.6 Conclusion

In this study, I aimed to contribute to debates related to European aquaculture development as well as to environmental justice literature by analyzing existing finfish aquaculture conflicts in Europe and by linking them to the policy level. I underline that while establishing new strategies for European aquaculture, the focus should not be solely on economic growth, but rather on ecologically, socially, and economically sustainable and just development of marine aquaculture. Integration of economic, social, and ecological concerns into national and regional aquaculture strategy plans proves to be potentially challenging but necessary in order to ensure social acceptance of fish farms and to control the impacts of new and already existing ones. I conclude the chapter by emphasizing the political significance of marine finfish aquaculture conflicts in Europe and the lessons to be learned in terms of their policy implications. An effective participatory decision-making mechanism should be designed that takes the views and perceptions of all relevant actors into account in order to determine whether or not to construct fish farms; and if yes, where to build them and how many. Best practices safeguarding environmental justice such as the establishment of inclusive decision-making mechanisms, ensuring access to transparent information and an equitable social distribution of burdens, benefits and risks resulting from aquaculture activities should be further investigated and incorporated into future policies.

4 Expansion of Marine Finfish Aquaculture in Turkey: The Next-to-last Commodity Frontier?

4.1 Introduction

Seafood is an important source of protein, the global demand for which has risen remarkably in recent decades (FAO 2016). Parallel to rising demand, especially since the 1950s onwards, industrial fishing expanded step by step—horizontally, from coastal waters to open seas; vertically, from shallow-waters to deep-seas; and taxonomically, from bigger species to smaller ones; in other words, by ‘fishing down marine food webs’ at lower trophic levels (Pauly *et al.* 1998). More recently, however, due to the ecological limits capture fisheries face, a further expansion has taken place in the form of marine intensive aquaculture production, which leads to new ways of producing seafood in encircled spaces in marine areas (Longo *et al.* 2015; Saguin 2016).

As a result of the increase in global seafood consumption and the stagnation in catches especially due to overfishing, aquaculture has gained increasingly more attention and become one of the fastest growing food-production industries. In the last three decades, the volume of global aquaculture production increased dramatically, at an annual average rate of 8.6% (FAO 2014), and compared to capture fisheries, its share in global seafood production has been rapidly rising. Currently, almost half of the fish supply for human consumption is provided by aquaculture (FAO 2016). This trend transforms the practices of seafood production from capture to farming, while opening new frontiers for capital, with new types of investments.

Traditional studies on aquaculture usually represent it as a solution to declining fisheries, defining it as “rearing or cultivation of aquatic organisms *beyond the natural capacity* of the environment [emphasis added]” (EC 2012, p.7) and emphasizing its biological, technical, or economic dimensions (Coull 1993; Lee *et al.* 2003; Irz &

McKenzie 2008; Nielsen 2012). In contrast, critical research on the political economy and political ecology of aquaculture is relatively scarce (for some examples see Clausen & Clark 2005; Mansfield 2011; Longo & Clark 2012; Saguin 2016). Moreover, while most studies focus on Asia or Latin America in terms of geography and on salmon and shrimp in terms of farmed species (Vandergeest *et al.* 1999; Cruz-Torres 2000; Hall 2003; Barton & Floysand 2010; Bustos-Gallardo 2013), research on Mediterranean aquaculture and species is rather limited (for recent studies see Mente *et al.* 2007; Perdikaris & Paschos 2011; Longo & Clark 2012; Hadjimichael *et al.* 2014). Following Moore's 'capitalism as a world-ecology' approach (2015, p.3), in this chapter, I argue that examining newly opened marine frontiers and the spatial and taxonomic expansion of the seafood industry in different geographies is crucial to thoroughly understand how aquaculture transforms spaces and production relations, since "capital not only occupies but also produces, space" (Lefebvre 1991 in Moore 2015:10).

In particular, I draw on Moore's framework on the expansion of commodity frontiers (2000, 2010a, 2010b), which is often used in relation to the geographical expansion of land-based extractive industries that exploit natural resources and raw materials, such as oil and minerals, in host places far from where manufacturing and selling takes place (Martinez-Alier *et al.* 2010; Orta-Martínez & Finer 2010; Conde & Kallis 2012; Silva-Macher & Farrell 2014). Here, I aim to expand this body of literature by examining the expansion of *marine* commodity frontiers and the resulting social and ecological relations of production (Campling 2012; Veuthey & Gerber 2012; Saguin 2016) that remain under-investigated.

Research on marine commodity frontiers has explored their expansion in industrial fisheries (Campling 2012) and argued that aquaculture offers a new frontier for capture fisheries (Saguin 2016). As experienced in the historical expansion of industrial capture fisheries that sought new commodity frontiers (Campling 2012), 'commodity widening' and 'commodity deepening' strategies—that steadily shift places of production toward ecologically less exploited areas and use advanced

technology to intensify production and increase profits—have enabled a similar expansion in intensive marine aquaculture production (Saguin 2016). Building on this body of literature and the conceptualization of aquaculture as a new frontier for capture fisheries, I aim to gain insight into the transformation in seafood production from capture fisheries to aquaculture by examining how commodity frontiers expand within the intensive marine aquaculture sector, based on the case of recent growth in marine finfish aquaculture in Turkey.

To address this question, I will examine the horizontal expansion of the marine finfish aquaculture sector from Europe—the largest importer of seafood products¹² (EUMOFA 2016)—to Turkey, an EU accession country at the periphery of the EU Common Fisheries Policy. The relatively late but remarkable growth in aquaculture in Turkey, which witnessed an almost quadrupling in production volume between 2000 and 2015 while marine capture fisheries experienced fluctuations and followed a downward trend (MoFAL 2016), hints both at an expansion of the sector into new areas and a shift from capture fisheries to marine aquaculture; a transformation of seafood production observed both in Turkey and worldwide. In this chapter, I analyze this transformation in Turkey and the associated export-oriented rise in farmed fish production—especially sea bass and sea bream, the most produced marine aquaculture species—and argue that the horizontal, vertical and taxonomic expansion observed in industrial capture fisheries is similarly taking place in intensive marine aquaculture through the commodity widening, commodity deepening, and what I call ‘commodity marketing’ strategies employed by aquaculture firms.

The approach I adopted in this study encompasses qualitative methods based on semi-structured in-depth interviews with key social actors in Turkey, as well as a review of sector and state reports, and the relevant legislations in Turkey and the European Union. In late 2015 and 2016, I conducted 22 interviews with 30 actors in

¹² The data is given in terms of value.

Ankara, the capital and home to the various Ministries; Istanbul, Turkey's biggest metropolis with important trade connections; and Mugla and Izmir, the largest production provinces for marine aquaculture (Appendix 4.1). Interviewees included representatives from the General Directorate of Fisheries and Aquaculture attached to the Ministry of Food, Agriculture and Livestock; the Ministry of Environment and Urbanization; small-scale and large-scale aquaculture producers; aquaculture producer organizations in Ankara, Izmir, and Mugla; fish feed producers; consultants in the aquaculture sector; scientists and academics working on issues related to seafood production; marine biologists; non-governmental organizations and civil society organizations; environmental litigation lawyers; small-scale and industrial fishing cooperatives; and industrial fishers. I transcribed the interviews and coded through open-coding methods, then analyzed by identifying and categorizing main points associated with the expansion of marine finfish aquaculture in Turkey, with a focus on its drivers and resulting social and ecological relations of production. Together with the data gathered from secondary sources, the interviews made it possible to uncover how marine intensive aquaculture expanded in Turkey.

The chapter is structured as follows: I explain the theoretical framework related to the expansion of (marine) commodity frontiers—on which this study is built—in the next section. In the section 4.3, I describe the growth in (intensive) marine finfish aquaculture in Turkey, focusing on the last 15 years, and illustrate why this constitutes a recently opened commodity frontier. In the sections 4.4 and 4.5, I analyze and discuss the spatial expansion and intensification of aquaculture commodity frontiers in Turkey through 'commodity widening' and 'commodity deepening' strategies of aquaculture firms, respectively. In the section 4.6, I examine what I call the 'commodity marketing' strategies of capital that aim to ensure the demand side of intensified production; and in the concluding section 4.7, I discuss the maturing conditions of aquaculture commodity frontiers in Turkey by elaborating on their implications for marine commodity frontiers.

4.2 Theorizing Marine Commodity Frontiers

Industrial production and its expansion rely heavily on the accelerating use of raw materials and energy, among other factors. Industrialized economies seek new and high quality natural resources that can be extracted and processed cheaply, easily and safely in return for higher profits (Bunker 1996, Krausmann *et al.* 2008). One way to explore the interaction between the world economy and local ecosystems, or “the interrelationships between production in one place, and the expansion of capitalist space in general” is provided by Moore (2000, p.411), who elaborates on the concept of ‘commodity frontiers’ by framing capitalism as a ‘world-ecology’ where nature and labor are simultaneously appropriated and exploited to produce commodities for exchange (Moore 2010a, 2015). Building on this theoretical framework, he studies the expansion of commodity frontiers—a term usually associated with the geographical expansion of the extractive industry that removes natural resources and raw materials from the earth, such as oil and minerals—by focusing on the production side of these frontiers from a world-historical perspective (Moore 2000; Orta-Martínez & Finer 2010; Conde & Kallis 2012; Silva-Macher & Farrell 2014; Andreucci & Kallis 2017). Commodity frontiers are expanding mainly in order to meet the rising material and energy demands of industrialized economies resulting from their increased social metabolism, and to broaden the scale and scope of the commodification of natural resources (Moore 2000; Conde & Walter 2014).

The expansion of commodity frontiers helps the operations and capital accumulation of extractive industries in three ways. First, when the quality and/or quantity of a natural resource is decreasing, it enables them to replace the extracted resource with a better quality and/or more abundant resource from another region in return for higher profits (Moore 2010a). Second, it allows them to relocate to new geographies, nationally or internationally, whenever socio-ecological conflicts arise due to environmental degradation caused by the extraction activity (Martinez-Alier *et al.* 2010; Conde & Walter 2014). Third, it gives them the possibility of moving their activities to places where profit margins are higher and production is cheaper or

safer—in terms of exploitation of labor, appropriation of nature or socio-political power exercised in the new area (Hilson & Yakovleva 2007). Overall, with the expansion of commodity frontiers, raw materials are extracted in places far away from where they are processed, marketed and ultimately consumed.

Meanwhile, the relationship between labor and capital in production processes has been changing as well; production for sustenance has gradually been replaced by the production of commodities for exchange. Consequently, exploring different commodity frontiers is essential in order to “track not only capitalist expansion but also the unevenness of that expansion” (Moore 2000, p.411), and this requires uncovering the strategies of capital accumulation. According to Moore, the expansion of commodity frontiers offers two such strategies (2010b). The first, called ‘commodity widening’, refers to relocating the extraction to new geographies whenever the raw materials exploited in a region begins to diminish in terms of quantity or quality; this opens new areas to extraction and leads to the greater commodification of natural resources. The second is termed ‘commodity deepening’ and describes increased extraction and intensified production at a given site through socio-technical innovations, as observed in going deeper for mineral extraction or the industrialization of agriculture (Moore 2010b; Knapp 2016).

Here, I will add the analysis of a third strategy that I call ‘commodity marketing’, which enables further capital accumulation by expanding products to new markets while maintaining current position in existing ones. This strategy aims to ensure demand is created for intensified production, and markets are secured for *commodities* produced for exchange. To examine this strategy, I will still follow the commodity frontiers approach, which focuses on primary production as opposed to commodity chain analysis that focuses on the final product. However, because all of these three strategies work together to generate horizontal, vertical and taxonomic expansions, I will also look into the ‘commodity marketing’ strategies of these firms, which seek and secure markets to exchange the commodities produced by their increased and intensified production. Thus, by looking at capitalism ‘as an ecological

regime that reproduces itself through new commodity frontiers' (Campling 2012, p.255), I will examine both the supply and the demand ends of commodity production for exchange in an interlinked manner.

Although the expansion of commodity frontiers and the subsequent commodification of marine spaces occurred relatively later, they occurred at a rapid and intense rate, resulting in complex and interrelated agrarian changes that can only be understood through meticulous political, economic and ecological analyses. Capture fisheries are a noteworthy example of the expansion of commodity frontiers based on the extraction of living resources. Especially from the 1950s onwards, expansion intensified horizontally, vertically (or bathymetrically) and taxonomically (Pauly *et al.* 1998; Longo *et al.* 2015) as a result of the commodity widening (such as the French and Spanish tuna fleets moving to the Eastern Tropical Atlantic and subsequently to the Western Indian Ocean) and commodity deepening (including greater vessel capacity and using technology such as sonars, satellite imaging and bird radars) strategies fishing companies employed, which enabled them to boost their catch and their profits (Campling 2012). Through these strategies, the fishing fleets of different countries moved from exploited or overexploited marine areas to new seas that offered a higher 'ecological surplus', or increased their catch rate with advanced technologies in 'mature frontier conditions' where ecological surplus was shrinking and stocks were dwindling (*ibid.*). This is how new marine areas and resources became commodified through capture fisheries (Clausen & Clark 2005; Longo & Clausen 2011; Campling 2012; Longo & Clark 2012).

Expansion on the basis of these strategies resulted in the global overexploitation of marine resources and the collapse of important fish stocks in some regions (see Bavington 2009, for the depletion of the Newfoundland cod fisheries; Radovich 1982, for the collapse of California's once abundant sardine stock). Fish has long been considered a renewable and 'inexhaustible' resource; a view prevalent especially until the late nineteenth century and still echoed by some in the fishing industry today (Pauly *et al.* 2003; Bavington 2009). Yet recent studies show that industrial

fishing intensified so much in the second half of the twentieth century that ‘peak fish’—the maximum amount of fish that can be captured, followed by continuous, fluctuating decline—was already reached in late 1980s (Watson & Pauly 2001; Pauly & Zeller 2014). This level of intense exploitation not only threatens the sustainability of fish stocks and the marine ecosystem but also hits fishing companies, since the declining catch rate puts a severe limit on further capital accumulation. Following the expansion strategies of capital in capture fisheries, a relatively recent development in marine spaces has been the emergence of intensive marine aquaculture production (Veuthey & Gerber 2012; Longo *et al.* 2015), in which aquaculture “provides a spatial and sectoral frontier to industrial capture fisheries by enrolling new places, practices and environments in fish production” (Saguin 2016, p.18).

Unlike fisheries, which were once common resources, aquaculture requires enclosing marine spaces and allocating them to private property, where production process can be better controlled. As a rapidly-growing food production sector, it employs technological advances to compensate for the rising costs of finding, extracting and transporting a resource that is declining in quantity and/or quality—in terms of size or marine trophic level—in other words, it has become a “technological treadmill in natural resource industries” (Bridge 2009, p.1229). As such, it is a new commodity frontier in marine areas, the development and expansion of which was achieved mainly through commodity deepening strategies, advanced technology and intensified production (Saguin 2016). It represents a new type of investment in the same marine space—and new opportunities for capital accumulation—instead of having to head further offshore or go to other countries’ seas in order to catch more fish. In short, it involves not the geographical expansion of a commodity frontier but rather a spatial transformation in seafood production, achieved by enclosing marine areas.

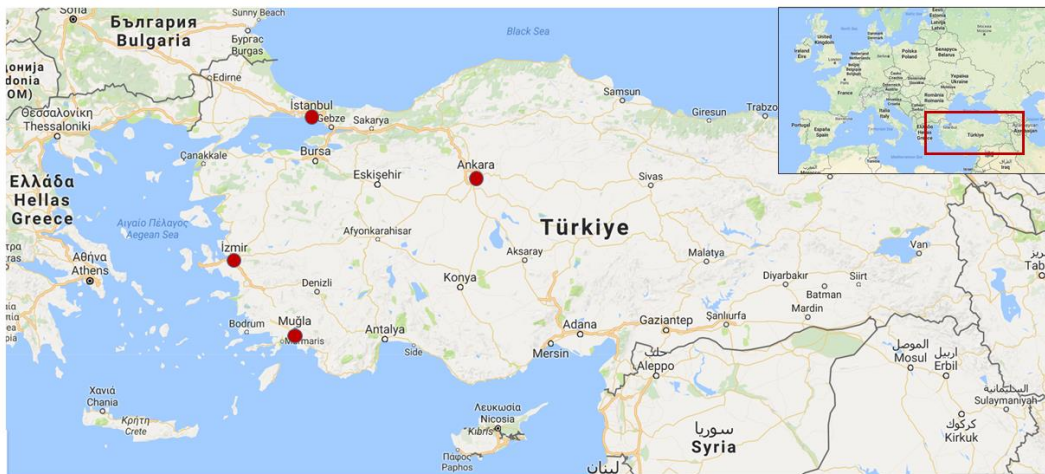
Building on Saguin’s conceptualization of aquaculture as a new frontier for capture fisheries, I will examine the recent growth in marine finfish aquaculture in Turkey to uncover its three-pronged—horizontal, vertical and taxonomic—expansion, and how

this became possible through the commodity widening, commodity deepening, and commodity marketing strategies employed by aquaculture firms. In line with my analysis, I argue that intensive aquaculture is not the final marine commodity frontier; rather, expansion continues within the aquaculture industry, in close relationship to capture fisheries, by transforming the practices and spaces of seafood production. In this way, I aim to contribute to existing research on the expansion of fishing-related human activities in marine areas, and the literature on commodity frontiers; thus, to the broader literature on the political economy and ecology of the transformation of marine spaces.

4.3 Aquaculture Commodity Frontiers in Turkey

Intensive aquaculture is a 'young sector' in Turkey compared to agriculture and livestock husbandry (FAO 2011, p.9). Moreover, Turkey is a latecomer compared to other European Mediterranean countries such as Greece, Italy and Spain (FEAP 2016); in other words, a relatively new frontier in marine finfish aquaculture production, the main farmed marine species being gilthead sea bream (*Sparus aurata*) and European sea bass (*Dicentrarchus labrax*)¹³ produced from 1985 onwards. While production levels were initially quite low in the late 1980s, the sector began to witness growth in the 1990s, although Turkey's total production volume was still very limited compared to its competitors.

¹³ Approximately 95 per cent of the farmed sea bass and sea bream comes from the Aegean Region, especially from the provinces of Izmir and Mugla, where the fieldwork for this study was conducted (FAO 2011). See Map 1 for production sites.



Map 1. Fieldwork sites in Turkey

During the next decade, and especially after the 2001 economic crisis, the sector grew remarkably, reaching 32% annual growth in production of marine species between 2002 and 2015 (MoFAL 2016). This corresponded to a 424% and 344% volume increase in sea bass and sea bream production, respectively (MoFAL 2017). Thus, in the 2000s, aquaculture became “one of the fastest growing industries¹⁴ in Turkey” (FAO 2011, p.2), and despite its latecomer status, the growth rate in marine aquaculture in Turkey skyrocketed over the past 15 years, even surpassing global growth rates—around 7.2% between 1995-2004 and 5.8% between 2005-2014 (FAO 2011).

