

## Article

# Periphery and Integrated Planning: Coping with Rural and Touristic Challenges across Scales in the German Wadden Sea Region

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**Abstract:** Rural landscapes face multiple challenges, but they can be attractive for developing nature-based tourism. Encouraging place-based participatory governance in local communities represents a relevant transdisciplinary landscape approach. In this study, we map (1) rural and touristic challenges and (2) coping strategies in peripheral–rural municipalities, and we (3) discuss the need for integration of local and regional-level actions. Two island and two mainland municipalities with different demographic profiles and different degrees of touristic specialization in the German Wadden Sea Region were selected as case studies. Through meetings and interviews we mapped perceived challenges and analyzed policies and other coping strategies. We then discuss the need for integration at multiple scales. Island municipalities were more exposed to tourism development challenges than mainland municipalities. Securing public services and welfare, and the sustainable conservation of ecological green infrastructures were particularly challenging. Applying a participatory approach was a coping strategy at the local level. However, there is a need for activities at multiple scales. In coping with rural development challenges, local level participatory approaches and regional planning complement each other. Combination and integration of local and regional-level concepts should be encouraged to support collaborative learning through evaluation.

**Keywords:** demographic transitions; governance; landscape approach; rural development; tourism

## 1. Introduction

Human populations in developed countries and regions across the world are facing shifting age-structures due to rapid transitions towards lower birth rates and an increasing life expectancy. Additionally, new inhabitants and new kinds of jobs in rural areas are no longer provided by traditional natural resource sectors such as agriculture, fisheries, and

forestry. This leads to migration from rural to urban areas within and among countries (e.g., [1]). However, rural decline processes may be partly counter-balanced through amenity migration [2], migration for retirement [3], nature- and culture-based tourism focused on wilderness and biodiversity [4], and attracting new inhabitants through valuable natural and cultural landscapes [5]. These trends bear clear consequences for the social-ecological resilience of rural regions across Europe [6]. Peripheral-rural regions across Europe are thus increasingly facing multiple, complex social-ecological challenges triggered by drivers such as economic globalization, human migration, and climate change, as well as loss of biodiversity and landscape character [7,8]. The unsustainable development of many peripheral-rural areas is reflected in demographic transitions and has been described as an archetypal “wicked challenge” [9,10]. Peripheral-rural areas attractive to nature-based tourism may, however, face a different, and more favorable, situation.

Germany is a polycentric, highly diverse country with more than 80 percent of its territory defined as rural [11], while 78% percent of the population lives in cities (<https://www.cia.gov/the-world-factbook/field/urbanization/> [accessed on 28 March 2023]) The characteristic portfolio of rural challenges sketched above can be identified in Germany as well. Germany’s population has become the second oldest in the world after Japan and is forecasted to age even further in the future [12]. However, regional differences remain immense between the larger cities, which are growing and rejuvenating their populations, and the mainly smaller cities and many rural areas, which are gradually ageing and shrinking.

The Wadden Sea Region along the North Sea coast in Europe is a typical rural-urban gradient ranging from rural, agricultural-dominated landscapes to small towns and cities. The entire Wadden Sea Region extends roughly 500 km along the western coast of the Netherlands, Germany, and Denmark, covering about 10.000 km<sup>2</sup> [13]. Different protected area designations aim at conservation of its unique nature, including the shallow waterbody between the mainland coast and the Frisian Islands. The Wadden Sea Region is designated as a UNESCO World Natural Heritage site, and significant tracts of the coast in Germany are designated as National Parks (IUCN Category II) or belong to a UNESCO Biosphere Reserve. Nature and landscape attributes and values are thus officially acknowledged as major assets for sustainable territorial development, including tourism [14].

To cope with demographic changes in Germany, the Federal Ministry of Education and Research (BMBF) established a funding mechanism called “Innovative Communities” in which municipalities cooperate with scientists and entrepreneurs using the Living Lab approach with the aim of addressing demographic challenges collaboratively. One of the 30 projects funded was the “Wat Nu?” project (<https://kommunen-innovativ.de/wat-nu> [accessed on 28 March 2023]) carried out in 2016–2019 in a section of the German Wadden Sea Region [13], which is the object of this study. The “Wat Nu?” project focused on the East-Frisian peninsula of the Wadden Sea Region, including the administratively autonomous island municipalities in Lower Saxony. This is mainly a rural region with many villages and a few small towns, agriculture still being the dominant form of land-use. Nearby cities such as Wilhelmshaven or Emden show a more diverse economic structure. Agriculture plays a strong economic role. In particular, the island municipalities are touristic hotspots serving the needs of visitors that often come from the urban centers in the rest of Germany [14,15]. They have also undergone economic transitions in the past several decades and have shifted from being dominated by agriculture and fishery to tourism and related services [14,16]. Being coastal, this region is vulnerable to climate change impacts such as more frequent storm surges and sea level rise.

Learning to cope with this suite of challenges requires a landscape approach, e.g., [17]. While such integrated approaches supporting sustainable development towards strong sustainability have been advocated for a long time [15,17–20], and are applied in the Wadden Sea Region, formal audits of what is delivered on the ground are rarely made [21–23]. Learning through evaluation is thus an important professional activity for improving an

understanding of “what really works” [24]. This also applies to Living Labs as a type of landscape approach.

Focusing on the Wadden Sea Region at both local and regional scales, the aims of this study are to map (1) typical rural and touristic challenges and (2) solutions in peripheral–rural municipalities, and (3) to discuss the need for regional integration of collaboration, conservation, and planning. First, we map perceived challenges that are directly related to demographic transitions typical for a peripheral–rural region. Second, we review decision makers’ coping strategies. To fulfil these two aims, we collected qualitative data to examine how decision makers deal with complex and wicked challenges and reviewed policies and the obstacles they face. Third, addressing the necessary regional integrated planning perspective for a sustainable Wadden Sea Region, we discuss how landscape approaches may facilitate the development of novel pathways for coping with rural demographic challenges, thus meeting increased demands for public participation in policy making and increasing the resilience of rural areas [25].

## 2. Materials and Methods

### 2.1. Overview of Methodology

Evaluation as a professional activity plays an important role in improving an understanding about “what really works”. To develop knowledge and translate it into actions on the ground in landscapes as social–ecological systems that support human well-being is a challenge. The role of tourism in coping with rural development issues is one example.

Focusing on learning from a project aimed at supporting rural development in island and mainland contexts in the regionally peripheral Wadden Sea Region in northwest Germany [26], we applied multiple methods to map rural and touristic challenges, associated policies, and other coping strategies (Figure 1).

