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# The (In)Vulnerable: the futures of the Halligen in the North Sea in the face of climate change

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## Abstract

Islands and small island groups are among the areas most affected by global climate change and face major adaptation challenges. Their role as hotspots of climate change impacts is widely recognized in the scientific literature, and it is not uncommon for small islands to act as poster children for particular climate-related vulnerability. Nonetheless, many island communities have a long tradition of living with oceanic influences, and the question is whether such habitats, where terrestrial and marine ecosystems overlap, have characteristics that contribute to greater self-regulation and resilience. The question is further whether and how the future or possible futures of such an exposed region and society could unfold, considering the negative impact of climate change and the resulting burden of natural disasters. The Halligen in the southern North Sea are an exceptional example of such a situation, and they are to be examined in this study particularly due to their extremely uncertain future. Questions regarding the future arise even more urgently due to the rapidly advancing sea-level rise in the course of climate change. They were already evident in a local field research in 2014 and for current reasons the collected interview material shall be analyzed under this prospective point of view. So what, under these harsh circumstances, might the futures of the Halligen look like? What does it mean for the future of a habitat and a society when the constant risk of storm surges is multiplied by the global risk of climate change and rising sea level? By examining this question from an interdisciplinary perspective in the present study, multiple answers can be provided. The futures differ significantly depending on the perspective from which one looks into the future. However, it is precisely this multidimensionality and heterogeneity that can pose an advantage when considering the unpredictability of future developments. Choosing this very specific region for the study also adds to the benefit – because: If the conditions change, if the strength of the environmental influences change in regions where two ecosystems overlap and which are particularly vulnerable due to their islandness, dealing with and adapting to the consequences of global warming becomes a glimpse into the future of all of us.

**Keywords** Futures Studies, Global Risks, Psychoanalytic-Ethnological Disaster Research, Climate Change, Island-Studies, Halligen, Cultures of Disaster, Vulnerability, Resilience

## Introduction

Islands and small island groups are among the areas most affected by global climate change – one of the most pressing current and future global risks (see [6, 28]) – and face major adaptation challenges, whereas adaptation can be defined as the process whereby an organism becomes better able to live in its habitat. Their role as hotspots of climate change impacts is widely recognized in the scientific literature, and it is not uncommon for small islands

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to act as poster children for particular climate-related vulnerability. Nonetheless, many island communities have a long tradition of living with oceanic influences, and the question is whether such habitats, where terrestrial and marine ecosystems overlap, have characteristics that contribute to greater self-regulation and resilience – the capacity to withstand or to recover quickly from difficulties. The question further is whether and how the future or possible futures of such an exposed region and society could unfold, considering the negative impact of climate change and the resulting burden of natural disasters. Because: If the conditions change, if the strength of the environmental influences change in regions where two ecosystems overlap and which are particularly vulnerable due to their islandness, dealing with and adapting to the consequences of global warming becomes a glimpse into the future of all of us.

Part of the largest contiguous mudflat area on earth, stretching almost 500 km from Den Helder in the Netherlands to Skallingen in Denmark, are the Halligen—small marshland islands that, offshore from the mainland, barely rise above sea level. The Halligen are a landscape that exceeds the scope of the idea of an ordinary living space, and special conditions are necessary if one wants to live on them permanently. Recurrent, severe storm surges devastate the land and the built-up living environment at regular intervals, and the rising sea level does not hold ideal prospects for the future. The Halligen are not surrounded by dikes to protect them from the floods as is the case on the mainland and on the islands along the entire North Sea coast. They are at the mercy of the storm surge, and several times in history unpredictable, violent floods have destroyed everything and claimed many lives. In most cases, the reconstruction of the houses was accompanied by a simultaneous raising of the terps, as a protection against renewed destruction. After the severe flood in 1962, large sums of government funding were made available to those who complied with the newly decreed safety measures, such as the repeated raising of the mound, but also, for the first time, the construction of a shelter room. Since then, every new house, or at least every warft, has had a reinforced concrete safety room, which is fixed to the warft by pillars also cast in reinforced concrete and is intended to provide security for the inhabitants in the event of further severe storm surges (Fig. 1).

Such catastrophic events have occurred throughout history and continue to manifest in the present of the Halligen. The question that interests us in this article, however, is rather what conclusions can be drawn for the future from the centuries-long course. Because the question of whether and how such catastrophic events influence human condition, vulnerability, resilience, and

development to this day is just not only relevant for analyzing events of the past and present. It is even essential to address a specific risk from a future perspective. And especially with the help of cultural, sociological, and depth psychological-psychoanalytic approaches, it can be discussed and addressed in this article. Because it is a deeply human need to explain the perceived senseless and cruel violence and destruction of a natural disaster – as evident in various traditions – and therefore, it is particularly the understanding approaches of the humanities that come into play in this matter.