It is important to note that around 75% of the European sea bass and gilthead sea bream farmed in Turkey is exported to European Union countries (FAO 2011). In 2012, Turkey ranked first in sea bass and second in sea bream production in Europe, occupying 25% of the European sea bass and sea bream market (Deniz 2013). Currently, it is the largest producer of farmed sea bass and sea bream among all

¹⁴ This report refers to the growth in production volume.

European Mediterranean countries—the others being Greece, Spain, Italy, Croatia, Portugal, Cyprus and France. Although Turkey’s aquaculture sector was not an ambitious rival of its European counterpart in the 1990s, its rapid growth in the last 15 years (especially after the economic crisis in Greece) made it the main exporter of sea bass and sea bream to Europe (FEAP 2016).

Meanwhile, Turkey represents an important case of the transformation in seafood production, where the contribution of intensive marine aquaculture to total seafood production volume (together with capture fisheries) increased from around 6% in 2000 to 20.6% in 2015¹⁵, while the total amount obtained from marine capture fisheries declined from around 460,000 tons in 2000 (about 79% of total production) to around 266,000 tons in 2014 (about 49.5% of total production)—although there was a recent jump to some 396,000 tons in 2015 (around 59% of total production).

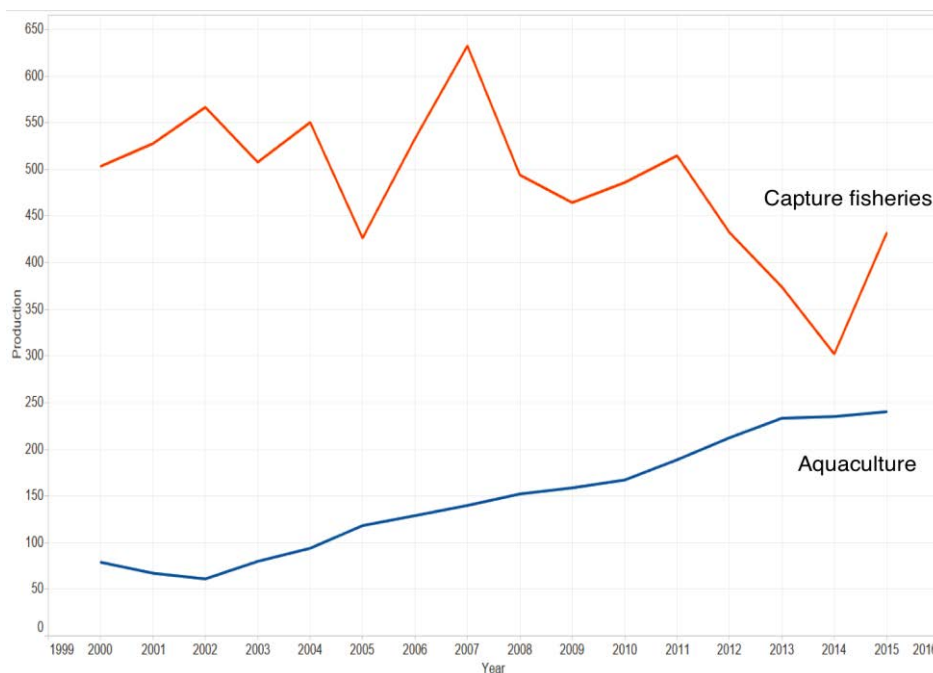


Figure 4.2. Annual seafood production volumes from capture fisheries and aquaculture in tons between 2000-2015 in Turkey (Source: Own adaptation based on the data from the Ministry of Food, Agriculture, and Livestock Statistics 2016)

¹⁵ Marine aquaculture production levels in Turkey rose from around 36,000 tons in 2000 (with lower production levels in 2001 and 2002 due to the economic crisis) to about 139,000 tons in 2015. (Seafood production levels between 2000-2015 can be seen in Figure 4.2.).

The declining share of capture fisheries in total seafood production is not only related to the growth of aquaculture in Turkey, but also to reduced catch and a tendency to overfish. Although some years it was possible to compensate for the reduced catch by intensifying fishing efforts, most years, the fishing fleet was able to boost catch rate only by targeting smaller pelagic species because the stocks of top predators had already collapsed (Goulding *et al.* 2014). To understand this shift and the agrarian change in marine areas in a broader sense, the relationship between marine fish farms and capture fisheries, and the rising share of aquaculture production have to be taken into account.

In the next three sections, I will examine this transformation by looking at how commodity frontiers expand in the marine finfish aquaculture sector, using the illustrative case of the sector's recent growth in Turkey. To this end, I will focus on the expansion and capital accumulation strategies—commodity widening, commodity deepening and commodity marketing—aquaculture firms in Turkey employ, sometimes simultaneously.

4.4 Commodity Widening and Spatial Expansion

In line with the horizontal, vertical and taxonomic expansion witnessed in industrial fisheries in newly opened commodity frontiers, I will begin by examining how the commodity widening strategies in intensive aquaculture first enable a horizontal expansion, where the appropriation of marine resources moves to new, relatively unexploited geographies (Saguin 2016).

Following the rapid development of marine finfish aquaculture in various European Mediterranean countries such as Greece, Italy and Spain in the 1980s and 1990s (FEAP 2016), Turkey—a country on the periphery of the European Common Fisheries Policy— appeared on the scene in the 2000s as an important regional

aquaculture producer. Most European countries on the Mediterranean, where sea bass and sea bream fish farms had spread prior to Turkey, were already facing conflicts related to the various uses of marine spaces (Hadjimichael *et al.* 2014; Ertör & Ortega-Cerdà 2015; Perdikaris *et al.* 2016), and barriers to further growth and expansion (Hofherr *et al.* 2012; FEAP 2016). When stagnation hit Europe (STECF 2013b), the sector expanded toward marine areas in Turkey, and as a new commodity frontier, Turkey's marine finfish aquaculture sector generated high profits in the late 1990s and early 2000s (Arisoy *et al.* 2012).

Marine aquaculture was introduced to Turkey initially with the support of external experts. Regarding these early stages, Knudsen has argued that the “involvement in Turkey can be seen as part of a global process where Norwegian companies have established themselves from Chile to Tasmania as expert consultants or operate farms in joint ventures” (1995, p.5). While attempts to produce salmon in the Black Sea in collaboration with Norwegian technicians mostly failed at this stage, the production of other marine species—namely, sea bass and sea bream—followed a different trajectory, and the successful application of commodity widening strategies led to a horizontal expansion from European Mediterranean countries to Turkey.

According to my interviews, Turkey seems to have ventured into intensive aquaculture mostly due to the developments in Europe—initial significant growth followed by stagnation despite high demand—resulting in a horizontal expansion of the sector toward new hinterland geographies (Interviewees #8, #9, #13) that offered one or more of these features: ‘free gifts’ of nature (Moore 2011) including favorable seawater conditions—in terms of temperature, oxygen level, currents and waves, water circulation, and wind speed and strength—suited sea bass and sea bream production along with unexploited or less-exploited resources of higher quality; an absence of intense conflicts related to the use of marine areas; and the availability of low-cost labor that made production cheaper and more profitable. An academic from the Faculty of Fisheries and Aquaculture in Izmir (Interviewee #9) argues:

We would never have grown this much had Europe not wanted us to. The only reason the sector grew is because Europe sees us their backyard. There are various actors and stakeholders against its development; environmentalists, tourism sector representatives, ecologists all have negative perceptions of aquaculture. Other European countries like Spain are the forefront of aquaculture production. They prefer to sell us technology and get the products cheaply. Our state allows this growth and development only because this is what Europe wants. They let it happen and support Turkey in doing the dirty work. Otherwise we would have never come this far and reached 235,000 tons of production.

Another interviewee (Interviewee #8) who represents both the academia and the aquaculture sector further claims: “Of course they [Europe] want us to grow; our production is cheaper and we sell at cheap prices. Why would they pollute their seas when they can buy farmed fish at such cheap prices from us? It’s also more costly for them to produce the fish.”

Indeed, relationships with Europe and the market capacity especially of Western Europe have played a decisive role in the expansion of the aquaculture sector, for 75 to 80% of the sea bass and sea bream currently farmed in Turkey is sold to European markets; mostly Italy, France, Spain and Germany (FAO 2011). The rapid growth of export-oriented production—rather than for local consumption—was made possible by appropriating nature and exploiting relatively cheap labor simultaneously—in other words, by taking advantage of both suitable seawater conditions, and lower wages for unskilled and high qualified workers alike (ibid.). A representative from the Izmir Aquaculture Farmers’ and Producers’ Organization (Interviewee #13) agreed that European actors and markets had a significant impact on the sector’s development in Turkey, and added that this is usually what happens in any kind of agricultural production. Hence, the introduction of marine finfish aquaculture in Turkey and its subsequent intensification illustrates a case of commodity widening, enabling the horizontal expansion of commodity frontiers to new marine areas.

The horizontal expansion of commodity frontiers through commodity widening strategies is not only limited to expansion between different countries; the zones allocated to developing marine aquaculture can also change and expand within the

same country. For instance, from 1985 onwards, the sea bass and sea bream farms in Turkey were situated near the coastline, in sheltered bays of the Aegean and the Mediterranean. They usually consisted of cubic wooden cages floating in the water, measuring 5 meters in each dimension (FAO 2011). These small cages were traditionally placed very close to the coast, “at distances that one could swim” (Interviewee #9). In contrast, by the late 2000s, most of these smaller cages were replaced by larger ones and placed further off the coast (Yucel-Gier *et al.* 2009; Arisoy *et al.* 2012). Through this horizontal expansion, new marine spaces were enclosed for larger fish farms with greater investment capacity.

There are various drivers that help explain the spatial expansion of marine finfish aquaculture in Turkey: First, aquaculture companies—especially the more economically powerful ones—aimed to simultaneously achieve economies of scale and produce greater quantities of fish, which could only be realized by placing bigger cages further off the shore and at greater depths, resulting in spatial expansion that was both horizontal and vertical. According to a representative from one of the biggest sea bass and sea bream producers in Turkey (Interviewee #19), their company predicted this necessity much earlier than the rest of the sector and moved most of their farms farther away from the coastline in the early 2000s. This enabled them to increase production volume from 1,500 fish per farm (4x4x4 meter wooden cages) in the 1990s to 1 million fish per farm in circular cages with a diameter of 50 meters, corresponding to an annual production change from 400-500 kg to about 4,000 tons per year. The chairman of the holding stated that as a result, the company grew 1,600-fold in 25 years¹⁶. According to Interviewee #14, not just the surface but also the depths of the sea became a space of production with the spatial expansion of fish farms: “The resources of the world are limited, and on land, you can’t go up, so production is only possible on the surface; but in marine areas you can go down. It is difficult to produce on square meters, which is why we try to produce in cubic

¹⁶ See the interview with the chairman of the holding (2015): <http://www.theworldfolio.com/interviews/seafood-export-leader-achieves-impossible-dreams/3621/>

meters”.

Second, aquaculture firms wanted to move production to new marine areas with better quality resources (especially seawater); due either to environmental legislations or potential risks to production. Fish farms in sheltered bays—where water circulation is less compared to offshore seas—cause significant change to the physical and chemical characteristics of seawater, leading to a higher nutrient load, eutrophication, pollution, reduced oxygen concentration and modified hydrology and sedimentation (Perdikaris *et al.* 2016). To avoid negative environmental impacts of this kind, Turkey’s Environment Law¹⁷ was amended in 2007, according to which fish farms had to be more than 0.6 nautical miles (almost 1.1 kilometers) off the shore and at a depth greater than 30 meters. Even without environmental legislation, deterioration of the seawater, sedimentation, and eutrophication would have had a negative effect not only on the marine ecosystem around fish farms, but also on aquaculture production, because sea bass and sea bream cannot survive in polluted waters with low concentrations of oxygen (Ökte 2002). Therefore, from 2008 onwards, due both to the environmental legislation and the cumulative impact of fish farms, aquaculture companies had to relocate their farms to new sites with higher circulation and better water quality in order to continue to secure a high ‘ecological surplus’ from production (Moore 2010a; Campling 2012). This illustrates a case of the commodity widening strategies of capital, aimed at appropriating a higher quality resource whenever seawater quality and profits begin to shrink at a given site.

4.5 Commodity Deepening and Intensification of the Capitalist Model

The second strategy of capital that enables further expansion of marine commodity frontiers in aquaculture is commodity deepening, which is defined as strategies to

¹⁷ Amendment to Environment Law No. 2872, published in the *Official Gazette* No. 26413, January 24, 2007.

intensify production “through enhanced capitalization and socio-technical innovation” (Campling 2012, p.256). In marine areas, this manifests as bigger, mechanized and more capitalized fish farms. Aquaculture firms use technological advancements and automated production processes for feeding, gathering and packaging, which allow them to apply strategies of scale economies and mass production. In the case of Turkey, the fact that the majority of aquaculture production—about 98%—comes from intensive farming systems (FAO 2011) illustrates how intensely aquaculture firms use these strategies, which enables them to continue growing and accumulating capital while expanding commodity frontiers.

4.5.1 Growing companies, growing farms

Commodity frontiers opened by the introduction of marine finfish aquaculture in Turkey have led to further intensification through commodity deepening strategies. Producers aimed to increase production output per unit of space while decreasing costs, which would enable them to benefit more from the ecological surplus. In this context, the number of fish farms almost doubled between 2002 and 2015, while their capacity increased by 857% (MoFAL 2017, p.27). Research and innovation efforts were driven by a desire to run more mechanized and capitalized farms managed via automation and advanced technologies to achieve economies of scale. These strategies made it possible to raise more fish to market size more quickly by benefitting from technological advances and biotechnology, which was only available to “growing companies [with] growing farms” (Interviewee #18). For instance, Interviewee #18 stated that bigger and mechanized firms like theirs already achieved increased productivity, and that while they used to generate 1 unit of production from 10 units of space, they now generated 20 units of production from 100 units of space, adding that “this growth is also a vertical one”. Mechanization and automation are crucial for vertical expansion that aims to produce more fish over a given time period because whenever the diameter of fish farms exceed 20 meters, it becomes impossible to manually feed or harvest the fish (Interviewee #19).

The intensification in marine aquaculture in Turkey and associated investments could

only be undertaken by firms with substantial financial strength and business capacity (Knudsen 1995), and the direct or indirect elimination of small-scale fish farms by ‘growing companies and growing farms’. Many companies have been changing hands, and mergers, acquisitions, and new joint ventures have become common in recent years (TAGEM 2013). By the late 2000s, many smaller firms had been sold to bigger capital owners—some of which were fish feed producers—following the horizontal and vertical expansion of the commodity frontiers. Currently, “marine fish farming [in Turkey] is mostly operated by large private enterprises with local communities rarely being involved” (FAO 2011, p.6). Most interviewees who represented the aquaculture industry or state institutions confirmed that the sector began to swallow small actors who were unable to reduce costs, and added that the sector would comprise of even fewer firms in the future.

Parallel to the expansion strategies of firms, the Turkish State itself facilitated the expansion of marine commodity frontiers in aquaculture through a series of administrative and legislative changes, especially in the last decade. One such change was a 2006 directive issued by the Ministry of Agriculture, Article 5 of which states: “To ensure the efficient use of areas allocated to aquaculture, applications to invest in marine aquaculture less than 250 tons per year will be denied”¹⁸. With this directive, the state not only cleared the path for intensification, but also eliminated other alternatives on the basis of the efficiency argument. Another change was the transfer of jurisdiction over determining the areas for aquaculture production from the Ministry of Environment to the Ministry of Food, Agriculture, and Livestock (Directive No. 2006/1). The MoFAL aimed to “support sustainable sector development”, so it collaborated with FAO to determine aquaculture zoning plans (Deniz 2013; EUNETMAR 2014), while cage farms had to move away from the coast in 2007 (FAO-MARA 2008).

A third change concerned the leasing of marine areas, jurisdiction over which was

¹⁸ Directive No. 2006/1. http://www.tarim.gov.tr/Belgeler/Mevzuat/Genelgeler/2006_1genelge.pdf

transferred from provincial governments to the MoFAL from 2011 onwards. Accordingly, the task of determining leasing fees was delegated to the Provincial Directorates of the MoFAL¹⁹, and the average leasing fee for one decare of marine area fell from 1,862 TL in 2010 to 510 TL in 2011 (SUYMERBIR 2014). These changes have been important drivers of growth by shortening the duration of applications and allowing extended lease periods (EUNETMAR, 2014). In brief, regulations of the state and relevant structural and institutional transformations not only opened the way for further expansion of commodity frontiers in marine areas, but also promoted bigger fish farms by larger but fewer companies.

4.5.2 Intensifying production through vertical integration

Another significant way to decrease costs, and currently the most common commodity deepening strategy used by marine aquaculture firms in Turkey is vertical integration. By following a ‘fully vertically integrated business model’ (Deniz 2013), the biggest and more capitalized marine aquaculture firms control each step of the supply chain: They have fleets to catch their own raw materials—i.e. wild fish—, fish meal and fish oil factories, fish feed production facilities, hatcheries for breeding and raising juveniles, adaptation units, farms for rearing fish, fleets for harvesting and large sea vessels for transporting juveniles; they also manage processing, packaging, transportation, logistics and marketing all by themselves. Interviewee #18 explains this process:

If you had 100 farms, you would still have the same level of production. However, through vertical integration, you can venture into hatcheries, fish feed, logistics, transportation, export, etc. For the aquaculture firms in Turkey, the main part of production costs is fish feed. That’s why you have to produce your own fish feed and have factories that process fish meal and fish oil. We buy the raw materials for fish feed from all over the world and produce our own fish feed. Last year, we also began to make investments in other countries such as Mauritania, where we produce fish meal. We have two factories and fish fleets there, which catch fish and produce fish meal for us.

¹⁹ No. 27951 of the *Official Gazette of the Turkish Republic*, published June 1, 2011.

In other words, the transformation in seafood production is marked by an advanced level of control and ownership, where aquaculture firms maximize the profits generated from each step of the value chain. As Clausen and Clark state (2005, p.436): “...aquaculture represents not only a quantitative change in the intensification and concentration of production; it also places organisms’ life cycles under the complete control of capitalist ownership. This new industry boasts of having ownership from egg to plate and substantially alters the ecological and human dimensions of a fishery”.

The most important aspect of vertical integration—and of the vertical expansion of aquaculture commodity frontiers—is the production of fish feed, which is the main component of aquaculture firms’ costs. Globally, fish feed accounts for between 45% and 70% of the costs in the intensive production of carnivorous species such as sea bass and sea bream. In Turkey, this figure is in the highest range, between 65% and 70% (Korkut *et al.* 2015; TAGEM 2013). Although the aquaculture industry globally wants to decrease the fish oil and fish meal content of fish feed and replace them with other sources of protein—soy, wheat gluten, algae, insects, by-products, etc.—fish meal and fish oil are still seen as essential components of fish feed (EP 2009b; EEA 2016), which are costly and affordable only for bigger and capitalized firms.