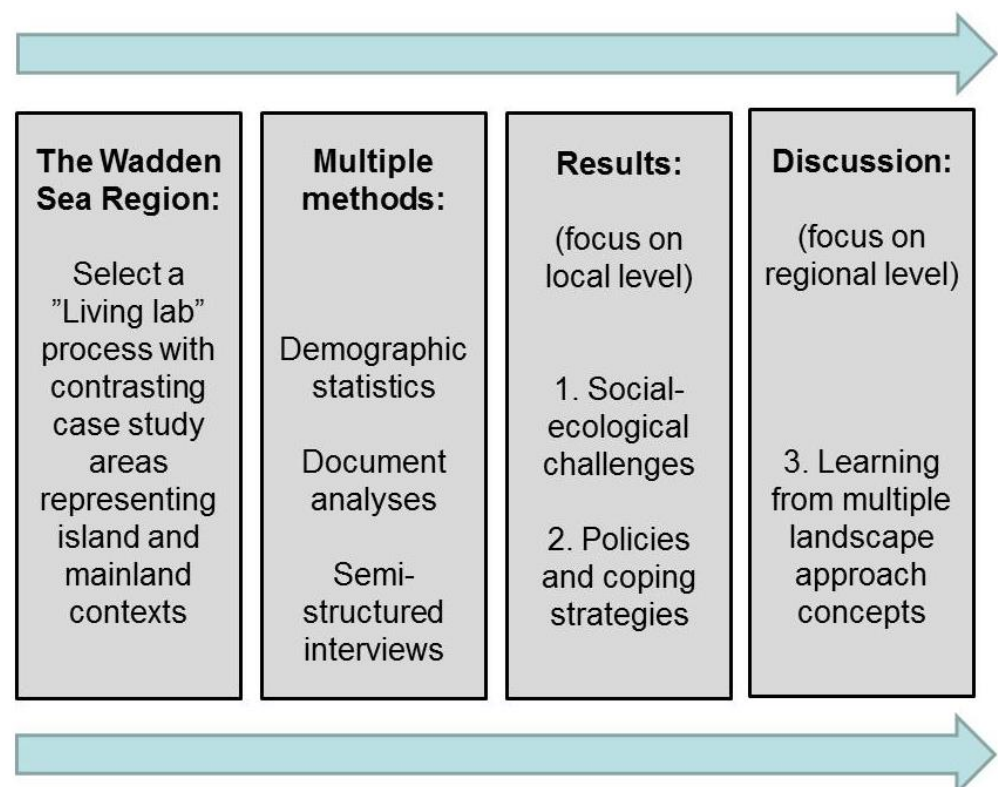
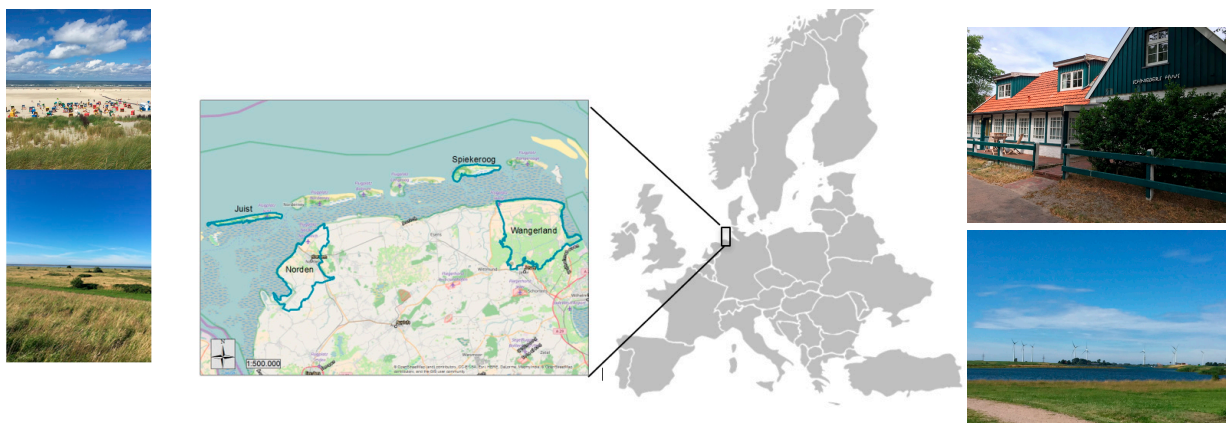


Figure 1. Overview of the flow in this study.

## 2.2. Case Study Areas

The Wadden Sea Region of Lower Saxony in northwestern Germany stretches from the Ems River estuary in the west located at the border with the Netherlands to the estuary of the River Elbe in the east. The Wadden Sea Region is one of the main hotspots for nature-based tourism in Germany [15,27]. Some island municipalities have a long history as tourism resorts dating back to the late 18th century (e.g., Norderney). Similarly, some mainland municipalities have become important tourist destinations seasonally, especially coastal villages and towns [28].

The case study areas include the two island municipalities Juist and Spiekeroog, which comprise about 800 and 1.600 inhabitants, respectively, and two municipalities on the mainland, Norden and Wangerland (Figure 2). Norden is a rural town with ca. 25.000 inhabitants, and Wangerland is a municipality with 16 villages and with less than 10.000 inhabitants in total (see Table 1). The Wangerland municipality sees over 2 million overnight stays per year. However, there is a gradient of tourism-intensity from the top-visited islands to the near-shore mainland resorts. Villages located only 5 to 10 km from the North Sea have a completely different economic and social structure. The case study area is representative of other rural tourist areas in the Wadden Sea Region that have declining populations [27,29].



**Figure 2.** Location of the two island (Spiekeroog and Juist) and two mainland (Norden and Wangerland) municipalities as case study areas in the coastal Wadden Sea Region in the northwest of the federal state of Lower Saxony in Germany [30] (Reprinted/adapted with permission from Nora Mehnen (2023)).

**Table 1.** Statistical characteristics of the case study municipalities [30].

	Island Municipalities		Mainland Municipalities	
	Spiekeroog	Juist	Norden	Wangerland
Inhabitants	806	1515	25,060	9190
Area in km <sup>2</sup>	18	16	106	176
Inhabitants per km <sup>2</sup>	44	92	236	52
Average age	43	45	47	48
Foreigners (total)	113	475	1958	325
Net migration	3	−5	250	−3

The two island municipalities and the two mainland municipalities are affected differently by demographic changes. According to the current official projections [30], the mainland city of Norden is expected to maintain its overall population by 2030, while the population of the municipality of Wangerland will decline over the same period. The islands of Juist and Spiekeroog are expected to slightly gain inhabitants.

The dominant age cohort in Norden in 2014 was 45–65 years (31%). The 65+ generation comprised around 26%. The age cohort of 65+ is expected to rise by 2027, while the number

of 5–15 and 15–25-year-olds is expected to decrease. This is due to the expected influx of retirees, and to the out-migration of the young generation searching for jobs and training which cannot be obtained in the case study municipalities. In Wangerland the situation is similar; the age cohort 25–45 is not changing. The 65+ generation is growing, whilst the number of 15–25-year-olds is declining. On the island Spiekeroog, the number of young people in particular is expected to decrease by 2027. This means that both the cohorts 0–5 years and 15–25 years will likely decrease. All other age cohorts are more or less stable or will increase. The island of Juist shows a relatively stable population development based on the official predictions. The 5–15-years cohort has dropped from 6% in 2017 to 3% in 2019.

