safecoast

keeping our feet dry in the north sea lowlands

THE INFORMED SOCIETY

ACTION 2 FINAL REPORT

September 2007

Interreg North Sea Region

ERDF

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1. summary

1.1 Tasks and objectives of SAFECOAST – "The informed society"

The SAFECOAST project deals with the overarching question of what the management of the North Sea coast would look like in 2050. The project is focused on the consequences of climate change, the spatial development for coastal defence and the safety of the public facing storm flooding risks.
SAFECOAST is co-financed by the European Union as part of the Interreg 3b North Sea Program for transnational projects. The total budget is 2.3 million euros.
SAFECOAST includes six actions, each of which contains a number of tasks which are being completed by actors in Denmark, the Netherlands, Great Britain, Belgium and Germany. The following topics are covered by the actions.

1. Inventory of climate scenarios and spatial development plans
2. Risk communication
3. Comparison of a number of simulation models for flooding scenarios
4. Integrated master plan for coastal protection in Flanders
5. Evaluation of current flooding risks and estimates of risks in 2050 in the various pilot areas
6. Consolidation of findings in order to develop an adaptation strategy for integrated coastal management

The subproject SAFECOAST (Action 2) "The informed society" is coordinated and co-financed by the Ministry of the Interior, Schleswig-Holstein, (Department of Catastrophe Protection) and the Ministry of Agriculture, Environment and Rural Areas, Schleswig-Holstein, (Division of Coastal Defence, Flood Protection and Harbours). Its goal is to develop a communication strategy to inform about storm flood risks in Schleswig-Holstein and to sensitise the population and political decision-makers. This targeted communication is to increase acceptance for measures for coastal and catastrophe protection and decrease the risk of residents in the flood-endangered coastal areas. A booklet and an exhibition is also being developed in this project, but the concept for the exhibition is not a part of this report. The development and implementation of this exhibition will be completed at the end of March 2008.

1.2 Stages and project history

The SAFECOAST project – "The informed society" so far includes the following stages, the results of which will be presented in this report:

- Literature analysis
- Primary analysis of communication activities in the project countries
- Production of the storm flood protection booklet
- Impact study
- Strategy development

In chapter 2 we will introduce those findings from the literature analysis that are relevant for this project. From the literature we will develop recommendations for creating a booklet as well as for general communication about risks. In Chapter 3 from the primary analysis of the communication activities in the SAFECOAST project partner countries Denmark, Great Britain, the Netherlands, Belgium and Germany an impression is given of how coastal defence and flooding protection are currently being communicated. Chapter 4 deals with the design and making of the booklet "Sturmflut - wat geiht mi dat an?" (Storm floods – why should I care?). This booklet was distributed in selected areas in Schleswig-Holstein at the end of April 2007. Two questionnaires were then sent to households in these areas six weeks apart. Chapter 5 contains an analysis of these impact studies. From

the findings of the previous project phases in Chapter 6 recommendations will then be given for a comprehensive communication strategy for storm flood defence.

1.3 Summary of project results

Risk communication in storm flood protection/recommendations for designing the booklet
By risk communication we mean "communication which serves to identify, estimate, assess and manage risks" (Wiedemann & Schütz 2006: 3). Scientists, decision-makers, the affected parties and all others interested can participate both as receiver as well as producers of risk communication. In the SAFECOAST project – "The informed society" – concepts for communication material are to be developed, implemented and evaluated. First of all a booklet was developed which gave information about storm flood risks and tips for safe behaviour in catastrophes. Findings from risk perception research show factors that influence a number of different risks. These factors yield important recommendations for the development of the booklet. In the following we will give a quick overview and summary of the recommendations from the literature and previous projects for the making of the booklet. In parentheses you can see the page of the booklet containing the recommendation.

- The greater the potential one is personally affected, the greater the awareness of the risk and the willingness to take measures.
  - ! Focus on communicating personal affectedness (pp. 2-4)
  - ! People will then take preventive measures when they are convinced of the effectiveness of their precautions. When presenting protective measures their effectiveness should be highlighted. (p. 11)

- Risks that seem familiar to people (e.g. by living on the coast for a number of years) are more likely to leave them indifferent.
  - ! A booklet should re-sensitise people to the risk. (pp. 2-4)

- If people have deliberately chose to live on the coast then they have accepted the risk of storm floods and flooding and their perception of risk is probably weakened.
  - ! A booklet should describe current risks and remind people of their endangered location. (pp. 2-3)

- The motivation for people to take precautionary measure on their own should be increased.
  - ! Photos of catastrophes should only be used if the harm shown is not too great and if it seems possible to successfully deal with the risk. (see photos in the booklet)
  - ! Role models (neighbours, well-known individuals) help communicate how to behave effectively. (p. 9)

- The booklet should inspire confidence and be believable.
  - ! The publisher of the booklet should briefly present its tasks and activities. (pp. 8, 16)

In general we can formulate the following requirements for communication material that is used in risk communication:

- Communicate simple, clear and succinct messages, which are still adequate in spite of the complexity of the contents.
- The material should provide comprehensive information and state sources and references for further, more detailed information.

- The material should be well illustrated and provide intuitive access to the scientific background, the possibilities for action and the conclusions drawn by the authorities.
- Trustworthiness should be underlined by stressing the quality of the scientific background.
- Action to be taken to reduce risk or avoid risk should be communicated..

Primary analysis of information and communication media in the partner countries

In Germany there is, for example in Cologne and Hamburg, more comprehensive information. In both cities flooding booklets are distributed to the population, there is information in the Internet and risk maps (maps showing areas threatened by flooding). In Cologne there is a texting service warning citizens about dangerous water levels.

In the Netherlands there are three major campaigns: Nederland leeft met water (the Netherlands live with water), Denk vooruit (Think ahead) and a collection of risk maps in the Internet. The campaign offers a very good combination of different media (booklets, newsletters, Internet, advertising). The evaluation of the risk maps shows clearly that the respondents would like a clear and simple operation and that at the time there is not a strong demand for risk information.

In Great Britain there is a comprehensive service for citizens wishing to get information about storm flooding and flooding risks. The Environment Agency provides an extensive Internet presentation with a number of targeted booklets, risk maps, a telephone warning service and it regularly conducts advertising campaigns. Affected citizens can join action groups, coordinated by the Flood Forum, and take part in discussions about flooding and organize mutual help.

In Belgium citizens can get information in the Internet in a so-called Kustatlas about technical coastal defence measures, climate change and potential threats from storm floods. There are no recommendations there for behaviour in the event of a disaster or for preventive measures.

In Denmark the Kystdirektoratet provides information about storm flood risks in an Internet homepage, through mass media and public events. Questionnaires and interviews show that this means of communication is appreciated by the public.

Impact Study

A summary of empirical results from the questionnaire organized by topic follows.

Risk perception and dealing with storm flood protection

- In the areas surveyed there is a great interest in storm flood protection.
- The feeling of being threatened is not that strong in these areas. Over 50% of those surveyed responded that they felt “little” or “not at all” threatened. In Glückstadt the feeling of being threatened was highest, while in Eckernförde it was lowest. The more people had personal experience of storm flooding, the higher the feeling of being threatened.
- There is no correlation between the feeling of being threatened and the age or gender of a person. There is also no relationship between the feeling of being threatened and education, length of residence in one area and whether a person rents or owns his or her property.

Evaluation of the booklet

- About 70% of the respondents take the booklet, as useful, as easy to understand and attractively designed. A somewhat smaller number of respondents agreed to the statement that the booklet is a comprehensive report on the topic. More local information and recommendations for catastrophe protection are wanted.
- The enclosed flyer is seen by over 80% of the respondents as “useful” or “very useful”.
- The preventive measures for protection from storm floods and in event of a disaster are taken by 14% respectively of the respondents after reading the booklet. About 40% of the respondents either do not in general take any steps for protection or had

already taken the corresponding measures before reading the booklet. There is a correlation between the reported intensity of feeling of being threatened and the willingness to take measures: the greater the feeling of being threatened, the more willing people were to take measures.

- In the survey there was a difference between test areas. On the west coast the feeling of being threatened is greater and preventive steps are taken more often. The interest and knowledge about storm flood risk is greater here. On the east coast basic work thus needs to be done to first sensitise people to the topic.
- The respondents had the greatest interest in recommendations in event of a disaster, in preventive measures against flooding damages and in local information about storm flood protection.

Communication about storm flood topics

- A clear majority (over 80%) of the respondents wants regular communication about the topic (at least once per year). About 70% of the respondents consider radio and television to be "very important" and these are seen as the most important channel of communication.
- About 60% of the respondents believe that official publications and newspaper and magazine reports are "very important" and so are highly approved of.
- By contrast only 36.4% of the respondents consider the Internet to be "very important".

Thinking about climate change

- The great majority is convinced that climate change is already happening or is going to happen. Only 2.3 of the respondents thought that climate change was not going to happen.
- 84.7% believe that climate change is anthropogenetic.
- 57.8% believe that everybody can help to slow down climate change.
- More than 80% agree with the statement or "somewhat" agree that climate change will lead to storm flood events in Schleswig-Holstein in a few decades and that existing protection facilities will not offer any safety.

Participation, voluntary involvement and neighbourly help

- More than 80% of the respondents are not taking an active part in decision-making about storm flood protection.
- However 23.3% of the respondents would take advantage of opportunities to participate in storm flood and coastal defence. This shows that there is a need for opportunities to participate.

Communication strategy

By risk communication strategy we mean how the objectives of risk communication are to be reached. This involves taking into account and coordinating the objectives and the message, the target groups, the sender of the information, the frequency of communication, the media and the style of language. For the communication strategy in Schleswig-Holstein regarding coastal defence and storm flood protection we recommend a targeted communication campaign using a combination of communication media. The more intensively people are already aware of storm flood risks and the more interested they are in the topic, the more actively they will search for information. The impact study showed that there are differences in the affected population concerning interest and the feeling of threat, and this must be taken into account by a communication strategy. The less interest and risk awareness present, the less an individual will be ready to spend large amounts of time searching for information. Table 1 gives an overview of target groups, together with the challenges for communication and the appropriate communication media.

Target group	Challenge for communication	Appropriate communication media
Affected population showing an interest in the topic and aware of the risk	Comprehensive presentation of the topic Presenting background knowledge Recommendations for right behaviour	Internet (e.g. in combination with risk maps, newsletters, podcasts, etc.) Booklets Exhibitions Television and radio reports (depending on length) Personal conversations
Affected population who are more likely to be uninterested and have no awareness for risks Unaffected population	Sensitising people for the topic who are not actively looking for information	Mass media (radio, television, newspaper) Advertising Personal conversations
Affected population (whether interested or feeling threatened or now)	Information about regional implications	Official publications Regional newspapers Flyers Information stands
Affected population (whether interested or feeling threatened or now)	Innovative access to topic	Calendar Postcards Theatre performances Information per texting

Table 1: Appropriate communication material for different target groups

The impact study yields further recommendations for communication about storm floods:

- There should be a stronger sensitising of the population, especially in the Baltic Sea region, so that preventive measures can be implemented there more often.
- There should be regular communication about coastal and storm flood protection (e.g. once a year).
- Mass media such as radio, television and official publications are considered the most important ways of communicating. These should be made better use of when expanding communication activities.
- Future communication should especially involve information about catastrophe protection, about local topics with reference to storm flood protection and preventive measures.