4.5.3 Changing uses of capture fish

The rise of fish farming in Turkey seems to be closely linked to the need to identify new sources of fish feed and the depletion of many major marine fishery resources (Arisoy *et al.* 2012). In general, feed for carnivorous species must be composed of 60 to 80% of ingredients based on animal proteins. The feed used for sea bass and sea bream in Turkey consists of 40 to 45% fish meal, 12 to 13% fish oil, and 40 to 45% other protein sources (Tacon & Metian 2008; TAGEM 2013). Moreover, the feed conversion ratio (FCR)—the amount of feed needed for farmed fish to gain a kg of body weight—for the sea bass and sea bream produced in Turkey is on average 2.1 and 1.9, respectively (Tacon & Metian 2008). According to an industrial fisherman and fish meal producer in Turkey (Interviewee #24), “this creates its own capture

fishing economy and increases the pressure on wild fish stocks instead of decreasing it. So, it leads to a paradox between capture fisheries and intensive marine aquaculture production”.

In Turkey, this paradox manifests in the European anchovy (*Engraulis encrasicolus*) catch, which takes place in the Black Sea region. European anchovy is the most efficient and preferred species for fish feed production; compared to two other species used partly for this purpose—European sprat (*Sprattus sprattus*) and European pilchard (*Sardina pilchardus*)— it yields a remarkably higher percentage of fish meal and fish oil (Fisheries Centre Research Reports 2016). Yet it is also a prize catch in terms of human consumption, which gives rise to a dilemma that might be better understood by looking at how its use has transformed over the past decades.

Between 1950 and 1960, “90% of [European anchovy] landings [in Turkey] was destined for direct human consumption”, while the remaining 9.9% was destined for other uses (mainly fertilizers), and only 0.1% for fish meal and fish oil (FMFO) production (Fisheries Centre Research Reports 2016, p.26). In the last decades, the rate of European anchovy landings used for FMFO climbed to around 50%, reaching 56% in 2013, and the rate for direct consumption fell remarkably (ibid.). In 2013, 260,000 tons of fish were captured in the Eastern Black Sea; 156,000 tons of it went directly to fish meal and fish oil factories, and only 90,000 tons were used for human consumption (TAGEM 2013). These shares imply that the common use of the small fish has shifted from direct human consumption to FMFO production.

Another crucial matter regarding this issue is whether this transformation affects the volume especially of European anchovy landings and its stock. The head of a small-scale fishermen’s cooperative (Interviewee #20) criticizes this transformation, claiming that the only ones benefiting from this shift are fish meal factory owners. He notes:

The anchovy 'we' should eat goes to factories. They [industrial fishermen] catch hundreds of tons of anchovy in just one night, and it's not that abundant as before. If its stock collapses, we would have no fishermen left. Another issue is what we would tell citizens. People might not advocate for their right to other species such as the bonito, tuna or other bluefish; but if the anchovy disappears, even those in Diyarbakir—a city in Southeastern Turkey without a coastline—would be vocal about their rights. They can't fish the entire anchovy stock in one night and send them to factories. That would be akin to plunder... Besides, if there is no anchovy, what will you feed the fish in fish farms? If you can feed them corn, okay. But you can't use the small fish; this has no end. There is no such 'feed' in the sea.

Returning to the paradox, it becomes crucial to examine the data on the European anchovy stock in the Black Sea in order to understand whether its use for fish feed production increases its intensive extraction and leads to a risk of the stock's collapse. The most recent data on anchovy stocks and fishing efforts in Turkey point to the fact that Turkish capture fisheries have been a significant pressure on European anchovy stocks at least from the 1970s onwards (Ulman *et al.* 2013; Goulding *et al.* 2014; O'Higgins *et al.* 2014; Fisheries Centre Research Reports 2016). After the catch and stocks of high-value commercial species declined somewhat in the 1970s, industrial fisheries underwent a taxonomic expansion and turned to smaller pelagic species, as a result of which anchovy and sprat stocks also collapsed in the late 1980s and early 1990s (Goulding *et al.* 2014). Although these two stocks had gradually but cyclically recovered in 2000s, the exploited biomass could not reach its levels before 1980s (Black Sea Commission 2008). Moreover, while the maximum sustainable yield—the maximum amount of a species that can be caught to allow its reproduction and maintain healthy stocks—for European anchovy is around 200,000 tons per year, the catch rate in Turkey between 2011-2014 was on average around 302,000 tons (Goulding *et al.* 2014).

Currently, anchovy fishing capacity exceeds by 200% in the Black Sea, while Turkey's other seas have an excess capacity of $\geq 500\%$ for all species. If overcapacity persists, catch per unit effort, fish length, and stock sizes will continue to decline (Ulman *et al.* 2013). This is why, in line with the insights gained from the dynamics of overfishing in Turkey, “[as the commodity frontier of capture fisheries], aquaculture presents an opportunity to address crises in industrial overexploitation in capture fisheries by

providing new spaces for and new practices of producing fish” (Saguin 2016, p.5). Hence, instead of providing a solution to declining fish stocks, the intensive marine aquaculture of carnivorous species only solves the crisis of capital in the short-term, and its expansion ends up putting more pressure on fisheries.

Recently, the largest aquaculture firms in Turkey have entered a new phase of horizontal expansion due to the high cost of fish feed, the pressure on fish stocks, and fierce competition among fishing fleets—in other words, due to ‘mature frontier conditions’ in industrial fishing (Campling 2012). Accordingly, they not only have their own fleets, but also move to new geographies to catch raw materials. In line with vertical integration strategies, they use their catch to produce fish meal, fish oil, and fish feed in their own factories, which are then transported long distances. This means a combination of commodity deepening and commodity widening strategies are at play; and the intensification of production in aquaculture has led capital once again to look for new areas to exploit, so as to be able to benefit from a relatively higher ecological surplus from captures that will then be turned into feed for the fish in their farms.

In sum, I argue that the increasing investments by aquaculture companies reflect that the marine commodity frontier in aquaculture is already ‘maturing’ requiring firms to pursue commodity deepening strategies in order to continue to exploit a reduced ecological surplus. Thus, intensive marine aquaculture does not only provide a commodity frontier for capture fisheries (Saguin 2016), but also creates its own horizontal, vertical, and taxonomic expansion of commodity frontiers.

4.6 Commodity Marketing and the Expansion of Market Power

The initial trials of marine finfish aquaculture production in Turkey had encountered one major barrier: a lack of marketing (Knudsen 1995). The later growth in sea bass and sea bream farming was therefore closely linked to marketing opportunities, and

the sector became increasingly export-oriented because domestic levels of fish consumption (6.2 kg per capita/year) were much lower than European (24.5 kg per capita/year in 2013) and global averages (above 20 kg per capita/year in 2015²⁰) (FAO 2011; EUMOFA 2016; MoFAL 2016). Following the commodity widening and commodity deepening strategies that generated an increased supply, an overarching capital accumulation strategy—‘commodity marketing’—came into play to address the demand side of broader commodification.

Since profit margins have recently been falling, aquaculture firms consider it vital to discover and enter new markets while maintaining their position in existing ones (Interviewees #12, #13, #18). Interviewee #18 explains that most aquaculture companies in Turkey are still unprepared for global competition because their production model is not oriented towards marketing. This had previously in the 1990s led sea bass and sea bream producers in Turkey—and other countries—to generate excessive supply without securing demand, as a result of which prices declined both nationally and internationally (Rad & Köksal 2000). In short, for a growing industry that aims to continue with growth and capital accumulation, marketing and creating the demand for farmed fish became a main concern.

The growth, expansion and export capacity of the aquaculture industry have often been facilitated by state interventions. State-sector collaboration forms an important part of such growth production processes (Veuthey & Gerber 2012; Saguin 2016), and in Turkey, the state has traditionally always been an important actor in determining the fate of nature-based industries (Adaman & Arsel 2012). In the context of marine finfish aquaculture, Turkish politics and policy-making have often followed and responded to the trajectory, needs, and demands of the sector (Interviewees #9, #11, #15, #25, #26, #27). For instance, the General Directorate of Fisheries and Aquaculture under the Ministry of Food, Agriculture and Livestock declared that its vision for 2023 was to increase aquaculture production to 500,000

²⁰ See the FAO website for more information (2016): <http://www.fao.org/news/story/en/item/421871/icode/>

tons per year; however, recent growth has not been so high, and the Ministry revised the target as 400,000 tons in 2017 (Deniz 2013; MoFAL 2017).

Individual or joint efforts by both the state and sector in Turkey have helped to promote and expand the marketing opportunities of marine finfish aquaculture by: keeping prices down through directly subsidizing firms, promoting both internal and external consumption and demand, opening new markets, and achieving species and product diversity—which I will illustrate and discuss below. I argue that these efforts made significant contributions to the expansion of the sector and marine commodity frontiers in aquaculture through the simultaneous application of both commodity marketing and commodity widening strategies, and thus resulted in the transformation of seafood production from capture fisheries to fish farming in Turkey.

4.6.1 Direct subsidies

Aquaculture was included in the scope of agricultural support schemes in Turkey in 2003, right after the 2001 economic crisis (MoFAL 2013), and the Ministry of Agriculture began to directly subsidize aquaculture producers for each kilogram of production (Yucel-Gier *et al.* 2009). For over a decade, the state has been providing direct income support to sea bass and sea bream producers (as well as producers of rainbow trout, mussels or new species), where the only eligibility requirement was being registered in the Ministry's Fish Farm Registry.

By 2013, following a full decade of direct subsidies, sea bass and sea bream producers were receiving 0.85 Turkish Lira (TL) per kilogram of production²¹. According to most interviewees, state subsidies were the main driver for the remarkable growth rate observed in sea bass and sea bream farming in Turkey between 2002 and 2015; an average of 30% annual production growth in tons (around 388% in total) (MoFAL

²¹ No. 28612 of the *Official Gazette of the Turkish Republic*, published April 8, 2013. <http://www.resmigazete.gov.tr/eskiler/2013/04/20130408-5.htm>

2017). In other words, direct subsidies played a major role in intensifying production and keeping prices down, and were welcomed by the sector—until they began to create problems in exports.

4.6.2 Opening new markets: exports, trade relations and conflicts over existing markets

To boost sales in the face of rising production, larger aquaculture companies had to identify new markets while maintaining their position and power in existing ones. While it had been the intention of both the state and the sector to increase domestic consumption levels, rates have not risen much, fluctuating between 7.1 and 5.5 kg per capita since 2010 (MoFAL 2016). In fact, with the consolidation of the sector, the farms that only served domestic consumption have gradually disappeared over the last decade (Interviewees #5, #13, #18). Consequently, the growth of aquaculture in Turkey was enabled and expanded by the export targets of the larger firms that entered into international markets²². The government also gave “active support [to such expansion] through export subsidies” (EUNETMAR 2014). Currently, approximately 75 to 80% of the farmed sea bass and sea bream is exported to European countries; especially to Italy, France, Spain and Germany (FAO 2011).

This trend of identifying and targeting new markets, in turn, generated conflicts over existing markets between the Turkish and European aquaculture sectors. In August 2015, the European Commission initiated “an anti-subsidy proceeding concerning imports of European sea bass and gilthead sea bream originating in Turkey”²³ after receiving a complaint lodged by the Association of Spanish Marine Aquaculture Producers (APROMAR), which represents the producers of over 25% of the total EU production of both species. The complaint demanded protection against subsidized imports from countries that were not members of the European Community—which

²² Turkish Seafood Promotion Committee: http://www.turkishseafood.org.tr/?page_id=31&lang=tr

²³ For EC's anti-subsidy proceeding (2015) see: http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:JOC_2015_266_R_0006&from=EN

was later backed by 60% of all sea bass and sea bream producers in the EU²⁴—and claimed that the Turkish subsidies on both species were causing ‘material injury to the EU industry’. The complaint read, APROMAR “has provided evidence that volume of imports of the product under investigation from Turkey have increased overall in absolute terms and have increased in terms of market share”. The proceeding was terminated²⁵ after APROMAR withdrew its complaint following a decision by the Turkish government to remove the subsidies in May 2016, effective the beginning of 2016²⁶. Ultimately, the proceeding concluded without the imposition of any measures—unlike the previous complaint against Turkey regarding trout subsidies.

In the aftermath of the trade conflicts with European producers, and Turkish producers’ adoption of EU quality standards related to fish welfare and fish safety by the late 2000s (Gozgozoglul & Deniz 2010; Deniz 2013), in 2016, Turkey became a member of the Federation of European Aquaculture Producers (FEAP) in order to remain in close contact and collaborate with the European sector and market. Moreover, sector representatives in Turkey grew in favor of the abolishment of direct subsidies because they did not want to lose their high level of exports²⁷ and instead, preferred state support aimed at boosting consumption (Interviewees #5, #18, Haberturk 2015²⁸).

4.6.3 Promoting consumption and demand

The state-sector collaboration in Turkey has played an important role in commodity marketing strategies geared to boosting domestic and overseas consumption and

²⁴ [http://www.mispecies.com/nav/actualidad/noticias/noticia-detalle/APROMAR-hace-balance-de-2016-y-presenta-perspectivas-para-2017/#.WGtjKz\]h2u5](http://www.mispecies.com/nav/actualidad/noticias/noticia-detalle/APROMAR-hace-balance-de-2016-y-presenta-perspectivas-para-2017/#.WGtjKz]h2u5)

²⁵ <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016D1360&from=EN>

²⁶ On May 5, 2016, a decree was published in the Turkish *Official Gazette* whereby Turkish authorities annulled the main subsidy scheme, effective January 1, 2016.

²⁷ <https://www.dailysabah.com/business/2015/08/06/turkish-fishermen-face-antidumping-case-in-eu-call-for-govt-action>

²⁸ <http://www.haberturk.com/yazarlar/abdurrahman-yildirim-1018/1111544-abden-levrek-ve-cipura-sorusturmasi>

demand for farmed seafood in a context where national annual per capita consumption of seafood was low; i.e. 6.2 kg in 2015 (MoFAL 2016). The FAO report on Turkey asserts that due to low total domestic fish consumption, only 10% of which is composed of farmed species, “the Turkish Government has shown a clear intention to increase the per capita fish consumption by increasing the production in the aquaculture sector which seems to be the only option for achieving this increase” (FAO 2011, p.5).

In efforts to improve the public image and acceptance of marine aquaculture and increase domestic seafood consumption, not only private advertisements by aquaculture firms became more frequent, but also public service announcements (PSAs) recommending eating fish at least twice a week began to appear on televisions²⁹. However, the aquaculture industry claims that PSAs have low impact since they appear only at night, when not many people are watching television. They feel it is necessary for the sector to take the initiative and put effort into developing effective private ads in different media, promotions, videos, and publications, and distributing farmed fish for free (Interviewee #5).

The Turkish Seafood Promotion Committee (STG)³⁰—founded in 2008 and composed of aquaculture companies and exporters, and various aquaculture farmers’ and producers’ organizations—also engaged in projects to increase marketing and consumption, such as distributing fish sandwiches to schoolchildren (Interviewee #5). Other state-supported commodity marketing strategies to ensure the growth of both consumption and production consisted of enabling the participation of firms in national and international fairs and conferences; organizing annual workshops for sector representatives (SUYMERBIR 2014), and producing brochures claiming that health organizations and dieticians recommend eating fish at least twice a week (FAO-MARA 2008).

²⁹ See the PSA on fish consumption: <https://www.youtube.com/watch?v=iiRkqhw5W8A>

³⁰ See STG’s webpage: <http://www.turkishseafood.org.tr>

4.6.4 Species and product diversity: taxonomic expansion and innovations in processing and packaging

Diversifying species and products is another key strategy employed by aquaculture firms, which involves producing various species concurrently and trying to grow new species by examining their physical adaptability to farming and profitability. This is how commodity frontiers that reach ‘mature conditions’ in one species expand taxonomically toward other species, because benefits from the ecological surplus gradually diminish over time. The state in Turkey is also supportive of attempts to produce new species in fish farms; the MoFAL has been providing the highest direct subsidies to the production of new species—1 TL per kg³¹. The main underlying reasons of such attempts include creating new markets with the new species, benefitting from being a first comer in the sector, and producing new niche luxury products that will draw higher prices in export markets; especially in the EU.

Another way to diversify products is by making innovations in processing and packaging, the lack of which has been considered a barrier to growth for aquaculture in Turkey (EUNETMAR 2014). Advances in processing and packaging are thought to add value to products in two ways: First, by enabling greater consumption of the commodity through easier ways to prepare, cook and eat fish (fillets, canned fish, fish chips and sea bass soup ready to cook); and second, by creating niche products that are more expensive (such as smoked or marinated sea bass and sea bream). A sector representative noted that one of the key issues related to the product is that it spoils easily and quickly (Interviewee #18). He argued that this was an issue that separated farmed fish from other industrial products, even from other nutritional products like grains or fermented goods. Thus, “matter matters” (Bakker & Bridge 2006, p.18), and marketing is a crucial aspect of the capital accumulation and expansion strategies of aquaculture companies.

³¹ No. 28612 of the *Official Gazette of the Turkish Republic*, published April 8, 2013.

Lastly, the larger aquaculture companies in Turkey—especially those with greater financial resources—are currently planning to approach the growing United States market and negotiate with new host countries in the Caribbean and Central America, such as the Dominican Republic. There are also plans to invest in new farms or facilities in different countries, such as Albania, Somalia, Mauritania, Libya, and Kazakhstan, where they would either pay less taxes for production or be closer to different markets (Interviewees #17, #18, #19) (TAGEM 2013). In short, the objective of expanding to new markets through commodity marketing strategies brings further commodity widening and geographical expansion through simultaneously applied strategies of aquaculture firms.

4.7 Conclusion: Maturing and Expanding Marine Commodity Frontiers

The horizontal expansion of marine finfish aquaculture from European Mediterranean countries to Turkey initially resulted in a very profitable industry in the newly opened frontier during the late 1990s and early 2000s. Following consolidation in the sector, only the larger firms with greater capital that had the capacity to employ commodity deepening strategies and ensure vertical integration continued to benefit from the ecological surplus, while smaller ones had to sell their farms and quit the industry. Meanwhile, intensified production required an export-oriented mindset in order to make sure products would be marketed. Recent trends in the sector and the perceptions of sector representatives imply that marine commodity frontiers opened through intensive aquaculture in Turkey are slowly maturing.