In summary, on the islands the average age sits below the national/regional and federal averages. In contrast, in the two mainland municipalities the average age was found to be above the national and federal state averages. The share of the population over 65 years in the mainland municipalities is clearly above the national and federal averages. This is in contrast with the two island municipalities, the average ages of which are clearly below the national average and the average of Lower Saxony due to the specific situation of the islands where people have to move to the mainland if they need more care.

The four case study municipalities have started to cooperate administratively to address challenges arising from demographic changes. These include coping with a lack of skilled labor and poorly developed infrastructure, stressing the need to develop novel governance instruments, and enhancing participation in search of alternative and more resilient futures.

### 2.3. Methods

The object of this study is the Living Lab concept as one type of landscape approach as applied to the two island and mainland municipalities which were funded by the project “Wat Nu?”. The Living Labs approach [31,32] aims at supporting local decision makers dealing with rural development challenges, such as those triggered by demographic changes. Based on ENoLL [33], a Living Lab is “a real-life test and experimentation environment where users and producers co-create innovations” and “a locally based regional, national and international infrastructure set-up to enable innovation processes in which users and value chain-relevant actors actively participate in development, testing and marketing phases. Interactive innovation processes take place gradually in users’ real-life surroundings (user observation, field tests) and user interaction laboratories (e.g., for prototyping)” [34]. Living Lab is mainly used in urban and city contexts [34–36]; <https://enoll.org/> [accessed on 28 March 2023].

Within the “Wat Nu?” project, one aim of the Living Lab methodology was to identify problems and challenges, including how demographic change is occurring and manifesting in each of the municipalities. This involved collection of three kinds of data.

1: Statistical analyses of official demographic data at local and regional levels. These included data drawn from the Lower Saxony Statistical Office and its database (LSN) and data provided by the municipalities. Since the municipalities are very attractive tourist destinations and tourism is the central economic factor of all four municipalities, and thus a key driver for shaping and resolving various challenges in the area, statistics related to tourism were also analyzed.

2: Document analysis of national, regional, and local theoretical and operational policy, planning, and administrative documents. The pre-specified inclusion criteria for documents to be selected were that they must not be older than from the year 2000, that they must have been approved by government agencies at national, regional, and local levels, and that their contents must include terms such demographic change(s), population decline, and ageing society.

3: Semi-structured interviews with selected experts in the field. These experts included political decision makers, people from the local administrations, entrepreneurs, professionals from the health and care sector, local citizens, and association representatives. Interviewees were first contacted via telephone or email, and then approached personally.



The semi-structured interviews concerned demographics, the living environment, and possible future strategies. The interview responses were transcribed and the conversations were coded with the software MaxQDA to extract central concepts. For the Wangerland municipality, a questionnaire and online survey to 85 respondents was used to collect quantitative data. In addition, qualitative data were collected through 8 meetings with administrative decision makers, including mayors, and 36 interviews with administrative staff in the municipalities and local areas. The team of authors brought together (1) researchers following the Wat Nu project as compilers of the collected quantitative and qualitative data, (2) researchers focusing on regional-level governance and planning, and (3) researchers experienced in landscape research.

### 3. Results

#### 3.1. An Overview of Perceived Challenges on Islands vs. Mainland

Each of the municipalities have been facing multiple challenges. Table 2 lists the concrete rural and touristic challenges and issues raised by municipal administrative actors. In total, sixteen typical peripheral–rural challenges (marked X) and eight typical tourism-related challenges (marked Y) were found in four municipalities. The table shows two clear general results. First, overall, being peripheral–rural seems to evoke more challenges ( $n = 16$ ) than being typically touristic. Regarding peripheral–rural challenges, no statistically significant difference was detected between island municipalities and mainland municipalities ( $\chi^2 = 0.060$  with Yates' correction,  $p = 0.81$ ). However, regarding typical touristic challenges, island municipalities were more exposed than mainland municipalities ( $\chi^2 = 18.9$  with Yates' correction,  $p < 0.0001$ ).

**Table 2.** Perceived challenges and issues raised by municipal administration actors. Typical peripheral–rural challenges are denoted with X and typical touristic ones with Y.

Area/Field of Action	Perceived Challenges	Typical Peripheral Rural	Typical Touristic	Mainland		Island	
				Wangerland	Norden	Spiekeroog	Juist
Demography	Decline/change in population structure	X		X	X		
	Low number of young people	X		X	X	X	X
	Out-migration of young people	X		X	X	X	X
	In-migration of elderly		Y	Y	Y		
Competition among land uses	Settlements		Y			Y	Y
	National Park restrictions		Y			Y	Y
	Agriculture vs. Tourism		Y	Y			

Table 2. Cont.

Area/Field of Action	Perceived Challenges	Typical Peripher Rural	Typical Touristic	Mainland		Island	
				Wangerland	Norden	Spiekeroog	Juist
Economics	Lack of specialised workforce	X	Y	X	X	Y	Y
	Only few jobs in academia	X	Y	X	X	Y	Y
	Dominance of tourism sector		Y			Y	Y
	General less attractive jobs	X	Y	X		Y	Y
	High unemployment rate of younger people	X				X	
Public services and Public health sector	Poor recruitment of General Practitioners	X		X		X	X
	No residential care for the elderly	X				X	X
	Difficult emergency medical services	X				X	X
Civil society/social togetherness	Decrease of volunteers, societies, clubs	X				X	X
	Losing local knowledge	X				X	X
	New inhabitants not interested in social life		Y	Y	Y	Y	Y
	Need to strengthen participation of local inhabitants	X		X	X	X	X
Infrastructure facilities	Shortage of rental houses		Y			Y	Y
	Infrastructure is not ready for demographic change	X	Y	X		Y	Y
	Tough financial situation of municipalities	X		X		Y	
	Investments are needed	X	Y	X	X	Y	Y
	“Brain-drain”	X		X		X	X
<b>Total # Typical peripheral–rural challenges</b>		<b>17</b>		<b>12/17</b>	<b>8/17</b>	<b>9/17</b>	<b>9/17</b>
<b>Total # Typical touristic challenges</b>			<b>12</b>	<b>3/12</b>	<b>2/12</b>	<b>11/12</b>	<b>10/12</b>

### 3.2. Key Challenges for Rural Development

#### 3.2.1. Infrastructural and Structural Factors

The perceived challenges affected by demographic drivers were different in the island and the mainland municipalities. The islands have comparatively small populations, which are concentrated in very small areas. For example, on Spiekeroog only about 4% of the area is used for settlements or transport infrastructure (81 ha of 1825 ha). The rest of the island is designated as a national park (IUCN II), thus posing strong restrictions for human uses. This is similar to the island of Juist.