- In addition there should be a well conceived education campaign about the local effects of climate change, considering the uncertainty in the population.
- With the media examined so far in this study it is possible to create a targeted communication but in most cases communication goes in one direction only and cannot take into account and make use of the wishes, claims and knowledge in the public. By involving the public in decisions and recommendations, the needs of the public can be better taken account of and so increase the acceptance of measures over the long term.
- Since opportunities for citizen participation in decision-making in storm flood and catastrophe protection can be explicitly requested, such opportunities for the public should be enhanced.

Risk communication can be defined as "communication that serves the identification, app

2. risk communication about storm flood topics

In this chapter we will give an overview of the state of risk communication research. Important research findings in the field of flood communication will be briefly introduced and related to the contents being developed here. In addition we will give recommendations for the design of the booklet.

2.1 Principles of risk communication

Risk is understood to be the "quantitative and qualitative characterization of a harm with respect to the probability of its occurrence and the consequences of its …" (Hollenstein 1997: 19). The formula for calculating objective risk used by the insurance industry is occurrence probability/time x damage. The goal is to be able to give an assessment of risk that is numerical and as objective as possible. Subjective risk on the other hand expresses the intuitively experienced risk, which is determined by risk perception (cf. Mertsch 2004: 34). Risk perception is influenced by a number of different factors. Effective risk communication must be based on the findings of risk perception research. But what is the exact definition of risk communication?

Risk communication can be defined as "communication that serves the identification, appreciation, assessment and management of risks" (Wiedemann & Schütz 2006: 3). Scientists, decision-makers and all interested or affected parties can participate in risk communication, not only as recipients but as producers (cf. Wiedemann & Schütz 2006: 3). Public communication by the authorities on the subject of heavy flooding is of key importance to citizens' risk perception, as the risk is not an ever-present feature of everyday life. In addition, we live in an increasingly complex and interlinked world, where media reports and political reactions often give conflicting impressions of risk levels (cf. Renn et al. 2005: 3). The objective of risk communication on the part of the authorities is thus to continuously remind citizens of the risk, to inform them and thus to maintain readiness for action. By providing the necessary information, dialogue or participation, the public should be empowered to assess the risk on a personal level. The goal of government risk communication is therefore to continue reminding its citizens of risk, to inform them and to maintain their readiness to take action. The acceptance of political decisions can be strengthened by suitable communication by the authorities (cf. Ruhrmann & Kohring 1996: 17).

The general public should be enabled to make a personal assessment of the risk by receiving the information they need, or the opportunity for dialog or participation. This risk responsibility is based on knowledge of the proven consequences of risks, the remaining uncertainty and other risk-relevant factors (see Renn et al. 2005: 11). Mertsch (2004: 45) also points out that the "creation of a permanent sensitivity for the sudden

occurrence of natural disasters and an awareness of their causes and consequences [...] important fundamentals for a strategy to mitigate and avoid damage. Only if the public is sensitised to the danger of flooding can catastrophes and the continuous development of an awareness of the causes and effects can a national and regional preventive and substantive flood protection, sufficient self-protection as well as joint catastrophe protection be realized."

On this basis a number of tasks can be formulated for risk communication. According to Covello et al. (1987: 112f.) these include

- Information on and explanation of risks (improving knowledge of risks, emphasizing education)
- Encouragement of changes in behaviour and preventive measures
- Information in emergencies and disasters
- Joint problem-solving and conflict-resolution involving political decision-makers, scientists and the public.

The first three points on this list apply to the task of producing a booklet for coastal lowlands in Schleswig-Holstein. The extent to which joint problem solving and conflict resolution need to be taken into account in the future development of a comprehensive communication strategy shall become more apparent as the project develops.

Communication research has shown that recipients are only able to (re)construct the communicator's message, and that their personal and social experience influences their uptake and evaluation of the message (cf. Ruhrmann & Kohring 1996: 14). Thus, there can be no such thing as an unfiltered influence of the communicator on the recipient. Only by observing the recipient's reaction can it be confirmed whether the communicator's intention has led to the desired change in behaviour (cf. Ruhrmann & Kohring 1996: 14).

The effectiveness of communication is determined by a range of influencing factors, which Ruhrmann and Kohring (cf. 1996: 15) have described as 'communicator factors' and 'recipient factors'. Communicator factors include the mass media, the informative activities of the authorities, etc. Recipient factors are to be understood as personal experiences, political attitudes or risk perception. As risk perception plays an important role in determining the form communication on risks should take, a number of findings from research into risk perception shall be presented.

2.2 Risk communication research

Since risk perception plays an important role in how risk should be communicated, we will describe briefly some of the findings of risk perception research.

Findings from Risk Perception Research pinpoint the factors that influence the perception of different risks. These influencing factors can provide important guidance in drafting an effective communication strategy on storm floods and flooding risks (cf. Kaiser et al. 2004: 49; Renn 1989)

Risk perception is generally understood as the process "by which people with no access to long data streams and precise calculation models go about the evaluation of risks" (Plapp 2003: 14). Intuitive risk perception "is based on the provision of information on the danger source, the psychic mechanisms for dealing with uncertainty and early experience with risks. The outcome of this mental process is the perceived risk, i.e. a collection of ideas which people put together on the basis of the available information and healthy common sense" (Renn 1989: 167f.).

Psychometric research is explicitly concerned with the search for factors that influence the perception and assessment of a given risk. The objective of this approach is a quantitative description of the cognitive and evaluative structure of risk and the determining factors involved (cf. Jungermann & Slovic 1993). The findings of numerous investigations have shown that risk perception and assessment is influenced by three

aspects: risk characteristics, personal characteristics and environmental conditions (cf. Markau 2003: 132).
Three risk characteristics were identified by Slovic, Fischhoff and Lichtenstein (cf. 1985) as having an influence on risk perception: how dreadful the risk is (determined by factors such as survivability, deadliness, uncontrollability, extent of damage); how familiar the risk is (scientific explanation, immediate consequences); and the number of people exposed to the consequences of the risk ('exposure') (cf. Slovic 1987; Slovic et al. 1985). How dreadful the risk is determines especially the risk perception of non-experts; experts, on the other hand, focus more closely on the probability of the risk.
Personal characteristics also have an influence on risk assessment. The German Advisory Council on Global Change (WBGU) (cf. 1998: 177ff.) has described the following important characteristics:

- Voluntary nature of risk acceptance: risks which are not voluntarily entered into tend to be perceived as greater than risks that have been taken on voluntarily (cf. Renn 1992).
- Personal experience: previous experience of being affected by risks heightens readiness to take preventive measures. Without such experience, the risk tends to be underestimated and preventive measures are not taken.
- Affectedness: people assess risks as more serious if they are potentially affected.
- Controllability: risks which cannot be influenced are often perceived as more threatening.
- Knowledge: knowledge can lead to the risk being judged as either more or less dangerous.
- Well-known and familiar risks are generally perceived as less threatening as new, unknown risks (i.e. mining vs. genetic engineering).

Besides the characteristics of risk and of the person, environmental aspects also influence risk perception. The geographical proximity of a risk can have an influence on the level of risk perceived. This risk is similar to the characteristic of being personally affected. For example, people with technological infrastructure on their doorstep tend to have a heightened risk perception. Nevertheless, after some time has passed people may get used to the risk and perceive it as being relatively harmless (see personal characteristics). Political and economic factors (war, recession etc.) can also influence risk perception.
The factors described here should not be seen as an exhaustive list. The list could be further extended (cf. Renn 1993) and should be considered as a selection of possible influences which are recurrently brought up in studies (cf. Markau 2003: 136). As established knowledge, however, the consequence of these factors for risk communication in practice is that dialogue between laypeople and experts is important, as is reference to the everyday lives of the target group in question (cf. Wiedemann & Schütz 2006: 8).

2.3 Risk perception and communication

There is a relative lack of research into the extent to which the influencing factors listed above must be comprehensively addressed by a communication strategy. The question of if and how citizens search for information, and the relationship to these factors, has not yet been unambiguously resolved (cf. Lion et al. 2002: 766).
There are a large number of studies about the extent to which fear as a reaction to a message leads to a change in behaviour by the recipient (cf. Gutteling & Wiegman 1996: 54f.). Sutton (cf. 1982) reach the conclusion that when fear of a risk increases the acceptance of recommendations about how to minimize that risk also rises. The "protection-motivation model" assumes that the behaviour that minimizes the affectedness of a danger will be more readily carried out. This theory gives four variables influencing whether behavioural measures will be actually carried out (cf. Gutteling & Wiegman 1996: 55):

- the harmfulness of a risk
- the probability that a risk occurs
- the effectiveness of the recommended behaviour
- the personal implementation of the recommended behaviour

These variables were investigated in a number of studies, without however coming to uniform results. The protection-motivation model offers a number of insights, which however need further research.
Lion et al. (cf. 2002) have therefore investigated what information people seek when confronted with an unknown risk. They interviewed nine focus groups with a total of 57 participants and distributed questionnaires to 500 households in the Netherlands. The aim of the study was to find out what kind of information on risks was preferred. It was demonstrated that laypeople are particularly interested in the following information (Lion et al. 2002: 772):

1. How high is my level of exposure to the risk?
2. What does the risk consist of?
3. What consequences does it have?
4. How great is the risk? Can I control it?

Their study brought out two distinct needs: one group of participants flatly rejected information on risks, either because they were afraid of further uncertainty and preferred not to burden themselves with knowledge of risks, or because they had no interest in risks in general. A second group was interested in comprehensive communication on risks. The researchers drew the conclusion that it is more difficult to inform people about risks if the personal relevance of the risks is not clear and present. A further finding was that people did not wish to know the precise probability of the risk; rather, a vague indication (high or low probability) is sufficient (cf. Lion et al. 2002: 773).

2.4 Findings from previous research projects

A number of research projects which have focused in specifically on perception of the risk of storm floods and flooding have shown the urgent need to communicate on the subject of these risks. Project segment 3 of the Interreg IIIb COMRISK Project (Common Strategies to Reduce the Risk of Storm Floods in Coastal Lowlands) dealt with the perception of coastal risks and public participation in coastal defences in Great Britain, the Netherlands, Germany, Denmark and Belgium. The key findings on risk perception included the following (cf. Kaiser et al. 2004: 81):

- Risk perception is heavily influenced by whether people have themselves experienced a major incident and how far back in time this event took place.
- There is no correlation between incident experience or risk perception and the actual implementation of preventive measures.
- There was no discernable correlation between the seriousness of the perceived risk and socio-demographic factors. It was not possible to confirm that women and older people had a heightened awareness of the risk.
- 30% of respondents were not aware that their house could be damaged by flooding, even though they lived in an at-risk area.
- 67% classified the risk as low or very low.
- Although one-third classified the risk as high, only 7% personally took preventive measures
- The most frequently named information sources were radio and television.

