Living on the Edge – Risk, Resources, Resilience and Relocations in the Western Limfjord, ca. 1750-1900

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Purpose and relevance. *This project seeks to explore the risks, ressources, resilience and relocations of small settlements on Agger Tange in western Jutland from the period c. 1750-1900. Our abilities as socities to cope with, through mitigation and adaptation, the human coastlines, we have created in the anthropocene, are crucial for human survival. Juxtaposing these current challenges with historical narratives adds some much needed depth in time and a perspective for the future we shall live in. The project consists of two sub-projects, a PhD project and a separate study by the principal investigator (PI). Both projects share a spatial, temporal and conceptual framework, examining the hypothesis that coastal communities on Agger Tange formed a number of historically contingent socio-ecological niches shaped by the entanglements of environmental forcing, natural resource exploitation and human agency, locally and nationally.*

On a stormy winter night in 1825, the North Sea breached the slender isthmus, Agger Tange in the north-western part of Denmark, and flooded the hinterland. The brackish Limfjord now permanently turned saline. Agger Tange had separated the North Sea from Denmark's largest and economically most important fjord, Limfjorden, an estuary with rich eel and herring fisheries, and a local highway of transportation. No lives were lost immediately, but the breach set off a series of subsequent catastrophies and human attempts to curb the impact of nature's frequent storms and floods. Coastal vegetation was stripped in many places, while the salt water intrusion stressed some of the local marine fauna to the brink of destruction (Poulsen, Holm, MacKenzie, 2007).

The Agger Tange area is one of the most remote and desolate places in Denmark. Just a couple of kilometers wide, this sandy stretch of barren fields was home to a few hundred, hardened people, who lived off the land, and not least off the sea. 'They are men of the sea, their (inland) neighbours are men of the land,' the Danish novelist Blicher wrote a few years later (Blicher, 1838). The area was frequently hit by violent storms and floods throughout history (Gram-Jensen, 1985), and the perils of the sea and the prevailing westerlies provided daily struggles between man and nature. A pilot study of Agger parish registers from Agger, shows that emigration quadrupled in 1825 and again 1839-40, two years with multiple storms and floods. Yet, many other storms did not prompt a similar exodus (Rigsarkivet, *Agger Sogns Kirkebog*, 1814-1868). While the extreme weather events are well recorded, the human response is little understood, and both sub-projects will address human response. The PhD project has its main focus on the settlements on the isthmus, while the PI's sub-project is oriented towards the changing socio-ecological niches in the fisheries.

The PhD project will analyse how, from the 1500s until ca. 1880, local settlements succumbed to the forces of nature. A least 7 known sites, are now situated several meters below the surface of the

North Sea. Staying on or relocating was a constant dilemma for people living on the edge of sea and sand. From the point of view of individual families, and for the local and national administration, the material world of Agger Tange was the scene of frequent tests of adaptation and resilience. Covering 150 years from 1750-1900 the project will investigate the historical contingency of how this dilemma unfolded until the late 1800s, when major infrastructure investments secured a more stable human landscape.

Today, coastal fortifications such as groynes and dikes provide shields to violent weather on Agger Tange, and in virtually all First World coastal areas. Satellites and computer simulations add credibility to weather forecasts around the Northern Hemisphere, to the point, where the perilous sea has become a faint abstraction for most citizens. This is slowly changing, as global warming and rising sea levels are once again rendering the ocean as a threat. This threat resonates with a past in which the inhabitants around the North Sea were regularly forced to adapt or flee as waves rose.

Theory, Concepts and State-of-the-art. Current environmental history lends inspiration for both sub-projects, emphasizing the contingency of historical change in relationships between man and nature. Within this research field, there is a strong interdisciplinary approach, bridging the knowledge and research found in natural as well as human sciences (Schwerdtner-Máñez & Poulsen, 2016; Worster, 1988; Sörlin & Warde, 2009; Jørgensen et al., 2013).

Relating to the field of in natural disaster history, the state of the art includes a notion that disasters are not disasters per se. Instead, they are events in nature, which can be perceived of and handled as disasters or not. This lends emphasis to human fragility, adaptation and resilience (De Keyzer, 2016; Bavel & Curtis, 2016; Mauch & Pfister, 2009; Parinello, 2013; Winiwarter et al., 2016).