## **Main text**

### **Methodology & approach**

In order to explore future scenarios, the focus must first be on existing aspects such as the ongoing threat posed by natural disasters and the risk situation. In this research project, the question of the disaster event is however not limited to external factors, sequences of events and reconstruction attempts, but places a significant focus on the personal processing of the catastrophe and how this is reflected in the mentality, collective identity, vulnerability and resilience factors. With this interest, sensitive layers and the inner life of the interviewees are most likely to be addressed, which requires a cautious and individual approach as a respectful manner. Using a quantitative approach such as questionnaires would not capture fundamental questions of human existence and problems of sense and understanding to a depth that does justice to the depth of the human mind. Even representatives of empirical-quantitative research recognize the limitations of their method in certain research endeavors, as the psychologist Jürgen Bortz writes, "Investigation ideas with [...] philosophical content" [7], p. 15) cannot be precisely examined with a classic-empirical approach. However, precisely this aspect is of considerable importance in the processing of an existential-threatening natural event and requires exploration through a qualitative approach, following the postulate: "The research question determines the choice of the method" [27], p. 173). Most suitable for this purpose are qualitative interviews, considered the "royal road" of empirical social research (cf. regarding the "soft method" in folklore studies [5], p. 18ff.). The capture of experience and perception categories is done inductively, and neither did I want nor could I provide any guidelines or assumptions regarding the evaluations and results of the interviews. Consequently, based on the central principle of openness that should be inherent in any research (cf. [11], p. 343, [27], p. 171, [14], p. 199), the unschematic approach of open interviews was the most suitable to allow the interviewees the greatest freedom of expression in the conversation. Furthermore, there is a potential affiliation with open biographical



**Fig. 1** Halligen and islands offshore the German North Sea coast today. ([https://upload.wikimedia.org/wikipedia/commons/7/7e/Nordfriesisches\\_Wattenmeer\\_D\\_JM.png](https://upload.wikimedia.org/wikipedia/commons/7/7e/Nordfriesisches_Wattenmeer_D_JM.png) |, Begw)

interviews [27], p. 174), even if only a partial aspect of one's life [15]/1980, p. 40f.), in this case, the experience of the storm surge, comes to the fore as a "guideline of life-history narration" [16], p. 19). The individual connection of everyday experiences with the particularly considered "life-historical leitmotif" [17], p. 152) can be developed through the freedom attained in the process of speech and narration and later uncovered in the analysis and evaluation process.

### Experiencing worlds

#### *In the face of disaster, know thyself*

Disasters are inherently in need of 'meaning' and therefore demand comprehensive examination – for both the affected individuals and global observers alike. The latter experience the confrontation through visual disaster communication, providing a media confirmation of the "panic culture" [28], p. 51–69) of the present, which, due to the strong presence of the topic in the media, might be

considered an argument for the oft-stated claim that the twenty-first century could be the century of disasters (cf. [19], p. 133–151). For this reason, disasters could serve as "semantic guiding fossils" [12], p. 145–163), through which the status quo and especially the transformation of societies can be understood as a superordinate phenomenon. In international disaster research, there is a strong argument for a clearer representation of the social order through the influence of disasters. As the cultural anthropologist Eric R. Wolf writes, "The arrangements of a society are most visible when they are challenged by crisis" [33], p. 593). If one were to consider a disaster as a crisis, it could indeed provide a comprehensive view of society and culture and serve as a heuristic instrument. For in the moment of danger, (social) orders become a subject of focus and thus represent a unique opportunity to observe and analyze the process of transformation. In this process, the individual order, specific behavioral patterns, and societal responses become observable

and recognizable, offering an opportunity for in-depth research due to their unique differentiation.

### **Cultures of disaster**

The predisposition of cultures in dealing with disasters is as heterogeneous as the cultures themselves. This leads us to a concept that represents a common denominator in most disaster research projects and is of essential importance for understanding the culture-specific experience and coping mechanisms. It is the concept of vulnerability, which, according to Oliver-Smith and Hoffman, explains the intersections of society, culture, and nature, which are expressed in the process of disasters. Thus, the disaster event is understood within the social, cultural, economic, and political foundations into which it is always embedded. Distinctions in vulnerability, for example, can mean the capacity for change and development or stagnation in comparative studies of affected societies. It raises the question of whether their own transformation is favored or sabotaged [20], p. 17).

