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## **Hofstede, Jacobus; Kaiser, Gunilla; Reese, Stefan; Sterr, Horst Risk Perception and Public Participation - COMRISK Subproject 3**

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# Risk Perception and Public Participation

## COMRISK Subproject 3

JACOBUS HOFSTEDÉ, GUNILLA KAISER, STEFAN REESE, HORST STERR

### Summary

With more than 16 million inhabitants the potential losses and damages resulting from coastal flooding in the lowlands of the North Sea region are immense. The fact that this is not so much “in the peoples mind” may, at least in part, result from the success of coastal risk management during the last decades. People feel safe in coastal lowlands and are tempted to ignore or forget the latent risks. Perception of coastal risk, however, not only increases the acceptance for (costly) countermeasures but, also, reduces the reaction time in case of emergencies. One way to achieve awareness is public participation or rather, active involvement of the people in the planning process. COMRISK subproject three focussed on coastal risk perception and public participation in coastal risk management in the North Sea region. This paper describes the activities and outcomes of this subproject.

### Zusammenfassung

*Mit über 16 Millionen Einwohnern sind die potentiellen Verluste und Schäden im Falle einer Sturmflutkatastrophe in der Nordseeregion immens. Die Tatsache, dass dies nicht so im Bewusstsein jedes Einzelnen ist hängt, zumindest teilweise, mit den Erfolgen des Küstenschutzes in den letzten Jahrzehnten zusammen. Die Einwohner fühlen sich sicher in den Küstenniederungen und werden dazu verleitet, die Risiken zu ignorieren oder zu vergessen. Risikobewusstsein erhöht jedoch nicht nur die Akzeptanz für (teure) Maßnahmen, sondern reduziert auch die Reaktionszeit bei Überflutungen. Eine Methode, das Risikobewusstsein zu erhöhen ist Bürgerbeteiligung bzw. aktive Einbeziehung der Menschen in den Planungsprozess. Teilprojekt drei von COMRISK befasste sich mit der Wahrnehmung der Küstenrisiken und der Bürgerbeteiligung im Küstenschutz in der Nordseeregion. In diesem Beitrag werden die Aktivitäten und Ergebnisse dieses Teilprojektes beschrieben.*

### Keywords

Coast, risk management, flood defence, risk perception, public participation

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### 1. Introduction

With more than 16 million inhabitants the potential losses and damages resulting from coastal flooding in the lowlands of the North Sea region are immense. The fact that this is not so much “in the peoples mind” may, at least in part, reflect the comprehensive coastal

defence efforts that have been undertaken during the last decades. As a result, despite rising storm surge water levels, no catastrophic coastal flooding occurred in the North Sea region since 1962. The resulting lack of awareness of coastal risks in the population may, at least in some North Sea countries, have been “facilitated” by Government. They either indicated that coastal lowlands are safe or, vice versa, did not inform effectively about the remaining risks. In both ways, people are tempted to ignore or forget the latent (but existing) coastal risk.

Awareness of the risks and of the importance of coastal risk management in the population is crucial. It reduces the reaction time of each individual and, as a result, the consequences in case of emergencies. Further, it increases the acceptance for expensive countermeasures. This aspect becomes specific significance with respect to future climate change and its consequences. Assuming a sea level rise of one meter till 2100 AD, a trilateral expert group estimated that the necessary costs to maintain present safety standards in The Netherlands, Germany and Denmark might double (CPSL, 2001). It must be stressed, however, that one meter of sea level rise by the year 2100 constitutes the most pessimistic scenario with a low probability (IPCC 2001).

In order to guarantee an adequate level of risk awareness, it is necessary to (further) develop and more intensively apply respective instruments. One verified way to improve awareness is public participation or, rather, active involvement of the people in the planning process. The EU-demonstration projects on integrated coastal zone management showed that active involvement of the affected leads to increased engagement and acceptance of shared responsibilities (EUROPEAN UNION DG XI, 1999). In result, the long-term awareness of the risks of coastal flooding in the population may be improved.

COMRISK subproject 3 focussed on coastal risk perception and public participation in coastal risk management. In literature, a number of definitions for risk perception and participation exist. For this study, risk perception is defined as (MARKAU, 2003; REESE, 2003): “the sensual or rational, individual or collective perception process and the connected identification, analysis and verbalisation of risk”. Participation is defined as (RENN and ZWICK, 1997): “forums of exchange that are organised for the purposes of facilitating communication between government, citizens, stakeholders and interest groups, and business regarding a specific decision or problem”. The subproject had the following technical objectives: (1) assessment of the present state of coastal risk perception and public participation in coastal risk management in the five participating countries, (2) evaluation of methods to improve coastal risk perception and public participation in coastal risk management, and (3) establishment of recommendations. Responsible for this subproject was the Coastal Defence and Harbour Division of the Schleswig-Holstein State Ministry of the Interior. The main part of the work was conducted by the Department of Geography in association with the Research and Technology Centre West coast and the Disaster Research Unit (all of Kiel University). The technical report of Kiel University (KAISER et al., 2004) contains a comprehensive description of the methods applied and results achieved. The pilot study “school material” (see below) was executed by the Schleswig-Holstein Institute for Quality Assurance at Schools.