On the basis of these empirical results the COMRISK project called attention to shortcomings in risk communication and then advocated detailed communication on the risks and their consequences for individuals. Background information on coastal defence issues and corresponding measures is required in order to increase their acceptance among the general public. In addition, recommendations for preventive measures and

actions to be taken in an emergency should be communicated to citizens. A combination of different media is also seen as useful in reaching the largest number of target groups. A neutral, objective and comprehensible presentation of information should be maintained in all media (cf. Kaiser et al. 2004: 150ff.).

A study by Markau (cf. 2003) on the risk awareness of the dangers of storm floods in the coastal lowlands of Schleswig-Holstein showed that the majority of the respondents in St. Peter-Ording classified the risk of a serious storm flood disaster as low. Similarly to the COMRISK study, Markau draws the conclusion that there is an information deficit among the general public on the subject of storm floods. 69% of respondents were unable to identify any measures for personal protection against flooding. Of the 45 households (29%) which were aware of personal protection measures, only 17 had taken preventive measures for their personal protection (cf. Markau 2003: 173f.).

Most coastal dwellers saw the prospect of global warming as an additional threat. Almost three quarters of respondents believed that global warming could bring with it an increased risk of storm floods (cf. Markau 2003: 177). Opinions were divided in similar proportions as to whether the measures taken by the authorities for storm flood and emergency protection were sufficient or insufficient (cf. Markau 2003: 173). However, the confidence in coastal protection measures which has been built up over the years remains sufficiently strong to create a feeling of safety, which has led to a neglect of preventive measures. Markau comes to the conclusion that "a better institutional information policy – as is also explicitly called for by the residents of St. Peter-Ording – could improve preventive measures here." (Markau 2003: 11).

In his dissertation, Grothmann (cf. 2005) uses the example of the flooding of the Elbe River in 2002 to investigate the possibilities of stimulating proactive private preventive measures against extreme weather damage and the psychological factors involved. He concludes that risk awareness alone is not the decisive motivation for active damage prevention. Rather, people need to recognise that they are in a position to act and that their preventive measures are indeed effective (cf. Grothmann 2005: 202). The possibilities for self-protection should therefore be clearly shown. Grothmann also makes recommendations on the use of extreme images of disaster, showing, for example, ruined houses or people being washed away by flood waves. "If the presented risk exceeds a threshold that people are capable of dealing with, fatigue sets in and readiness to take preventive measures falls" (Grothmann 2005: 202). Thus, the use of extreme images of catastrophe can give rise to a distorted and overblown impression of the damage and discourage people from taking private damage preventive measures. Grothmann (cf. 2005: 204) suggests that trust in the information source exerts a strong influence on the impact of the information. If a given media form appears untrustworthy, no changes in attitudes and behaviour can be achieved.

2.5 Recommendations for the design of media

What implications do the findings of the literature analysis have for the presentation of media in the context of risk communication?

First of all, the urgent need for a communication campaign on the subject of storm flood and flooding risks is evident. Communication of a risk is easier if people have already been affected or if the potential threat is made clear through communication. Information about the risk and how it applies to people should thus be given priority. Furthermore, the booklet should be trustworthy and inspire confidence. Personal contact with affected citizens would surely offer more opportunities to establish trust than a dry booklet. Nevertheless, written information can also include elements, which inspire trust. For example, in a fictional interview a 'neighbour' could be asked what protective measures she has taken and what effect they have. Celebrities could also act as role models, provided they offer points of contact with the everyday life of the booklet's target groups (cf. Grothmann 2005: 204). The following box provides an overview of the options.

- The greater the extent to which people are potentially affected, the greater will be their perception of the risk and their readiness to take action.
  - ! The booklet should therefore focus on explaining how people are affected.
  - ! People take preventive measures only when they are convinced that their measures will have some effect. Effectiveness should thus be stressed in the description of protective measures.
- Risks to which people have become familiar (e.g. by living on the coast for many years) are seen as less threatening.
  - ! A booklet should reawaken awareness of the risk.
- If people have made a conscious choice to live at the coast, this implies that they have accepted the risk of storm floods and flooding, and risk perception may therefore be weaker.
  - ! A booklet should describe the current risk situation and make specific reference to living on the coast.
- Motivation to undertake own damage preventive measures should be intensified.
  - ! Images of disasters should only be used when the damage shown is not too great and when it still appears that the risk can be overcome.
  - ! Role models (neighbours, celebrities) could facilitate communication on effective behaviour.
- The booklet should inspire confidence and be trustworthy.
  - ! The publisher of the booklet should briefly present its tasks and activities.

Figure 1: Recommendation for design alternatives

The Federal Institute for Risk Assessment has brought out guidelines for the presentation of information, which give important guidance in the drafting of risk communication materials. The contents are focused on the area of consumer health protection, but it is possible and methodologically useful to transfer these guidelines to other risk influenced areas, and its recommendations can also be applied to the booklet to be produced here (cf. Renn et al. 2005: 56f.).

- Communicate simple, clear and concise messages which are appropriate despite the complexity of the subject.
- Simple messages should be placed at the beginning of text blocks, and more complex contents should be placed towards the end. Interested readers are prepared to read the whole text, whereas those with a more passing interest should be sufficiently informed by the first sentence.
- The material should provide comprehensive information and state sources and references for further, more detailed information.
- The material should be well illustrated and provide intuitive access to the scientific basis, the scope for action and the conclusions drawn by the authorities.
- Behavioural measures for reducing or avoiding the risk should be communicated.
- Trustworthiness should be underlined by stressing the quality of the scientific basis.
- Contact addresses should be given.

Figure 2: Recommendations from the Federal Institute for Risk Assessment and Risk Communication

Further practical recommendations for the preparation of the booklets are given in section 2.3.

3. risk communication abut storm flood topics

Using the methods of empirical social and communication studies we provide in this chapter a systematic overview of existing information and communication media in the area of coastal and flood protection in Germany, the Netherlands, Belgium, Great Britain and Denmark. The research involved e-mail or telephone contact with the competent bodies for coastal and flood defences in the respective countries. In addition, relevant websites and documents were sought on the Internet. This survey should not be considered as complete, but rather as an impression of the kinds of communication currently being used. First we will give a quick survey of the research findings and then make a qualitative analysis using the data analysis software Max QDA.

3.1 Survey of communication activities in the partner countries

While researching communication activities in the partner countries we looked for both examples of flooding communication and storm flood communication. The media reported on in the following were chose as exemplary in order to document certain characteristics of communication in these countries. A complete list with all identified activities can be found in the appendix of the report.
Unfortunately there are only a few evaluation studies of communication campaigns in these countries. The evaluation studies we received will be presented in the report on activities. The lack of completed evaluations shows the urgent need to measure the success of (risk) communication activities and the measures needed to improve them.

3.1.1 Germany

The activities in Hamburg and Cologne can be mentioned as a positive example for comprehensive communication since the communication media there show concrete possibilities to act, the level of danger for the public and how to behave in the event of a catastrophe. Risk communication was concentrated in both cities on the needs of the public and was not left too general. In Hamburg there are, alongside a number of booklets about flooding, so-called storm flood leaflets that give recommendations on what to do in the event of a catastrophe. These leaflets are regularly distributed to 109,000 households in potential flooding areas, can be downloaded from the Internet and are available from the local authorities. On the backside of the leaflets there are maps of the residential areas pointing out the flooding areas. An individual can see whether he is in danger and what measures he can take before and during a catastrophe.
In Cologne there are a number of complementary activities from the central flood protection authorities in Cologne and several citizens' initiatives . In addition to a flood protection leaflet for the public with recommendations about how to behave in case of flooding there are a number of other innovative information media. The Cologne-Rodenkirchen citizens' initiative has introduced a so-called "water level texting service". Individuals living in flood areas along the Rhine are warned by mobile phone text message when the water level reaches a critical level. On the Internet page of the citizens' initiative there is an emergency plan with a recommendation on what to do for each level of the river. In a risk map an individual can enter his or her street and see how critical the danger is. Each person is able to determine his or her own personal risk. The communication of preventive measures ensures that he or she is able do something actively about that risk.

The Pellworm authorities publish on an Internet page multimedia animations showing how storm floods originate, the worst storm floods in the past, climate change and coastal defence technology. The clips are professionally produced and interesting. Unfortunately there is no indication of how long the clips are so that the viewer is not able to learn how long the films are.
The Oldenburg Dike Association III in Lower Saxony was the organizer of two exhibitions on coastal history, storm floods and dike construction. The exhibitions were embedded in a series of other communication activities for local residents and tourists, for example a theatre performance of Storm's novella "The Rider on the Grey" was held on the dike, including extensive accompanying material. It should be especially noted that the local population was well-integrated, for example local women and retired people gave guided tours through the exhibition and theatre performance. These reports by local residents made the topic more real and believable for the audience.
In Germany there is a number of different kinds of communication about storm floods. There is not an overarching communication strategy at a federal or state level. The extent to which the public is informed depends on how local political decision-makers get involved and how active the water and soil associations are in communicating the topic in public.

3.1.2 The Netherlands

In the Netherlands there are currently three major campaigns communicating flooding dangers: Nederland leeft met water (the Netherlands lives with water), Denk vooruit (Think ahead and the publication of risk maps in the Internet.
The campaign 'Nederland leeft met water' is organised by the Ministry of Transport, Public Works and Water Management, the Association of Provincial Authorities (IPO), the Association of Water Boards (UvW) and the Association of Netherlands Municipalities (VNG). The campaign emphasises the need to give more space for water. The consequences are described for different groups of the population. The goal of the campaign is to promote the readiness of citizens to support flood protection measures in order to ensure the long-term security in the country. (see Adrichem et al. 2006). Alongside the general public there are four groups that are especially targeted:

1. Residents of areas in which water is a known problem or is especially relevant,
2. Residents of cities,
3. Homeowners,
4. Businesspeople (e.g. farmers and gardeners)

The consequences are described for different groups of the population. Risk communication takes place, but not disaster communication, so the recommendations for action remain rather general. However, the exemplary element of this campaign is the combination of a range of mass media: the campaign uses radio and television commercials, newsletters, advertising and information booklets, informative events and a comprehensive website round off the range of information. There is a website where responsible parties in the public authorities can download material.
The public have described the campaign as trustworthy and informative: "At the end of 2003, 82% of the population recognised the social importance of measures to protect against flooding" (Ministry of Transport and Public Works et al. 2004: 9). In the 2006 annual report of the campaign (Adrichem et al. 2006) regional communication is especially recommended. The topics should be prepared in as explicit a manner as possible for the residents.