Subsequently, the question arises of *how* disasters penetrate this complex structure and can inform us about the culture that is affected. This leads us to the concept of 'Cultures of Disaster' – a concept explored by Greg Bankoff in his study of "natural hazards" in the Philippines. According to this concept there is a close relationship between "a society's vulnerability and the adaptation of its culture in terms of local knowledge and coping mechanisms." [3], p. 36) This refers to cultures in specific regions of the world where the hazard posed by disasters is a real factor and continuously influences the daily lives of the population. Bankoff describes the population in the Philippines from this perspective as such a "Culture of Disaster," which has adapted to the given natural environmental conditions and potential threats, forming its own coping strategies and local knowledge. Not every culture affected by disasters becomes a "Culture of Disaster." Instead, these are cultures in certain areas where the hazard of disasters constitutes an actual and persistent factor that shapes the daily lives of the population. The people have normalized the danger and incorporated it as an integral part of their culture, encompassing everyday life, societal systems, politics, etc. This includes the type of possible agricultural practices, agricultural management, construction methods, and specific migration patterns, all designed to create conditions for living between reciprocity and autarky. These and other strategies allow the inhabitants of hazard-prone areas to assess their risk significantly and align their actions with religious beliefs and a deeply rooted resignation in daily life. The trust in dealing not only with disasters but also with everyday challenges lies predominantly in their own village, neighbors, and, above all, their own family – not

with the authorities and politics, towards which there is a strong skepticism, doubt, and suspicion:

*The result is cultures in which people have successfully striven to come to terms with the threat of hazard in their daily lives, of living in the shadow of the volcano. Such popular attitudes to hazard are largely dismissed in the western discourse of disaster as 'folk' behavior to be replaced in due course by the language of rationality. [4], p. 178).*

The result is cultures that have successfully integrated the threat of natural hazards into their everyday lives – an approach that is frequently dismissed in Western discourses on disasters as "folk behavior" and replaced by the voice of reason. Bankoff's observation is a transition to a current discussion about "disaster cultures," which are mainly located in developing countries in contrast to a "world risk society" [25], p. 13). This discussion is not of further relevance here, but its basic assumption about the location of disaster cultures is pertinent. When applying the previously outlined concept to the area and population of the Halligen, significant parallels and similarities become apparent: Flooding in the form of 'landfall' and storm surges of different magnitudes represent a concrete uncertainty in this landscape and constantly influence the everyday life of the Hallig Frisians. To adequately address these natural conditions, the population developed coping strategies by "normalizing" the danger and accommodating to the influences of nature. The construction of houses is precisely tailored to natural conditions; the warfts are adapted to the height of rising tides and are continually raised. Safety rooms were integrated into the uppermost floor of every residential building and deeply anchored in the warft after the 1962 storm surge to provide maximum security in emergencies. The interviews reveal how they have dealt with the threat throughout their lives and how the population on Hallig Langeness adapts to the challenges of their living environment as effectively as possible.

The descriptions clearly illustrate the coping strategies that can be examined, improved, and adjusted to even harsher conditions following a major disaster like the 1962 storm surge. The forms of agricultural management also adapt to the frequent flooding in the winter months, with the fertile meadows primarily used as summer pastures for the livestock of mainland farmers. Living in a hazardous zone and being constantly exposed require a better assessment of risk, which is essential and possible (cf. Hayen, 2014).

The result is a culture that has mostly successfully adapted to the hazard posed by the North Sea in its daily life. Even the distancing from bureaucracy and politics finds a corresponding expression in Hallig culture, which

dates back to the past but still pervades the present self-conception of the people. The trust they rely on is derived from their own community on the Hallig, their own neighbors, and ultimately their own warft. In the event of a disaster, they must face it alone and rely solely on their own coping strategies and knowledge. While they can count on the support of the wider community and politics in the form of donations and funding for reconstruction after the event, they must confront the specific threat of the sea on a daily basis. The trust in assessment and coping is rooted in their immediate surroundings. Thus, even by Bankoff's impressive standards, the population on the Halligen qualifies as a Culture of Disaster—far from a developing country or the living standards of one. The classification into this specific understanding of a Culture of Disaster arises instead from the continuous influence and extensive determination that the sea exerts on life there.

Consequently, Cultures of Disaster, as understood by Greg Bankoff, can be determined by the everyday presence of threat and the society's response to it. They describe an approach that can only be developed in regions where people live with an acute awareness of the threat. To return to vulnerability and its integration into social, cultural, political, and economic circumstances: The threatened order on the Halligen suggests the ability and willingness of its inhabitants not to prevent their own transformation in the face of the North Sea but to reinforce it, finding a form of coping through change and building resilience through maintaining this willingness to change.