In contrast, the mainland municipalities Wangerland and Norden have only very small areas of land designated as protected areas (nature reserves, landscape reserves). Hence, the administrative, land, and economic barriers for built development are much higher on the islands. Consequently, the pressure on the islands is higher, with related land-use conflicts arising.

The concrete issues and challenges raised for each municipality by members of the municipality administrations (either mayors or administrative staff) were diverse (Table 2). Some are island-specific, such as those driven by the presence of the national park, the high pressure for development, and the shortage on the housing market due to an increase in holiday homes. In contrast, in the hinterland of the mainland municipality of Wangerland, rural emigration increases the proportion of vacant houses. Maintaining mobility through public transport is thus a key challenge. In early 2019, the mobility association in Wangerland was founded, focusing on the implementation of a citizen bus driven by local inhabitants as its first project. Spillover effects in the community led to increased cooperation between locals and newcomers as well as new small initiatives such as a survey by the village community.

The problems and challenges arising across the case study areas are clearly diverse and complex. For example, all municipalities are expected to maintain and fund comprehensive infrastructure for health, education, and social services, which are nonetheless of little use outside the tourist season. This requires that additional financial resources are provided for these already poorly funded municipalities, because the financial contributions to municipalities from the federal government are largely based on the number of inhabitants rather than on their broader tasks, functions, and responsibilities. Adapting existing infrastructure to the challenges and to the plausible requirements of an ageing population is costly and involves a lot of effort and investment. Despite similar basic characteristics in terms of location, size, and tourist orientation, the islands show different levels of emphasis regarding their natural and landscape resources and supply capacity. Spiekeroog, for example, is an idyllic rural village island offering nature-based tourism, whilst Juist to some extent has a stronger urban character.

#### 3.2.2. Local Public Services and Social Cohesion

Local public services are especially crucial for elderly people and for increasing the levels of social cohesion in villages. For example, it is not possible to get residential health treatment and care on the islands; thus, basic services for many of the eldest local inhabitants are neglected. The following narrative illustrates the social challenges: *“A local inhabitant described the situation in the Wangerland municipality. As a native of the municipality Wangerland she grew up in the small village of Tettens with ca. 500 inhabitants. She witnessed how the whole village structure changed; the bank closed its branch more than four years ago, and the last grocery store quickly disappeared afterwards. This is not only bad for the supply of services, but for what actually characterized a living village, she observed. She expressed that especially elderly were affected. Her mother who usually went to the bank with her bike every day to get a bank statement, or went shopping, used these activities to meet people and socialize. After the bank and the grocery store closed, she had no reason to go out. Now the communication with other villagers takes place only during grave care on the graveyard. The communication and encounter are main reasons why people decide for a village life at all. Now there is hardly anyone on the street. The*



woman expressed that these developments are very unfortunate and there is a need for new ideas, measures and initiatives, especially in small villages”.

Another specific challenge in regard to social cohesion is reflected in the coexistence of, and conflicts of interests between, locals and newcomers. These newcomers are often retirees, but they can also be second homeowners. Many of these newcomers came to the area as tourists. Following the development of a strong connection and attachment to the area, they later decided to move to the area. Furthermore, the decline of young people in associations and clubs has an enormous impact in small communities. Often the elderly take on two or more voluntary tasks, and the new generation is missing.

### 3.2.3. Challenges in Tourism and Their Relation to Demographic Changes

The mainland municipalities host higher numbers of overnight stays than the island municipalities. For example, in 2019 Wangerland had >1.20 million overnight stays and Norden had 0.92 million, as compared to 0.41 million for the island Spiekeroog and 0.59 million for the island Juist, based on the official data (Table 3, LSN-Online: Table K7360001, counting only businesses with more than eight beds). Accessibility poses major challenges for the citizens living for a long time on the islands and this is also related to the higher costs of living, as access to the two islands is highly dependent on the schedule of the tide. This is especially problematic for the island Juist, where the ferry takes more than 90 min. However, the tourism intensity (tourist per inhabitant) (Figure 3), and thus also the pressure on the landscape and natural resources, is much higher on the islands compared to the mainland. Restricted access to certain protected area zones further concentrates tourist pressure on the islands.

**Table 3.** Overnight stays, calculation of tourist density, and average stays (Source: LSN-Online: Table K7360001) in the study area.

Municipality	Inhabitants	Tourists Per Inhabitant	Average Stay 1/365 of One Year		Average Stay 7/365 of One Year		
			Full Time Tourist Equivalents (FTTE)	FTTE Per Inhabitant	Full Time Tourist Equivalents (FTTE)	FTTE Per Inhabitant	
Island	Spiekeroog	805	745	1644	2.0	11,507	14.3
	Juist	1522	263	1096	0.7	7671	5.0
Mainland	Norden	25,056	32	2192	0.1	15,342	0.6
	Wangerland	9275	129	3288	0.4	23,014	2.5

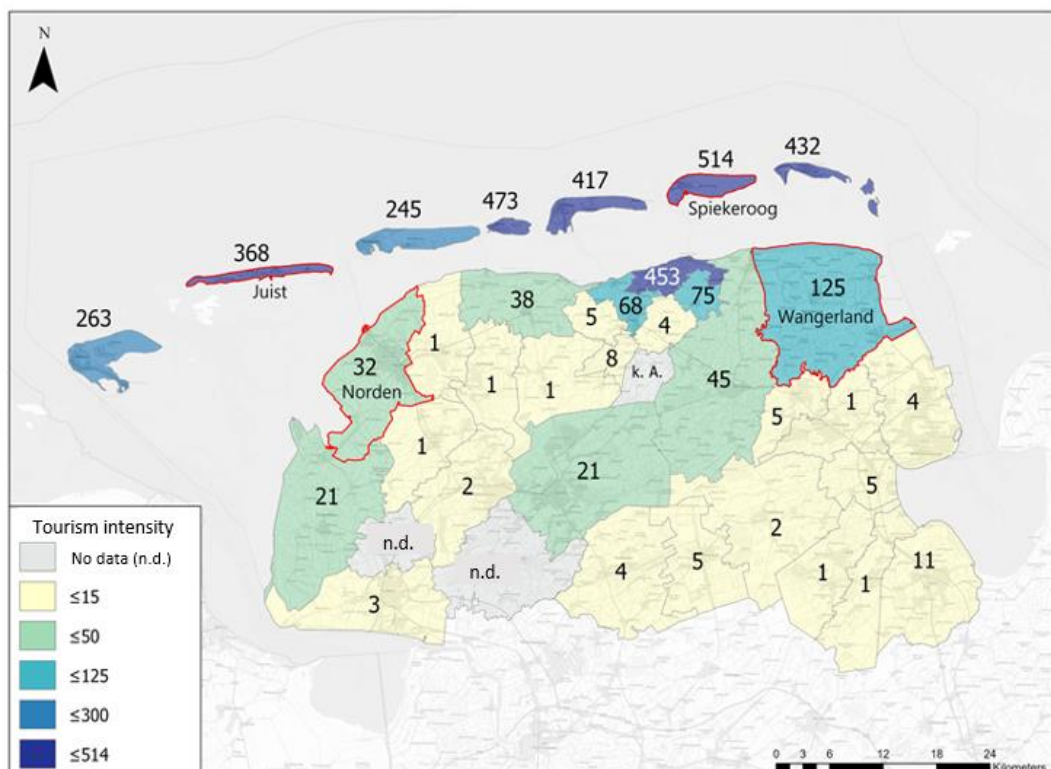
### 3.2.4. Lack of Skilled Labor

Generally, the lack of a skilled labor force and of suitable successors for businesses are two key factors which hamper the economic prospects for both the island and the mainland municipalities. For example, in the city of Norden the municipality administration personnel were very aware of this and aimed at actively initiating projects and measures to stop or reduce the lack of a skilled work force. Furthermore, the lack of a skilled work force is evident not only in tourism and health care jobs, but also in industry, trade, and craft [37].