The campaign Denk vooruit has the goal to sensitise the public to catastrophes and give recommendations for appropriate behaviour during a catastrophe. There is communication about five different types of catastrophe (flooding, fire, terrorist attack, chemical accident and power shortage) in the Internet, TV commercials and flyers. Two checklists in the event of a catastrophe can be downloaded from the Internet . The information

however is very general. Individuals can check to see how much they are at risk by clicking a link on the page to a risk map. The project runs from 2006-2010 and has an annual budget of 1 million euros.

Risk maps show what sources of risk are present in a particular area. They also give information about the make-up of surroundings, which allows a risk map to accelerate the process of individuals and organizations becoming aware of safety in their lives. Risk maps are at the same time an important aid for the authorities and services involved in risk management (see Anonymous o.J.). The Dutch Ministry of the Interior has evaluated the effectiveness of risk maps published in the Internet and surveyed 400 residents about user friendliness and risk perception. The respondents show a low awareness of risk: only 6% believe that a major catastrophe could take place in their neighbourhood within the next 5 years. A low level of interest in independently searching for information about risks was found (about 68% had not searched for information about risks over the past two years), which means that we cannot find an unequivocal interest in risk information. Fifteen percent of the respondents knew the Internet page, and 38% thought that such information services were good in principle. Respondents who had visited the web page say that the symbols were confusing and the explanatory text was too difficult. There was criticism that

- too many symbols were in the legend;
- the menu structure and the navigation instruments were too unclear;
- risks were displayed after selecting a province and not a town or city;
- risk probabilities, risk consequences and behavioural measures were not found.
- In spite of these criticisms the page was found to be interesting enough to recommend to others and to visit again in the future.

In general the activities in the Netherlands are numerous and are characterised by a modern and attractive design. An important building block is the risk map in the Internet, even though there is a fair amount in the design and layout, as shown in the evaluation, which can be optimised. Still the map links the depiction of risk with corresponding advice on preventive measures and on what to do in the event of a catastrophe. Unfortunately this thematic coupling is missing so far in the Nederland leeft met water campaign.

3.1.3 Great Britain

In Great Britain every individual has the possibility to take out insurance against flood damage. The country does not give aid after a flood catastrophe so that the public has a greater self responsibility (see Nooteboom 2007: 44). As a result the Environment Agency offers a broad spectrum of information material on the topic of flooding and storm flood risks. In an extensive Internet presentation on the topic booklets, flyers, guidelines and school materials can be downloaded . On the entry page on flooding there are a number of subtopics that can be clicked on: “Prepare for flooding”, “During a flood”, “Cleaning up after a flood”, “Online flood library” and “Flood guide for older people”. In addition there is a link to the Health Protection Agency. This clear structure offers the user a quick overview of the topics and, depending on the need for information, the opportunity to learn more about a topic. An interactive risk map gives each individual the opportunity, by entering his or her postal code, to assess his or her own vulnerability to flooding.
The Environment Agency provides a telephone service. Each person can register with the Floodline and in the event of a flood will be automatically informed by telephone, fax or pager. There is also very detailed information given about the current flooding levels, which are ranked according to symbols and codes (“Flood Watch“, “Flood Warning“, “Severe Flood Warning“, “All Clear“). The same warning symbols and codes are used in the weather reports in the television news shows. In general the information service appears to be comprehensive, clear and understandable. The Environment Agency has for a number of years run an advertising campaign in the mass media, the so-called Flood Awareness Campaign, as a part of risk management. The national advertising campaign 2006/07 was made up of advertisements in national newspapers (The Times, The Daily

Telegraph, The Daily Mail und The Daily Mirror), in regional and local press media, in the Internet and in radio commercials. In these advertisements and spots the public was encouraged to contact the Environment Agency (by telephone or Internet) in order to determine their own flooding risk. The advertising campaign was supported by presswork from the Environment Agency. In the follow-up survey of the public, 18% of the respondents could remember one or more of the advertising formats (see Environment Agency 2007: 26). The Environment Agency separates the preventive measures in case of flooding into six steps. In the survey participants were asked to tell what steps they had taken in order to prevent flooding damage. The results are presented in Table 2.

Step	Preparation in Advance of Flooding	2005/ 06	2006/ 07
1	Found out if my property is 'at risk' from flooding	**9%**	7%
2a	Found out if flood warnings are available in my area	2%	3%
2b	Made sure I know how flood warnings are issued for my area	2%	1%
2c	Signed up to Floodline Warnings Direct (if available)	<1%	1%
3a	Found out about the Environment Agency Flood Warning Codes	n/a	1%
3b	Made sure I understood the Flood Warning Codes	<1%	1%
3c	Made sure I knew what to do if a flood warning is issued	n/a	1%
4	Checked that buildings and contents insurance covers flood damage	4%	3%
5	Prepared a flood checklist	1%	<1%
6a	Found out how to make my property flood resilient	1%	1%
6b	Made my property flood resilient	2%	1%
Net: Preparation in Advance of Flooding (Steps 1, 2 and 3)		<1%	1%

Base: All respondents in 2005/06 (1,747) and 2006/07 (1,138)
N/a = not asked in 2005/06. The list of Preparations in Advance of Flooding has been refined since the 2005/06 survey.
Figures in bold are significantly higher

Table 2: Implementation of prevention steps (source: Environment Agency 2007: 22)

If the respondents answered with steps 1-3 then according to the definition of the Environment Agency they carried out preventive measures. This makes up only 1% of the respondents in this form (see Table 2). The percentage of persons who answered with any one of the preventive measures from step 1-6 and were aware of the publicity campaigns was 15%. In comparison 14% carried out one or two measures but were unable to remember the publicity.
In the campaign 2005/06 the implementation of preventive measures from steps 1-3 because of advertisements or spots was also less than 1% of the respondents. The influence of advertising on the implementation of preventive measures in both years was minimal. Advertising can merely increase the awareness that flooding risks exist. (see Environment Agency 2006: 39).
The participants who felt threatened by flooding were more likely to have carried out steps 1-3 than those who did not feel threatened. And even those who only implemented one of the six steps responded that they had a higher feeling of being threatened. This makes clear how important risk perception is for the implementation of measures

(Environment Agency 2007: 22). The 2005-06 came to the same conclusion: "Analysis of the data […] show that awareness of flood risk is a better predictor of Preparation in Advance of Flooding than social grade, property tenure, previous flood experience, or the number of years spent at the property" (Environment Agency 2006: 72f.).
The National Flood Forum supports those people who want to find information about flooding topics and offers an advisory service. The local Flood Groups are a good way of involving the public, who can also serve as contacts for others who are interested.
There is also active flood information from the county authorities. Essex County has its own Internet site including flyers and pdf documents . So-called Flood Fairs are held yearly allowing the public to get and exchange information about various flooding topics. Two DVDs were produced for schools and for general information and are factual and attractive reports about various aspects of flooding and storm flood risks as well as how to behave in an emergency.

3.1.4 Belgium

In Belgium we were able to find only a few activities. In the Internet the Kustatlas provides information about the coast with topics on technical coastal defence measures, climate change and the threat of storm floods in Belgium . Recommendations on what to do in the event of a catastrophe or preventive measures were not given.
There are a number of communicative activities in the Kruibeke-Bazel-Rupelmonde Flood Control Area. The area is in the tidal river Schelde and was frequently flooded in the 70s. As part of the Sigma plan the area was renatured and water was thus given more room. In order to minimize reservations about the project there was considerable investment in communication. Communication activities today include information stands in the area, newsletters for residents, information evenings, excursions, articles in the local newspaper and a website . An evaluation of the activities shows people are most aware of the newspaper articles: 76% of the respondents say that they read the articles. The newsletter was read by 68% regularly und 38% went to the information evenings. The Internet site was visited by 125 people per month. According to staff, personal talks are the best way to clear up misunderstandings and prejudices in the long term.

3.1.5 Denmark

On its Internet website, the Danish Coastal Authority (Kystdirektoratet) publishes information on the causes of flooding and on the public flood warning system in Southern and Northern Denmark (on the Wadden Sea side) . In addition, information is given on critical water levels. However, no booklets on flooding emergencies are available for download from the website and there are no recommendations for action in the event of an incident. Furthermore the Coastal Authority communicates through articles in the television, newspapers and in radio; lectures are also held. Currently the Internet page of the Coastal Authority is fairly technical in its content and is to be reworked in the coming two years.

In the COMRISK project the Danish communicative activities were positively evaluated (see Kaiser et al. 2004). The strategy to use mass media such as radio, television and newspapers to inform about flooding seems to be accepted by the public. In the COMRISK survey the agreement of the population about the quality of information was significantly higher in comparison to the other countries (Great Britain, the Netherlands, Belgium, Germany). Of the respondents 79% found that the communication was "good" or "very good" (see Kaiser et al. 2004: 80). Citizens in Denmark cannot insure themselves against storm flood damages, but there is a fund for compensating damages. Only those homeowners can file claims who have carried out a minimum amount of precautionary measures. (see Nooteboom 2007: 27). And so, as in Great Britain, a degree of personal responsibility is required.

3.2 Qualitative und quantitative analyses

As far as possible the communication activities studied were qualitatively evaluated with the data analysis software Max QDA and subsequently quantified. Based on knowledge about risk communication research and from practical experience we have developed a system of categories to analyse a variety of information and communication media. Then with the help of Max QDA we coded and analysed the texts.
In order to organise the texts and compare them with one another, the category/codes 'Publisher', 'Medium' and 'Combination with other Media' are important. The contents and approach of risk and disaster communication are covered by the codes 'Objective', 'Topics' and 'Target Group'. The codes 'Language', 'Illustrations' and 'Design' give information on the presentation of the media.
Once the communication media received from the project countries has been coded, conclusions can be drawn as to the contents, design, etc. Table 3, below, depicts the code tree from the Max QDA program.

Publisher	Company City administration Citizens' initiative, non-governmental organisation Water and dike associations Ministries, authorities, commissions
Target groups	Teacher Homeowner Company (farmer, gardener…) Senior citizens Affected population Unaffected population Political decision-makers School children /children / young people Unspecified
Objective	Education and information Behaviour during a catastrophe Preventive measures
Medium	Calendar Television spot Advertisement Email newsletter School materials Flyer Booklet (more than 10 pages) Internet Risk map

	Film
Topics	Current water level indicator Focus coast Focus river Political decisions Storm flood and flood protection facilities Risk description Facts about the origin of floods Flood stories Preventive measures for citizens Recommendations for action during an incident Equipment for flooding Flooding maps Evacuation Information addresses Behaviour after flooding Climate change
Combination with other media	Does not happen Happens
Language	Informative entertaining Factual Warning
Design	Functional Old-fashioned Black-white Modern Colourful
Illustrations	Few catastrophe illustrations Few illustrations No catastrophe illustrations Many catastrophe illustrations No illustrations Many illustrations

Table 3: The code system

In the following we present the results of our analysis. At first we give the total frequency of the codes, then we discuss discrepancies regarding each country.
The most communication material is entered for Germany, followed by the information material from Great Britain (see Tab. 4). For the Netherlands there are eleven items. For Denmark and Belgium only very few items of communication material could be taken into account. In the case of Denmark this was because the material is in Danish or that it was communicated through the mass media radio and television, so that the material is not available. In Belgium there was less activity identified and there was no possibility to translate the material. The frequency of the codes according to the various countries therefore has only little validity. The presentation of the results is oriented on the sequence of the code tree.