#### How disasters can exist and not exist at the same time

##### *Dimensions of vulnerability*

In order to comprehend and contextualize a catastrophe experienced by a specific population group through its diverse cultural connectedness, a fundamental understanding of the varying vulnerability of people must be generated. The assessment and integration of a natural event into one's own life will depend on this understanding. The indefinite nature of a catastrophe with fluid boundaries can only be evaluated and understood when the context, the cultural background in which it occurs, is considered. Such an evaluation should be a goal of disaster research (cf. [31], p. 107) in order to gather knowledge and expertise for resource generation and efficient application in the broader context.

An integrative approach to assessing the vulnerability of a reference unit, i.e. a population group in relation to a risk, seeks to unite the many factors that interconnect in the complexity of catastrophic processes. Processes, in a precise sense, only become catastrophic through vulnerability. Martin Voss delves deeper into this integrative

approach and emphasizes the importance of treating the researched population as 'experts of their everyday life' while keeping the research framework open to unforeseen aspects that may be considered more significant than the researchers' perspectives. Current scientific vulnerability research covers various spatial and societal reference units, different ecosystems and the diverse risks to which these reference units are exposed. According to Turner et al., vulnerability is defined as "the extent to which a system, subsystem, or system component is likely to experience harm due to exposure to a hazard, either a perturbation or stress/stressor." [30], p. 8074) Following this definition, natural hazards such as storms, floods, earthquakes, or volcanic eruptions are just elements among others. In an integrative vulnerability analysis, the concept of catastrophes dissociates itself from being exclusively tied to 'extreme natural forces', sacrificing analytical precision but promoting the overcoming of reductionism [31], p. 110).

Consequently, disasters become a retrospective indication of the vulnerability of a population or, in other words, a „realfalsification" [9], p. 183) of social orders. This refers to the practical experience of the invalidity of a theory regarding the nature of the world. Within the vulnerability framework, a simple causal relationship between individual elements recedes into the background, replaced by complexity and overlap, ambiguity, and multidimensionality. (cf. [31], p. 110f.)

Within the integrative framework of vulnerability, four distinct elements can be delineated: 1. the reference unit, i.e. the system of focus for analysis, 2. the exposure or hazard, the reference unit's adaptability to disturbances, 3. the societal and environmental conditions, including the influence factors in societies, and, 4. resilience. Resilience here refers to the characteristics of a reference unit that result in a lower susceptibility to catastrophic events. However, resilience will be discussed briefly in this framework to proceed with practical examples. A general assumption, as stated by Voss, is that a system is.

*"more resilient if it can (cognitively, habitually, biophysically, etc.) flexibly respond to changes in itself and its environment. This flexibility or adaptability is influenced, among other things, by the degree of dependence on social and natural resources." [31], p. 117).*

Now, three influencing factors can be differentiated that constitute the resilience in the proposed context of vulnerability. The literature offers various interpretations, especially concerning the two approaches *Adaptive Capacity* and *Coping Capacity* (cf. e.g. [1, 8]). The third approach, *Participative Capacity* is complemented by Voss [31]. To ensure a consistent starting point, these will

be briefly examined below. *Adaptive Capacity* describes the ability to adapt structures, which may result from conscious learning processes (active-reflexive) or, more commonly, through trial and error. This can be observed in everyday life as ‚muddling through‘ [18] as well as in evolution. On the other hand, *Coping Capacity* encompasses all kinds of productive processing methods, which, however, develop not only after experiencing crises or disasters but also after any situation of significant stress. These strategies make challenging, extraordinary situations more tolerable, integrating them into familiar, known routines of everyday life. That includes social networks that generate support and perspectives as well as rituals and customs that reinforce uncertain notions of normalcy. Religion is also one of the coping strategies, explaining the inexplicable and providing missing meaning. Voss sees the coping strategies as highly relevant: "For vulnerability research, coping strategies are of extraordinary importance; they force a culture-specific evaluation of supposedly objective risks." [31], p. 119) For example, on the island of Java in Indonesia it is believed that victims of a volcanic eruption are elevated to a special status, as they are called by the Merapi volcano as wedding guests (cf. [26]). Only by incorporating such coping models and attributions of meaning can vulnerability be assessed subsequently. A comprehensive assessment of the relationship between the advantages of remaining in the danger zone and the potential loss of property or life becomes essential.

Martin Voss describes yet another aspect of resilience in the vulnerability approach: *Participative Capacity*. (on participative capacity in more detail cf. [32]) It refers to the capacity of a reference unit to actively influence the catastrophic event (Fig. 2).

#### ***Langeness: adaption & security in the eternally uncertain***

With this fundamental and essential theory on human vulnerability, the groundwork is laid to examine more closely the experiences and perceptions of the Hallig residents concerning the occurrence of catastrophes. This is the area where the fields of cultural and social sciences are complemented by depth psychology (for analytical concepts in disaster research see also [22, 23]). In the following, we will now focus on the individual experiences, associations, and classifications of storm floods by the residents of Langeness. (The transcribed texts are not included here in the original as it would exceed the scope of the article. For the full interview texts see [13]).