The narratives in this project center on concepts like modernization and the desire to control and manipulate nature through engineering projects such as canals, dikes, croynes and port facilities. With the inspiration of Norwegian historian Fulsås (2003), further intellectual and technological modernization also ensued with the gradual advent of scientifically based weather reports in newspapers and through telegraph and telephone systems as well as safety measures at sea and ashore. From the point of view of the emerging sphere of social welfare policies it is worth noting that the Danish government and private donors alike initiated financial aid for the inhabitants on Agger Tange from the 1840s onwards. The idea was that worthy recipients could receive funds to move away and start over in a more hospitable landscape (Langer, 1980).

Finally, there is a cosmological dimension to life on Agger Tange, where the appropriation of modern knowledge systems went hand in hand with the all pervasive Lutheran denomination. The later period in question saw the rise of an alternative, a relatively dark and fatalistic congregation of the Home Mission, which according to popular legend, set the coastal dwellers apart from the more lively and cheerful villagers in the interior of the Limfjord (Kirk, 1928; Riber Jørgensen, 2018).

Conceptually, these developments, often entangled, have a strong material backbone, where the project will apply the concept of *socio-ecological niche* construction (Russell, 2011) In this way, populations of humans are socially differentiated into groups of actors sharing more similar interests, perceptions and livelihoods than they share with other actor groups. The concept has been applied to skiing in the technofied landscape of the Austrian Alps (Gross & Winiwarter, 2015). In this project (both sub-projects), the application of socio-ecological niches to studies of a concrete set of small and remote settlements along the coastline, will be a novel way of addressing and understanding the historical development of coastal communities.

The concept of *community* is central in the international debate on how, and to what extent, it is possible to conceive of coastal settlements as social arenas, where the will and skill sense of belonging and togetherness can be spurred on and challenged by diverse ideas such as capitalist enterprise, market dynamics, cooperative behaviour, kinship, religion, government interventions and not least – natural hazards and risk assessments (Holm, 2016).

Exploring the development of socio-ecological niches in the western Limfjord over time, both sub-projects aim to analyse the life histories of individuals and families over time, as they became entangled in the threats and opportunites of the natural environment, and the societal efforts to meet these challenges. The choices made in relation to migratory behaviour will be analyzed against the backdrop of current literature and theory of migration history (van Lottum, 2007). The proposed combination of concepts and methods from diverse literature demands a rigid and often quantifiable approach to the data of the PhD project as well as the work of PI.

Compared to other coastal communities, the western Limfjord is different from the Waddensea because of the proximity of rich fishing grounds both in and outside the fjord. Fishing was also part of the combination of economic activities the coastal communities of Bohuslen and much of Norway (Holm, 1991), as well as in coastal Canada and New England (Bolster, 2012; Newell, Ommer & Ommer, 1999). From very different understandings of community, other studies analyzed how fisher-farmer societies adapted to changing natural conditions, where labour migration was a frequent option (Van Lottum, 2007; Fischer et al., 1992). Such studies proliferated since the 1970s in Scandinavia (Christiansen & Mathiesen, 1974; Holm, 1991; Löfgren, 1976, 1979; Sogner, 1994; Stoklund, 1971, 1976, 1988). On the island of Amrum the male population migrated to Amsterdam and Copenhagen (Rheinheimer, 2016; Seerup & Rheinheimer, 2010). Migration and fights over land and fishing rights feature in studies from Atlantic Canada and the US (Payne, 2010; Newell, Ommer & Ommer, 1999). On the islands of Texel and Fanø, and on Cape Cod in the US, tourism supplemented seafaring and farming in the 1800s (McKenzie, 2010; Van Ginkel, 2010; Hahn-Pedersen, 2001), while whaling and sealing secured a windfall for the island of Rømø (Kelm, 1999).

From a cosmological point of view, the population in coastal areas have reasoned their frequent loss of lives, lands and livestock. Gradually religious explanations have been replaced by secular, and since the late 19th century, science-based explanations (Allemeyer, 2006; Rheinheimer, 2004).

Research plan, data gathering for sub-projects. The project will commence on the 1 August 2019 and run for 41 months. The Principal Investigator will be able to allocate 2 months per semester and a total 12 months of work to the project. 80% of the empirical data is already identified in state and local archives.