This is the underlying reason for the more aggressive commodity deepening and commodity marketing strategies, such as controlling the entire supply chain, looking for new markets, and maintaining a strong presence in existing ones. Future projections are not showing much profit; the sector in Turkey more and more

resembles an almost fully-exploited marine frontier. Thus, capital is already looking for new marine commodity frontiers and new production areas to expand into. In other words, both commodity deepening and commodity marketing strategies led to new commodity widening strategies, where aquaculture firms established their own fish fleets, looked for new geographies to harvest smaller pelagic fish for fish feed, built fish feed factories in other countries where production costs are lower, and all the while spent effort to boost both the supply and the demand of their increased production.

Given these state of events, the recent growth of marine finfish aquaculture in Turkey offers a good example of how marine commodity frontiers expand geographically and spatio-politically. Based on this case, I followed Moore's framework and aimed to uncover how expansion takes place in the intensive marine finfish aquaculture sector. By building on the conceptualization of aquaculture as a new frontier for capture fisheries, I argued that intensive marine finfish aquaculture is not only a frontier for capture fisheries, but rather continues to expand within the sector: horizontally, by enclosing different marine areas both nationally and internationally; vertically, by establishing bigger farms at greater depths and intensifying production; and taxonomically, by producing different species and processing them differently, and by turning small fish into fish feed to produce economically more valuable fish, thus benefitting from a different ecological surplus.

Based on my analysis, I argued that this three-pronged expansion was made possible by three different strategies that aquaculture companies use, sometimes simultaneously: namely, commodity widening, commodity deepening, and commodity marketing. First, commodity widening enables aquaculture firms to establish farms in new geographies (domestic or overseas) where seawater conditions are suitable, enclosing marine areas is easier, and production is cheaper. Additionally, they expand further horizontally with bigger farms situated farther off the shore and at greater depths. Second, commodity deepening strategies provide growing aquaculture companies reduced input costs and greater control over the

entire production chain through vertical integration. These strategies meanwhile lead to further commodity widening strategies, where firms begin to look for new sites to capture small fish; in other words, the raw materials needed to produce fish feed to be used in their farms. Third, although my unit of analysis followed the commodity frontiers approach and focused on primary production, I also incorporated an analysis of commodity marketing strategies that generate demand and boost consumption, since they simultaneously enable further commodity widening strategies and geographical expansion. As commodity frontiers mature, the pursuit of increasing profits by exchanging a relatively cheaply-produced commodity involves commodity marketing strategies, which ensure that intensified production meets demands—mostly in international markets. The commodity widening, deepening, and marketing strategies thus lead to further expansions, where new areas and new practices of seafood production serve the interests of capital.

Finally, by employing the framework of the expansion of commodity frontiers in this chapter, I have shown how expansion transforms the practices and spaces of seafood production from capture to intensive farming; illustrated the relations between capture fisheries and intensive marine aquaculture, in other words, the dependence of the latter on the former; and highlighted the strategies capital employs to further extend and intensify its accumulation in marine areas. My data illustrated that instead of providing a solution to depleting fish stocks, the intensive marine aquaculture of carnivorous species creates another source of pressure for fisheries, where exploitation leads to further expansion and intensification. On this basis, I argued that continuous expansion implies how capital produces nature, spaces and socio-ecological regimes with the intention of overcoming rather than social or ecological crises related to declining stocks and capture fisheries, primarily crises of decreasing profits. This is how capital creates new spaces and production relations in intensive aquaculture; by further enclosing and commodifying marine areas to extend its reach and continue to accumulate.

5 Discussion and Concluding Remarks

5.1 Overview of Empirical Findings and Arguments

In this thesis, by using a political ecology theoretical lens, I have explored how the European marine finfish aquaculture transforms relations of seafood production and marine governance, in the context of a rising demand for fish and capitalist expansion. I have contributed to the political ecology of aquaculture by making three main arguments: First, the transformation of relations of seafood production is enabled by aquaculture discourses and their underlying assumptions that lead to a disembodied understanding of aquatic space and resources, thereby facilitating their privatization through enclosures. Second, this understanding leads to the exclusion of a variety of social actors, who react by posing environmental justice demands, manifested in socio-environmental conflicts related to fish farms in Europe. Third, intensive marine aquaculture transforms seafood production practices by allowing capital to expand into new commodity frontiers; it does not only provide a frontier for capture fisheries, but also continues to expand within the sector by enclosing and commodifying new marine areas and resources. In the rest of this chapter, I will first summarize these findings and arguments, then discuss them in relation to broader debates, and finally address future lines of investigation and policy implications of my research.

First, drawing on Bacchi's WPR (What's the Problem Represented to be?) approach to discourse analysis (2009), I have examined the discourses on European aquaculture and unpacked their main themes and objectives as well as their incoherencies and implicit assumptions (see Chapter 2). My analysis has indicated the main objectives of European aquaculture to be: enhancing profitability and competition, job creation, food security, and sustainability—though usually prioritizing the first one. I have also unveiled and problematized four significant assumptions underlying the discourses

on European aquaculture: wild fish and farmed fish are perfect substitutes; growth is an imperative for EU aquaculture; wild fish is a public resource while farmed fish a private one (without considering this transformation in seafood production as privatization); and stakeholder participation in decision-making related to the use of marine areas is already enabled by the formal EU procedures. By analyzing these findings through a Polanyian theoretical lens, first, I have argued that taking these implicit assumptions for granted leads to a disembodied understanding of aquatic space and resources, and facilitates their privatization through enclosures. Secondly, I have claimed that these assumptions are not openly debated in the development of related strategies and policies; and as a result, the voices of different social actors questioning and problematizing these assumptions and offering alternative models for aquaculture development are silenced. By unveiling both the tensions among the main objectives of European aquaculture discourses and their underlying assumptions, I have contested the premise that aquaculture production offers a solution to stagnant capture fisheries by exceeding environmental limits. Furthermore, I have argued that farmed fish cannot be considered as perfect substitutes for wild fish or as ‘objects produced for sale on the market’—in other words, as (fictitious) commodities (Polanyi 2001[1944], p.75-76)—since the social, economic, and ecological functions of aquaculture differ from those of capture fisheries, and aquaculture production does not occur in isolation from natural cycles and socio-ecological relations, but is rather embedded in them.

In Chapter 3, in order to better understand different social actors’ opinions on European aquaculture development—including the ones diverging from dominant discourses—, I investigated socio-environmental conflicts related to fish farms in Europe. Based on my analysis of these conflicts informed by Schlosberg’s theoretical framing of environmental justice, I have argued that resistance to fish farms in Europe is not limited to NIMBY (Not-In-My-Backyard) reactions—as it is usually perceived by most national and European aquaculture sector representatives and policy-makers. Nor do they have purely conservationist motivations, such as closing the marine areas to human activities or only establishing Marine Protected Areas.

Rather, they entail a complex set of claims linked to the environmental justice demands of various social actors, including fishers, tourism representatives, local people, environmental NGOs, researchers, public administration (usually local governments), and other aquaculture and energy sector representatives. These demands include calls for an even distribution of risks, burdens, and benefits resulting from marine finfish aquaculture; the right to be recognized as relevant stakeholders; and an effective participation process in which all social actors have access to adequate and transparent information and are capable to influence decision-making and maintain their social cohesion and functioning. Lastly, I have underlined that treating such resistance and opposition as NIMBY reactions undermines local movements and ignores the political significance of these conflicts and their potential to include constructive and transformative proposals for the seafood production model. Through my analysis, I have contributed to the understanding of such conflicts and their political relevance as well as to environmental justice and aquaculture policy debates.

Finally, in Chapter 4, I have examined how capital expands into marine commodity frontiers through intensive marine aquaculture. Based on the analysis of the recent growth and expansion of this sector in Turkey, and by following Moore's theoretical framework, I have claimed that intensive marine finfish aquaculture transforms seafood production practices while allowing capital to expand into new marine commodity frontiers. By building on the conceptualization of intensive aquaculture as a new frontier for capture fisheries, I have argued that intensive marine aquaculture is not only a frontier for capture fisheries, but rather continues to expand within the sector: *horizontally*, by enclosing different marine areas both nationally and internationally; *vertically*, by establishing bigger farms at greater depths and intensifying production; and *taxonomically*, by producing different species and processing them differently and by turning small fish into feed to produce economically more valuable fish, thus benefitting from a different ecological surplus. My research has evidenced how this three-pronged expansion is enabled by diverse strategies that aquaculture companies employ with the support of the Turkish State:

‘commodity widening’, ‘commodity deepening’, and what I call ‘commodity marketing’ strategies. Thus, I have illustrated and asserted that such a continuous expansion underpins how capital produces nature, space, and socio-ecological regimes with the intention of overcoming rather than social and ecological crises related to declining stocks and capture fisheries, primarily the crisis of decreasing profits. In this way, I have clarified how capital creates new spaces and production relations in intensive aquaculture by further enclosing and commodifying marine areas to extend its reach and continue to accumulate.

In the next section, I will discuss these arguments in relation to three main debates to which my thesis has contributed.

5.2 Synthesis: Growth Imperative, Silenced Voices and Enclosures

5.2.1 The ‘growth imperative’ in aquaculture

The literature on aquaculture’s growth and development has discussed the ‘blue growth’ and ‘blue revolution’ paradigms in marine areas and compared them to the ‘green revolution’ witnessed through the global rise of industrial agriculture—based on monoculture production, increased inputs, mechanization and higher productivity gains accompanied by a global food system controlled by fewer agro-food companies—in order to achieve higher food supply and economic growth (Coull 1993; Barton & Staniford 1998). Meanwhile, critical studies on the rapid growth of intensive aquaculture in political ecology, political economy, and geography have usually focused on salmon and shrimp aquaculture—being two of the most profitable species—and highlighted their uneven social and ecological consequences (see Stonich & Bailey 2000; Clausen & Clark 2005; Rodríguez-Labajos & Martínez-Alier 2013; Islam 2014; Lim & Neo 2014). However, these studies have mostly examined the ‘political economy of export products consumed in the global North’, with a focus on certification schemes and geographical relations of export (Belton & Bush 2014,

p.3), or the arising socio-environmental conflicts in the global South (such as in Thailand, Ecuador and Chile, due to the fast expansion of globalized food chains and intensified production; see Vandergeest *et al.* 1999; Martinez-Alier 2001; Beitzl 2012; Bustos-Gallardo 2013).

This emphasis on exported species and socio-environmental conflicts in the global South has produced the counter-narrative that European seafood production (and consumption) is, by contrast, developing 'sustainably' without significant ecological problems or socio-environmental conflicts (a presumption that I have uncovered in Chapter 2 and contested with my findings in Chapter 3). Research focusing on Europe contributes to deconstructing the prevailing assumptions about that governance mechanisms in Europe already integrate social and environmental policies (see Shore 2011), and that following formal procedures purportedly ensures the participation of all relevant stakeholders (Ertör & Ortega-Cerdà 2017). Therefore, my thesis has analyzed the development of the European marine finfish aquaculture through a political ecology lens, in order to better understand: (i) why and how marine finfish aquaculture transforms seafood production practices and creates new spaces and relations of production, (ii) how the sector's growth and development in Europe shapes and is shaped by the current context of a rising demand for seafood and by capitalist expansion, (iii) and how it contributes to new—usually uneven—social and ecological changes.

In the European Union, the Blue Growth initiative launched in 2012 in the Communication of the European Commission included aquaculture as one of its five axes (EC 2012a). This showed that the industry development model and the ensuing policies and strategies for aquaculture in Europe would incorporate and reproduce the logic of the 'growth imperative' as observed in the development of fisheries and many other sectors under the global capitalism (Fløysand *et al.* 2010; Campling *et al.* 2012; D'alisa *et al.* 2014). Not surprisingly, the Blue Growth initiative and following policies mainly aimed at ensuring the recovery of European aquaculture production from existing stagnation—with -1.14% of growth in volume between 2009 and 2010

(JRC 2012)—and restoring the sector’s competitiveness. With this purpose, the marine finfish aquaculture segment was the most promoted subsector in Europe due to higher growth³², competitiveness, and profitability expectations (see Chapter 2). Its higher profitability has drawn more attention and led to its prioritization—over other subsectors—in a range of European aquaculture strategies since the profitability objective as well was usually prioritized over other objectives such as sustainability or job creation.

In this thesis, I have argued that the growth imperative—as one of the main implicit assumptions underlying European aquaculture discourses—has been taken for granted by aquaculture industry representatives as well as by policy-makers and several environmentally-focused NGOs working on marine issues. The NGOs, whose work I followed and whose representatives I interviewed, were positioning themselves usually as the following: ‘NGOs support the growth of aquaculture in Europe, provided it is underpinned by sustainable development principles and managed using the ecosystem based approach’ (SAR 2014, p.5).

This positioning implies first a *de facto* acceptance of the growth imperative even by the actors who are not representing the aquaculture sector, but rather aim to control the negative impacts of the industry. This stance is even stronger among the policy-makers who are usually playing a mediator role between the industry and the NGOs in Europe, though never questioning the growth imperative. Secondly, my research has revealed that most NGOs accept the growth imperative in order to be considered as relevant social actors, and not to be labeled as ‘radical ecologists’ opposing the development of the aquaculture sector. Thus, most NGOs participating in official debates with representatives of European public administrations (such as the European Union and the European Commission) avoid ‘radical’ arguments such as

³² During the stagnation period of European aquaculture sector, marine finfish aquaculture was the only segment that has maintained a positive growth rate in volume (3.1%) as opposed to freshwater and shellfish aquaculture with growth rates of -0.49% and -2.4%, respectively. The rates correspond to the period between 2006 and 2010 (JRC 2012).

'degrowth' in order to be taken seriously. They fear that otherwise they would probably not be able to influence the policies regarding concrete issues such as fish feed components, limiting the chemicals that can be used in fish farming, or the sites where establishing fish farms should be prohibited. The acceptance of the growth imperative and the resulting 'silencing process' relate both to the implicit assumptions taken for granted in European aquaculture discourses (see Chapter 2) as well as to the environmental justice demands of individuals or groups to be recognized as relevant social actors in fish farm conflicts (see Chapter 3). Hence, this reluctance of discussing growth indicates how the political debates on environmental governance are being limited already in the initial phase and how some critical voices are silenced in the process, which I will discuss further in the next subsection 5.2.2.

Another point of discussion related to the growth imperative is distribution, that is, how an increased amount of farmed fish and revenues in aquaculture production will be distributed. In Chapter 2, I have argued that European aquaculture discourses do not incorporate a clear vision nor strategies and policies regarding distribution. Following that, I have demonstrated in Chapter 3 that this growth and expansion is unequally distributed across social actors. The existence of socio-environmental conflicts related to fish farms in Europe implies that in fact some social actors are increasingly questioning this growth imperative and the unequal distribution of fish farms' risks, burdens and benefits, for different socio-ecological and political reasons. For instance, some consumer groups, activists, wild fish anglers and small-scale fishers are against intensive marine fish farming due to concerns such as animal welfare, illnesses contaminating wild species, escapees, enclosing common marine resources, and dispossession or displacement of fisher people, among others. In addition, the environmental justice demands put forward by small-scale fishers, local populations—the two most common actors involved in the fish farm conflicts in Europe—, and local or regional public administrations, illustrate that usually this growth imperative is followed at the expense of local actors. The concerns of these actors are ignored and their participation is limited, even though they are exposed to the fish farms' direct impacts, such as water degradation and restricted access to

marine areas.

Finally, the growth imperative of capitalist production goes hand in hand with the expansion of commodity frontiers in marine finfish aquaculture (see Chapter 4). In order to benefit more from the 'free gifts' of nature (Moore 2011) and the 'ecological surplus', the industry moves into new geographical areas or intensifies the production at the same place through socio-technical innovations (Moore 2010a; Campling 2012; Saguin 2016). All these efforts aim achieving growth by decreasing the costs of inputs and increasing the quantity of production simultaneously. Therefore, as I have demonstrated in Chapter 4, the growth imperative is followed by such horizontal, vertical, and taxonomic expansions of commodity frontiers in marine finfish aquaculture. Higher profits and the continuation of capital accumulation are achieved through the sector's commodity widening, deepening and marketing strategies at both the supply and demand ends of commodity production for exchange.

In sum, all three chapters have drawn attention to the growth imperative and how it transforms marine spaces and social and ecological production relations. The uneven development this imperative brings with it, and its consequences, are manifested both in socio-environmental conflicts and in the voices that are silenced, which I discuss next.

5.2.2 Dominant discourses versus silenced voices

Taken-for-granted assumptions make some discourses unquestioned and dominant, which in turn silence other voices and alternatives. Here, I will first highlight and discuss two dominant discourses: (i) 'market logic' and (ii) 'aquaculture as a panacea' to declining wild fish stocks; and then focus on how these dominant discourses silence voices of different social actors, limits their participation, and establish prevailing forms of environmental governance.

5.2.2.1 'Market logic'

Discourses 'following the market logic' play a key role in silencing alternative voices. These discourses go beyond the growth imperative and assume that all (social, economic and ecological) relations are organized according the needs, rules and functioning of the market mechanism (Polanyi 2001 [1944]). In this thesis, I have tried to go beyond 'a one-sided account of ecological problems that effectively naturalize and universalize capitalist relations of production' (Bresnihan 2016, p.10). Hence, I have problematized the main implicit assumptions establishing and strengthening dominant discourses on European aquaculture and argued that the development model of European aquaculture follows the rules of a market economy, that is, 'an economic system controlled, regulated, and directed by market prices' (Polanyi 2001[1944], p.71).

My argument on the dominance of the market logic in European aquaculture discourses furthers Mansfield's claim on the governance of fisheries: "Putting property at the center of fisheries' problems is a neoliberal, market-based approach to ocean governance, [which] starts from a particular economic logic that takes economic rationality (meaning individual profit maximization) as a given" (Mansfield 2004, p.324). In this thesis, I claimed that this market logic—that was already present in fisheries governance especially by adopting Individual Transferable Quotas—is reproduced by aquaculture strategies and policies, through which new marine areas get enclosed by private property (see Chapter 2). With this market logic, privatization of marine areas is naturalized, which discards other ways and alternatives for seafood production such as human rights-based access to common resources, community-based approaches, non-hierarchical share systems and a transparent distribution of surplus (see St Martin 2007; Bresnihan 2016).

However, as stated by Longo *et al.*, "improving efficiency does not necessarily lead to fewer demands on ecosystems" (2015, p.168), nor does it reduce the environmental injustices occurring due to the unequal distribution of burdens, benefits, and risks of fish farms and to the lack of recognition, participation or capabilities of social actors

(see Chapter 3). On the contrary, I argue that the marine finfish aquaculture sector in Europe develops by adopting this neoliberal market logic, which in turn transforms seafood production with the aim of furthering capital accumulation and an enhanced commodification—by producing ‘commodities for exchange’ (see Chapter 4).