Bente Jensen, Hauke Hayen, and Tade Behrends share their individual memories of storm flood experiences. Through their narratives, they present the realities of three men who have different stories to tell, yet their comments, uncertainties in speech, spontaneous



**Fig. 2** The single warfts on Langeness, distantly visible on the horizon. (own recording, May 2014)

justifications, or remarks, as well as nonverbal communications reveal a context and personal background that contribute to a more comprehensive understanding of the actual content. This, in turn, enables a specific experience and evaluation of the storm flood(s). The component of the inner psyche and its influence plays a significant role here. From this focused examination of the individual, we aim to derive a fundamental conception that is common among the interviewees and, to the extent possible on Langeness, represents a societal pattern in dealing with storm floods. The storm flood experiences of other Langeness residents can serve as a reference point for examination, but they will be investigated in a separate chapter since the birthplace of these individuals is not the Hallig but the mainland, and differences in perception will be considered in the analysis.

The three interviewees were all born, raised and currently reside as adults on Langeness. At the time of the interviews they were 43, 65, and 72 years old, unrelated to each other, and never lived on the same warft. Despite experiencing numerous other storm floods in their lives, their actual memories of storm floods all revolve around their childhood. It seems that these early memories, forming in the minds of the individuals, serve as the foundation for all subsequent storm flood memories. It should be noted that in no case did I initiate the conversation in a way that focused on their earliest childhood memories related to storm floods – the interviewees spontaneously chose to recall their experiences as children or teenagers. This leads us directly to a concept from psychoanalysis and individual psychology that is apparently relevant here. According to Alfred Adler, childhood memories are fragments revealing patterns of action that allow conclusions about one's ‚style of life‘. Adler emphasizes the significance he attributes to thoughts of the past, stating, among other things, the following passage from 1931:

*Of all the psychic expressions, a person's memories are among the most illuminating. In them, he carries admonitions about his weak points and indications of the significance of certain experiences. There are no 'accidental memories.' Out of the unpredictably large number of impressions that befall a person, he selects only those as memories that he – even if only dimly – feels were important for his development. Thus, his memories represent his 'life story,' a story he tells himself to warn or comfort himself, to maintain orientation towards his goal, and to prepare himself to confront the future with a tried and tested style of action. [2]/1979, p. 65).*

According to Adler's perspective, memories fit into the specific life story, reflecting the expression of current security efforts as well as current problems or solutions. Each memory that is considered valuable and retained in one's memory thus stands in a very particular relationship to the individual. This selective apperception, i.e. the attempt to experience and perceive oneself and the environment in a way that corresponds to one's own style of life, relieves the individual of inner psychological tensions. By selecting specific memories, this process provides a sense of security and a homeostatic well-being, allowing individuals to return to their preferred style of life even in threatening situations. The analysis – or in our case, even just perceiving and attributing meaning – of early childhood memories, due to their temporal proximity to the initial formation of one's style of life is, according to Adler ([2]/1979, p. 164ff.), the best method for understanding attitudes towards oneself and one's environment, as well as current behaviors and evaluations. In the case of our earliest storm flood memories, this means that they reveal elements of structure that not only influenced the child's perception but also prove to be immediately relevant for subsequent development. The fact that all of them spontaneously began to talk about their earliest memory of such a natural event indicates the relevance of these memories for the experience of storm floods.

Let us now take a closer look at these memories. In all three early childhood memories of storm floods, similar elements are recalled, even though the extent and level of detail vary significantly. Bente Jensen's first association with storm floods is the flooding of the land, which he connects to positive childhood feelings such as curiosity, excitement and adventure. His first storm flood memory from 1976 primarily involves a mental image of his parents and grandparents moving furniture upstairs to protect it from the water. At that time, the locals did not perceive or feel threatened by