As for the PhD project, the link between human activity and the changing natural conditions is assessed using archives from a number of government commissions and agencies. Significant archival holdings stem from commission work from major storms and floods, where commissioners took stock of the damages to people, livestock and houses. As a more routine practice the Danish government also set up commissions to inspect and report on the issue of sand drift and soil erosion. From the mid-19th century onwards the Department of Hydraulic Engineering has left a bounty of material from the construction of groynes, dikes and port facilities on the lee side of the isthmus. In addition there is a rich topographical literature from the area. The PhD student will also develop a database centering on the demographic history of Agger Tange. From the 1750s onwards, there is an abundance of parish registers, census material, tax registers (for the later period), and probate inventories, which lend themselves to a thick description of the particulars of this coastal community living on the edge of fjord and ocean. This is a crucial task for the project, but the clear limit in geographical and chronological scope makes it feasible for a PhD project. Between 300-500 people lived in the two parishes on Agger Tange until the 1880s, when huge construction work and the new port of Thyborøn drew hundreds of new workers and families to the area.

With regards the PI's sub-project on fisheries, there is a bounty of both published and unpublished natural science investigations from c. 1830 onwards. In addition, as the fjord fisheries were highly regulated and subject to customs and tax regulations throughout most of the period in question, there is a rich cluster of material available for further research. The annual migration patterns for the pulse seine fishermen, for instance, can be tracked through the so-called *Retsbetjentarkiver*, where local sheriffs checked the gear and lodging of the North Sea fishermen, when fishing in the Limfjord. As many migrant fishermen came from Agger Tange, this work will inform the demographic database and complement the investigation of the PhD student.

Enrichening both sub-projects, these rich and virtually untapped archival resources will add new knowledge to historical landscape changes, migration and settlement patterns, and the connection between societal wealth and status and the risk of falling victim to natural hazards.

Research environment and facilities. The PI brings academic leadership and networks established in the EU-COST Network Oceans Past Platform (€1 mio); HMAP Executive Committee

($1.5 mio.); Navigator project as PI (1.35 mio. DKK), and the ICES Working Group in the History of Fish and Fisheries (WGHIST). Aalborg University's research groups in history (CEPS and CHI) brings an environment with first-rate skills in environmental, social and cultural history, where digital solutions increasingly assist in breaking new ground. This includes the Carlsberg Foundation postdoc Dr. Aske Brock (supervised by PI), who is an expert in early modern family reconstruction and economic history, as well as an advanced user of digital networking tools. Collaboration between AAU and local museums around the Western Limfjord is manifest in the research centre, *Center for Kulturarvsforskning*. The project will also gain from Aalborg University's new *Centre for Digital Social Science* (CALDISS).

The PhD student, Camilla Andersen is already a skilled and experienced user of databases and GIS-mapping as well as historical archival work, but the 6-month stay at the Huygens Institute in Amsterdam will expose her to a top institution working in the cross sections of the emerging digital humanities and more classic social and economic history (see appendix).

The project benefits from an advisory panel with complimentary skills consisting of Prof. Verena Winiwarter, Prof. Poul Holm, Dr. Jelle v. Lottum, and Museum Directors Jytte Nielsen, Mette Lund Andersen and Anders Bloksgaard (see appendices). The panel meets in Aalborg in project year 2, in addition to more informal get-together at the conferences and workshops outlined below.

Dissemination. The project will present sessions at the 2020 conference of the American Society of Environmental History; the 2021 conference of the European Society for Environmental History, and the annual ICES WGHIST expert group meetings. The project culminates with hosting an international conference (50-80 participants) on maritime and environmental history in 2022. The overall project will publish 8 articles, 6 with a single author and 2 articles, where the two sub-projects will complement each other through joint publication. Camilla Andersen's PhD thesis will consist of these 6 articles (2 co-authored) with tentative titles. The PI is responsible for the rest:

- Andersen, C., Mapping soil erosion and settlement in a changing landscape, *Hist. Methods.*
- Andersen, C., Wealth, marriage structure, and occupational changes on Agger Tange, ca. 1750-1880, *Journ. Fam. Hist*.
- Andersen, C. Socio-ecological niche construction at Agger Tange, 1750-1900, *Env. Hist*.
- Andersen, C., Accident-prone? Did poverty play a role for perils related to the impact of storms and floods in the western Limfjord?, *Continuity and Change*
- Andersen, C. & Poulsen, B., Religion, kinship and Limfjord migration, ca. 1825-1920, *Soc. Hist.*
- Poulsen, B. & Andersen, C. Mobility and resilience in pulse seine fishing, *Int. Journ. Mar. Hist.*
- Poulsen, B. North Sea fishermen as migrant agents of modernization *Hist. and Techn.*
- Poulsen, B. Commercial eel fisheries in Europe, c. 1100-1900, *PLoS One.*

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