## 2. Methods

In order to achieve the technical objectives, the following activities were conducted. A classical desk top literature research was followed by an expert workshop. Further, a public opinion poll was conducted in five coastal localities (Fig. 1), and later a questionnaire was distributed to experts from administration and science. With respect to the evaluation of

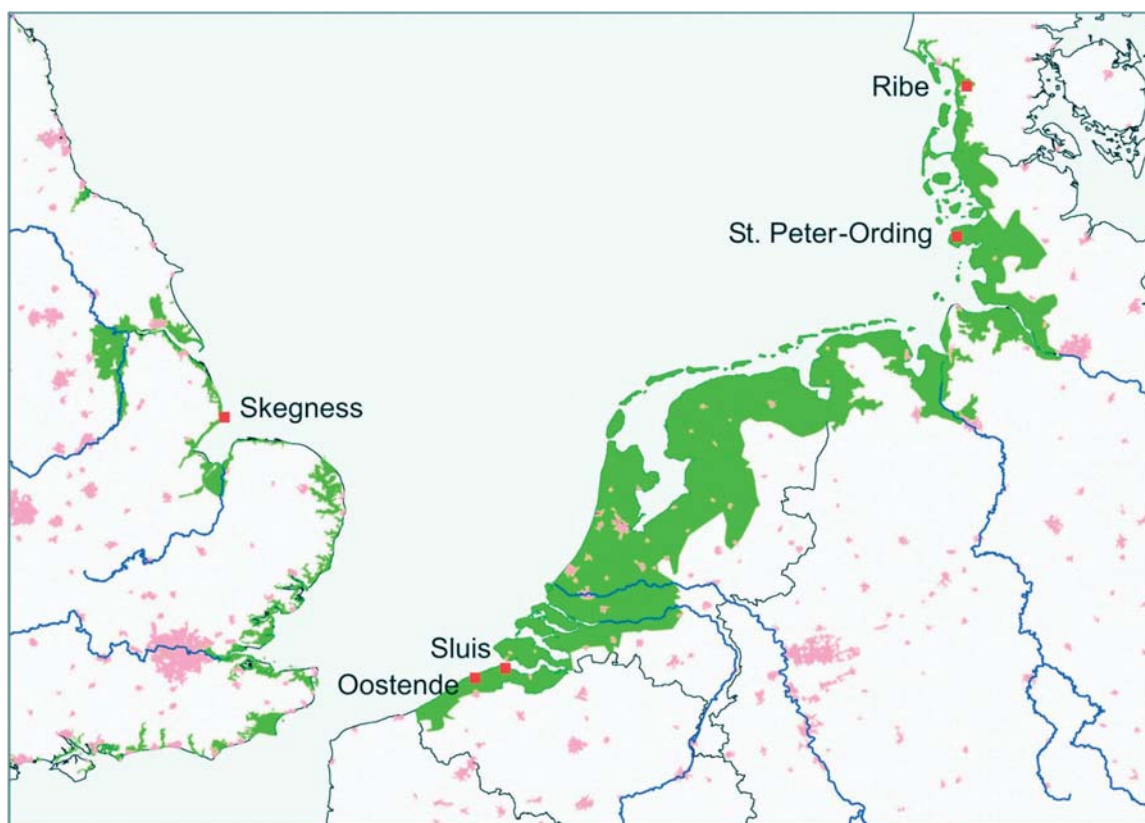


Fig. 1: Locations of the public opinion poll in the southern North Sea region

methods to improve coastal risk perception, one promising method, i.e. the establishment of school material, was tested in a pilot study.

As a start up event, an expert workshop was organised in order to discuss the chosen methodology to assess and evaluate coastal risk perception and public participation in coastal risk management. Further, the draft questionnaires for the public opinion poll and the expert survey that had been established by Kiel University on the basis of the literature research were elaborated. Finally, invited speakers from the United Kingdom, The Netherlands and Germany presented their project outcomes concerning the two subproject topics.

The public opinion poll about coastal risk perception and public participation was conducted as a mail survey. In order to increase the return rate, prepaid envelopes were distributed with the questionnaires, and a press release was mailed to the local newspapers announcing the inquiry. Further, the (German) questionnaire was translated into English, Dutch and Danish and, finally, additional information was given in a leaflet and a cover letter. Five coastal localities in the North Sea region were chosen for the inquiry in close coordination with the COMRISK project team (Fig. 1). In all, 2,000 questionnaires (i.e., 400 per locality) were distributed personally to randomly selected households. To have comparable samples in all localities, 1/3 of the questionnaires were distributed in the town centre, 1/3 directly behind the dike or dunes and 1/3 in areas further away from the sea. A map was included in the questionnaire where the people should mark where about they live in the area of investigation. In these maps, streets were eliminated to guarantee anonymity. The questionnaire contained twelve questions about risk perception, nine questions about participation and three questions concerning demographic data. The questions were multiple choice, ranking, as well as open questions.

Apart from the public opinion poll, an expert survey about participation procedures in coastal risk management was conducted. In close coordination with the COMRISK project team, 121 experts from administration, science, consultants and stakeholders in the participating countries were selected. With respect to the high number of interviewees, the survey was conducted by electronic mail. The questionnaire included 12 questions concerning the evaluation of information tools, experience with and evaluation of participation procedures. The questions were multiple choice, ranking, as well as open questions. The questionnaire had a downloadable form and could be returned electronically or by mail.

From the literature research and the expert workshop it became clear that the perception of coastal risk may effectively and sustainably be enhanced by education. Students are susceptible for new information and can, thus, be influenced in their long-term behaviour or, rather, perception. This capability generally decreases with age. To test this hypothesis, a pilot study was conducted. On the basis of available data and information (raw and processed data, internal reports and documents, publications, diagrams and photographs, etc.) in the coastal defence administration of Schleswig-Holstein, pedagogues established appropriate school material for three class levels. The outputs are in German as only information from Schleswig-Holstein was edited. They are available in analogue (book) as well as in digital format (CD-ROM). As a next step, the established material was tested in school classes, seminars and advanced training courses for teachers by the pedagogues and the first author.

### 3. Results

#### 3.1 Expert workshop

The workshop was attended by 32 experts from administration and science. Invited speakers from the United Kingdom, The Netherlands and Germany gave oral presentations about their research. From the discussion it appeared that people feel relatively safe in coastal lowlands, i.e. they have trust in the authorities (FLINTERMANN et al., 2003). However, a public survey in Lower Saxony showed that there is scepticism about the ability of the coastal defence system to cope with climate change. In this context, 30 to 50 % of the interviewed local residents support the reinforcement of coastal defence structures (PETERS & HEINRICHS 2003). Further, experts (from science and administration) and the society apparently define risk in different ways: the quantifiable technical risk applied by administration (e.g. return intervals, probability of breaching), on the one hand, and the subjectively perceived risk in the population (will my house be damaged?) on the other. To overcome this problem, risk should be translated into the language of the society, reference should be made to personal living surroundings and to personal consequences, and options for personal action should be presented. Another result was that people tend to ignore or disclaim the risk for personal or financial reasons. Society needs/demands targeted, understandable and regular information, e.g., by using local champions/celebrities (RIKZ and BWD, 2002; MCCUE, pers. Comm., 2003).