### 3.2.5. Territorial Challenges

Territorial challenges occur across many rural communities, but they are particularly problematic in communities with high nature and landscape values that attract many tourists. In particular, small islands represent a complex setting. On the one hand, they are largely protected via their designation as a national park, which makes control over land development and change more restrictive; on the other hand, they are affected by stronger sustainability and occasionally strict conservation requirements [38]. Territorial cohesion [39] is another important factor contributing to perceived challenges in landscapes as social–ecological systems. The four municipalities belong to different county districts

(Landkreise) and are thus characterized by different administrative and political relations. However, cooperating on joint projects such as the “Wat Nu?” project can help to foster unity and collaborative learning.



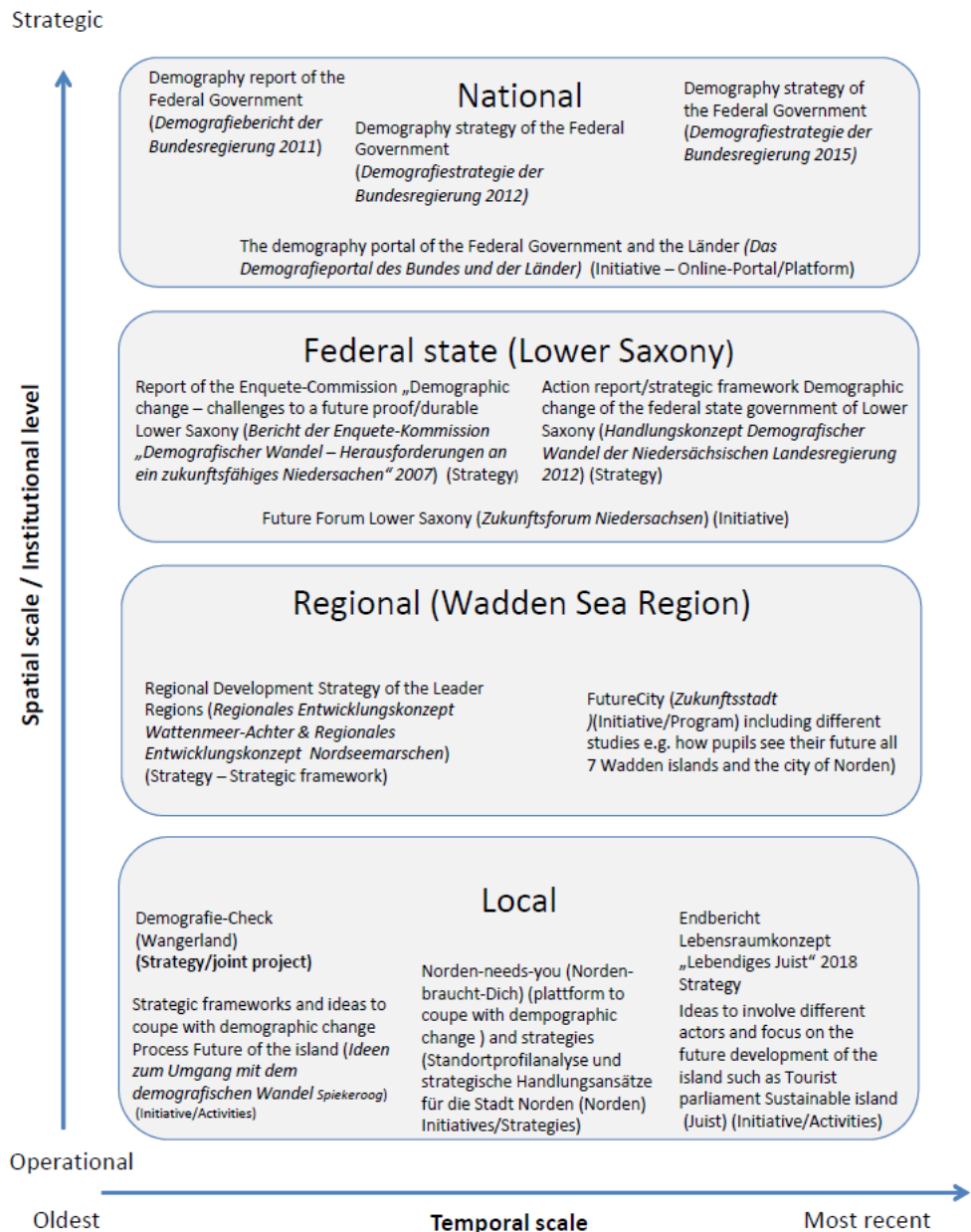
**Figure 3.** Tourism intensity (number of tourists per inhabitant) from 2018 in the study area (Sources: LSN, calculations).

### 3.3. Policies and Coping Strategies at Different Scales

The national government of Germany and the federal state of Lower Saxony both play a key role in devising and implementing strategic guidance addressing demographic changes in the Wadden Sea Region. This happens primarily by approving, enforcing, and monitoring strategic plans and concepts, and also by granting funding for specific projects at the lower spatial and institutional levels. In Figure 4, we summarize the demographic policies and strategies of relevance for the coastal Wadden Sea Region across time and spatial scales and across four governance levels.

At the national level, based on conclusions from the national demographics report from 2011 [40], a year later the federal government made public its demographic strategy [41], which was approved in 2015. The demography report of the federal government of October 2011 [42] describes demographic development and its effects on individual aspects of quality including family and society, migration and integration, health and long-term care, and economy, labor, education, and research. Implications for the environment are hardly discussed in this report, except for a few brief references to the fact that “*that the impacts of demographic change are complex for nature and environment—the use of resources is increasing, but are also chances for the environment and nature if the directions are chosen wisely*”. Conversely, it presents the measures undertaken by the federal government so far across all ministries and highlights future areas of action. Key findings are that people live longer and stay healthy longer, and fewer children are born. This means that they are gradually becoming older and fewer and that young people and thus also the population is decreasing. Demographic development is also influenced by inflows and outflows of both permanent and temporary citizens, and it varies widely across German regions and localities [40,43]. A key related issue consists of the inequalities between development at

regional and local levels. Generally, it is acknowledged that social challenges arising from demographic changes can only be jointly tackled by integrating the federal, regional, and local administrations.