	Number of communication items studied
Germany	30
Great Britain	21
The Netherlands	11
Belgium	5
Denmark	2
Total	69

Table 4: Number of communication items studied according to country

Publisher
Almost 60% of the media studied were published by ministries, authorities or commissions. Communication material from city authorities (17.4%), citizen initiatives/non-governmental organisations (14.5%), water and dike associations (13%) as well as companies (e.g. insurance companies) (8.7%) was published significantly less often.
In Great Britain companies and citizen initiatives published more often than in other companies (19% each). In the Netherlands water and dike associations published more than half (54.4%) of the communication material. In Germany 10% of the publishers were water and dike associations. Ministries and official authorities in every country were often the publishers or were involved in the publication, especially in the Netherlands (90.9%) and in Great Britain (61.9)%). In Germany ministries played a part in the publication of 43% of all communication material investigated in this study.

Response in %	Total	Great Britain	Netherlands	Germany
Ministries, authorities, commissions	59.4	61.9	90.9	43.3
City authorities	17.4	-*	-	40.0
Citizen initiatives/NGOs	14.5	19.0	-	6.0
Water and dike associations	13.0	-	54.5	10.0

Companies	8.7	19.0	-	-

Table 5: Publisher of communication material
* No communication material available.

Target group
Almost half of the media investigated in this study is targeted at the public affected by flooding. However the target group is often also unspecified (39.1%). Groups such as homeowners, farmers, companies or school children are targeted less often. Senior citizens or political decision-makers are addressed only rarely.

Responses in %	Total
Teacher	1.4
Homeowner	14.5
Businesspeople (farmer, gardener…)	8.7
Senior citizen	1.4
Affected population	49.3
Unaffected population	1.4
Political decision-makers	2.9
School children / children / young people	7.2
Target group unspecified	39.1

Table 6: Target groups of the communication material

In all of the communication activities investigated in this study, the target group "teacher" was found only in Great Britain. Similarly we could find offerings for homeowners (28.6%) more often there than in other countries. The Environment Agency in Great Britain is the only institution to give recommendations especially for senior citizens. In the media investigated here political decision-makers were only addressed in Germany and Great Britain. School material was also only available in Germany and Great Britain. This finding however does not mean that there is no similar material, e.g. for schools, in other countries. It is simply the case that we did not sample such data in our study, as we did not sample the whole population.

Objectives
Education and information are most often the objective of communication (82%) and this is especially the case with ministries and authorities. Showing preventive measures (46.4%) takes place less often, just as emphasizing behaviour in the event of a catastrophe (39.1%).
Behaviour in the event of a catastrophe is less often emphasized in the Netherlands than in Great Britain and Germany. Great Britain gives the most information about prevention, while in the Netherlands there is less information (9.1%).

Medium

The media analysed most often in this study are flyers (40.6%), booklets (21.7%) and the Internet (29%). Communication material such as television spots, email newsletters, risk maps, films, school materials, and calendars were used only occasionally as part of large-scale campaigns. Flyers are especially popular in Great Britain: 57.1% of the British media studied here are flyers. Booklets are the most common media in Germany (36.7%). The Internet is used most often in Germany and Great Britain for communication purposes. In Germany, the Netherlands and Great Britain there are risk maps. There is an information film in Germany and Great Britain, while there are television spots and advertisements only in the Dutch campaign. In Belgium and the Netherlands there is a newsletter, while school materials are available in German and British schools. In Germany a flood calendar is published.

Responses in %	Total	Great Britain	Netherlands	Germany
Flyer	40.6	57.1	18.2	33.3
Booklet	21.7	4.8	27.3	36.7
Internet	29	28.6	18.2	26.7
Risk map	4.3	4.8	9.1	3.3
Film	2.9	4.8	-	3.3
Television spot	2.9	-	18.2	-
Newsletter	2.9	-	9.1	-
School materials	2.9	4.8	-	3.3
Calendar	1.4	-	-	3,3
Advertising (newspaper, radio)	1.4	-	9.1	-

Table 7: Media used in the each country

Topics

When searching for communication material we did not confine ourselves to the coastal area but also included inland flooding. The communication material in our sample focuses on the coast and river flooding (one third each) and a third of the communication material did not have a specific focus as it was about the origins of flooding (through storms or river flooding).

In the media the central topic is most often the risk of flooding. In more than half of the documents there is an information address given. Similarly preventive measures, recommendations on how to behave in case of flooding, storm flood and flooding facilities were given. Slightly more than 30% of the media give recommendations for putting together emergency equipment, 30.4% give information about flood history and political decisions. Of the communication media, 27.5% have as a central topic the origins of floods and 23.2% behaviour after a flood. Only 18.8% show flooding maps or give information about climate change. Water levels are given in only one medium.

Responses in %	Total
Risk description	68.1
Information address	53.6
Preventive measures for individuals	49.3
Recommendations for behaviour in an emergency	39.1
Storm flood and flood protection facilities	37.7
Emergency equipment for flooding	31.9
Flood history	30.4
Political decisions	30.4
Facts about the origin of floods	27.5
Behaviour after flooding	23.2
Flooding maps	18.8
Climate change	18.8
Evacuation	15.9
Water level	1.4

Table 8: Topic frequency

The Netherlands gives very frequent recommendations about storm flood facilities, without mentioning measures for the prevention of damage. British communication material give information addresses especially often, as well as making behaviour after flooding a central topic.

Combination
A combination of media (e.g. the download of a booklet from an Internet page) was found in 78.3% of the communication material. However this is made with the qualification that the research in the partner countries was accomplished mainly with the aid of the Internet so that the booklets found there automatically have a combination effect (booklet/Internet page).

Language & design
For a large number of media, language and design are kept functional (56.5%). In only 14.5% of the material was the topic communicated in an informative/entertaining way, while in 15.9% the language had a strong warning tone. About a third of the communication material was colourful, while 13% were black and white. Only 33.3% of the material is modern in appearance.

In the communication material there are often illustrations (42%), however fewer catastrophe photos (31.9%). In 29% of the media there are no catastrophe illustrations at all. The communication in the Netherlands is more colourful and modern; in the other

countries it is more functional. Great Britain differs from the other countries in that it uses somewhat fewer illustrations.

4. recommendations for the design of the storm flood booklet

As part of the SAFECOAST project, and in close cooperation with the Ministry of the Interior and the Ministry for Agriculture, Environment and Rural Areas of the state Schleswig-Holstein, a booklet "Sturmflut - wat geiht mi dat an?" (Storm floods – why should I care?) was developed to provide information on the risks of flooding and storm floods on the North and Baltic Sea coasts. As far as possible the concept of the booklet and its design were based on the recommendations from the literature review.
The booklet has 16 pages and a 21x21 cm. Format. A flyer that emphasizes the event of a disaster and contains regionally specific information is enclosed. In order to produce a suitable booklet, the following questions should be answered using findings from communication research.
It is then to be distributed in three coastal areas in Schleswig-Holstein and is subsequently to be evaluated (see Meissner 2005: 84):

1. What is the objective of the booklet?
   a. What messages are to be conveyed?
   b. What reaction is intended to be stimulated in the recipient?
2. What target group is being addressed?
3. What contents are to be communicated (core and secondary messages)?
4. What will the design of the booklet look like (graphics, typesetting, format)?

In the following and sections these questions and relevant points from the literature analysis will be answered with reference to the booklet.

1. Objective of the booklet
The primary objective of the booklet is to educate and inform the public about the risks of storm floods. Affected citizens should be made aware of their personal level of risk from storm floods. The reader is able to find his or her location on the map on page 2 of the booklet and see whether they are living in a flood-endangered area. The blue box on page 3 also explains which neighbourhoods storm floods endanger. In addition recommendations on what preventive measures should be taken and how to behave in case of a disaster can be found on pages 11-14.
The booklet should make clear that the state government is responsible for coastal defence determines what is involved in storm flood and coastal defence. In addition it should be clear that there is no absolute safety and that each individual is responsible for taking precautionary measures (pages 8, 11).

2. Target groups of the booklet
The target group of the booklet to be published is the population groups directly affected in flood risk areas on the North and Baltic seas. Once the booklet is completed it will be distributed to the residents before the beginning of the storm season.

3: Content of the booklet
The following recommendations are based on the analysis of the literature and were used in the concept of the booklet:

- Consider the sequence of the topics
- Make personal affectedness clear (reminder of at-risk location, risk perception weakened by habit)
- Explain action to be taken and the effectiveness of action

- Work with role models
- Create trust in the publisher by naming a contact partner
- Limit the number of catastrophe photos in order not to weaken motivation for overcoming risk
- Make the topic transparent and comprehensive
- Use short sentences

Sequence of topics

Since the public is especially interested in its own risk situation and then about consequences or possibilities to act (see Lion et al. 2002), the topics on the first pages of the booklet should satisfy this need for information. In the booklet on pages 2-4 the relevance of the risk for individuals is described and how he or she is affected by it. The title of the booklet, "Sturmflut – wat geiht mi dat an?" also speaks directly to the individual and should make them curious about the topic. The consequences of the risk, i.e. the necessary protective measures and the potential impact of a catastrophe, are then introduced. Once an individual has learned something about his or her risk situation then they are more willing to think about taking protective measures and how to behave in the event of a disaster. This point is dealt with on pages 10-14 of the booklet:

- Preventive storm flood measures
- Behaviour in case of a disaster
- Equipment in case of a disaster

Personal affectedness/reminder of location

As already shown the personal feeling of concern influences risk perception and behaviour. The greater the awareness of risk is, and if the process of habituation (e.g. by living on the coast for many years) is disrupted again and again by risk information, then the greater the willingness to undertake certain preventive measures will be. The personal dimension of danger is clearly shown on the first four pages of the booklet. The enclosed flyer gives additional regional information and so calls attention once more to the risks of this particular location.

What to do and the effectiveness of taking action

In order to avoid giving the public a feeling of powerlessness in the face of natural forces and to reduce fear and anxiety, it is important to emphasize preventive measures. This satisfies the need of the public to learn something about the controllability of the risk. The effectiveness of the recommended action should be focussed on because it motivates individuals to take action and strengthens a feeling of self-responsibility. And so on page 12 the recommendation to have battery-powered devices (radio and torches) is supplemented by the explanation that in case of power failure you could still hear important information on the radio. More detailed recommendations as to behaviour in case of a disaster are given in the enclosed flyer. Also the topic of evacuation is a special topic in the flyer.