The discussion about the questionnaires that had been prepared by Kiel University resulted in a number of recommendations, like a preamble with references to the EU INTERREG IIIB program and to the COMRISK website, and the announcement of the public opinion poll in local press. These were considered in the surveys.

### 3.2 Public opinion poll

Of the 2,000 questionnaires that were randomly distributed to private households, 411 (21 %) were returned. Most of the respondents (64 %) were male and (only) 7 % younger than 30 years. The highest return rate (28 %) was recorded for Oostende where a public discussion about a comprehensive coastal defence measure is underway. It is stressed here that the opinion polls in the selected localities are not representative for the whole country. Local situations, as described above for Oostende, prevent a generalization. Figs 2 to 5 display some selected results from the poll.

From the answers, it appeared that the awareness about the risk situation is not well developed. Although all selected households are situated within flood-prone areas, 30 % thought that their house could not be inundated during storm surges. For Sluis this ratio amounted to 10%, for Ribe to 68 % (Fig. 2). For Ribe this may be explained by the fact that Ribe town is situated some kilometers inland from the sea dike.

About 33% of the respondents estimated the risk of a coastal flooding event in their region to be high or very high (Fig. 3). This implies that a call for action or at least more

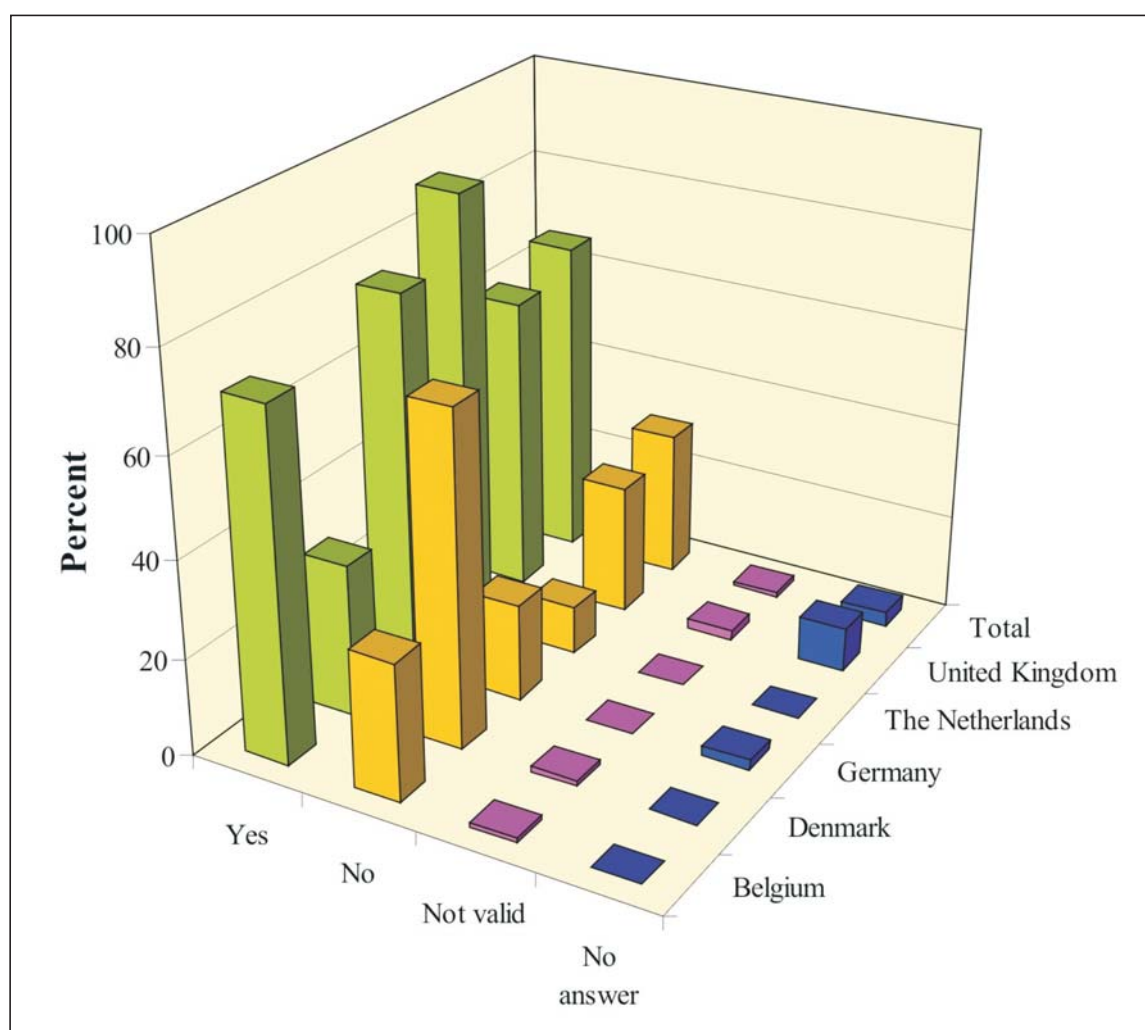


Fig. 2: Response to the question: could your dwelling be hit by the floodwater in case of a coastal flooding?