the danger, which was the case in 1981 when he participated in moving belongings to safety. Details in the memory describe specific furniture items – the rolled-up carpet, the sofa on the table, and the stove on the sofa, etc. The associated feeling is one of tranquility. In Hauke Hayen's memory of the storm flood of 1962, a sense of confidence and calmness is also evident, emanating from his local mother. However, his father's (justified) fear introduces an ambivalence in the 13-year-old boy at the time, which likely also persists, albeit unconsciously, in the adult man today. This fear is probably a strong intrapsychic foundation for his various public appearances and comments related to storm floods, as the unresolved tension he experienced as a child is repeatedly addressed, and in the repeated discussion, he seeks to resolve the tension and conflicting emotions. Nevertheless, Hayen also describes a feeling of tranquility when the moon shone into the hay on the attic where him and his brother sought refuge from the flood. Even though the situation had an eerie aspect, it was inherent to life on the Hallig, and a real danger was highly unlikely since – „it probably won't be as bad today.“ (Hayen, 2014) Lastly, let's consider Tade Behrends, who only finds it noteworthy to mention the act of tidying up, rearranging and stacking things inside the house. The only specific detail he recalls is his sister repeatedly pouring water out of the house using a bucket. Thus, all three interviewees unequivocally fall into the category of *Participative Capacity*, the ability to take active influence, allowing for the application of Voss' [31] strategy of influence not only through language and communication but also through actual activities and actions. The Langeness residents' approach to storm surges demonstrates how personal and societal resources, both within and beyond the family, enable them to actively influence the situation. From a depth psychological perspective, the consistently similar pattern of storm flood memories is plausible. The *Participative Capacity* helps to balance their own vulnerability and the exposure to the force of the sea, as well as their limited ability to act, by offering the possibility to actively intervene and ensure greater safety. The *Participative Capacity*, according to Martin Voss, as an important method of communication to the outside world, is also evident, as problems or proposed solutions are consistently communicated to land-circles and the mainland to seek support for improvements. (cf. Hayen, 2014, p. 5) Thus, we turn to the experiences and perceptions of storm floods beyond the acute situation. Bente Jensen emphasizes the relatively limited damage on the Halligen compared to the mainland or other islands, which is attributed to the different construction of houses and roofs, the preparedness for

storms and floods, and significantly better adaptations to the environment. Ongoing efforts involve planning and developing further protective measures, minimizing weaknesses and vulnerabilities as much as possible, and adjusting life to the environmental conditions. For Hauke Hayen as well, life during storm floods is directly related to coping strategies and preventive measures, which maintain overall security but can never guarantee absolute safety. Consequently, continuous development and dealing with more recent risks such as strong winds and hurricanes are essential to further adapt life on the Hallig to achieve maximum safety. These aspects closely linked to the experience of storm floods fall into the category of *Adaptive Capacity* – the Langeness residents' ability for structural adaptation and flexibility through conscious learning processes and/or trial and error. The *Adaptive Capacity* is also present in response to *new* threats like storms and hurricanes that did not reach such extreme dimensions in the past. By intensely engaging with these challenges, life on the Hallig is continually adjusted to environmental conditions, allowing the utilization of *Participative Capacity* and available resources when needed.

Taking into account the three interviews as a whole, it is challenging to envision a population with lower or better-controlled vulnerability in the face of disaster during storm floods. At this point, it is also interesting to note the fundamental absence of eco-anxiety, a fear of the future associated with the increased occurrence of catastrophic events due to climate change (see [24] on eco-anxiety). However, an important point must be noted: Neither Bente Jensen, Hauke Hayen nor Tade Behrends described their experiences of storm floods as an invasion of an idyllic world, a sudden breach of boundaries or a dreadful destruction of culture by nature. Considering the definition of a natural disaster as "a challenge to society and culture," an "abrupt development in the environment that encounters an inadequately prepared society," and results in "significant damage to human life, health, and material values within society" ([29], p. 7), storm surges, from the perspective of the Langeness residents, do not truly qualify as disasters. Although this was not explicitly stated or emphasized in the interviews, it can be inferred from the analysis of the data, taking the definition of disaster into account.

#### ***Oland: natural order?***

In the last chapter, the perception of storm surges was primarily examined in terms of vulnerability. In this chapter, another concept will be included to further understand such events' existential impact on the affected population: the concept of 'order'. The vulnerability approach, as a measure of susceptibility to disaster

events, remains an essential framework of structural adaptation, active influence, and processing. This assesses both the societal constitution and the individual level of vulnerability to an event. However, it becomes necessary to consider the existing order as a created lifeworld. Only then can specific mechanisms of coping and a genuine understanding, which in our case distances itself from the concept of disaster, be identified on the Halligen.

We now turn to the storm surge experiences of four residents of Oland: Johann & Inga Thomsen, Mattes Andresen and Jan Petersen, who also shared their experiences and thoughts in interviews. Whether and to what extent threats and destruction of existing orders have occurred and whether there is an existential break due to these extreme events, could be evident from the storm surge experiences and the traces they leave on the order structure. This will be the focus in the following section to capture the underlying constitution for all subsequent coping and processing strategies (such as vulnerability, resilience, etc.).