5.2.2.2 ‘Aquaculture as a panacea’

The second dominant discourse that I will discuss here is on the presentation of aquaculture as a solution to falling captures and declining fish stocks. Faced with global overfishing and several collapses of fish stocks, aquaculture has been offered as a ‘panacea’ to declining stocks and stagnated captures; and this approach defines aquaculture as “rearing or cultivation of aquatic organisms *beyond the natural capacity of the environment* [emphasis added]” (EC 2012b, p.7) (see Chapters 2 and 4). My findings have led me to challenge this view, and to endorse Longo and Clark’s (2012, p.204) argument that intensive aquaculture “is a technological fix, which cannot resolve fundamental ecological contradictions”—contradictions that are intensified by increasingly industrialized production and capitalist relations.

Building on this, I have argued that intensive marine aquaculture—especially of carnivorous species mainly produced in European marine finfish sector—primarily helps to overcome capital’s challenges for further accumulation in the short-term; and instead of providing a solution to declining fish stocks, its expansion ends up putting more pressure on fisheries (see Chapter 4). This is why intensive marine aquaculture expands within the sector horizontally, vertically, and taxonomically by moving into new marine areas, generating new practices and production relations, and commodifying new marine spaces and species.

Based on the ‘aquaculture as a panacea’ discourse; growth, expansion, and intensification of production have been legitimized by food security claims. As an objective shared by many social actors and in most discourses, food security is employed in order to justify the need for a competitive, profitable, and growing aquaculture industry (see Chapter 2). However, it is neglected that, without ensuring

a just distribution but only focusing on a higher and intensified production, food security will not improve the access of everyone to seafood nor would achieve the public acceptance of different social actors (see Chapter 3). As Clausen and Clark argue, intensive aquaculture may produce a rising share of the global seafood in the context of declining captures, and lead to temporary increases in total production, but it does not provide a solution to food security: “Food security is tied to issues of distribution. Given that capitalist production is driven by the pursuit of profit, the desire for monetary gain trumps the distribution of food to those in need” (Clausen & Clark 2005, p.437).

Moreover, in order to ensure food security, the relation between capture fisheries and marine finfish aquaculture—especially of carnivorous species such as salmon, sea bass and sea bream—has to be analyzed closely (see Chapter 4). Carnivorous fish are the most demanded by European consumers. The dependence of carnivorous fish farming on the capture of wild species is a key issue in terms of food security. Due to the high fish feed requirement, farming these species leads to a higher pressure on fish stocks. It transforms a higher amount of ‘cheaper’ small pelagic fish—which could be used in direct human consumption—into fish feed, in order to produce a lower quantity of economically more valuable carnivorous fish. However, this issue related to food security is often obscured in dominant discourses.

Ostensibly in order to achieve food security, discourses of ‘market logic’ and ‘aquaculture as a panacea’ silence other voices, questions, and problems—such as how the benefits are distributed and how the development of aquaculture affects social and ecological relations around marine areas and resources.

5.2.2.3 Silenced voices in participation and environmental governance

Dominant discourses do not only establish a pre-defined way of thinking about the problems at stake—or ‘problem representations’ as Bacchi (2009) calls it—, but also silence other voices or alternative proposals (see Chapter 2). As in the cases of following the ‘market logic’ and promoting ‘aquaculture as a panacea’, they prevent

wider discussions on how to produce seafood to take place. Taking for granted the assumptions underlying these discourses blocks participatory processes and a horizontal decision-making linked to the model of European aquaculture and seafood production even in the initial stage. As a result, pluralistic debates on alternative models of aquaculture development cannot proceed and one type of environmental governance is imposed, which is in accordance with the dominant discourses.

Silenced voices are sometimes local voices. However, in cases when the decision-making process in Europe has ignored local opposition, the reactions in earlier stages of fish farm projects have usually resulted in socio-environmental conflicts involving social actors such as local populations, small-scale fishers and environmental NGOs against the aquaculture industry or public administration. As I argued in Chapter 3, labeling these local resistances as NIMBY initiatives leads some sector representatives and policy-makers to ignore their environmental justice claims and political relevance, and thus to silence their voices instead of addressing their demands.

The result is not only a material dispossession by the exclusion of some social actors from marine areas, but also an “exclusion of certain ways of knowing and relating [to the sea]” (Bresnihan 2016, p.12-13). This is especially true in the case of local small-scale fishers, which is also the social group most commonly opposing fish farms in Europe. Environmental justice demands are closely linked to such exclusion and to how decisions on fish farms and on the use of marine areas are made. Meanwhile, undermining the environmental justice demands and opposition of different social actors blocks the possibility to discuss and incorporate a wide range of alternative positions and proposals regarding the desired model for seafood production and distribution. Neglecting the concerns of local social actors—as observed in other industries and in aquaculture development in other contexts (Martinez-Alier *et al.* 2010; Gerber 2011; Urkidi & Walter 2011; Veuthey & Gerber 2012)—may lead to a spread and intensification of conflicts related to fish farms in Europe.

In other instances, silenced voices are more widespread and alternative opinions are

'governmentalized' (Foucault 1991b), through a process in which dominant discourses become the sole way of doing and knowing things. Such discourses dominate the social imaginaries and decision-making spaces and allow only one type of governance, as evidenced above in the case of the NGOs. Most of the NGOs who are able to enter into European debates and decision-making—through the workshops organized by the European Commission and stakeholder meetings with the sector and policy-makers—do not question growth discourses and priorities. This is both because the dominant social imaginary does not sufficiently challenge the growth imperative; but also since it is a prerequisite for NGOs in order to be taken seriously and recognized by European public authorities and aquaculture sector representatives. Therefore, throughout my thesis, I have underlined that taken-for-granted assumptions construct dominant discourses, which inform strategies and policies. Consequently, I have aimed to give voice to silenced debates on European aquaculture and to open the political field of environmental governance to different possibilities (see Chapter 2).

5.2.3 *Marine enclosures*

The development of marine finfish aquaculture in Europe has been transforming the marine space and its governance through marine enclosures in the form of fish farms. Throughout this thesis, I have developed this argument in three steps.

First, building on a Polanyian theoretical framework, I have established a link between enclosing commonly-used forestry lands and the enclosure of marine areas through fish farms. This link demonstrates how fish farms reproduce the act of enclosing commonly-used areas and transfer them to private property, which in turn excludes or displaces other users of common marine areas and enables furthering capital accumulation by a few industry leaders. As Longo and Clausen state (2011, p.318), "the need to transform land [or sea] into capitalist private property is the driving force of the enclosure of the commons. That is, capitalist private property is the social form that promotes enclosures, and the process of primitive accumulation, so as to conform to the needs of commodity production".

Building on this, I have argued that enclosures of marine areas enable a further form of privatization. I have found that European aquaculture discourses usually consider wild fish as a public resource, while presenting farmed fish as a private one. However, these discourses do not consider marine finfish aquaculture as a form of privatization. Consequently, they avoid the relevant necessary public discussions, through taking this presumption as given and normalizing it. I have argued that the discourses on European aquaculture adopts an 'economistic' perspective (Polanyi 1977) that pursues a disembodied understanding of aquaculture and facilitates the privatization of aquatic spaces and resources through enclosures (see Chapter 2). Since "the need to commodify, invest in, and develop new elements of nature that previously existed outside the political-economic competitive sphere becomes necessary for private capitalist enterprise" (Clausen & Clark 2005, p.436), marine finfish aquaculture offers an appropriate investment type for further privatization and commodification of marine space, enabled through enclosures, thus opening new frontiers for capital accumulation (see Chapter 4).

Second, I have argued that enclosures do not only refer to biophysical space. 'New enclosures' also incorporate the use of market-based instruments and economic valuation for (environmental) governance (Mansfield 2004; Heynen & Robbins 2005; Cotula 2013; Bresnihan 2016). With these new enclosures, neoliberalization processes eliminate any alternative form of marine governance and socio-economic and political organization. This phenomenon has already been observed in relation to other aspects of marine governance such as: the allocation of fishing rights, Individual Tradable Quotas (ITQs), exclusive economic zones, and species conservation (Pontecorvo 1988; Helgason & Palsson 1997; Mansfield 2004; Mansfield 2007; St Martin 2007). In this thesis, I have highlighted how this approach to the environmental governance of intensive marine aquaculture results in privatizing marine areas and transforming seafood production for the benefit of capital (Veuthey & Gerber 2012; Longo *et al.* 2015; Bresnihan 2016).

Third, this thesis has explored how marine enclosures change the ways, practices,

and relations of seafood production through fish farms. Marine finfish aquaculture is transforming marine spaces and social and ecological production relations continuously, especially as capital seeks to expand into new commodity frontiers geographically, spatially, and taxonomically. When commodity frontiers in capture fisheries 'matured' and became less profitable due to the ecological limits of fish stocks, the expansion of commodity frontiers was enabled by fish farms in the same marine area, through enclosures. This is why Saguin (2016) calls aquaculture as 'the commodity frontier of capture fisheries', since it opens a new possibility of expansion by benefitting from the ecological surplus created by such a socio-technical innovation. By building on this conceptualization, I have argued that marine finfish aquaculture not only is a frontier for capture fisheries, but also opens new frontiers that continue to expand within the sector by transforming the practices and spaces of seafood production through marine enclosures (see Chapter 4). I have demonstrated that this expansion is made possible by the commodity widening, commodity deepening, and commodity marketing strategies employed by aquaculture firms and usually facilitated by the State. In some cases, the transformation of seafood production and the expansion of commodity frontiers are State-led processes (Saguin 2016). In the case of Turkey, however, I have argued that they were not led but rather facilitated by the State through providing subsidies, promoting national and international consumption, opening new markets, allocating expanded zones for fish farms, and favoring farms with a higher production capacity (following the efficiency arguments and growth imperative, as I discussed above).

In sum, I contributed to the literature on marine enclosures by showing how they are mobilized for further expansion of commodity frontiers through fish farms.

5.3 Future Research and Policy Implications

5.3.1 *Limitations and future research*

In this section, I discuss some of the limitations of my analysis of the political ecology of marine finfish aquaculture in Europe, and reflect on how they may open avenues for future research.

First, rather as a methodological choice, my study has not involved a quantitative analysis—such as material and energy flow analysis, ‘human appropriation of net primary production’, ‘societal metabolism’ or ‘life cycle assessments’ of carnivorous intensive fish farms. Such analyses would have contributed to a better understanding of the social and ecological impacts, labor requirements and labor productivity, and capital intensity of different models of aquaculture production (e.g. recirculating aquaculture systems, extensive, organic or land-based aquaculture, farm ponds, and integrated multi-trophic aquaculture) and would have thus enriched the debates on the political ecology of intensive aquaculture. These aspects were beyond the scope of my thesis. Nevertheless, I have analyzed the most recent data on the situation of fish stocks; carrying capacity; illnesses affecting farmed fish; food conversion ratios; fish feed composition and production; social and economic data on growth, export, and labor productivity; and zones allocated to fish farms. I have also followed the up-to-date debates of marine biologists, environmental NGOs, fisheries economists, policy-makers, and representatives of the sector, in order to have a comprehensive view about the issue at stake and its various dimensions. Even though this has not been my main focus, understanding ecological aspects³³ has been crucial in order to comprehend how biophysical and political processes matter to and influence each other. Political ecology offers important conceptual tools for such an interdisciplinary

³³ They include different characteristics of farmed species, impacts of fish farms on wild species, sea lice problems affecting both farmed and wild species, negative environmental impacts of fish farms such as an increased eutrophication, higher nutrient load, escapees, pollution, reduced oxygen concentration and modified hydrology and sedimentation (Perdikaris *et al.* 2016).

perspective. In other words, I fully agree with Bakker and Bridge's argument that "matter matters" (Bakker & Bridge 2006, p.18), and I believe that political ecology studies on aquaculture should precisely take into account biophysical aspects as well.

The second topic that remained beyond the scope of my thesis—despite its importance—is gender. This is an essential research area to prioritize in future research, particularly because women working in both fisheries and aquaculture sectors are exposed to less recognition, lower wages, and precarious and invisible jobs. Throughout the EU, women represent an average of 3% of the (formal) workforce in capture fisheries, 27% in aquaculture, and 53% in processing. The role of women and their informal and/or nonpaid work were found to be both very important and highly undervalued. Moreover, there is a documented economic discrimination against women in the sector: women are paid (at least) 12% less than men for what appears to be the same work (EC 2002b). These numbers are quite dubious since most women work informally or realize nonpaid work; thus, available data is usually incapable of covering the multidimensional work undertaken by women in fishing and aquaculture sectors (Biswas 2011). However, they are one of the main social groups whose voices are usually silenced and whose labor becomes invisible. Clearly, this has a crucial impact on environmental injustices related to aquaculture, regarding women both opposing fish farm projects and/or working in the aquaculture sector. This issue is slowly gaining attention. 'Gendering the ocean' and 'gendering seafood production' will be significant lines of investigation in order to contribute to our understanding on the political ecology of fisheries and aquaculture. This has also emerged and been discussed as a future line of research in a 'Cost Action' network on 'Ocean Governance for Sustainability', in which I am participating.

A third issue that would require a deeper analysis is that of the agency and political subjectivities of members of NGOs working on marine issues and aquaculture (for literature on the agency and subjectivities of NGOs see Fisher 1997; Nagar & Raju 2003; Romani 2015). I have argued above that silencing the voices of some NGOs had

two aspects: (i) dominant social imaginaries and discourses about the growth imperative, as well as (ii) NGOs' willingness to be recognized as relevant actors in decision-making processes and to influence concrete policies. According to my analysis, their lack of criticism of growth and capitalism, and their silenced voices, hint to the fact that a degrowth agenda and alternatives for radical socio-ecological transformation could not enter into such mainstream debates, especially in the case of Brussel-based and more institutionalized NGOs³⁴. However, issues such as the evolving identity of both these NGOs and of individuals working in them, their relations with the EU public administration, and their dependence on funding agencies (which usually leads them to undertake short-term projects and hinder their engagement in wider political discussions) would require further analysis, which would contribute to the literature on the political ecology of aquaculture.

Lastly, political ecology research on land rights, food sovereignty, and agro-ecology are more developed than their marine counterpart. Some recent academic and activist work on the 'right to the sea' (Hadjimichael *et al.* 2014), 'ocean grabbing' (TNI *et al.* 2014; Bennett *et al.* 2015), and fisher people's sovereignty—especially the rights of small-scale artisanal fishing communities (TNI *et al.* 2013)—have already made important contributions to this line of investigation. However, future political ecology research still has many areas to discover on this topic, and my thesis has only partly touched upon it through engaging with an analysis of Blue Growth and food security discourses, enclosures and the environmental justice. Here, an important aspect, which mostly lacks in these studies, regards the impacts of European industrial fishing fleet, intensive marine aquaculture, and consumption and trade relations on fishing communities—both in global North and South—and on their food sovereignty. Different geographies and the production of different species have to be taken into account in order to have a more complete view of how the dynamics of global expansion and capital accumulation operate. Chapter 4 of this thesis has shown

³⁴ For an analysis of European environmental NGOs and their strategies in marine campaigns see: Richards & Heard 2005.

the expansion of commodity frontiers through marine finfish aquaculture, influenced by European consumption and the search for growth and capital accumulation. As a future research agenda, research on marine fish farms and resulting socio-ecological relations should be connected to agrarian change and struggles over land. Further political ecology analysis exploring ethnographic, ecological, socio-political and economic dimensions would enhance our understanding of this issue and contribute to unpacking transformations of production relations and the restructuring of local economies and ecologies in coastal areas.

5.3.2 Policy implications and concluding remarks

5.3.2.1 Policy implications

As discussed throughout this thesis, political ecology analysis gives us important insights that can be used to derive political lessons and construct alternatives. First, discourses have to be analyzed carefully to unpack and problematize the assumptions taken for granted in fisheries and aquaculture debates, strategies and policies, in order to enable inclusive discussions about desired models of and alternatives for seafood production, distribution, and consumption. These discussions should not be limited to solving problems, but rather aim to initiate debates on the desired type of aquaculture model already in the design phases of policies. Such debates cannot be achieved solely by relying on formal procedures and stakeholder consultations, but by incorporating open, pluralistic, horizontally-organized and integrated discussions on the ‘problem represented to be’ in European aquaculture policies—and by ensuring a process of co-elaborating politics with wide groups of social actors, including local and regional ones. Otherwise, the lack of such an approach will exclude relevant stakeholders who disagree with the pre-designed ‘problems’ on the future development model of European aquaculture. This is crucial, since currently new aquaculture strategies and decision-making bodies (like the Aquaculture Advisory Council of European Commission) are being initiated and the mid-term evaluation of the 2014 European Common Fisheries Policy reform and the

implementation of key European aquaculture policies are already underway.

Secondly, I have argued that taking for granted implicit assumptions within dominant discourses leads to a disembodied understanding of marine space and resources. Yet, farmed fish cannot be considered as pure 'objects produced for sale' because its production is embedded in broader social and ecological processes (see Chapter 2). As I have illustrated throughout this thesis, such a disembodied approach leads to both social and ecological crises, since economic efficiency leads to outcomes that are neither ecologically less destructive nor socially more equitable. Therefore, European aquaculture policies have to follow an understanding of economy embedded in society and ecosystems, instead of pursuing the market logic, growth imperative and neoliberal environmental governance. To embrace such an approach, the decision-making systems have to be profoundly transformed and a bottom-up way of co-laborating politics should be constructed. Increasing the importance of bottom-up decision-making at a local scale would increase the capabilities of many social actors (such as small-scale fishers, tourism sector representatives, sailors, anglers, recreational users, and local people) to participate in and influence decisions. Currently, at the European scale, sector policies and strategies are designed by the public administration and sector representatives. They lack discussion about and incorporation of local challenges, limits, voices of social actors, and other alternatives. However, the aquaculture development model should follow a human rights and ecosystem-based approach for defining access to and use of marine commons, placing non-hierarchical community governance at the center.

Third, I have pointed out the policy implications of socio-environmental conflicts related to fish farms in Europe (see Chapter 3). I have argued that regional or national interest should never ignore the local level of decision-making and that inclusive, participatory decision-making procedures must ensure: (i) timely and public provision of transparent, clear, and adequate information on proposed fish farm projects and their model of production, so that each stakeholder can adequately evaluate different development options; (ii) allocation of public funds for public

research, diversifying the fields and topics of investigation (to counter the dominance of technical and financial studies), and avoiding the control of aquaculture companies over research entities³⁵; and (iii) prioritization of local needs and concerns by facilitating open debates on what kind of uses and projects would be desired in the marine area. Hence, an effective participatory decision-making mechanism should be designed that takes the views and perceptions of all relevant actors into account in order to determine whether or not to construct fish farms; and if yes, how many to build and where, and what kind of production model to pursue. Best practices safeguarding environmental justice—such as the establishment of inclusive decision-making mechanisms related to fish farms, ensuring access to transparent information, and an equitable social distribution of burdens, benefits and risks resulting from aquaculture activities—should be further investigated and incorporated into future policies.