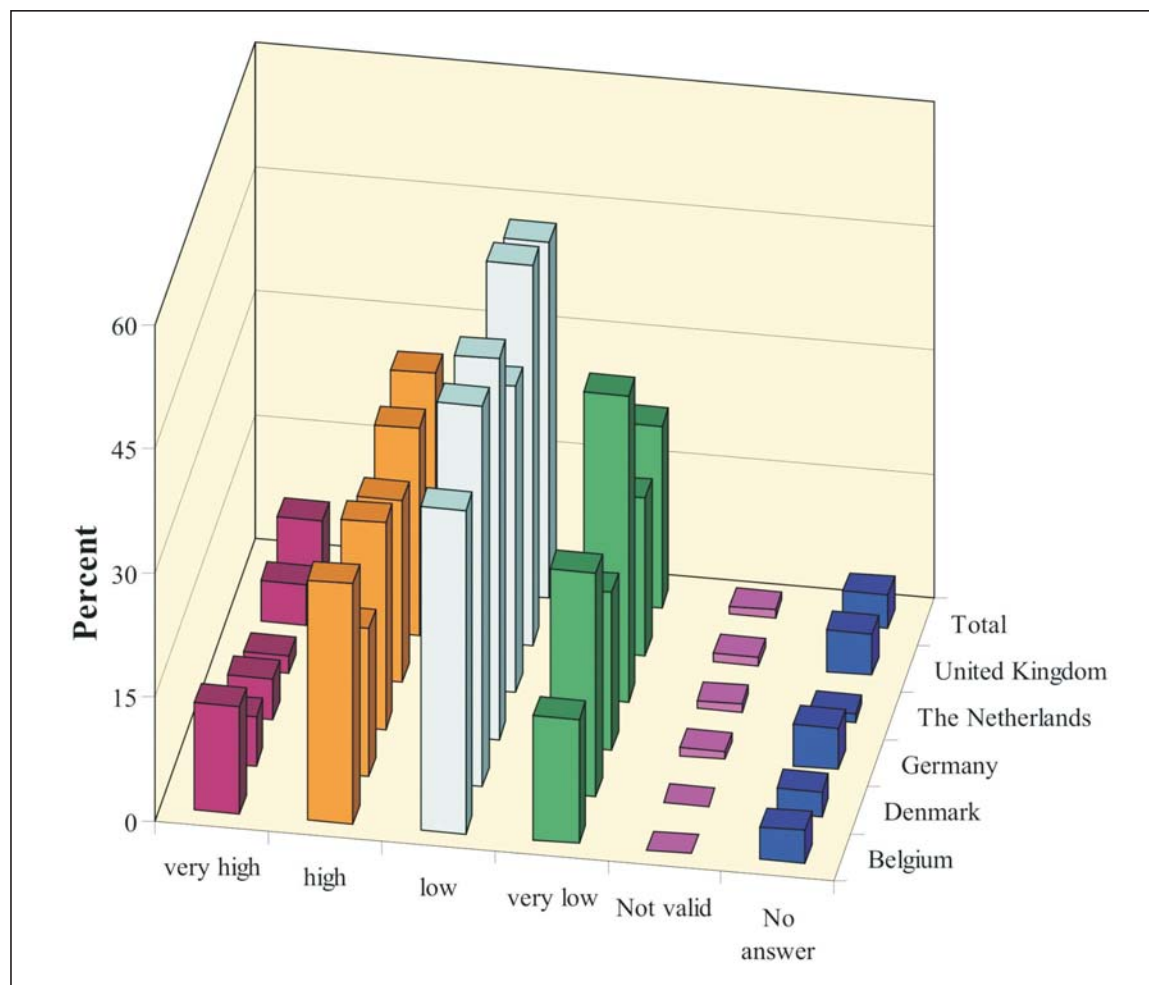


Fig. 3: Response to the question: how high do you estimate the probability of a coastal flooding?

information exists. Despite this high result, only 7 % had ever taken personal measures to be prepared for a future storm flood. There appears to be a discrepancy between the perception and the action of the people, as 90 % of the persons who estimate the probability of a storm flood as very high, had not taken any personal measures.

The answer to the question: “how well have you been informed about the basic risks of a storm flood by the responsible authorities”, indicated an information deficit. Apart from Ribe, where 79 % seem to be satisfied with the information policy of the authorities, more than half of the respondents answered that they were informed poorly or very poorly (Fig. 4). Hence, a felt information deficit became apparent.

Apart from more information, the respondents demanded more active involvement in the process. However, if asked about concrete actions, (only) 6 % said they would be willing to sacrifice one working day, 9 % would work regularly as a volunteer, whereas about 50 % would visit an information event (Fig. 5).

In summary, some main results from the public survey on risk perception are: (1) risk perception is strongly influenced by personal experiences and the time that elapsed since than, (2) no correlation exists among personal experience and precautionary actions, (3) knowledge about the risk does not automatically imply knowledge about the consequences and precautionary actions, and (4) people are partly sensitive for climate change and sea level