**Figure 4.** Institutional mapping of strategies, programs, and activities regarding demographic changes at four different levels of governance relevant for the Wadden Sea Region.

At the Lower Saxony federal state level, there is the “Action Concept Demographic Change (Handlungskonzept) Land Niedersachsen 2012”, which is based on the Enquete Commission of the Lower Saxony parliament [44]. In this document, concrete recommendations are provided for action in the fields of business and the labor market, state and regional development, education, science and research, family, social affairs, and health. In 2012, the state government delivered the draft action plan “demographic change” [45], which consisted of eleven chapters outlining policy measures that Lower Saxony was already implementing and proposed to implement in the future to address key demographic challenges and changes at both state and municipal levels. Following a dialogue process with numerous associations and social groups, various adjustments were made. The action

plan thus provided a flexible guide for dealing with demographic challenges in Lower Saxony. However, declining populations also lead to declining tax revenues and lower financial allocations.

At the Lower Saxony regional level, two regional strategic development frameworks are particularly relevant for our study. In the case of Wangerland, it is the *Regionale Entwicklungskonzepte* (REK) Nordseemarschen [46], whilst for the islands of Juist, Spiekeroog, and the city of Norden, it is the REK Wattenmeer-Achter [46]. The motto of the REK Wattenmeer-Achter was “Wattenmeer-Achter—shaping the future in an intelligent, sustainable and integrative way”. In this REK, the region was acknowledged to already be strongly affected by demographic changes and suffering from a considerable deficit in skilled labor. The forecasted population development suggests that this problem will intensify in the future. This concept addressed issues ranging from climate, environment, nature, and energy to tourism, regional products and businesses, education, and services of general interest. A third interesting initiative is the “Zukunftsstadt” (<https://wattenmeer-achter.de/zukunftsstadt/> [Last accessed on 28 March 2023]) of the Wattenmeer-Achter [47,48], for which two online surveys were conducted, one targeting teens and young adults and a further one targeting all citizens within the LEADER region. The guiding principles covered issues such as enhancing the livability of the area, acknowledging the identity and traditions of the people, improving the environment and adapting to climate change, as well as securing sufficient infrastructure. Several other strategies, plans, programs, and measures exist at the regional level, such as the so-called “Demografiebeauftragte” (e.g., [49], a forum for regional demographic representatives, and also the master plan for Weser Ems titled “Innovation in der Daseinsvorsorge”, which was published in May 2018 [50]. These initiatives clearly show how the topic of demographic change is on the agenda in the region.

Finally, also at the local/municipality level, different strategies, initiatives, plans, and research projects have been approved, initiated, conducted, and implemented. All four municipalities indicated that demographic change is an issue scoring high on their agenda from the beginning of the “Wat Nu?” and other projects [51]. Concrete measures and actions have been implemented concerning issues including the change of location of the primary school in the Wangerland municipality. This was carried out in order to improve accessibility to essential services by combining primary and higher education. The island of Juist prepared a strategy for the development, and Norden developed a platform to cope with demographic change. Additionally, the island of Spiekeroog prepared a strategic framework and developed ideas to cope with demographic change in a process concerning the future of the island.

## 4. Discussion

### 4.1. Rural and Touristic Challenges

The two mainland municipalities and the two island municipalities figuring in this study were less heavily affected by population decline than other municipalities in Germany [52]. However, challenges still exist in Wadden Sea Region communities, including the ageing of the population due to out-migration of young people, increasing life expectancy, and the in-migration of retired persons. Another issue is the low number of resident inhabitants during the low season, which stands in contrast to the influx of tourists in the high season. Island municipalities were more exposed to touristic challenges than mainland municipalities. However, typical rural challenges were similar. Securing public services and welfare, and the sustainable conservation of ecological green infrastructures, is particularly challenging. With more than 8.3 million overnight stays, the East Frisian North Sea coast is the main tourist destination of Lower Saxony [30]. Municipalities are faced with a range of additional challenges. This includes securing the demand for skilled workers, which is hindered on the islands by the shortage of housing. In addition, an increasing number of holiday apartments are being bought by individuals as secondary homes, thus becoming unavailable on the real estate market as well as potentially distorting prices for

local populations, e.g., [53]. This “sell-out” of the islands has immediate negative economic consequences and also changes the social structures of the municipalities.

Regarding natural and cultural landscapes as key sites of infrastructure for tourism, sea level rise, storm surges, and coastal flooding associated with climate change, the coastal municipalities in the Wadden Sea Region are amongst the most vulnerable and exposed municipalities in Germany [54–56]. Additionally, stakeholders in an earlier European project (Enhance, 2017) identified the possibility of shipping accidents, conflicting forms of land-use, and the impacts of demographic changes as the most prominent challenges in the rural areas of their municipalities [57]. Complex social–ecological challenges are generally considered as “wicked challenges” [9]. These involve challenges for which there is often little common understanding among the involved actors; instead, actors pursue their own interests, thus also hampering clarity as to whether such problems can be effectively tackled, or even as to whether they constitute problems worth resolving [58]. These challenges, e.g., [59], demand holistic, novel, and innovative approaches and solutions that can bridge spatial scales and multiple levels of governance.

#### *4.2. Policies and Decision Makers’ Coping Strategies*

Policies at different levels of governance are needed to support decision makers as they work to tackle rural and touristic challenges [60]. This calls for horizontal and vertical coordination among all actors in charge of rural and touristic development. Most important are regional and local policies and the strengthening of formal and informal inter-municipal cooperation arrangements between municipalities. The decision makers can find their own coping strategies in terms of scientific support, funding, and bringing people together. Those who are able to acquire funding are often able to strengthen the municipality by supporting careful strategic action in the community. In touristic rural areas, local populations are very heterogeneous, and there is the necessity to balance different interests and needs [28,61]. Applying the Living Lab approach in the “Wat Nu?” project in two island and two mainland municipalities was thus a coping strategy at the local level. Here the focus was on informed dialogue based on collecting evidence-based demographic data, interviews and surveys with experts and citizens, and analyses of policy and planning documents. However, there is also a need for the integration of activities at multiple spatial scales [14]. The range of other integrative approaches to governance, management, and planning in landscapes as social–ecological systems consistent with the landscape approach, and applied in the Wadden Sea Region, is thus an important asset.