Furthermore, I have underlined that, in establishing new strategies for European aquaculture, the focus should not be on economic growth, but rather on how to achieve an ecologically, socially and economically sustainable and just production of seafood (see Chapters 2 and 3). As I have illustrated, an endless pursuit of growth and expansion obscures fish farms' impacts on local regions and social actors. It silences the voices and demands of a range of social actors like small-scale fishers, NGOs, local people, tourism representatives, and other users of marine areas; and disrupts their relation with marine areas and commons. Meanwhile, the pursuit of growth invisibilizes the relationship between intensive carnivorous fish farming and declining wild fish stocks; in other words, the dependence of the former on the latter due to fish feed requirement (see Chapter 4). Therefore, early warnings given by these conflicts should be seriously taken into account in order to prevent the expansion and spread of conflicts, and to derive lessons for developing appropriate

³⁵ Currently, one of the biggest aquaculture research institutions that also receives EU funding is EATiP (European Aquaculture Technology and Innovation Platform), which was established by the European aquaculture sector. Federation of European Aquaculture Producers (FEAP) is a founder member of this Technology Platform and supplies the Secretariat that coordinates its activities.

policies.

Finally, rather than assuming marine finfish aquaculture as a solution to declining fish stocks and wild fish captures; fisheries and aquaculture policies should carefully analyze the underlying anthropogenic—ecological, social, political and economic—reasons for the collapse of fish stocks and avoid repeating the same failures with aquaculture policies that promote an endless growth of production and consumption. Rather, they should focus on the relation of marine finfish aquaculture—particularly of carnivorous species—with wild fish stocks and captures, and adopt a view in which seafood production is embedded in social and ecological relations.

5.3.2.2 Concluding remarks

In this thesis, I have contributed to three bodies of political ecology scholarship on fisheries and aquaculture: (i) the WPR (What is the Problem Represented to be?) approach to discourse analysis, combined with a Polanyian theoretical framework on (marine) enclosures and embeddedness; (ii) environmental justice literature focusing on socio-environmental conflicts; and (iii) literature on the expansion of (marine) commodity frontiers. I have established a link between the expansion of marine finfish aquaculture and the privatization of marine spaces and resources through enclosures, and uncovered how European marine finfish aquaculture transforms seafood production and environmental governance of marine areas in a context of increasing seafood demand and capitalist expansion. My research has aimed to contribute to political ecology literature as well as to enrich environmental and political debates on European aquaculture. It has sought to open the political arena to wider debates on environmental governance, by uncovering the complex set of social actors and demands that are silenced in discourses, which facilitate the expansion and intensification of fish farm projects.

I have concluded that intensive marine (finfish) aquaculture as a relatively recent socio-technical innovation shapes and transforms marine spaces and production relations. The increasing demand for seafood and the rise of aquaculture's share in

total seafood production is part of a global process closely linked to capital's drive to increase profitability in the food industry. This leads to a transformation of seafood production based on dominant discourses and their underlying assumptions, in which capital expands continuously into new commodity frontiers by enclosing marine commons, while it excludes a variety of social actors and leads to socio-environmental conflicts and injustices. This is a structural issue, related to what kind of food production and distribution system we want to create both on land and sea. Here, the contribution of political ecology will be crucial in order to better understand these processes and the resulting inequalities and changing power relations among social actors. The gaze of political ecology will enable us to connect diverse aquaculture-related struggles in defense of the commons and construct alternatives for a more just, sustainable, and equitable model of seafood production, distribution, and consumption.

References

- Adaman, F. & Arsel, M., 2012. Political economy of the environment in Turkey. In: M. Heper & S. Sayarı, eds. *The Routledge handbook of modern Turkey*. London: Routledge, pp.317-327.
- Adduci, M., 2009. Neoliberal wave rocks chilika lake, India: Conflict over intensive aquaculture from a class perspective. *Journal of Agrarian Change*, 9(4), pp.484–511.
- Andreucci, D. & Kallis, G., 2017. Governmentality, development and the violence of natural resource extraction in Peru. *Ecological Economics*, 134, pp.95–103.
- Arisoy, Y., Yucel-Gier, G. & Pazi, I., 2012. Relocation of the fish farms in Gulluk Bay. In: *Water Resources and Wetlands*, eds. P. Gâştescu, W. Lewis Jr. & P. Breţcan, pp.390-395. 14–16 September 2012, Tulcea-Romania. ISBN: 978-606-605-038-8
- Bacchi, C., 2009. *Analysing policy: What's the problem represented to be?* Frenchs Forest, NSW: Pearson Australia.
- Bailey, C., 1988. The social consequences of tropical shrimp mariculture development. *Ocean and Shoreline Management*, 11, pp.31–44.
- Bailey, C., 1996. Social science contributions to aquacultural development. In: C. Bailey, S. Jentoft & P. Sinclair, eds. *Aquacultural development: Social dimensions of an emerging industry*. Boulder, CO: Westview Press. pp.3-20.
- Bailey, C., Jentoft, S. & Sinclair, P., eds., 1996. *Aquacultural development: Social dimensions of an emerging industry*. Boulder, CO: Westview Press.
- Bakker, K. & Bridge, G., 2006. Material worlds? Resource geographies and the “matter of nature”. *Progress in Human Geography*, 30(1), pp.5–27.
- Barton, J.R., 1997. Environment sustainability and regulation in commercial aquaculture: the case of Chilean Salmonid production. *Geoforum*, 283, pp.313–328.
- Barton, J.R. & Fløysand, A., 2010. The political ecology of Chilean salmon aquaculture, 1982-2010: A trajectory from economic development to global sustainability. *Global Environmental Change*, 20(4), pp.739–752.
- Barton, J.R. & Staniford, D., 1998. Net deficits and the case for aquacultural geography. *Area*, 30(2), pp.145–155.
- Bavington, D.L.Y., 2009. Managing to endanger: Creating manageable cod fisheries in Newfoundland & Labrador, Canada. *MAST*, 7(2), pp.99–121.
- Beitl, C.M., 2012. Shifting policies, access, and the tragedy of enclosures in ecuadorian mangrove fisheries: Towards a political ecology of the commons. *Journal of Political Ecology*, 19(418), pp.94–113.
- Belton, B. & Bush, S.R., 2014. Beyond net deficits: new priorities for an aquacultural geography. *The Geographical Journal*, 180(1), pp.3–14.

- Beltrán, M.J., Kotsila, P., García-López, G., Velegrakis, G. & Velicu, I., eds., 2016. *Political ecology for civil society*. ISBN:9788894071467
- Béné, C., Arthur, B., Norbury, H., Allison, A.H., Beveridge, M., Bush, S., Campling, L., Leschen, W., Little, D., Squires, D., Thilsted, S.H., Troell, M. & Williams, M., 2016. Contribution of fisheries and aquaculture to food security and poverty reduction: assessing the current evidence. *World Development*, 79, pp.177–196.
- Bennett, N.J., Govan, H. & Satterfield, T., 2015. Ocean grabbing. *Marine Policy*, 57, pp.61–68.
- Biswas, N., 2011. *Turning the tide: Women's lives in the fisheries and the assault of capital*. Economic & Political Weekly, XLVI(51), 17 December 2011. Available at: <http://environmentportal.in/files/file/Fisheries.pdf>
- Black Sea Commission. 2008. State of Marine Living Resources. In *State of the Environment of the Black Sea (2001–2006/7)*, ed. T. Oguz, Chapter 9, Publications of the Commission on the Protection of the Black Sea Against Pollution (BSC) 2008-3. Istanbul, Turkey. Available at: http://www.blacksea-commission.org/_publ-SOE2009-CH9.asp
- Blaikie, P. & Brookfield, H., 1987. *Land degradation and society*. London: Methuen.
- Bresnihan, P., 2016. *Transforming the fisheries: Neoliberalism, nature, and the Commons*. Lincoln and London: University of Nebraska Press.
- Bridge, G., 2009. Material worlds: Natural resources, resource geography and the material economy. *Geography Compass*, 3(3), pp.1217–1244.
- Bryant, B. & Mohai, P., 1992. *Race and the incidence of environmental hazards: a time for discourse*. Boulder, CO: Westview Press.
- Bryant, R.L., ed., 2015. *The international handbook of political ecology*. Cheltenham, Northampton: Edward Elgar Publishing.
- Bullard R., 1990. *Dumping in Dixie: race, class, and environmental quality*. Boulder, CO: Westview Press.
- Bunker, S.G., 1996. Raw material and the global economy: Oversights and distortions in industrial ecology. *Society & Natural Resources*, 9(4), pp.419–429.
- Bush, S.R. & Marschke, M.J., 2014. Making social sense of aquaculture transitions. *Ecology and Society*, 19(3), 50.
- Bustos-Gallardo, B., 2013. The ISA crisis in los Lagos Chile: A failure of neoliberal environmental governance? *Geoforum*, 48, pp.196–206.
- Bustos-Gallardo, B. & Irarrazaval, F., 2016. “Throwing money into the sea”: Capitalism as a world-ecological system. Evidence from the Chilean salmon industry crisis, 2008. *Capitalism Nature Socialism*, 27(3), pp.83-102.
- Campling, L., 2012. The tuna “commodity frontier”: Business strategies and environment in the industrial tuna fisheries of the Western Indian Ocean. *Journal of Agrarian Change*, 12(2–3), pp.252–278.

- Campling, L., Havice, E. & Mccall Howard, P., 2012. The political economy and ecology of capture fisheries: Market dynamics, resource access and relations of exploitation and resistance. *Journal of Agrarian Change*, 12(2-3), pp.177-203.
- CEFAS, 2014. Centre for Environment, Fisheries & Aquaculture Science (CEFAS) report C6078. Background information for sustainable aquaculture development addressing environmental protection in particular (SUSAQ): *Sustainable aquaculture development in the context of the Water Framework Directive and the Marine Strategy Framework Directive*.
- Christiansen, E.A.N., 2013. Negative externalities of food production: discourses on the contested Norwegian aquaculture industry. *Journal of Political Ecology*, 20(1), pp.180-198.
- Clausen, R. & Clark, B., 2005. The metabolic rift and marine ecology: An analysis of the ocean crisis within capitalist production. *Organization & Environment*, 18(4), pp.422-444.
- Coffey, B., 2016. Unpacking the politics of natural capital and economic metaphors in environmental policy discourse. *Environmental Politics*, 25(2), pp.203-222.
- Conde, M. & Kallis, G., 2012. The Global Uranium Rush and its Africa Frontier. Effects, Reactions and Social Movements in Namibia. *Global Environmental Change*, 22(3), pp.596-610.
- Conde, M. & Walter, M., 2014. Commodity Frontiers. In: G. D'Alisa, F. Demaria, & G. Kallis, eds. *Degrowth: A vocabulary for a new era*. Abingdon: Routledge, pp.71-74.
- Cotula, L., 2013. The new enclosures? Polanyi, international investment law and the global land rush. *Third World Quarterly*, 34(9), pp.1605-1629.
- Coull, J., 1993. Will a Blue Revolution follow the Green Revolution? The modern upsurge of aquaculture. *Area*, 25(4), pp.350-357.
- Cruz-Torres, M.L., 2000. "Pink gold rush": Shrimp aquaculture, sustainable development, and the environment in Northwestern. *Journal of Political Ecology*, 7, pp.63-90.
- D'Alisa, G., Demaria, F., & Kallis, G., eds., 2014. *Degrowth: a vocabulary for a new era*. Abingdon: Routledge.
- D'Alisa G, Di Nola MF, Giampetro M. 2012. A multi-scale analysis of urban waste metabolism: density of waste disposed in Campania. *Journal of Cleaner Production*, 35, pp.59-70.
- Deidun, A., Borg, S. & Micallef, A., 2011. Making the case for marine spatial planning in the Maltese Islands. *Ocean Development & International Law*, 42(1-2), pp.136-154.
- Deniz, H., 2013. The success story of Turkish aquaculture. GOAL Conference, 7-10 October 2013, Paris. Available at the Global Aquaculture Alliance website: <https://www.aquaculturealliance.org/wp-content/uploads/2015/04/goal13-deniz.pdf?x69012> [last accessed 15.03.17].

- EAS, June 2011. European Aquaculture Society. *Aquaculture Europe*, 36(2), pp.1–47.
- EATIP, 2012. European Aquaculture Technology and Innovation Platform. Outputs of aquaculture research funded by the European Union - *Consumer interests*.
- EC, 2002a. Commission Communication. *A strategy for the sustainable development of European aquaculture*. COM(2002) 511 final, 19.9.2002.
- EC, 2002b. *Summary of the report "The role of women in fisheries"*. Available at: https://ec.europa.eu/fisheries/sites/fisheries/files/docs/body/summary_en.pdf
- EC, 2009. Commission Staff Working Document Impact Assessment. *Building a sustainable future for aquaculture: a new impetus for the strategy for the sustainable development of European aquaculture* {COM(2009) 162} {SEC(2009) 454}, SEC(2009) 453.
- EC, 2011. Commission Staff Working Paper Impact Assessment on the Common Fisheries Policy [repealing Regulation (EC) N° 2371/2002]. 13 July 2011 SEC(2011) 891.
- EC, 2012a. Commission Communication. *Blue Growth opportunities for marine and maritime sustainable growth*. 13.9.2012 COM(2012) 494 final.
- EC, 2012b. European Commission. *Guidance on aquaculture and Natura 2000: Sustainable aquaculture activities in the context of the Natura 2000 network*. Available at: <https://ec.europa.eu/fisheries/sites/fisheries/files/docs/body/guidance-aquaculture-natura2000.pdf>
- EC, 2012c. European Commission, Mare DG. A2. *Roadmap: Commission Communication on strategic guidelines for the promotion of sustainable EU aquaculture*; November 2012.
- EC, 2013. Commission Communication. *Strategic guidelines for the sustainable development of EU aquaculture*, COM(2013) 229 final, 29.4.2013.
- EC Fisheries and Aquaculture, 2017. Available at: http://ec.europa.eu/fisheries/cfp/aquaculture/index_en.htm
- EC Food Waste, 2017. Available from: http://ec.europa.eu/food/safety/food_waste/index_en.htm.
- EEA, 2016. *Seafood in Europe: A food system approach for sustainability*. 25. Luxembourg: European Environment Agency. ISSN:1977-8449.
- EESC, 2013. *Opinion of the European economic and social committee on the communication from the commission – strategic guidelines for the sustainable development of EU aquaculture*. COM (2013) 229 final. NAT/605. Sustainable aquaculture: Brussels. 16 October 2013.
- EJOLT, 2014. Environmental Justice Organizations, Liabilities and Trade Project: Mapping environmental justice. Available at: <http://www.ejolt.org/section/resources/reports/>

- EP, 2009a. European Parliament, Directorate-General for Internal Policies, Policy Department B, Structural and Cohesion Policies - Fisheries. *Regulatory and legal constraints for European aquaculture*. Brussels: European Parliament. Available at:
[http://www.europarl.europa.eu/RegData/etudes/etudes/join/2009/431568/IPOL-PECH_ET\(2009\)431568_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/etudes/join/2009/431568/IPOL-PECH_ET(2009)431568_EN.pdf)
- EP, 2009b. European Parliament, Directorate-General for Internal Policies, Policy Department B, Structural and Cohesion Policies - Fisheries. *European aquaculture competitiveness: limitations and possible strategies*. Brussels: European Parliament. Available at:
[http://www.europarl.europa.eu/RegData/etudes/etudes/join/2009/431569/IPOL-PECH_ET\(2009\)431569_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/etudes/join/2009/431569/IPOL-PECH_ET(2009)431569_EN.pdf)
- EP, 2014. Fact sheets on the European Union. *European aquaculture-2014*. Brussels: European Parliament.
- Ertör, I. & Ortega-Cerdà, M., 2015. Political lessons from early warnings: Marine finfish aquaculture conflicts in Europe. *Marine Policy*, 51, pp.202–210.
- Ertör, I. & Ortega-Cerdà, M., 2017. Unpacking the objectives and assumptions underpinning European aquaculture. *Environmental Politics*, pp.1-22. doi:10.1080/09644016.2017.1306908
- EU, 2014. *Facts and figures on the common fisheries policy*. Luxembourg: European Union.
- EUMOFA, 2014. *2014 Edition: The EU fish market*. Brussels: European Market Observatory for Fisheries and Aquaculture Products.
- EUMOFA, 2016. *The EU Fish Market: 2016 Edition*. Brussels: European Market Observatory for Fisheries and Aquaculture Products (EUMOFA).
- EUNETMAR, 2014. *Studies to support the development of sea basin cooperation in the Mediterranean, Adriatic and Ionian, and Black Sea*. European Networking Group for Integrated Marine Policy, Report 1, Annex 2.12, Country fiche: Turkey. Available at:
https://webgate.ec.europa.eu/maritimeforum/sites/maritimeforum/files/Report_1_full_final.pdf
- European Court of Auditors, 2014. *Special report: the effectiveness of European fisheries fund support for aquaculture*. Luxembourg: European Court of Auditors.
- FAO, 1988. *History of aquaculture*. ASEAN/UNDP/FAO Regional Small-Scale Coastal Fisheries Development Project. Philippines: Food and Agriculture Organization of the United Nations. Available at: <http://www.fao.org/3/contents/0edbf87f-b553-5e23-9645-9913009b964c/ag158e00.htm>
- FAO, 2011. *National aquaculture sector overview: Turkey*. Available at: http://www.fao.org/fishery/countrysector/naso_turkey/en
- FAO 2012. *The state of the world fisheries and aquaculture 2012*. Rome: The Food

- and Agriculture Organization of the United Nations Fisheries and Aquaculture Department.
- FAO, 2014. *The state of world fisheries and aquaculture: Opportunities and challenges*. Rome: Food and Agriculture Organization of the United Nations Fisheries and Aquaculture Department. Available at: <http://www.fao.org/3/a-i3720e.pdf>
- FAO, 2016. *The state of world fisheries and aquaculture: Contributing to food security and nutrition for all*. Rome: Food and Agriculture Organization of the United Nations. Available at: <http://www.fao.org/3/a-i5555e.pdf>
- FAO-MARA, 2008. *Developing a Roadmap for Turkish Marine Aquaculture, TCP/TUR 3101 Project*. Available at: http://151.1.154.86/gfcmwebsite/CAQ/WGSCC/2009/Crete/Turkish_Road_Map_Okumus.pdf
- FEAP, 2012. Federation of European Aquaculture Producers. *Annual report 2012*.
- FEAP, 2014. Federation of European Aquaculture Producers. *Annual report 2014*.
- FEAP, 2016. Federation of European Aquaculture Producers, *Annual Report 2016*. Available at: <http://www.feap.info/default.asp?SHORTCUT=617>
- Fisher, W.F., 1997. DOING GOOD? The Politics and Antipolitics of NGO Practices. *Annual Review of Anthropology*, 26(1997), pp.439–464.
- Fisheries Centre Research Reports, 2016. *The end use of marine fisheries landings*. 24(3). Institute for the Oceans and Fisheries, University of British Columbia, Canada. ISSN: 1198-6727
- Fløysand, A., Haarstad, H. & Barton, J., 2010. Global economic imperatives, crisis generation and local spaces of engagement in the Chilean aquaculture industry. *Norsk Geografisk Tidsskrift - Norwegian Journal of Geography*, 64(4), pp.199–210. Available at: <http://www.scopus.com/inward/record.url?eid=2-s2.0-78649691762&partnerID=tZOtx3y1>.
- Foucault, M., 1984. Polemics, politics and problematizations. In: P. Rabinow, ed. *Essential Works of Foucault, Vol. 1 "Ethics"*. New York: The New Press. Available at: <https://foucault.info/doc/foucault/interview-html>
- Foucault, M., 1991a. Politics and the study of discourse. In: G. Burchell, C. Gordon & P. Miller, eds. *The Foucault effect: studies in governmentality*. Chicago: The University of Chicago Press.
- Foucault, M., 1991b. The Foucault effect: Studies in governmentality. In: G. Burchell, C. Gordon, & P. Miller, eds. *The Foucault effect: studies in governmentality*. Chicago: The University of Chicago Press.
- Freitas, D., Gomes, J., Sales, L.T., Madruga, L., Marques, C., Baptista, G., Rosalino, L.M., Antunes, P., Santos, R. & Santos-Reis, M., 2007. Otters and fish farms in the Sado estuary: ecological and socio-economic basis of a conflict. *Hydrobiologia*, 587(1), pp.51–62.