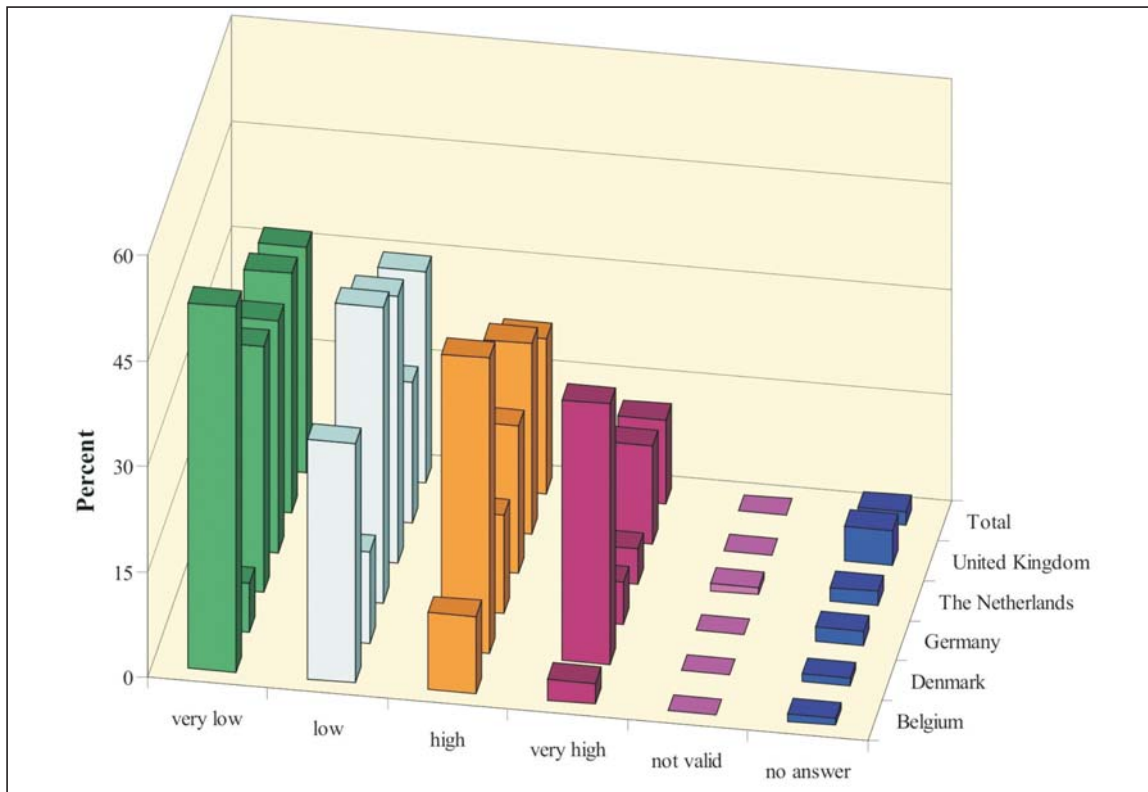


Fig. 4: Response to the question: how well have you been informed about the basic risks of a storm flood by the responsible authorities?

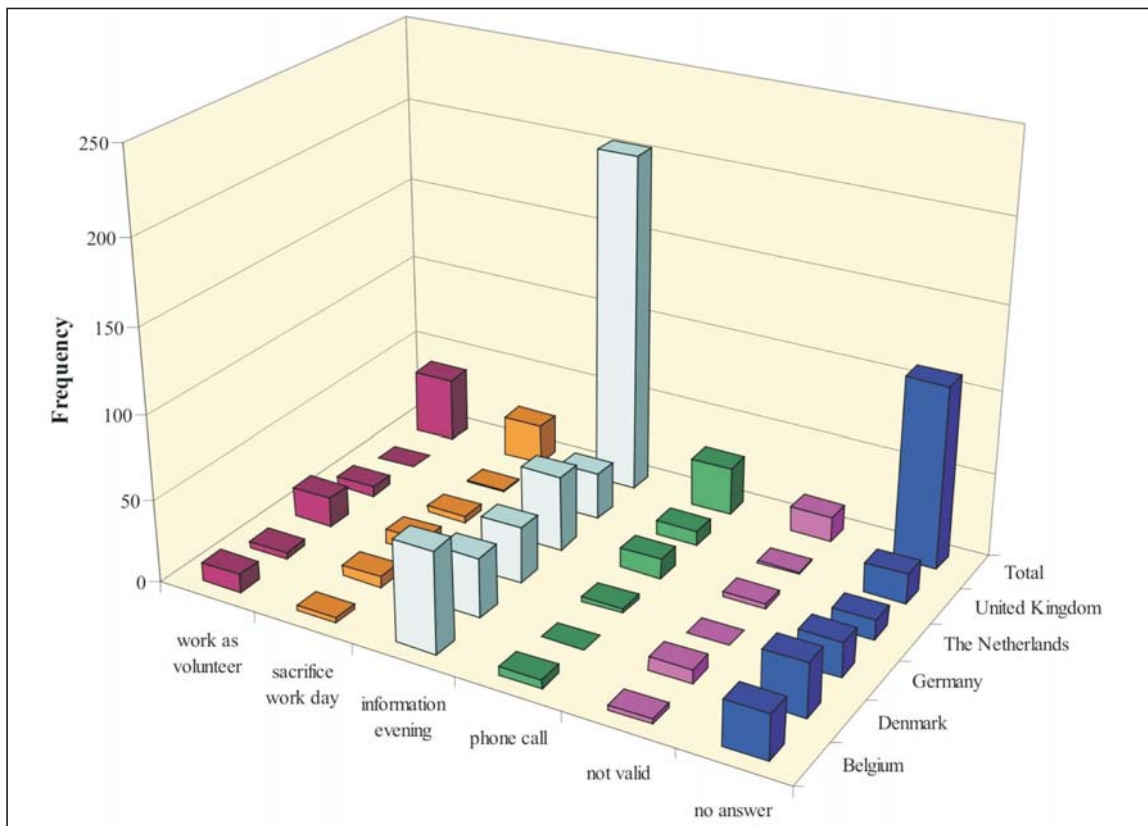


Fig. 5: Response to the question: if you want to represent your opinion in coastal defence planning, what would you like to do?



rise but the majority has no adequate information about this issue. Main results from the public survey on participation are: (1) only 8 % have ever been involved in a participation procedure, they would do it again (positive experience), (2) active participation is demanded for, but only 6 % would sacrifice one working day, 50 % would attend an information event, and (3) the information supplied by administration about participation procedures does not reach the public to the desired extent, and (4) in result, people feel that they are not adequately informed and are sceptical about their possibilities to influence decisions.

### 3.3 Expert survey about public participation

From the 121 contacted experts, 42 (35%) returned the questionnaires. The highest return rate was recorded for Germany with 60%. The distribution of returned questionnaires was, however, very inhomogeneous among the countries. As a result, it was not possible to establish national differences. Some selected results are given below.

Out of a list of seven information tools and 13 participation tools, the respondents were asked to select those of significance for coastal risk management. From the list, press and local media were named by most respondents as an important information tool, the formal project approval procedure as a significant participation tool.

Further, the interviewees were asked to rank eight listed participation tools with respect to their capability to increase the acceptance of the measure (Fig. 6). The highest ranking was given to workshops, followed by round tables and project approval procedures. Participation through Internet received the lowest ranking.

About 85% of the experts believe that participation increases the acceptance of planned measures. At the same time, 76 % expect that participation causes problems for the involved administration. Some reasons listed are: (1) it is time-consuming, (2) it requires extra costs and man-power, (3) the outcomes must be considered in the plan (even if administration doubt the feasibility), and (4) it may be difficult to integrate all requests (someone will have to take the decision anyway).