#### *4.3. Landscape Approaches in the Wadden Sea Region*

##### *4.3.1. The Living Lab Approach*

The opportunities for citizens to participate in the “Wat Nu?” project’s application of the Living Lab approach were diverse, and ranged from workshops and steering meetings to video film interviews ([www.wat-nu-im-watt.de](http://www.wat-nu-im-watt.de)). Participation was thus open and possible for everyone to attend. The Living Lab approach was thus a way of encouraging a participatory process. Nonetheless, inter-municipality cooperation is often still problematic, as competition about inhabitants and external funding is high on the agenda. Nonetheless, new information and communication technologies, but also local meeting places and workshops, can be applied to explore and strengthen novel governance and action-oriented approaches, e.g., [14,62]. The aim was to connect science and practice, to show and test individual, innovative solutions, and where possible to implement feasible measures. The views of different actors and stakeholders representing citizens, entrepreneurs, policy, administration, and “fans” [14] at different levels of governance need to be considered. This can identify synergies. For example, improving access to transport infrastructure was not only helpful for the elderly, but also for families with young children, and disabled or temporarily injured persons could benefit from measures improving the transport infrastructure. Through increased public participation, the landscape approach Living Lab



applied in the “Wat Nu?” project might thus facilitate development of new ways of coping with demographic changes.

By looking at the mobilization and involvement of actors, key findings and lessons learned from the “Wat Nu?” project and related actions and initiatives [63] indicate that a mix of research methods and participatory approaches are required. Sufficient duration over time is also needed to reach beyond usual common research project time scales and political electoral cycles. However, it is not necessary to have as many participants as possible, and the possibility for stakeholders and actors to opt in/out/in again must be granted. Furthermore, existing endogenous resources are extremely important, as well as the engagement of stakeholders and enabling actors to overcome a state of pure deliberation without evidence-based learning. Additionally, certain limitations need to be considered; for example, volunteers cannot perform all of the new tasks. The expectations on all sides should thus not be too high. Additionally, it is important that local conditions and sensitivities are taken into account across all phases of project and planning design, implementation, and post-implementation.

#### 4.3.2. Other Landscape Approaches

##### World Heritage Site

Governance of the Wadden Sea Region has to embrace complex interplays in landscapes as social–ecological systems [64]. With the aim of strengthening collaboration and sustaining participatory processes [65] towards sustainability, different landscape approach concepts have been proposed and put into practice in the Wadden Sea Region. While ecological monitoring in the Wadden Sea Region had already begun in 1872, integrative approaches involving landscapes as social–ecological systems are more recent. There are seven national parks, with one in Denmark established in 2010, three in Germany established 1985, 1986, and 1990, and three in The Netherlands established in 1989, 2002, and 2003, e.g., [16,66]. The Wadden Sea also became a World Heritage site in 2009 (<https://whc.unesco.org/en/list/1314/> [Last accessed on 28 March 2023]), followed by the enactment of the Waddenacademie and Common Wadden Secretariat as administrative bodies covering the entire Wadden Sea Region in Germany, Denmark, and The Netherlands. The 1972 Convention Concerning the Protection of the World Cultural and Natural Heritage developed from the merging of two separate movements: the first focused on the preservation of cultural sites, and the other dealt with the conservation of nature.

##### Biosphere Reserve

The UNESCO Biosphere Reserve reflects another nomination [67]. The Wadden Sea includes parts of The Netherlands, Denmark, and Germany, the governments of which have been working together since 1978 on Wadden Sea conservation, and in 1997 a Trilateral Wadden Sea Plan was adopted (see <https://web.archive.org/web/20120227154648/http://www.waddensea-secretariat.org/trilat/trilat.html> [Last accessed on 28 March 2023]). In 1990, the Wadden Sea and Hallig Islands of Schleswig-Holstein were declared a Biosphere Reserve by UNESCO [68]. The Wadden Sea of Lower Saxony was already designated a Biosphere Reserve in 1992. Biosphere Reserves aim to preserve both natural and cultural landscapes as social–ecological systems and to function as models for sustainable development [69,70]. They should therefore aim at participatory multi-stakeholder governance, e.g., [21]. Hence, the establishment of landscape stewardship may be particularly likely to succeed [71]. The state administration of the Biosphere Reserve of the Wadden Sea of Lower Saxony is attempting to extend its transition zone onto the mainland of the East Frisian Peninsula and adjacent areas on the coast. This organization has explored the existing societal structures and has identified both potential catalysts and possible pitfalls for the establishment of landscape stewardship as a governance approach. Agricultural groups and municipalities have had the most influence and appeared well-connected. Furthermore, landscapes’ cultural importance could foster landscape stewardship. Agricultural lobbies, associations and municipalities have suggested that the Biosphere Reserve administration



may function as a sustainable development catalyst by bringing stakeholders together and thereby initiating model projects in the region.

#### LTSER Platform

Another concept is the Long-Term Socio-Ecological Research (LTSER) platform, e.g., [72–76]. The LTSER network emerged as a bottom-up process where existing local and national initiatives became part of a network and were then recognized and coordinated at the European level. The Wadden Sea Region has been a part of the LTSER network since 2016 [77]. This has involved a transition from ecological monitoring and research to ecosystem-based management approaches [78]. These have been developed to develop effective, holistic, and evidence-based strategies to cope with the challenges of complex socio-ecological systems. Giebels et al. (2013) reviewed three initiatives, applying the concept of ecosystem-based management in the Wadden Sea Region [64]. They found that knowledge production about ecological complexity and coordination of scientific knowledge through multi- and inter-disciplinary approaches were indeed evident. Additionally, direct and continuous co-production of knowledge between experts, citizens/ stakeholders, and policymakers did take place.

#### 4.3.3. Integrating Landscape Approaches

Landscape approach is a generic term for the integration of efforts supporting the enhancement of adapted and adaptive place-based implementation of policies concerning sustainability [19,22,79,80], and for fostering place-based knowledge production and engaged stakeholder collaboration. The application of landscape approaches has been advocated for more than a decade [81], and several studies have analyzed the concept [19,22,65,82]. In an effort to identify commonalities rather than to stress differences among the wide range of landscape approach concepts, Angelstam et al. [23] suggested four general criteria to define what a landscape approach concept should include. These include (1) a concrete landscape representing both space and place, or siting according to [74], which is supported by (2) construction, maintenance, and networking of an appropriate administrative infrastructure [74]. This is then combined with the use of Lee's [83] ideas of (3) compass (sustainability as a consequence of governance) and (4) gyroscope (sustainable development as a societal process). In Table 4, we compare two generic groups of criteria for a landscape approach [22,63] with Living Lab and three other concepts consistent with the core criteria of the landscape approach which are applied in the Wadden Sea Region; namely, the World Heritage Site, UNESCO Biosphere Reserve, and LTSER platform. They have different roots: ecological monitoring (LTSER platform), nature conservation (World Heritage, Biosphere Reserve), and stakeholder engagement (Living Lab). Using the landscape approach's generic criteria as a lens for comparative analyses of different concepts (Table 4) is useful for the design of options for tackling existing social–ecological challenges. We encourage systematic, collaborative learning through evaluation from different landscape approach concepts. Collaboration among landscape approach concepts should also be encouraged.