Role model

In the literature we find the repeated recommendation that certain people, e.g. prominent individuals, can serve as role models and present topics with greater credibility. For the storm flood protection booklet this aspect was incorporated through an interview with Volker Popp, the mayor of Timmendorfer Beach and head of the tourism association of Schleswig-Holstein (p. 9). Volker Popp has, after serving as spa director on Sylt Island and now as mayor, much knowledge and experience of life on the North and Baltic sea coasts. He experienced the 1962 flood as a child in Dithmarschen, which makes him an ideal interview partner to talk about storm flood and coastal defence. The topic is presented in an informative fashion in this interview. In addition the credibility of the the booklet and the willingness to take action should be enhanced.

Trust and contact partner

The acceptance of recommendations about flood and storm flood protection depends above all on the trust in the government coastal and flood protection authorities. And that is why it is so important to emphasize the task of coastal defence and the responsibilities. The provision of an address allows those interested to get further information on their own. In the booklet these topics are dealt with on pages 6-8:

- Storm flood protection by Schleswig-Holstein (responsible individuals and activities)
- Addresses of relevant actors and for further information (p. 14)
- Project description (p. 16)

Language and design

Figure 3: Cover of the booklet

The text was kept as concise as possible and the sentences as short as possible. This should make it easier to understand. Numerous photos serve to support the text's message and break up the text. At the same time catastrophe photos were used sparingly so as not to raise doubts about the controllability of the risk.

"Flood facts"

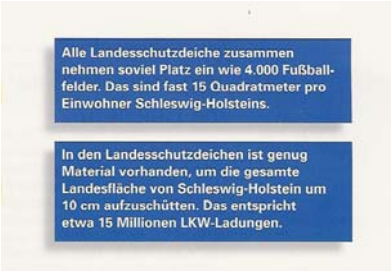
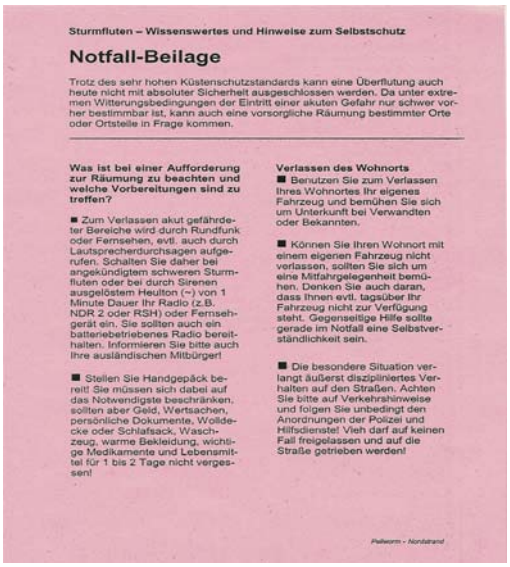


Figure 4: Flood facts in blue boxes

In order to increase attention paid to the booklet, there are blue boxes with “flood facts” throughout the booklet. By flood facts we mean information that amazes the reader and moves them to either reflection or just a smile. The facts are all related to coastal and storm flood protection. It would be an advantage if these brief and stimulating messages were discussed in the neighbourhood creating further informal debate about the topic. Under the rubric “Facts worth knowing” on page 15 there is more background information and explanations. They are meant to break up the text and at the same time stimulate interest.

Content of the flyer



Sturmfluten – Wissenswertes und Hinweise zum Selbstschutz

Notfall-Beilage

Trotz des sehr hohen Küstenschutzstandards kann eine Überflutung auch heute nicht mit absoluter Sicherheit ausgeschlossen werden. Da unter extremen Witterungsbedingungen der Eintritt einer akuten Gefahr nur schwer vorher bestimmbar ist, kann auch eine vorsorgliche Räumung bestimmter Orte oder Ortsteile in Frage kommen.

Was ist bei einer Aufforderung zur Räumung zu beachten und welche Vorbereitungen sind zu treffen?

■ Zum Verlassen akut gefährdeter Bereiche wird durch Rundfunk oder Fernsehen, evtl. auch durch Lautsprecherdurchsagen aufgerufen. Schalten Sie daher bei angekündigtem schweren Sturmfluten oder bei durch Sirenen ausgelöstem Heulton (~) von 1 Minute Dauer Ihr Radio (z.B. NDR 2 oder RSH) oder Fernsehgerät ein. Sie sollten auch ein batteriebetriebenes Radio bereithalten. Informieren Sie bitte auch Ihre ausländischen Mitbürger!

■ Stellen Sie Handgepäck bereit! Sie müssen sich dabei auf das Notwendigste beschränken, sollten aber Geld, Wertsachen, persönliche Dokumente, Wolldecke oder Schlafsack, Waschzeug, warme Bekleidung, wichtige Medikamente und Lebensmittel für 1 bis 2 Tage nicht vergessen!

Verlassen des Wohnorts

■ Benutzen Sie zum Verlassen Ihres Wohnortes Ihr eigenes Fahrzeug und bemühen Sie sich um Unterkunft bei Verwandten oder Bekannten.

■ Können Sie Ihren Wohnort mit einem eigenen Fahrzeug nicht verlassen, sollten Sie sich um eine Mitfahrgelegenheit bemühen. Denken Sie auch daran, dass Ihnen evtl. tagsüber Ihr Fahrzeug nicht zur Verfügung steht. Gegenseitige Hilfe sollte gerade im Notfall eine Selbstverständlichkeit sein.

■ Die besondere Situation verlangt äußerst diszipliniertes Verhalten auf den Straßen. Achten Sie bitte auf Verkehrshinweise und folgen Sie unbedingt den Anordnungen der Polizei und Hilfsdienste! Vieh darf auf keinen Fall freigelassen und auf die Straße getrieben werden!

Figure 5: Cover of the flyer (preliminary version)

The regional four-page flyer is enclosed in the booklet and should offer advice in the event of a catastrophe (behaviour, checklists and contact partners). For each coastal district there is a separate version of the flyer so that regional recommendations in case of evacuation and maps with gathering places and escape routes. The flyer is not bound in the booklet so that it can be taken out and kept ready should it be needed.
Since a number of facts were not available when the booklet needed to be distributed for the impact study (e.g. gathering points), the flyer was sent out in a preliminary version for the first distribution. In the course of the project the necessary information will be requested from the coastal regions so that by autumn 2007 a reworked and final version of the flyer can be distributed with the booklet. .

5. impact study for evaluation of the booklet

After finishing the booklet, it was distributed to close to 2000 residents in selected test areas in Schleswig-Holstein. Two weeks after mailing the booklet the first questionnaire was sent to the same households. Approximately 8 weeks after the first questionnaire, a second one was sent to the same households in order to get more detailed information on certain aspects.

5.1 The survey area

In Schleswig-Holstein almost a quarter of the surface area, 3,722 km², is less than five metres (west coast) or three metres (east coast) above the sea level and are therefore considered in danger of being flooded (see Hofstede & Hamann 2000).
The "land between the seas" has a coast line that totals about 1,190 km, 553 km of which are on the west coast (297 km on the mainland, 195 km on islands and 61 km on the Hallig coast) and 637 km on the east coast (162 km on the Schlei and 87 km on the Fehmarn island) (see Ministry for Rural Areas 2001).
Baltic sea floods become threatening for the coast line of Schleswig-Holstein when a strong west wind drives the Baltic Sea water far into the Gulf of Bothnia and from there with a dropping wind or when the wind turns to the northeast (bath tub effect) (see Klug 1986). However the probability that a storm flood occurs on the Baltic Sea is somewhat less likely than on the North Sea coast (see Table 9).

Storm flood	North Sea coast	Baltic Sea coast
Light	10 to 0.5 (= ten times per year till once every two years)	2 to 0.2 (= twice per year till once every 5 years)
Heavy	< 0.5 to 0.05 (= once every 2 years till once in 20 years)	< 0.2 to 0.05 (= once every 5 years till once in 20 years)
Very heavy	< 0.05 (= less than once every 20 years)	< 0.05 (= less than once every 20 years)

Table 9: Storm flooding and mean annual probability (see Jensen 2000: 43)

As a test area for the booklets Pellworm, Nordstrand, Glückstadt and Eckernförde were selected because they are representative of both coastal areas. By distributing questionnaires in these different towns, we wanted to find out if there are regional differences (e.g. between islanders and people on the east coast).
The island Pellworm is in the Schleswig-Holstein Wadden Sea National Park and has an area of 37 km2 with a population of 1,180 inhabitants, about 150 are school age children. There are about 560 households on the island, about 90 of which are second homes. Pellworm offers visitors about 2,000 beds – after agriculture tourism is the second most important economic factor .
Nordstrand is connected to the mainland by a dam through the North Sea. There are 2,300 inhabitants living on the 50 km2 peninsula. Nordstrand has 2,700 beds – tourism plays an important role here as well. The heavy storm flood of 1362 and 1634 gave the island its present shape. Since 1906 Nordstrand is connected with the mainland by a dam .
Glückstadt in Steinburg county is on the lower Elbe river and has about 12,000 inhabitants. The Elbe at Glückstadt is a tidal river, so that with an elevation of 2 metres above sea level Glückstadt is threatened by flooding and by storm floods.
Eckernförde in Rendsburg-Eckernförde county is on the Baltic Sea and has about 23,000 inhabitants. The city is 0-42 metres over sea level and so some areas are threatened by flooding while others are higher and are safe.