From 10 possible instruments, the experts were asked to list those that are most qualified to sustainably inform people about coastal risks. Press and local radio were, again, named most frequently. Exhibitions and topic at school got high scores as well. The lowest score was given to phone-hotlines.

In summary, some main results from the expert survey on participation are: (1) information is as necessary and important as participation, (2) there exists no ideal information and participation tool, (3) active participation fosters the acceptance of the measures, but implies large efforts for administration, (4) good preparation and external (neutral) moderation increases the chances of success, (5) communication is often the key problem, (6) controversial opinions exist under the respondents about formal participation, and (7) there exists a deficit in the integration of coastal flood defence and disaster management.

### 3.4 School material

In Schleswig-Holstein, coastal defence is a topic at school at different class levels (at the ages 9, 10, and 18). Pedagogues associated to the Schleswig-Holstein Institute for Quality assurance at Schools established school material (based on data and information from Schleswig-Holstein) for these class levels. The material was tested in school classes, at seminars and

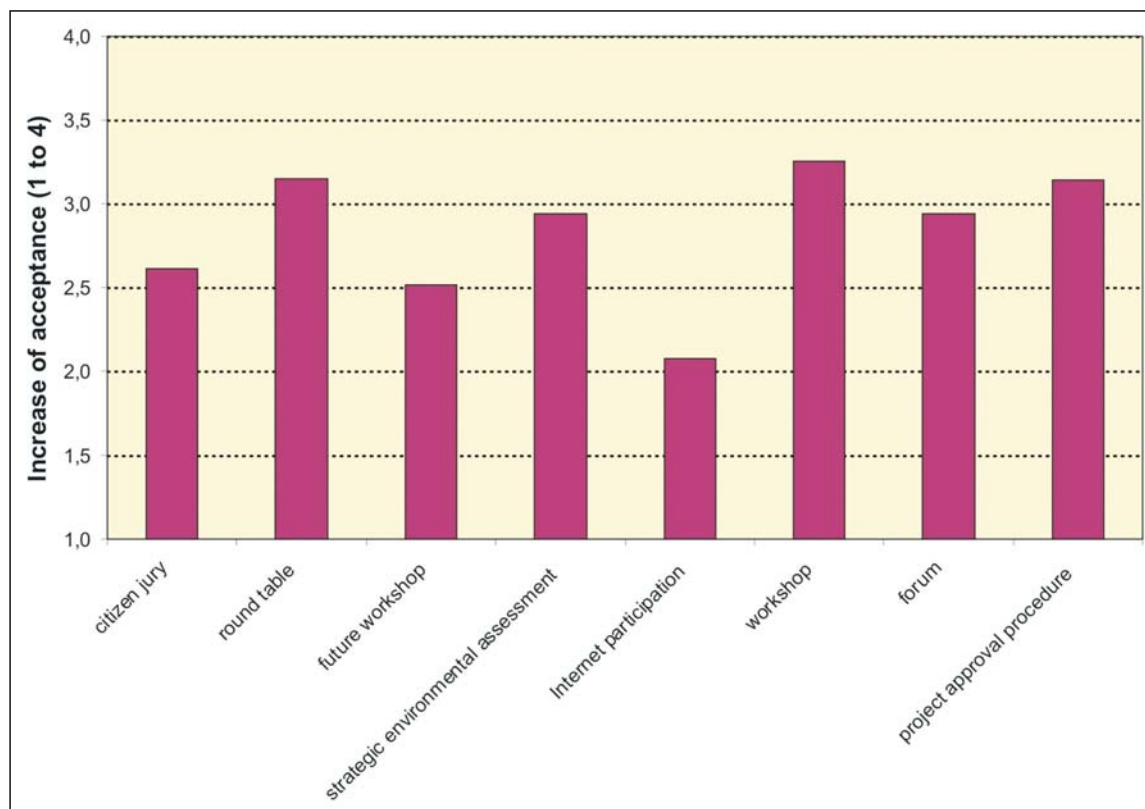


Fig. 6: Response to the question: how useful are the listed procedures for the acceptance of coastal defence measures? (1 = very low; 2 = low; 3 = high; 4 = very high)

in advanced training courses for teachers. Some main findings and experiences from lower grade (age 10) and high school graduates (age 18) that tested the material in a teaching unit are given below. The school material has been distributed (in book form and on CD-ROM) to all schools by the Schleswig-Holstein Institute for Quality Assurance at Schools.

For the lower grade (at age 10), the material was prepared in the form of “learning at stations”. At nine stations, small groups worked independently (assisted as necessary by the teacher) on different topics. For example, they prepared a map showing the flood-prone lowlands along the North Sea coast of Schleswig-Holstein, and listened to an authentic flood warning that had been broadcasted by radio. At the beginning of the teaching unit, the pedagogue organised an excursion to a sea dike to experience the “state of knowledge and awareness” among the scholars. Most of the scholars were aware of the topic coastal defence (had visited a coastal location with sea dikes before), but could not clearly express the significance. With the stations, questions were delivered that needed to be solved by the scholars. From the answers and a final discussion it became clear that the scholars had gained a lot of information. Especially the written eyewitness account from a storm surge by peer kids living at small islands (Halligen) in the German sector of the Wadden Sea worked as a light bulb moment. In result, the knowledge about and the awareness for coastal risks could be raised substantially.