On Oland, a disaster can simultaneously exist and not exist. Interestingly, this is expressed in a completely different way than on Langeness. The two indicators of vulnerability and resilience, *Adaptive Capacity* and *Participative Capacity*, which were consistently present in the previous material, are not found on Oland at all. Instead, other elements suddenly come to the fore, such as *Coping Capacity*, which can also act as an indication of resilience. This difference may be due to Oland's different structure, with its village community on just one central warft, leading to different resilience strategies compared to Langeness. *Coping Capacity*, as previously explained, refers to all forms of constructive processing, such as assigning meaning and explanatory models, to make perceived stress manageable. In this sense, Inga Thomsen associates her lesser personal affectedness compared to her more affected neighbors with their migration and deaths, thus providing an explanation for the two moments, both of which are objectively explainable but likely to evoke strong emotions (such as guilt, fear, etc.) and therefore likely to trigger stress. This personal explanation does not relate to manifest facts or observable data; rather, it establishes a connection between feelings, which can bind them and cope with the emotional inexplicability. A similar situation occurs with the story-telling of Mattes Andresen, which also arises from a psychological motivation and clarifies and confirms one's own positioning in a threatening situation. The self-esteem that may waver and be destabilized in such a moment can be regained and solidified, overcoming the momentary disorientation. These constructive forms of processing one's own instability and emotions, expressed through stories and assigning meaning, not



only provide temporary stress reduction but also stabilize in the long run, impacting resilience. Other elements of *Coping Capacity* are also present in Mattes Andresen's narratives, including the assumed causality between dyke breaches on the coastline and increasing safety on the Halligen. This, whether true or not, provides an explanation for the relative sparing of the island's residents in the past and attributes some sense to the sometimes devastating dyke breaches that caused many deaths on the mainland in 1962. While it costs lives on the mainland when the dykes break, the dyke breaches suddenly and rapidly reduce the water level on the Halligen, sparing lives. A similar situation can be seen with the Rungholt myth, which suggests that the prosperous trading city of Rungholt sank into the North Sea during a storm surge due to the sinful behavior of its inhabitants. Again, this provides an explanation for an event that seems senseless and brutal, thus establishing a certain controllability of one's own affectedness. Otherwise, such destruction and threat would be entirely random and uncontrollable, destabilizing the psychological balance and rendering life under constant unpredictability unsustainable. The explanation, the *Coping Capacity*, is constitutive in this case for further living in a threatening landscape.

A natural event like a storm surge, when unpredictable or not integrated into everyday life, is a threat to the established order understood and practiced by a society. At this point, a different perspective must be assumed for the Halligen, as storm surges are part of the societal order and, even if somewhat unpredictable, integrated into everyday life. The special order that incorporates the danger and threat from the outside and thereby can hardly be completely shaken by it is also observable in the interviews. This approach allows us to explore how disasters can simultaneously not be disasters at all.

In the context of an interview, for example, it may seem entirely normal for the interviewee – like Inga Thomsen here – to suddenly and somewhat unexpectedly begin talking about Suden, the tasty salt grass that grows on the sea slopes. It appears like the idea of an older lady, talking about the events of the day or the week. But why is it precisely this topic that she (unconsciously) chose from a multitude of possible topics that occurred on that day or week? For some reason, the unconscious must have considered Suden noteworthy in that moment. The context helps us again in this consideration: The entire remaining time was spent talking about storm surges, which was also the main topic of the interview. The focus shifted from past storm surge experiences to the present, behaviors, life with the sea on the Halligen, fears and threats, until finally reaching the topic of Suden. So what relationship does harvesting the rare plant have to the sea and the relationship to the sea on the Halligen?

It is repeatedly emphasized how tasty, special and valuable the grass is, which only grows due to its proximity to the sea. It is, therefore, a gift, a valued food given directly by the sea. This relativizes the threat and inconvenience posed by the sea during high water or storm surges, creating a kind of balance. The sea may be wild and stormy at times, causing damage to homes and creating dirt, but it also nourishes, provides and sustains the people who dare to live in its immediate vicinity. This balance creates an order that enables a life without internal struggle and is, as a form of coping, simultaneously constitutive of and a part of this order. In this regard, Inga Thomsen refers, in the context of remembering all the experienced storm surges mentioned by her husband, to the water level gauge on Langeness, which represents another element shaping local processing and the local order. The event of a storm surge is thus integrated into the series of identical events that have occurred before. It becomes a format of memory and, as a result, part of the order and collective memory (cf. [10], p. 72).

In the conversation with Mattes Andresen, a completely different element of order becomes apparent. His stories, jokes, and sayings – of which there are five – never mention storm surges or similar events. But why does such a formative, impactful natural event not appear in them? Because, and here again the connection to life-world order – it is *not* a defining natural event on the Halligen. Surely it would be included in some narrative, anecdote, or saying from the past if it were not part of the known order, from which it does not stand out and therefore does not need to be processed in stories.