- Friends of Loch Etive, 2014. Available at: <http://lochetive.org>. [last accessed 20.03.14].
- Friends of the Irish Environment, 2014. Available at: <http://www.wildfish.ie/references.html> [last accessed 20.03.14].
- GAAIA, 2014. Global Alliance Against Industrial Aquaculture. Available at: <http://salmonfarmingkills.com>
- GBPG, 2014. Galway Bay Protection Group webpage. Available at: <http://savegalwaybay.com> [last accessed 20.03.14].
- Gerber JF., 2011. Conflicts over industrial tree plantations in the South: who, how and why? *Global Environmental Change*, 21, pp.165–176.
- Goulding, I.C., Stobberup, K.A. & O'Higgins, T., 2014. Potential economic impacts of achieving good environmental status in Black Sea fisheries. *Ecology and Society*, 19(3), 32.
- Gouletquer P, Le Moine O., 2002. *Shellfish farming and Coastal Zone Management (CZM) development in the Marennes-Oléron Bay and Charentais Sounds (Charente Maritime, France): a review of recent developments. Aquaculture International*, 10(6), pp.507–525.
- Gozgozoglul, E. & Deniz, H., 2010. *The Future of the Turkish Aquaculture Industry*. Available at: http://www.fao.org/fileadmin/templates/SEC/docs/Fishery/Fisheries_Events_2012/Recirculation/RAS_2_of_5_The_future_-_MARA_-_17_sept_2010.pdf
- Green Warriors of Norway (Norges Miljøvernforbund), 2011. *Report on the environmental impact of farming of North Atlantic salmon in Norway*. Available at: http://www.nmf.no/files/dokumenter/PDF/ORIGINAL_LAKSERAPPORTEN_LOWRES.pdf
- Greenberg, J.B. & Park, T.K., 1994. Political ecology. *Journal of Political Ecology*, 1(1), pp. 1–12.
- Hadjimichael, M., Bruggeman, A. & Lange, M.A., 2014. Tragedy of the few? A political ecology perspective of the right to the sea: The Cyprus marine aquaculture sector. *Marine Policy*, 49, pp.12–19.
- Hajer, M. and Versteeg, W., 2005. A decade of discourse analysis of environmental politics: achievements, challenges, perspectives. *Journal of Environmental Policy & Planning*, 7(3), pp.175–184.
- Hall, D., 2003. The international political ecology of industrial shrimp aquaculture and industrial plantation forestry in Southeast Asia. *Journal of Southeast Asian Studies*, 34(2), pp.251–264.
- Hall, D., 2004. Explaining the diversity of Southeast Asian Shrimp aquaculture. *Journal of Agrarian Change*, 4(3), pp.315–335.
- Hamouda, L., Hipel, K.W., Kilgour, D.M., Noakes, D.J., Fang, L. & McDaniels, T.T., 2005.

- The salmon aquaculture conflict in British Columbia: a graph model analysis. *Ocean and Coastal Management*, 48(7–8), pp.571–587.
- Harrison, E., 1996. Digging fish ponds: perspectives on motivation in Luapula Province, Zambia. *Human Organization*, 55, pp.270–278.
- Helgason, A. & Palsson, G., 1997. Contested Commodities: The Moral Landscape of Modernist Regimes. *The Journal of the Royal Anthropological Institute*, 3(3), pp.451–471.
- Heynen, N. & Robbins, P., 2005. The neoliberalization of nature: governance, privatization, enclosure and valuation. *Capitalism Nature Socialism*, 16(1), pp.5–8.
- Hilson, G. & Yakovleva, N., 2007. Strained relations: A critical analysis of the mining conflict in Prestea, Ghana. *Political Geography*, 26(1), pp.98–119.
- IFOAM, 2010. Dossier of international federation of organic agriculture movements EU group. *Organic Aquaculture: EU Regulations (EC) 834/2007, (EC) 889/2008, (EC) 710/2009-Background, Assessment, Interpretation*. Brussels.
- Irz, X. & McKenzie, V., 2003. Profitability and technical efficiency of aquaculture systems in Pampaanga, Philippines. *Aquaculture Economics & Management*, 7(3–4), pp.195–211. doi: 10.1080/13657300309380340
- Islam, M.S., 2014. *Confronting the Blue Revolution: industrial aquaculture and sustainability in the Global South*. Toronto: University of Toronto Press.
- Jespersen, K.S., Kelling, I., Ponte, S., Kruijssen, F., 2014. What shapes food value chains? Lessons from aquaculture in Asia. *Food Policy*, 49, pp.228–240.
- Jorgensen, M. and Phillips, L.J., 2002. *Discourse analysis as theory and method*. London, Thousand Oaks, New Delhi: Sage.
- Joyce, A.L. & Satterfield, T.A., 2010. Shellfish aquaculture and First Nations' sovereignty: The quest for sustainable development in contested sea space. *Natural Resources Forum*, 34(2), pp.106–123.
- JRC, 2012. *An approach towards European aquaculture performance indicators: Indicators for sustainable aquaculture in the European Union*. Luxembourg: JRC Technical Reports
- Kelly, P.F., 1996. Blue revolution or red herring? Fish farming and development discourse in the Philippines. *Asia Pacific Viewpoint*, 371, pp.39–57.
- Knapp, FL. 2016. The birth of the flexible mine: Changing geographies of mining and the e-waste commodity frontier. *Environment and Planning A*, 48(10), pp.1889–1909.
- Knudsen, S., 1995. *Introduction of aquaculture along Turkey's Black Sea coast: Entrepreneurs, knowledge and regulations*. Fifth Annual Common Property Conference of the International Association for the Study of Common Property, 24–28 May 1995, Norway.

- Korkut, A.Y., Kop, A., Saygi, H., Göktepe, Ç., Yedek, Y. & Kalkan, T., 2017. General evaluation of fish feed production in Turkey. *Turkish Journal of Fisheries and Aquatic Sciences*, 17, pp.223-229.
- Krausmann, F., Fischer-Kowalski, M., Schandl, H. & Eisenmenger, N., 2008. The global sociometabolic transition: Past and present metabolic profiles and their future trajectories. *Journal of Industrial Ecology*, 12(5-6), pp.637-656.
- Kruse, S.A., Flysjö, A., Kasperczyk, N. & Scholz, A.J., 2009. Socioeconomic indicators as a complement to life cycle assessment—an application to salmon production systems. *The International Journal of Life Cycle Assessment*, 14(1), pp.8-18.
- Layfield, D., 2008. New politics or environmental class struggle? *Environmental Politics*, 17(1), pp.3-19.
- Lee, W-C., Chen, Y-H., Lee, Y-C. & Liao, I.C., 2003. The Competitiveness of the Eel Aquaculture in Taiwan, Japan, and China. *Aquaculture*, 221(1-4), pp.115-124.
- Lim, G. & Neo, H., 2014. The economic geographies of aquaculture. *Geography Compass*, 8(9), pp.665-676.
- Liu Y, Olaussen JO. & Skonhoft A., 2011. Wild and farmed salmon in Norway: a review. *Marine Policy*, 35(3), pp.413-418.
- Longo, S.B. & Clark, B., 2012. The commodification of bluefin tuna: The historical transformation of the Mediterranean fishery. *Journal of Agrarian Change*, 12(2-3), pp.204-226.
- Longo, S.B. & Clausen, R., 2011. The tragedy of the commodity: The overexploitation of the Mediterranean bluefin tuna fishery. *Organization & Environment*, 24(3), pp.312-328.
- Longo, S.B., Clausen, R. & Clark, B., 2015. *The tragedy of the commodity: Oceans, fisheries, and aquaculture*. New Brunswick, New Jersey, and London: Rutgers University Press.
- Mansfield, B., 2004. Neoliberalism in the oceans : "rationalization", property rights, and the commons question. *Geoforum*, 35(3), pp.313-326.
- Mansfield, B., 2007. Articulation between neoliberal and state-oriented environmental regulation: fisheries privatization and endangered species protection. *Environment and Planning A*, 39(8), pp.1926-1942.
- Mansfield, B., 2011. Is Fish Health Food or Poison? Farmed Fish and the Material Production of Un/Healthy Nature. *Antipode*, 43(2), pp.413-434.
- Martinez-Alier, J., 2001. Ecological conflicts and valuation: mangroves vs. shrimp in the late 1990s. *Environment and Planning C: Politics and Space*, 19(5), pp.713-728. Available at: http://www.juniata.edu/projects/it110/ms/References/362_Island Ecosystems/Mangrove productivity and zonation/12_Ecological conflicts shrimp vs mangrove.pdf.
- Martinez-Alier, J., 2009. Social metabolism, ecological distribution conflicts, and

- languages of valuation. *Capitalism Nature Socialism*, 20(1), pp.58–87.
- Martinez-Alier, J., Kallis, G., Veuthey, S., Walter, M. & Temper, L., 2010. Social metabolism, ecological distribution conflicts, and valuation languages. *Ecological Economics*, 70(2), pp.153–158.
- MCS, 2013. Marine Conservation Society aquaculture policy and position paper. Available at: http://www.mcsuk.org/downloads/fisheries/MCS%20policy%20%26%20position%20papers/MCS_Aquaculture_Policy_Paper_2013.pdf
- Meadows, D., Randers, J., & Meadows, D., 2004. *A synopsis. Limits to growth: the 30-year update*. Vermont: Chelsea Green Publishing.
- Meltzoff S.K. & LiPuma, E., 1986. The social and political economy of coastal zone management: shrimp mariculture in Ecuador. *Coastal Management*, 14, pp.349–380.
- Mente, E., Pantazis, P., Neofitou, C., Aifanti, S., Santos, MB., Oxouzi, E., Bagiatis, V., Papapanagiotou, E., Kourkouta, V. & Soutsas, K., 2007. Socioeconomic interactions of fisheries and aquaculture in Greece: a case study of South Evoikos Gulf. *Aquaculture Economics and Management*, 11(3), pp.313–334.
- MoFAL, 2013. *Structural changes and reforms on Turkish Agriculture 2003-2013*. Available at the Ministry of Food, Agriculture, and Livestock website: http://www.tarim.gov.tr/Belgeler/ENG/changes_reforms.pdf
- MoFAL, 2016. *Su ürünleri istatistikleri 2016*. Available at the Ministry of Food, Agriculture, and Livestock website: <http://www.tarim.gov.tr/sgb/Belgeler/SagMenuVeriler/BSGM.pdf>
- MoFAL, 2017. *Su ürünleri yetiştiriciliğinin dünü bugünü*. Presentation in 5th Aquaculture Workshop, 24 February 2017. Available at: <http://www.suymerbir.org.tr/wp-content/uploads/01-Su-Ürünleri-Yetiştiriciliğinin-Dünü-Bugünü.pdf>
- Moore, J.W., 2000. Sugar and the expansion of the early modern world economy. *Review: A Journal of the Fernand Braudel Center*, 23(3), pp.409–433.
- Moore, J.W., 2010a. “Amsterdam is standing on Norway”. Part I: The alchemy of capital, empire and nature in the diaspora of silver. *Journal of Agrarian Change*, 10(1), pp.33–68.
- Moore, J.W., 2010b. “Amsterdam is standing on Norway”. Part II: The global North Atlantic in the ecological revolution of the long seventeenth century. *Journal of Agrarian Change*, 10(2), pp.188–227.
- Moore, J.W., 2011. Transcending the metabolic rift: A theory of crises in the capitalist world-ecology. *Journal of Peasant Studies*, 38(1), pp.1–46.
- Moore, J.W. 2015. *Capitalism in the web of life: ecology and the accumulation of capital*. London and New York: Verso Books.
- Nagar, R. & Raju, S., 2003. Women, NGOs and the contradictions of empowerment

- and disempowerment: A conversation. *Antipode*, 35(1), pp.1–13.
- Naylor R, Burke M., 2005. Aquaculture and ocean resources: raising tigers of the sea. *Annual Review of Environment and Resources*, 30, pp.185–218.
- Nielsen, R., 2012. Introducing individual transferable quotas on nitrogen in Danish fresh water aquaculture: Production and profitability gains. *Ecological Economics*, 75, pp.83–90.
- Noakes D.J., Fang L., Hipel K.W. & Kilgour D.M., 2003. An examination of the salmon aquaculture conflict in British Columbia using the graph model for conflict resolution. *Fisheries Management & Ecology*, 10, pp.123–37.
- O’Higgins, T., Farmer, A., Daskalov, G., Knudsen, S. & Mee, L., 2014. Achieving good environmental status in the Black Sea: Scale mismatches in environmental management. *Ecology and Society*, 19(3), 54.
- OJ, 2013. Official Journal of the European Union on the Common Fisheries Policy, No. L354, 28.12.2013. 22–61.
- OJ, 2014. Official Journal of the European Union on the European Maritime and Fisheries Fund, No. L149, 20.05.2014. 1–66.
- Orta-Martínez, M. & Finer, M., 2010. Oil frontiers and indigenous resistance in the Peruvian Amazon. *Ecological Economics*, 70(2), pp.207–218.
- Ökte, E., 2002. Grow-Out of sea bream *Sparus aurata* in Turkey, particularly in a land-based farm with recirculation system in Çanakkale: Better use of water, nutrients and space. *Turkish Journal of Fisheries and Aquatic Sciences*, 2, pp.83–87.
- Pauly, D., Alder, J., Bennett, E., Christensen, V., Tyedmers, P. & Watson, R., 2003. The future for fisheries. *Science*, 302(5649), pp.1359–1361.
- Pauly, D., Christensen, V., Dalsgaard, J., Froese, R. & Torres Jr., F., 1998. Fishing down marine food webs. *Science*, 279, pp.860–863.
- Pauly, D. & Zeller, D., 2014. So long, and thanks for all the fish: The Sea Around Us, 1999-2014, A fifteen year retrospective. Fisheries Centre, The University of British Columbia, Canada. Available at: http://www.seaaroundus.org/wp-content/uploads/2015/01/small_SO_LONG_-_report_to_Pew-Dec-03-w-cover.pdf
- Peel D. & Lloyd M.G., 2008. Governance and planning policy in the marine environment: regulating aquaculture in Scotland. *The Geographical Journal*, 174(4), pp.361–73.
- Peet, R. & Watts, M., eds. 1996. *Liberation ecologies: Environment, development, social movements*. London: Routledge.
- Pelletier, N.L., Ayer, N.W., Tyedmers, P.H., Kruse, S.A., Flysjo, A., Robillard, G., Ziegler, F., Scholz, A.J. & Sonesson, U., 2007. Impact categories for life cycle assessment research of seafood production systems: review and prospectus. *The International Journal of Life Cycle Assessment*, 12(6), pp.414–421.