For the sixth form (at age 18), the material was provided in digital format and applying a simple version of a geographical information system (GIS). The GIS allowed for simulations, e.g., what would happen to Schleswig-Holstein without dikes. This option, especially, helped to demonstrate the coastal risks in Schleswig-Holstein. The fact that, without sea dikes,

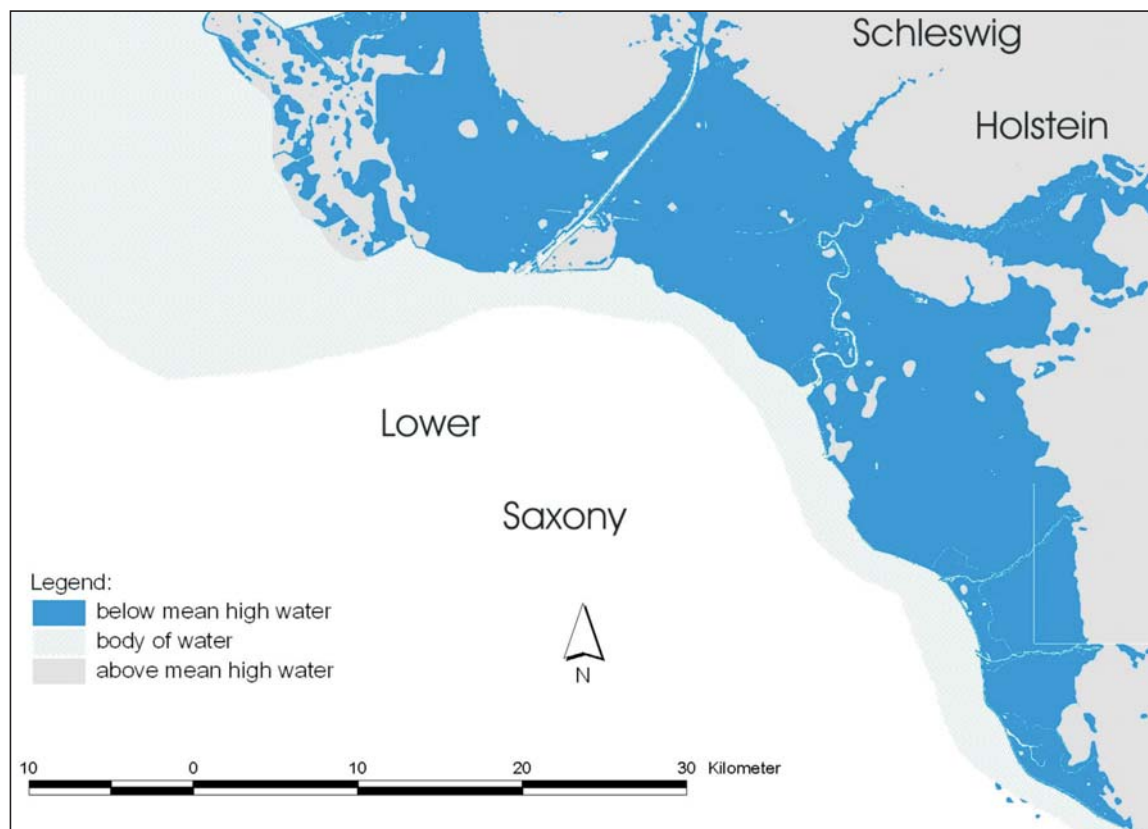


Fig. 7: Land area (dark blue) along the river Elbe in Schleswig-Holstein that would get under tidal influence without sea dikes

significant parts of Schleswig-Holstein like the marshes along the Elbe (Fig. 7) would come under daily tidal influence, struck up instantaneous awareness of the problem and resulted in a strong motivation to find out more. One of the provided options, the conduction of an external school survey on the basis of free software, turned out to be unfeasible. Schools which were not directly involved were reluctant to cooperate, which was interpreted by the high school graduates as lack of coastal risk awareness. An excursion to the coast (the test school was situated in one of the most coast remote locations in Schleswig-Holstein) opened the eyes of the students for the major tourist services and, therewith, the damage potentials that are situated directly along the shoreline. In conclusion, the material provided was seen as complete, allowing for a broad range of topics to be addressed. The application of new multi-media based techniques was motivating and resulted in a high creativity of the high school graduates. In the end, there was agreement among the students that the teaching unit had resulted in strong and sustainable coastal risk awareness. The teacher who tested the material now presents the unit on a regular (yearly) basis.

#### 4. Discussion and recommendations

Although financial and time constraints do not allow for generalization of the results, the study seems to confirm the postulated deficit in coastal risk awareness in large parts of the coastal population. Although 33 % of the interviewees in the public opinion poll state that the risk of coastal flooding in their region is high to very high, they feel safe, have thrust

in Government and/or tend to forget or disclaim the risk. Although situated in the lowland, 30 % believe that their houses could not be flooded when the sea dikes breach. Furthermore, 90 % of the people who estimate the chances of coastal flooding in their region to be very high had not taken any precautionary measures. This seems to indicate that the information flow towards the population is either insufficient, does not reach the recipients or is not taken seriously. There is an apparent deficit in risk communication. One of the reasons may be that the perception of risk differs among administration and science (the suppliers), and the population (the recipients). The information that sea dikes are able to withstand a certain water level with a certain (very low) probability of occurrence is too academic and may even give the false impression of absolute safety. To overcome this problem, risk should be translated into the language of the society, reference should be made to personal living surroundings and to personal consequences, and options for personal action should be presented. Background information about coastal risk management and about measures for personal precautionary actions should be distributed on a regularly basis.

In their answers, 62 % of the respondents to the public opinion poll indicated that the quality of the information about the risks of storm floods delivered by the responsible administration is low (30 %) to very low (32 %). The variance among the countries in the answers to this question was large. In Ribe, only 20 % of the respondents were not satisfied, whereas in Oostende this figure amounted to 86 %. These results should be viewed with special care. Although 80 % of the interviewees in Ribe were satisfied about the quality of information, 68 % of them indicated that their property could not be hit by a storm flood (although situated in a flood-prone area). In Oostende, a large coastal defence scheme is being planned that automatically leads to controversial discussions and discord among the affected population (despite extensive information campaigns and participation procedures). This general feeling of discontent is certainly reflected in the answers from Oostende. It may be concluded that the supposed degree of satisfaction among local residents is rather subjective and, at least in part, depending on external factors. To overcome this problem (at least in part), the information supplied should be neutral, objective, plain, targeted, comprehensive and understandable. Further, a mix of information tools should be used in combination.