Similarly, Jan Petersen is convinced that although storm surges can lead to losses, they can also be merciful. The *speechlessness* or *memory heaviness*, as observed in Jan Petersen, is the next order-constituting element, as there simply isn't much to say about storm surges since they are *quite normal*. A *normal* event does not disrupt the life-world order; therefore, situational configurations do not make it a disaster. It would only become a disaster if it affected a socio-material vulnerable action space and overwhelmed the order's inherent processing capacities, as is the case on the coast in the event of a dyke breach. This is perhaps the most significant difference from the societal orders as conventionally conceived in science (e.g. [10]) – that this is an order that has not been established by society but by nature and habitat, and into which society has integrated itself.

## Conclusions

### Futures on the halligen or the invulnerable society

To return to the original question at this point: What might the futures of the Halligen look like? What does it mean for the future of a habitat and a society when the

constant risk of storm surges is multiplied by the global risk of climate change and rising sea levels? By examining this question from an interdisciplinary perspective in the present study, multiple answers can be provided. The futures differ significantly depending on the perspective from which one looks into the future. However, it is precisely this multidimensionality and heterogeneity that is an advantage when considering the unpredictability of future developments (for the multidisciplinary of complex future issues see also [21]).

The first perspective, namely that of the future of the Halligen habitat, the natural geographical perspective, can be summarized briefly: due to the relatively rapid rise in sea levels compared to sediment accumulation, the Halligen are likely doomed in the not too distant future [34]. A future that is under the sword of Damocles of global climatic changes and probably has no future due to their already vulnerable exposure.

As a second future, from a societal perspective and in accordance with the nature of the Frisians as well as a continuation of the past, it can be said that entirely different factors come into play: Resilience, as an interactive phenomenon, a multidimensional and hypothetical construct seeking to capture the dynamic structure in response to breaking disturbances such as storm floods, is very well integrated into everyday life on the Halligen. It manifests not only in crisis situations but just as well in all small, everyday movements and behaviors. A typical characteristic is that the society, despite being in a high-risk zone, performs better than expected based on the circumstances. This is fulfilled on the Halligen, as well as the outstanding resilience and maintenance of functionality after a natural event like a storm flood. Adaptation processes are ever-changing, ready for modification, and immediately attempt to include new threats, such as unexpected storms, in their solutions and thus in their order (cf. Bente Jensen & Hauke Hayen, 2014). The adaptation processes are constantly evolving, ready for change and modification, attempting to incorporate new threats such as unexpected storms into their solutions and thus their order; they have even in this dimension of constant change optimally adapted to the sea and its tides. The Halligen as a structure, composed here from the individual results of the conversation material, are therefore a stronghold of resilience, a success story that is probably so effective precisely because this concept is fully integrated into societal order. From this perspective, the future is painted in a completely different light, that of successful adaptation even to the most adverse circumstances.

Lastly, at this point, psychological elements and the role of the psyche in a possible future scenario should be mentioned. Various capacities were identified and

presented in the individual coping strategies of the interviewees, which have different manifestations and goals, and also differ depending on which Hallig the conversation partner resides on. However, it is a fundamental characteristic of both adaptive, participative, and coping capacity to maintain one's own contribution to the events being processed. The connection of the Hallig residents to their habitat and the sea enables them to free themselves from powerlessness towards regional and global risks and to achieve a lifestyle through activity, adaptation efforts, and attributions of meaning where a sense of community with natural forces is sought rather than an inferiority complex. This leads to a future where life on the Halligen only takes place in coordination and under a compromise of conditions with the sea and will continue to do so in the future. The relationship between humans and nature is the factor that allows risks to arise but also enables a future on the Halligen.

## Interviews

Hauke Hayen, May 6, 2014: Pers. interview. Audio Recorder, 52:20.

Mattes Andresen, May 7, 2014: Pers. interview. Audio Recorder, 33:57.

Inga Thomsen, May 7, 2014: Pers. interview. Audio Recorder, 28:03.

Johann Thomsen, May 7, 2014: Pers. interview. Audio Recorder, 28:03.

Tade Behrends, May 9, 2014: Pers. interview. Audio Recorder, 07:26.

Peter Dreyer, May 9, 2014: Pers. interview. Audio Recorder, 40:03.

Heike Jensen, May 14, 2014: Pers. interview. Audio Recorder, 37:19.

Bente Jensen, May 14, 2014: Pers. interview. Audio Recorder, 01:10:52.

Jan Petersen, May 16, 2014: Pers. interview. Audio Recorder, 01:00:16.

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## Declarations

### Ethics approval and consent to participate

The fieldresearch was anonymised so that participant cannot be recognized by their names or activities. The ethics approval was given by the Sigmund-Freud University Vienna.

### Consent for publication

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