5.2 Implementation and content of the survey

With the help of a coding system that allows respondents to be assigned anonymously but individually, changes within a single household as well as statements for each survey wave can be made. The sample size is large enough to be able to carry out the usual statistical analyses. The questionnaire is mostly standardised and only contains open or semi-open elements where possible responses cannot be anticipated. The questionnaire in the first wave included 31 questions, organised in five topic areas. In addition to content aspects the questionnaire contains some socio-demographic questions so that a target group specific reception analysis can be carried out in retrospect.
The topic areas are:

- Risk perception and dealing with storm flood protection (Questions 1-7)
- Evaluation of the booklet and the flyer (Questions 8-21)
- Climate change and risk assessment (Questions 23-25)
- Communication strategy (Questions 26-29)
- Knowledge questions (Questions 22, 30, 31)

About eight weeks after the first questionnaire, the second one was sent to the four areas and to the same people. It developed some of the aspects of the first questionnaire (e.g. citizen participation, communication strategy). There were no more knowledge questions about the booklet in the second questionnaire.
The following topics were covered in the second questionnaire:

- Risk perception and dealing with storm flood protection (Questions 1,2 and 15)
- Evaluation of the booklet and the flyer (Questions 3-6, 16)
- Communication strategy (Questions 7,8)
- Participation in coastal protection (Questions 9-11)
- Climate change and risk assessment (Questions 12-14)

With a total of only 16 questions the second questionnaire is quite a bit shorter than the first one. In addition this questionnaire gave respondents the possibility to express praise or criticism (in the last question) and not to complete the rest of the questions. This was pointed out in the cover letter and was meant to encourage those who would otherwise not have filled out the questionnaire.
On Pellworm, Nordstrand, in Glückstadt and Eckernförde the impact analysis was carried out in those streets normally hit by storm floods, that is those areas below 5 metres above sea level (on the west coast) and under 3 meters above sea level (on the west coast). The choice of streets was made so that they would be representative of the whole area. The greatest topographic differences in height were in Eckernförde. This fact made the sampling strategy considerably more difficult as the streets selected at random showed large fluctuations in height. However since the quality of a random sample depends entirely on the strictness with which the sampling strategy is conducted, in Eckernförde the possibility was introduced into the sampling strategy of splitting a street with a large difference in height into two parts, with the higher part being excluded from the sample. As a result a number of smaller units were formed that however were largely below the required height limit. It was only on the edges were there some higher residential areas.
A total of 1985 questionnaires were sent in the first wave: on Nordstrand to 409 households, on Pellworm to 380 households and in Glückstadt and Eckernförde to 598 households each. The number of 400 planned (for Nordstrand and Pellworm) and 600 (for Glückstadt and Eckernförde) arose as a result of local differences and questionnaires returned because they could not be delivered by post .
In the second wave a total of 1976 questionnaires were sent – 402 of which on Nordstrand, 379 on Pellworm, 598 in Glückstadt and 597in Eckernförde.

5.3 Results of the impact study

The return rate (see Figure 6) in the first wave was 16.67%. The participation in the second was somewhat less, 13.71%. The return in the first wave met expectations (an

average of 15-20% returns for written questionnaires). The second wave did not quite meet these expectations. This could be explained by the repetition effect, that is the declining readiness of participants to complete a questionnaire a second time. 136 persons answered both questionnaires and returned them. The greatest participation in the questionnaire, in both the first and the second wave, was in Pellworm. The people of Glückstadt took part in the first wave second most often; in the second wave they showed a considerably lower participation level of 11.2%. Nordstrand showed the lowest participation rate in the first wave with only 13.69%; in the second wave the return rate increased however to 15.2%. Eckernförde showed in the first wave quite a low participation level of 13.88%; in the second round it declined again to 12.4%.

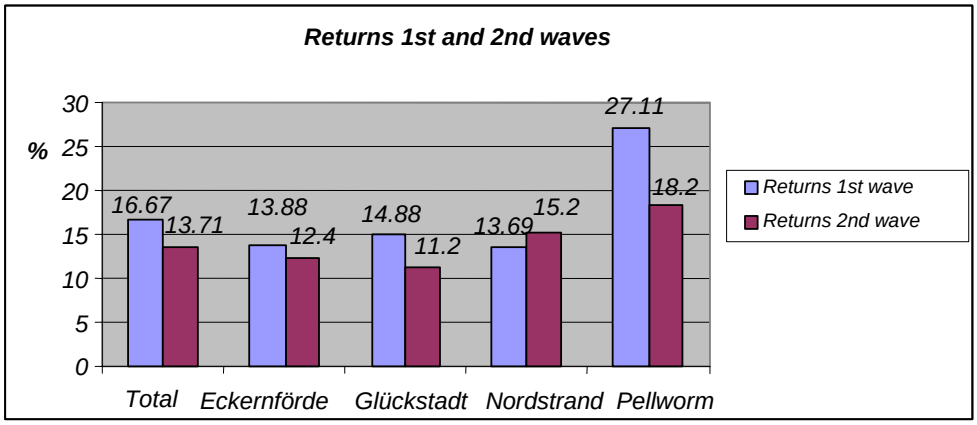


Figure 6: Return rates in first and second waves

In written surveys it is generally the case that those people who respond to the questionnaire are more receptive to the topic. On the other hand it should be noted that experience shows that specific demographic groups tend to take part in such surveys. These tend to be people who are in some way emotionally affected by the topic, that is those who feel strongly positive or negative about the topic. In addition to affectedness it is often groups either with a high level of education or a large amount of free time that respond to written surveys.

In our specific case however there are very few individuals who took part in the survey out of negative emotional reasons, although there was the possibility to just give either praise or criticism in Question W2-16 and ignore the rest of the questionnaire. As this happened very infrequently we suspect an influence common in survey research: those people interested in the subject are over-represented and it will be very unlikely to find a group with an extreme negative attitude in the population. Our results can only be interpreted with this consideration in mind. For example the data about expressed interest in the topic must be qualified somewhat. It could be seen as an important indicator for a definite interest by the whole population, however it shouldn't be forgotten that indifference in the population could only be represented with difficulty in the sample, as these people tend to be less active in taking part in surveys.

In the following the results from the first and second wave are summarized and ordered according to the topic blocks from the questionnaire.

5.3.1 Risk perception and dealing with storm flood protection

In the topic complex risk perception and dealing with storm flood protection there were questions in the survey, for example about interest in storm flood topics, state of knowledge, feeling of being threatened, debate about the topic and responsibilities.

Figure 7 and Table 10 show the frequency and the corresponding averages for Question 1 in the first questionnaire, which asks about the interest of the public in the topic of storm flood protection.

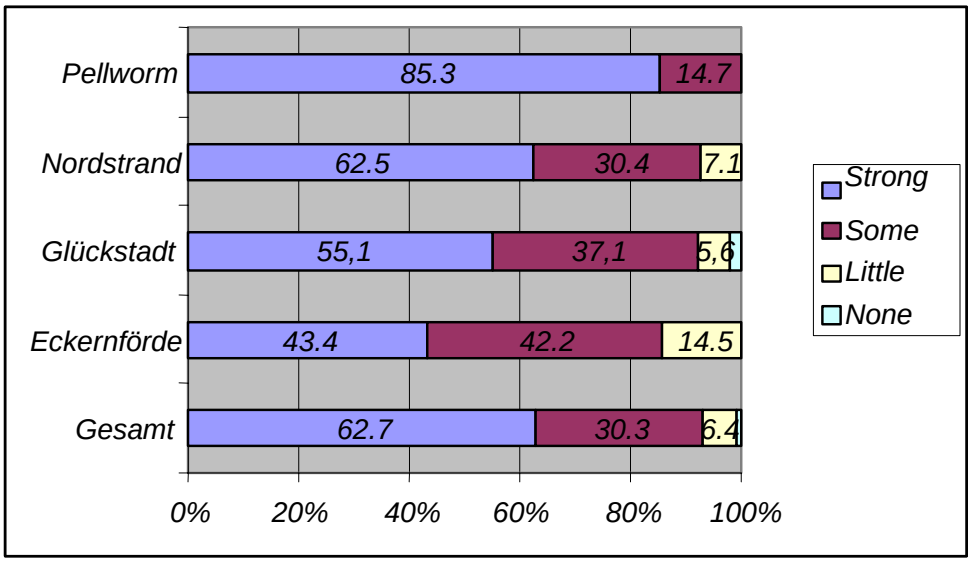


Figure 7: (Question W1-1) Interest in the topic storm flood protection

	Total	Eckernförde	Glückstadt	Nordstrand	Pellworm
average*	1.5	1.7	1.6	1.5	1.2

* (strong=1, somewhat=2, little=3, none=4)
Table 10: (Question W1-1) Average: interest in topic storm flood protection

Over 90% of those people who took part in the survey say they were “somewhat” or “strongly” interested in the topic of storm flood protection. This high interest, which reflects the current situation, is a good basis for further communication with the public. The greatest regional difference is between Pellworm and Eckernförde. The people on Pellworm are most interested in storm flood protection: 85.3% say they are “strongly” interested in the topic, while in Eckernförde on the other hand only 43.4% or the respondents say that they are strongly interested. The difference between Pellworm and Eckernförde can also be clearly seen in that in Eckernförde 14.5% of the respondents say that they have only a little interest, while in Pellworm none of the respondents give this response. It may be that the topic is not as highly charged because the importance for the Baltic Sea areas is generally less great. In Glückstadt and Nordstrand the interest in the topic is roughly the same. The average is for Glückstadt 1.6 and for Nordstrand 1.5.

Have you recently given more thought to the topic “storm flood protection”?

Percentage of responses in %	Total	Eckernförde	Glückstadt	Nordstrand	Pellworm

Yes, because of the discussion in the media	28.8	27.8	29.7	33.3	25.0
Yes, because I have noticed changes in the number and strength of storm floods.	26.8	22.2	29.7	19.3	35.9
Yes, because of the booklet "Sturmflut – wat geiht mi dat an?"	37.0	40.3	42.2	33.3	31.3
Yes, I am thinking more about the topic because… *Open response possible*	17.5	16.7	15.6	22.8	15.6
No, I do not think more about the topic.	28.2	33.3	23.8	28.1	27.0

Table 11: (Question W2-1) Increased thinking about storm flood protection

he results of the second wave for the question about increased thinking about storm flood protection (cf. Table 11) show that there is a good deal of thought about the topic. Only a bare third of the respondents are not thinking more about the topic. It is satisfactory that after reading the booklet "Sturmflut - wat geiht mi dat an" 37% of all respondents were prompted to spend more time thinking about the topic. This took place especially in Eckernförde and Glückstadt: over 40% think more about the topic after reading the booklet. On Nordstrand and Pellworm about a third of the participants say that they are stimulated by the booklet to think more about the topic. 28.8% of the respondents say "the media" is a trigger for their thinking more about the topic and 26.8% say "changes in storm flooding" as the reason for thinking more about the topic. For the open response the most common answer is personal affectedness as stimulus for increased thinking (27 times). Also climate change (9 times) and professional interest (6 times) are mentioned, however significantly less often.

Do you talk with family, friends, neighbours or acquaintances about the booklet?

Responses in %	Total	Eckernförde	Glückstadt	Nordstrand	Pellworm
Yes	49.5	35.6	46.8	66.7	53.8
No	50.5	64.4	53.2	33.3	46.2

Table 12: (Question W1-18) Talk about the booklet

In total every second respondent speaks in the family, with friends, neighbours or acquaintances about the booklet. In Eckernförde the fewest people speak about the booklet (35.6%), while on Nordstrand this happens most often (66.7%).

Do you talk with family, acquaintances, friends or relatives about the topic "storm flood protection"?