An extensive number of participation procedures exist. KAISER et al. (2004) describe and evaluate 32 tools for information and participation. Some of these are formalized and mandatory like the project approval procedure. Most of the described tools, however, have a more informal character which implies, for example, that the results are not binding. Being mandatory, the project approval procedure is the best known tool to the experts from administration. A plan which needs to be approved is produced by a public or private initiator. The administration that is responsible for the approval has to take several steps to assure that all public and private affected institutions and persons can comment on the plan. It has to be published and laid out in affected communities, written comments have to be gathered and evaluated, and public hearings to decide on all objections have to be conducted. The expert survey delivered controversial results. Some experts feel that the project approval procedure is the optimal way to consider the desires of the affected. Others state that the procedure is rather reactive, i.e. people are only allowed to react on an existing plan. An active involvement of the affected in the development of their living surroundings (bottom-up principle) is not possible.

From the public survey it became apparent that people are sceptical whether their objections to plans are taken seriously. About 40 % of the respondents stated that the public has no influence. To overcome this scepticism, independent (external) persons might be used to moderate the process, and more information about the results and outcomes of the procedure

should be provided. These results and outcomes should, of course, duly reflect the objections made during the procedure. In this respect, KAISER et al. (2004) recommend the administration to be positive and responsive, e.g., by respective training of staff. Furthermore, from the 92% of the respondents who said that they had never taken part in a participation procedure, 48% believed that such a procedure had never occurred in their region. From the expert surveys it became clear, however, that such procedures have been conducted in all locations (maybe several years ago). Apparently, the information about the procedure did not reach the public or was not noticed. More effective information tools like the involvement of (trustworthy) “local celebrities” and local press should be applied.

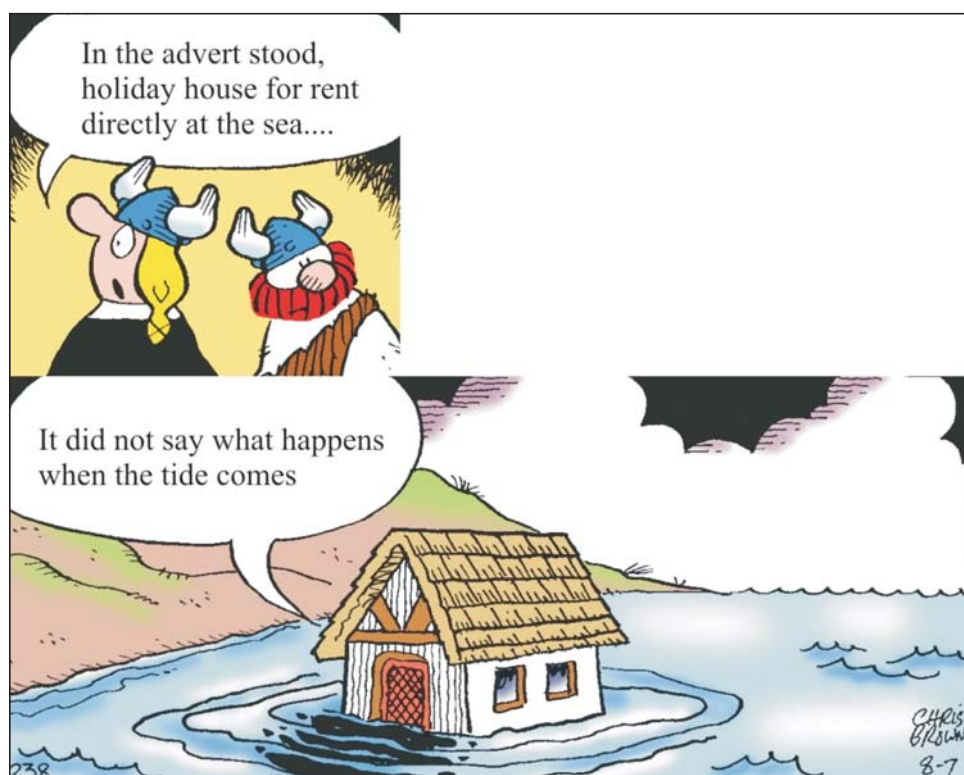


Fig. 8: Example of “vivid” information to explain the significance of coastal risk management to basic scholars (From the comic: “Haegar the Terrible”; with the courtesy of Bulls Press GmbH, Germany)

A promising tool to increase and maintain coastal risk awareness among the population in a sustainable (long-term) way is to include coastal risk management in the instruction topics at schools. The pilot study for Schleswig-Holstein demonstrated that students are, still, highly susceptible for praxis-oriented, tangible and vivid education (Fig. 8). As soon as they were convinced about the significance, they were highly motivated to increase their risk perception and their state of knowledge and awareness. It is recommended that the school material should be established in close cooperation among coastal risk administration and pedagogues to assure qualified and praxis-oriented education. Administration should deliver actual and praxis-related data and information, to be transferred into school material by qualified pedagogues applying multi-media based techniques. In order to remain modern, the material and applied techniques should be updated on a regular basis, e.g., conform the actualisations of respective coastal risk management master plans. In order to increase the application at schools, online advanced training courses for teachers should be provided for.

The results and findings of this study, to the larger part, confirm and reflect previous national research projects. As a response to national and regional findings, comprehensive efforts are being undertaken by the respective administrations to overcome the information deficits and lack of active involvement that are experienced by the public. For example, in the United Kingdom extensive information campaigns have been or are being conducted to increase the awareness and preparedness, such as the distribution of a leaflet to all households in flood-prone areas, the maintenance of a comprehensive internet-presentation including a flood-warning system, and a national flood-phone. Investigations are underway to assess and communicate the risk of flooding, e.g. the national program “Veiligheid Nederland in Kaart - VNK” in The Netherlands, the RASP and Foresight-programmes in the UK, and the projects PRODEICH, MERK and KRIM in Germany. In the Netherlands, school material for different class levels and schools has been assembled in 2003 to commemorate the 1953 national storm flood catastrophe.

The added value of this study may be the conclusion that the observed deficits in all the North Sea countries and regions are highly comparable despite major differences in the physical, social, economic and cultural context (see contribution Kiezebrink, this volume). Every country and region has developed and implemented strategies to counteract the shortcomings. In consequence, the countries and regions can learn from each other.

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