- Peluso, N.L., 2007. Enclosure and privatization of neoliberal environments. In: N. Heynen, J. McCarthy, S. Prudham & P. Robbins, eds. *Neoliberal environments: false promises and unnatural consequences*. London: Routledge, pp.89–93.
- Perdikaris, C., Chrysafi, A. & Ganiyas, K., 2016. Environmentally friendly practices and perceptions in aquaculture: A sectoral case-study from a Mediterranean-based industry. *Reviews in Fisheries Science and Aquaculture*, 24(2), pp.113–125.
- Perdikaris, C. & Paschos, I., 2011. Aquaculture and fisheries crisis within the global crisis. *Interciencia*, 36(1), pp.76–80.
- Perreault, T., Bridge, G. & McCarthy, J., eds., 2015. *The Routledge handbook of political ecology*. London, New York: Routledge.
- Polanyi, K., 1977. The economic fallacy. In: H. Pearson, ed. *The livelihood of man*. New York: Academic Press, pp.5–34.
- Polanyi, K., 2001[1944]. *The great transformation: The political and economic origins of our time*. 2nd ed. Boston: Beacon Press.
- Pontecorvo, G., 1988. The enclosure of the marine commons. Adjustment and redistribution in world fisheries. *Marine Policy*, 12(4), pp.361–372.
- Rad, F. & Köksal, G., 2000. An overview of aquaculture in Turkey: With emphasis on sea bass and sea bream. *Aquaculture Economics & Management*, 4(3–4), pp.227–239.
- Radovich, J., 1982. *The collapse of the California sardine fishery: What have we learned?* CalCOFI Reports, 23, pp.56-78. Available at: http://calcofi.org/publications/calcofireports/v23/Vol_23_Radovich.pdf
- Ridler, N.B., 1997. Rural development in the context of conflictual resource usage. *Journal of Rural Studies*, 13(1), pp.65–73.
- Robbins, P., 2004. *Political ecology: A critical introduction*. Oxford: Blackwell.
- Rockström, J., Steffen, W., Noone, K., Persson, A., Chapin, F.S. & Lambin, E.F., 2009. A safe operating space for humanity. *Nature*, 461, pp.472– 475.
- Rodríguez-Labajos, B. & Martínez-Alier, J., 2013. The economics of ecosystems and biodiversity: Recent instances for debate. *Conservation and Society*, 11(4), p.326-342.
- Romani, S. 2015. Being NGO girls: gender, subjectivities and everyday life in Kolkata. *Gender, Place & Culture*, 23(3), pp.365-380.
- Saguin, K., 2016. Blue Revolution in a Commodity Frontier: Ecologies of Aquaculture and Agrarian Change in Laguna Lake, Philippines. *Journal of Agrarian Change*, 16(4), pp.571–593.
- SAR, 2014. Seas At Risk. *Priorities for environmentally responsible aquaculture in the EU: Joint NGO paper*. August 2014. Available at: http://www.seas-at-risk.org/images/pdf/archive/2014/Joint_NGO_position_paper_-_aquaculture_-_FINAL_15_August_2014.pdf

- SAR, 2015. Seas At Risk. *Ensuring sustainable aquaculture feed ingredients. Policy paper*. November 2015. Available at: http://www.seas-at-risk.org/images/pdf/Reports/2015/SAR_Feed_Policy_paper_FINAL_16_Nov_2015.pdf
- Save Bantry Bay, 2014. Available at: <http://savebantrybay.org> [last accessed 20.03.14].
- Schlosberg D. 2007. *Defining environmental justice: theories, movements and nature*. Oxford: Oxford University Press.
- Schlosberg D. 2013. Theorising environmental justice: the expanding sphere of a discourse. *Environmental Politics*, 22(1), pp.37–55.
- Schrank, W.E., 2005. The Newfoundland Fishery: Ten Years After the Moratorium. *Marine Policy*, 29(5), pp.407–420.
- Sen A.K., 1990. Development as capability expansion. In: K. Griffin & J. Knight, eds. *Human development and the international development strategy for the 1990s*. London: Macmillan Press, pp. 41–58.
- Shore, C., 2011. ‘European governance’ or governmentality? The European Commission and the future of democratic government. *European Law Journal*, 17(3), pp. 287–303.
- Silva-Macher, J.C. & Farrell, K.N., 2014. The flow/fund model of Conga: Exploring the anatomy of environmental conflicts at the Andes–Amazon commodity frontier. *Environment, Development and Sustainability*, 16(3), pp.747–768.
- St Martin, K., 2007. The difference that class makes: Neoliberalization and non-capitalism in the fishing industry of new england. *Antipode*, 39(3), pp.527–549.
- STECF, 2012. *Economic performance of the EU aquaculture sector (STECF-OWP-12-03)*. Luxembourg: JRC Scientific, Technical and Economic Committee for Fisheries.
- STECF, 2013a. *Summary of the 2013 economic performance report on the EU aquaculture sector (STECF 13-30)*. Luxembourg: JRC Scientific, Technical and Economic Committee for Fisheries.
- STECF, 2013b. *The economic performance of the EU aquaculture sector (STECF 13-29)*. Luxembourg: JRC Scientific, Technical and Economic Committee for Fisheries.
- STECF, 2013c. *The economic performance of the EU aquaculture sector – 2012 exercise (STECF-13-03)*. Luxembourg: JRC Scientific, Technical and Economic Committee for Fisheries.
- Stonich, S.C. & Bailey, C., 2000. Resisting the blue revolution: contending coalitions surrounding industrial shrimp farming. *Human Organization*, 59(1), pp.23–36.
- Subirats, J., 2011. *Otra sociedad, ¿otra política? De «no nos representan» a la democracia de lo común*. Barcelona: Icaria.

- SUYMERBİR, 2014. *Su ürünleri yetiştiriciliği sektör raporu*. Su Ürünleri Yetiştiricileri Üretici Merkez Birliği, Ankara. Available at: <http://www.suymerbir.org.tr/wp-content/uploads/1/Rapor-2014.compressed.pdf>
- SWAN & Coastwatch, 2014. Aquaculture in Ireland in the context of EU Water Law (MSFD & WFD): challenges and opportunities. SWAN(Sustainable Water Network)/Coastwatch Seminar, 30th October 2013, European Union House, Dublin. Available at: <http://www.swanireland.ie/wp-content/uploads/2011/02/SWAN-Coastwatch-Aquaculture-Seminar-Report.doc> [last accessed 20.03.14].
- Tacon, A.G.J. & Metian, M., 2008. Global overview on the use of fish meal and fish oil in industrially compounded aquafeeds: Trends and future prospects. *Aquaculture*, 285(1-4), pp.146-158.
- TAGEM, 2013. *I. Balıkçılık Çalıştayı sonuç raporu*. 4-6 November 2013, Antalya. Tarımsal Araştırmalar ve Politikalar Genel Müdürlüğü. Available at: http://balik.tagem.gov.tr/calistay/calistay_sonuc.pdf
- Tatenhove, J.P.M.V., 2016. The environmental state at sea. *Environmental Politics*, 25 (1), pp.160-179.
- Tiller, R., Brekken, T. & Bailey J., 2012. Norwegian aquaculture expansion and Integrated Coastal Zone Management (ICZM): simmering conflicts and competing claims. *Marine Policy*, 36, pp.1086-1095.
- TNI Agrarian Justice Programme, Masifundise & Afrika Kontakt, 2014. *The Global Ocean Grab: A Primer*. Available at: https://www.tni.org/files/download/the_global_ocean_grab.pdf
- TNI, WFFP & Afrika Kontakt, 2013. *Human rights vs property rights: Implementation and interpretation of the SSF Guidelines*. Available at: https://www.tni.org/files/article-downloads/human_rights_versus_property_rights_implementation_of_the_ssf_guidelines_en.pdf
- Ulman, A., Bekişoğlu, Ş., Zengin, M., Knudsen, S., Ünal, V., Mathews, C., Harper, S., Zeller, D. & Pauly, D., 2013. From bonito to anchovy: A reconstruction of Turkey's marine fisheries catches (1950-2010). *Mediterranean Marine Science*, 14(2), pp.309-342.
- Urkidi L. & Walter M. ,2011. Dimensions of environmental justice in anti-gold mining movements in Latin America. *Geoforum*, 42, pp.683-695.
- Vanderveest, P., Flaherty, M. & Miller, P., 1999. A political ecology of shrimp aquaculture in Thailand. *Rural Sociology*, 64(4), pp.573-596.
- Varjopuro R, Sahivirta E, Mäkinen T. & Helminen H., 2000. Regulation and monitoring of marine aquaculture in Finland. *Journal of Applied Ichthyology*, 16, pp.148-156.
- Veuthey, S. & Gerber, J.F., 2012. Accumulation by dispossession in coastal Ecuador:

- Shrimp farming, local resistance and the gender structure of mobilizations. *Global Environmental Change*, 22(3), pp.611–622.
- Watson, R. & Pauly D., 2001. Systematic distortions in world fisheries catch trends. *Nature*, 414, pp.534-536.
- Weeks, P., 1992. Fish and People - Aquaculture and the Social-Sciences. *Society & Natural Resources: An International Journal*, 5(4), pp.345–357.
- Watts, M.J., 2000. Political ecology. In: E. Sheppard & T. Barnes, eds. *A companion to economic geography*. Oxford: Blackwell, pp. 257–274.
- Wetherell, M., Taylor, S. & Yates, S.J., 2001. *Discourse as data: a guide for analysis*. London, Thousand Oaks, Delhi: Sage.
- Whitmarsh D. & Wattage P., 2006. Public attitudes towards the environmental impact of salmon aquaculture in Scotland. *European Environment*, 16(2), pp.108–121.
- WWF, 2014. Farmed Seafood. Available at: <http://worldwildlife.org/industries/farmed-seafood> [last accessed 20.03.14].
- Yucel-Gier, G., Uslu, O. & Kucuksezgin, F., 2009. Regulating and monitoring marine finfish aquaculture in Turkey. *Journal of Applied Ichthyology*, 25(6), pp.686–694.

Appendices

Appendix 2.1. List of code families with their corresponding number of codes and quotes

	Code Families	No. of Codes	No. of Quotes
1	Actors/stakeholders	18	137
2	Competition - imports	25	220
3	Consumer demands	10	141
4	Economy	20	114
5	Environment - ecosystem	30	149
6	Environmental problems	36	238
7	Fisheries vs. Aquaculture	34	173
8	Food security	23	157
9	Governance - transparency	68	617
10	Growth	20	192
11	Job creation	23	127
12	Local economies and development	20	102
13	Local opposition (conflicts) - social acceptance	33	264
14	Market	16	38
15	Participation	18	121
16	Planning, assessment and monitoring	39	441
17	Quality: health, social and environmental standards	24	233
18	Research, knowledge/knowhow, data, information	24	219
19	Sustainability	36	237

Appendix 2.2. List of information sources

List of information sources			
Doc- ument no.	Institution	Publi- cation year	Document
1	Centre for Environment, Fisheries & Aquaculture Science (CEFAS)	2014	Report C6078 submitted to the European Commission. <i>Background information for sustainable aquaculture development addressing environmental protection in particular (SUSAQ): Sustainable Aquaculture Development in the context of the Water Framework Directive and the Marine Strategy Framework Directive.</i>
2	European Aquaculture Society (EAS)	2011	<i>Aquaculture Europe</i> . Vol. 36 (2) June.
3	European Aquaculture Technology and Innovation Platform (EATIP)	2012	<i>Outputs of aquaculture research funded by the European Union - Consumer Interests</i>
4	European Aquaculture Technology and Innovation Platform (EATIP)	2013	<i>Report of the 5th Annual Meeting</i>
5	European Bureau for Conservation and Development (EBCD)	2012	<i>New strategy for the European Aquaculture</i>
6	European Commission (EC)	2009a	Commission Staff Working Document Impact Assessment. <i>Building a sustainable future for aquaculture: A new impetus for the Strategy for the Sustainable Development of European Aquaculture</i> {COM(2009) 162} {SEC(2009) 454}, SEC(2009) 453.
7	European Commission (EC)	2009b	Commission Communication <i>Building a sustainable future for aquaculture: A new impetus for the Strategy for the Sustainable Development of European Aquaculture</i> {SEC(2009) 453} {SEC(2009) 454}, Brussels, 8.4.2009 COM(2009) 162 final
8	European Commission (EC)	2011a	Commission Staff Working Paper Impact Assessment on the <i>Common Fisheries Policy [repealing Regulation (EC) N° 2371/2002]</i> . 13 July 2011 SEC(2011) 891
9	European Commission (EC)	2011b	Commission Staff Working Paper, Summary of the Impact Assessment on the <i>common organisation of the markets in fishery and aquaculture products</i> {COM(2011) 416 final} {SEC(2011) 883 final}. 13 July 2011 SEC(2011) 884 final

10	European Commission (EC)	2012a	Commission Communication. <i>Blue Growth opportunities for marine and maritime sustainable growth.</i> 13.9.2012 COM(2012) 494 final
11	European Commission (EC)	2012b	<i>Guidance on Aquaculture and Natura 2000: Sustainable aquaculture activities in the context of the Natura 2000 network.</i>
12	European Commission (EC)	2013	Commission Communication. <i>Strategic guidelines for the sustainable development of EU aquaculture,</i> COM(2013) 229 final, 29.4.2013.
13	European Commission (EC)	2014a	Commission Staff Working Document <i>Marine Knowledge 2020: roadmap - Innovation in the Blue Economy realising the potential of our seas and oceans for jobs and growth {COM(2014) 254 final}</i> Brussels, 8.5.2014 SWD(2014) 149 final)
14	European Commission (EC)	2014b	Corrigendum - <i>Innovation in the Blue Economy: realising the potential of our seas and oceans for jobs and growth</i> Brussels, 13.5.2014 COM(2014) 254 final/2
15	European Court of Auditors	2014	<i>Special Report: The effectiveness of European Fisheries Fund support for aquaculture</i>
16	European Economic and Social Committee (EESC)	2013	<i>Opinion of the European Economic and Social Committee on the Communication from the Commission– Strategic Guidelines for the sustainable development of EU aquaculture COM (2013) 229 final.</i> NAT/605 Sustainable aquaculture, Brussels. 16 October 2013
17	European Parliament (EP), Directorate-General for Internal Policies, Policy Department B, Structural and Cohesion Policies - Fisheries	2009a	<i>Regulatory and Legal Constraints for European Aquaculture.</i>
18	European Parliament (EP), Directorate-General for Internal Policies, Policy Department B, Structural and Cohesion Policies - Fisheries	2009b	<i>European Aquaculture Competitiveness: Limitations and Possible Strategies</i>
19	European Parliament (EP)	2014	Fact Sheets on the European Union. <i>European Aquaculture-2014.</i>
20	Euro-Pêche (FEAP) and COPA (European farmers)- COGECA(European agri-cooperatives)	2013	<i>EU/Fisheries: Mixed feelings amongst European Fisheries and aquaculture professionals on the political agreement reached by the European Parliament and Council on the reform of the CFP - Press release: EP(13)57/FISH(13)4474: 2</i>

21	Federation of European Aquaculture Producers (FEAP)	2012	<i>Annual Report 2012</i>
22	Federation of European Aquaculture Producers (FEAP)	2013	Press release - Aquaculture in Motion 2013
23	Federation of European Aquaculture Producers (FEAP)	2014	<i>Annual Report 2014</i>
24	International Federation of Organic Agriculture Movements (IFOAM) EU Group	2010	<i>Organic Aquaculture: EU Regulations (EC) 834/2007, (EC) 889/2008, (EC) 710/2009 - Background, Assessment, Interpretation.</i>
25	Joint Research Centre Technical Reports (JRC)	2012	<i>An approach towards European Aquaculture Performance Indicators: Indicators for Sustainable Aquaculture in the European Union</i>
26	Marine Conservation Society (MCS)	2013	<i>Marine Conservation Society Aquaculture Policy and Position Paper</i>
27	Official Journal of the European Union (OJ)	2009	Official Journal of the European Union on <i>organic aquaculture animal and seaweed production</i> No. L 204, 06.08.2009. p.15-34.
28	Official Journal of the European Union (OJ)	2013	Official Journal of the European Union on <i>the Common Fisheries Policy</i> , No. L354, 28.12.2013, pp. 22-61
29	Official Journal of the European Union (OJ)	2014	Official Journal of the European Union on <i>the European Maritime and Fisheries Fund</i> , No. L 149, 20.05.2014, p.1-66
30	Seas at Risk (SAR)	2014	<i>Priorities for environmentally responsible aquaculture in the EU: Joint NGO Paper</i>
31	Scientific, Technical and Economic Committee for Fisheries (STECF)	2012	JRC Scientific, Technical and Economic Committee for Fisheries. <i>Economic Performance of the EU Aquaculture Sector (STECF-OWP-12-03).</i>
32	Scientific, Technical and Economic Committee for Fisheries (STECF)	2013a	<i>Summary of the 2013 Economic Performance Report on the EU Aquaculture Sector (STECF 13-30).</i>
33	Scientific, Technical and Economic Committee for Fisheries (STECF)	2013b	<i>The Economic Performance of the EU Aquaculture Sector (STECF 13-29).</i>
34	Scientific, Technical and Economic Committee for Fisheries (STECF)	2013c	<i>The Economic Performance of the EU Aquaculture Sector – 2012 exercise (STECF-13-03).</i>

Appendix 3.1. List of interviews

- 1) Baltics – NGO network representatives, 11.04.2013
- 2) Brussels – NGO representative, 07.03.2013
- 3) Brussels – NGO representative, 05.03.2013
- 4) Brussels – NGO representative, 04.03.2013
- 5) Brussels – NGO representative, 11.03.2013
- 6) Brussels – Aquaculture sector representative, 22.04.2013
- 7) Brussels – Public administration (DG Environment), 22.04.2013
- 8) Brussels – Public administration (DG Mare), 23.04.2013
- 9) Cyprus – Researcher, 28.08.2013
- 10) France – NGO representative, 07.08.2013
- 11) Greece – NGO representative, 07.02.2013, 30.07.2013
- 12) Greece – NGO representative, 18.07.2013
- 13) Ireland – NGO representative, 03.09.2013
- 14) Netherlands – NGO representative, 01.03.2013
- 15) Norway – Environment Agency, 13.09.2013
- 16) Norway – Researchers, 18.09.2013
- 17) Norway – Association of Hunters and Anglers, 16.09.2013
- 18) Norway – NGO representative, 31.07.2013
- 19) Norway – NGO representative, 25.07.2013
- 20) Norway – NGO representative, 28.06.2013
- 21) Portugal – NGO representative and researcher, 02.08.2013
- 22) Portugal – Researcher, 08.03.2013
- 23) Spain – NGO representative and researcher, 12.09.2013
- 24) Spain – NGO representative, 04.02.2013
- 25) Spain – Sector representative, 13.09.2013
- 26) UK-Scotland – NGO representative, 08.02.2013
- 27) UK-Scotland-Ireland-Norway - Researcher and activist, 11.04.2013

Appendix 3.2. Reference list of the Table 3.2.

Number of the article	References
[30]	Gouletquer & Le Moine (2002)
[31]	Mente <i>et al.</i> (2007)
[32]	Phyne (1997)
[33]	Tiller <i>et al.</i> (2012)
[35]	Liu <i>et al.</i> (2011)
[38]	Varjopuro <i>et al.</i> (2000)
[40]	Deidun <i>et al.</i> (2011)
[41]	Christiansen (2013)
[42]	Freitas <i>et al.</i> (2007)
[43]	Peel & Lloyd (2008)
[44]	Ridler (1997)

Appendix 4.1. List of interviewees, their institutions, and cities

Interviewee #	Institution	City
Interviewee #1	The Ministry of Food, Agriculture and Livestock, the General Directorate of Fisheries and Aquaculture	Ankara
Interviewee #2	The Ministry of Food, Agriculture and Livestock, the General Directorate of Fisheries and Aquaculture	Ankara
Interviewee #3	The Ministry of Environment and Urbanisation, the General Directorate of Environmental Impact Assessment, Permit and Inspection	Ankara
Interviewees #4, #30	The Ministry of Environment and Urbanisation, the General Directorate of Environmental Management, the Marine and Coastal Area Management Department	Ankara
Interviewees #5, #6, #7	The Central Aquaculture Producers' Organization	Ankara
Interviewee #8	Aquaculture consultant	Izmir
Interviewees #9, #10	Ege University, Faculty of Fisheries and Aquaculture	Izmir
Interviewee #11	9 Eylül University, Faculty of Fisheries and Aquaculture	Izmir
Interviewee #12	Aquaculture producer, fish farm and hatchery owner	Izmir
Interviewee #13	Izmir Aquaculture Farmers' and Producers' Organization	Izmir

Interviewee #14	Aquaculture producer (sea bass and sea bream)	Izmir
Interviewee #15	Environmental litigation lawyer	Izmir
Interviewee #16	Karaburun Common Life Platform	Izmir
Interviewee #17	Milas Aquaculture Farmers' and Producers' Organization and the Association of Mugla Fish Farmers	Mugla
Interviewee #18	Aquaculture firm	Mugla
Interviewee #19	Aquaculture firm	Mugla
Interviewees #20, #21, #22	Small-scale and industrial fishing cooperatives	Istanbul
Interviewee #23	Industrial fisherman	Istanbul
Interviewee #24	Industrial fisherman and fish oil factory owner	Istanbul, Rize
Interviewees #25, #26	Marine biologists	Istanbul
Interviewee #27	Slow Food Turkey	Istanbul
Interviewees #28, #29	United Nations Development Program	Ankara