This argumentation is consistent with a wide range of studies in the Wadden Sea Region at multiple scales. Environmental management requires knowledge co-production practices by mobilization and integration of different types of knowledge [84]. Kabat et al. [13] advocate an integrated, social–ecological systems approach for science-based management of the Wadden Sea Region. Key characteristics of this approach are strong interdisciplinarity and a focus on aspects of scale and cumulative processes. At the local level, Kwiatkowski et al. [85] observe strong potential for integrating volunteering with tourist experiences and meaningful engagements with residents. Additionally, Heslinga et al. [86] stress that synergy between tourism and landscape supports improved resilience, and analyses of multi-level governance at the local level help formulate guidelines for decision making. At the regional level, natural and cultural landscapes as green infrastructure for tourism need to be understood as including physical geography, biology, and culture [87].

**Table 4.** Comparison of generic attributes and principles of general landscape approach frameworks and Biosphere Reserve, LTSER platform, and Living Lab approaches applied in the Wadden Sea Region. This table matches four general criteria as a base for learning through evaluation that combines landscape as space, infrastructure, and Lee’s (1993) [83] ideas of compass and gyroscope (see also [88]).

Criterion (Inspired by [83])	General Framework ([79])	General Framework ([70])	Living Lab ([31,32,34,35])	World Heritage Site (the Five “Cs” (underlined); [89])	Biosphere Reserve ([69])	LTSER Platform ([72–74])
A. Landscape as space	<ul style="list-style-type: none"> <li>Attribute 1: A sufficiently large area matching management requirements and challenges to deliver desired goods, services, and values</li> </ul>	<ul style="list-style-type: none"> <li>Principle 3: Multiple scales</li> <li>Principle 4: Multifunctionality</li> </ul>	<ul style="list-style-type: none"> <li>Often urban/neighborhood context, flexible region or catchment, municipality level</li> </ul>	<ul style="list-style-type: none"> <li>A credible representative and geographically balanced testimony of cultural and natural properties</li> </ul>	<ul style="list-style-type: none"> <li>Biosphere reserves are organized into three management zones, known as core areas, buffer zones, and transition areas.</li> </ul>	<ul style="list-style-type: none"> <li>Siting in a large area relevant to both ecological and social system topics</li> </ul>
B. Infrastructure	<ul style="list-style-type: none"> <li>Attribute 4: Integrative knowledge production</li> </ul>	<ul style="list-style-type: none"> <li>Principle 1: Continual learning and adaptive management</li> </ul>	<ul style="list-style-type: none"> <li>Multiple formats and approaches</li> <li>Networking among multiple actors (citizens, local authorities, entrepreneurs, NGOs)</li> </ul>	<ul style="list-style-type: none"> <li>Promote the development of effective <u>capacity-building measures</u></li> </ul>	<ul style="list-style-type: none"> <li>Logistical support for research, education, monitoring, etc.</li> </ul>	<ul style="list-style-type: none"> <li>Construction and maintenance of coordination capacity (databases, labs, monitoring schemes)</li> <li>Networking among initiatives</li> </ul>
C. Gyroscope (sustainable development as a societal process in a landscape as place)	<ul style="list-style-type: none"> <li>Attribute 2: Multi-level and multi-sector stakeholder collaboration that promotes sustainable development as a social process</li> <li>Attribute 5: Sharing of experience, results, and information to develop local tacit and general explicit knowledge</li> </ul>	<ul style="list-style-type: none"> <li>Principle 2: Common concern entry point</li> <li>Principle 5: Multiple stakeholders</li> <li>Principle 6: Negotiated and transparent change logic</li> <li>Principle 7: Clarification of rights and responsibilities</li> <li>Principle 9: Resilience</li> <li>Principle 10: Strengthened stakeholder capacity</li> </ul>	<ul style="list-style-type: none"> <li>A close and integrated form of cooperation between disciplines and with local actors (administrations, associations, and civil society).</li> <li>Become explicit test -beds for new usage and management concepts or patterns of action and planning</li> <li>Together with local actors (administrations, associations and civil society), possible options for action and management are set up and tested</li> </ul>	<ul style="list-style-type: none"> <li>Increase public awareness through <u>communication</u>; Enhance the role of <u>communities</u></li> </ul>	<ul style="list-style-type: none"> <li>Stakeholders are informed; should participate on the procedure for the elaboration and review of integrated management policy</li> <li>Environmental education: (1) respect natural and cultural heritage; (2) favor responsible relationships with the environment and better land management, (3) citizens aware of responsibilities to future generations</li> <li>Institutional structure for sustainable development</li> </ul>	<ul style="list-style-type: none"> <li>Stakeholder engagement for regional/local development involving decision makers at different levels of governance, land-use stakeholders, the public</li> <li>Collaborative learning builds on both quantitative and qualitative research and stakeholders’ skills and experiences</li> </ul>
D. Compass (states and trends of sustainability)	<ul style="list-style-type: none"> <li>Attribute 3: Commitment to and understanding of sustainability as an aim among stakeholders</li> </ul>	<ul style="list-style-type: none"> <li>Principle 8: Participatory and user-friendly monitoring</li> </ul>	<ul style="list-style-type: none"> <li>Evaluation of process and result</li> </ul>	<ul style="list-style-type: none"> <li>Effective <u>conservation</u> of World Heritage properties</li> </ul>	<ul style="list-style-type: none"> <li>Development of integrated management policy</li> <li>Conservation of biological diversity and sustainable use of natural resources</li> </ul>	<ul style="list-style-type: none"> <li>Long-term monitoring of social and ecological systems</li> <li>Biological conservation and sustainable provision of ecosystem services to nature and people</li> </ul>

## 5. Conclusions

Focusing on social–ecological challenges in rural settings in the Wadden Sea Region in NW Europe, this study stresses the importance of coping strategies that integrate local participatory and regional planning scales. This is based on an empirical mapping of multiple rural and touristic challenges in two island and two mainland municipalities in the results section, and by arguing in the discussion for regional integration of local and regional level collaborative learning, conservation, and planning.

The empirical part demonstrated a long list of driving factors including the ageing of the population due to out-migration of young people, the in-migration of retired persons, and the low number of resident inhabitants during the low-season period. Securing public services and welfare, and the sustainable conservation of ecological green infrastructures, was perceived as particularly challenging. Island municipalities were more exposed to touristic challenges than mainland municipalities. Applying an approach such as Living Lab in a rural development project was a coping strategy supporting informed dialog at the local level.

However, there are also several regional-level initiatives that complement local-level efforts. In the case of the Wadden Sea Region, the application of different landscape approach concepts has historic explanations. The focus on nature conservation with national parks as assets for rural livelihoods and tourism is represented by Biosphere Reserve and World Heritage designations. The LTSER platform has roots in the more than century-long history of ecological monitoring, and the Living Lab has a focus on local stakeholder engagement. We encourage wide use of systematic collaborative learning through the integration of place-based applications of different landscape approach concepts. We conclude that tourism can provide a buffer against typical peripheral–rural challenges, but that approaches, policies, and coping strategies need to be multi-level.

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