Responses in %	Total	Eckernförde	Glückstadt	Nordstrand	Pellworm
Yes, several times a	8.4	9.6	7.8	12.1	4.5

month					
Yes, when there is a reason (e.g. the booklet, in winter after a storm flood etc.)	47.9	32.9	48.4	51.7	60.6
Rarely	39.1	47.9	39.1	34.5	33.3
Have never talked about this topic	4.6	9.6	4.7	1.7	1.5

Table 13: (Question W2-2) Storm flood protection as a topic of conversation

The answers to Question 2 from the second wave about "Topic of conversation storm flood protection" clearly shows again its discursive relevance. Only 4.6% of all respondents say that they have never talked about storm flood protection. This is not surprising, since all of the areas are located on the coast or rivers. The inhabitants of Pellworm talk about this topic especially when there is a particular reason (60.6%). But only 4.5% of the respondents talk about storm flood protection several times a month. This means that certain occasions stimulate talk about the topic but that there is not a more serious permanent concern in the population. In Eckernförde only 32.9% talk about the topic on a current occasion. This could be explained by the fact that storm floods are less common on the Baltic Sea coast. Accordingly 47.9% of the respondents in Eckernförde make the topic a subject of conversation. On Nordstrand 12.1% speak several times a month about the topic – this is more often than in any other area. 34.5% speak "rarely" about storm flood protection and 51.7% only when there is a particular reason. In Glückstadt 4.7% of the respondents never speak of storm flood topics. 39.1% of the local inhabitants speak "rarely" about the topic. Current occasions are a reason for talking about the topic for 48.4%, and 7.8% speak several times a month about storm flood protection.

How much would you say that you know about storm flood protection?

Response in %	Total	Eckernförde	Glückstadt	Nordstrand	Pellworm
Very much	8.0	3.7	3.5	12.5	13.0
Much	45.8	37.8	45.9	42.9	54.0
Little	42.1	53.7	43.5	41.1	32.0
Very little	4.0	4.9	7.1	3.6	1.0
Average*	2.4	2.6	2.5	2.4	2.2

*(very high=1, high=2, low=3, very low=4)
Table 14: (Question W1-2) Assessment of knowledge about storm flood protection

Slightly more than half of all respondents say in response to Question 2 (W1) about assessing their own knowledge (cf. Table 14) that they know "much" or "very much", while the other half assess their own knowledge as "little" or "very little". The Pellworm inhabitants have the highest level of knowledge, with an average of 2.2. The population on Nordstrand also assesses their own knowledge in comparison to other areas as higher (average 2.4). In Eckernförde the level of knowledge is assessed as lowest, with an average of 2.6. About half of the people from Glückstadt assess their level of knowledge as "little" or "very little", with an average of 2.5.

Do you know about how much the house you live in is above or below sea level?

Responses in %	Total	Eckernförde	Glückstadt	Nordstrand	Pellworm
No	17.9	11.1	38.6	19.1	5.9
Yes	82.1	88.9	61.4	80.9	94.1

Table 15: (Question W1-3) Knowledge of residence's height above sea level

82.1% of the respondents say that they know how high their home is above sea level. The residents of Pellworm know, according to their own assessment, the height above sea level of their own house: 94.1% say so. This could be due to the fact that the island has a rather simple profile. The residents of Glückstadt know how high their homes are above sea level much less often: only 61.4% answer the question with "Yes". In Eckernförde 88.9% of the respondents know their height above sea level; on Nordstrand the percentage is 80.9%. In the open category those people who had said they knew the height of their home above sea level were asked to write it down. 86.3% say that their home is as much as 5 metres above sea level. 8.8% say that their house is from 5.1 to 10 metres above sea level while 4.8% say a height of over 10 metres above sea level. This data are assessments by the respondents.

In your present situation do you feel threatened by storm floods?

Responses in %	Total	Eckernförde	Glückstadt	Nordstrand	Pellworm
Very much	5.5	3.6	3.4	3.6	9.8
Somewhat	39.9	27.7	51.7	42.9	38.2
Little	37.8	38.6	37.9	42.9	34.3
Not at all	16.8	30.1	6.9	10.7	17.6
Average*	2.7	3.0	2.5	2.6	2.6

*(Very much=1, Somewhat=2, Little=3, Not at all=4)
Table 16: (Question W1-4) Present threat

Table 16 shows the frequency of the responses to the question about the perceived threat situation and the corresponding averages. A majority of 54.6% of the participants feels "little" or "not at all" threatened. Only 5.5% feel "very much" threatened. In Eckernförde the feeling of being threatened is, with a value of 3.0, the lowest. Almost a third of the respondents say that at the moment they do not feel threatened "at all" by storm floods. In Glückstadt on the other hand the feeling of being threatened is greatest, with more than half of the respondents feeling "somewhat" or "very much" and only 6.9% reporting "not at all". On Pellworm the feeling of being threatened is less than in Glückstadt but is just as strong as on Nordstrand. 48% say that they feel "somewhat" or "very much". On Pellworm however in comparison to Nordstrand and Glückstadt however the percentage of those not feeling threatened at all is high, at 17.6%. On Nordstrand 46.5% feel "somewhat" or "very much" threatened. It is striking that in none of the areas is there a strong feeling of being threatened, although all of the areas are at risk by storm floods.

In your present situation do you feel threatened by storm floods?

Responses in %	Total	Eckernförde	Glückstadt	Nordstrand	Pellworm

Very much	5.1	1.4	6.3	8.6	4.5
Somewhat	31.5	17.1	42.9	31.0	36.4
Little	41.6	40.0	39.7	46.6	40.9
Not at all	21.8	41.4	11.1	13.8	18.4
Average*	2.8	3.2	2.6	2.7	2.7

*(Very much=1, Somewhat=2, > Little=3, Not at all=4)
Table 17: (Question W2-15) Perceived threat from storm floods

We also asked about the feeling of being threatened by storm floods in the second questionnaire (cf. Table 17). It became clear that, six weeks after the first survey, the feeling of being threatened was less. The average dropped to 2.8. Eckernförde had also in the second wave, as reported, the lowest feeling of being threatened. Over 80% say this time that they felt "little" or "not at all" threatened. In Glückstadt, as in the first wave, the feeling of being threatened is the strongest – almost half of the residents say that they feel "somewhat" or "very much" threatened by storm floods. On Nordstrand and Pellworm, as in the first wave, the reported feeling of being threatened is just as high, with the average being 2.7 each time.
The feeling of being threatened dropped significantly even for the respondents who completed both questionnaires. (Significance: .003). That the feeling of being threatened lessened over the period of time could be explained by the fact that the storm flood season had been over some time and that in the summer storm floods are not anticipated.
It could not be detected that men and women show differences in how much they feel threatened. Also educational qualification or degree did not have an effect on the feeling of being threatened by storm floods. Similarly a correlation between length of residency and the feeling of being threatened could not be found. The fact that someone is renting or living temporarily in a holiday home or owns his or her own home also had no influence on the feeling of being threatened.
However there was a significant causal relationship between increased thinking about storm flood protection and the feeling of being threatened. The more often people think about storm floods, the greater the feeling of being threatened. Communication about the topic is thus related to the feeling of being threatened: the persons who report talking more often about storm flood protection also report a greater feeling of being threatened.

Have you already been personally threatened by flooding from a storm flood?

Responses in %	Total	Eckernförde	Glückstadt	Nordstrand	Pellworm
Yes, several times	10.9	6.0	18.0	8.9	9.8
Yes, once	19.1	8.4	22.5	23.2	22.5
No, not ever	70.0	85.5	59.6	67.9	67.6

Table 18: (Question W1-5) Threat in the past

A total of 7 of 10 respondents say that they have never been threatened by a flood in the past. The inhabitants of Glückstadt report that they have been threatened by storm floods most often. 40.5% say that they have been endangered once or more. However 93.1% of the Glückstadt residents say that their own home has never been threatened by a storm flood. On Pellworm and Nordstrand almost a third of the respondents (each) has felt

threatened by a storm flood once or more. In Eckernförde this was reported by only 14.4% of the respondents.
There is a reciprocal relationship between the present feeling of being threatened and the actual experience of being threatened in the past. The more often someone was threatened in the past by storm floods, the stronger he or she feels threatened today. This relationship is found to be especially strong in Glückstadt and Pellworm. For the respondents on Nordstrand the relationship is not significant.

Has your house ever been flooded after a storm flood?

Responses in %	Total	Eckernförde	Glückstadt	Nordstrand	Pellworm
Yes, several times	3,1	2,5	4,6	3,8	2,0
Yes, once	4,7	9,9	2,3	5,7	2,0
No, not ever	92,2	87,7	93,1	90,6	96,0

Table 19: (Question W1-6) Threat to house in the past

The responses to Question 6 (W1) are surprising in comparison to the results looked at above. In response to the question whether their own house has ever been threatened by storm flood, 4% of the inhabitants of Pellworm answer with “yes” or “yes, several times”. In Eckernförde on the other hand 12.4% of the homes are reported to have been threatened once or more, in Glückstadt 6.9%, on Nordstrand 9.5%. Only very few of the respondents know of a storm flood that actually threatened their own house.
The more a person is interested in the topic of storm flood protection, the more he or she is feeling threatened by storm floods. This relationship is valid for all areas studied except for Pellworm. Apparently the inhabitants of an island have a fundamental interest in the topic but have developed a certain relaxed attitude towards it and are not continually worried about a storm flood threat. The people on Nordstrand have somewhat less interest in the topic and report knowing less than the people on Pellworm. In Eckernförde and in Glückstadt people less about the topic and are also less interested. The more a person thinks about the topic the more strongly he or she feels threatened.

Who is responsible for storm flood protection? Please tell us how much you agree with each statement.

Average*	Total	Eckernförde	Glückstadt	Nordstrand	Pellworm
Storm flood protection is a matter for public institutions (e.g. by building dikes).	1.1	1.1	1.1	1.1	1,1
Each person must take care of himself to be protected from flooding (e.g. by putting together personal emergency equipment).	1.6	1.6	1.6	1.6	1,6

Those people who may be affected by flooding should take precautionary measures together (e.g. purchasing protective equipment together).	2.3	2.1	2.5	2.3	2,2
In the event of flooding public institutions are responsible for coping with the disaster (e.g. fire department).	1.2	1.3	1.3	1.3	1,2
In the event of flooding individuals must above all organise themselves and help each other (e.g. neighbourhood help).	1.7	1.8	1.9	1.6	1,5
In the event of flooding each person is responsible for himself (e.g. pumping water).	2.4	2.3	2.4	2.6	2,4

*(Agree=1, Agree somewhat=2, Disagree somewhat=3, Disagree=4)
Table 20: (Question W1-7) Responsibility for storm flood protection

Question 7 of the first wave was about which actors are responsible for storm flood protection. The respondents generally agree with the statement that storm flood protection is a matter for public institutions. The average in all areas is 1.1. Also with regard to the event of a catastrophe, respondents are of the opinion that public institutions are responsible for catastrophe management. According to the respondents measures for preventive storm flood protection should be taken by individuals alone and not after reaching agreement with each other. In the event of a catastrophe this opinion changes. Now respondents think that individuals should help each other (average 1.7) and the individual is less strongly responsible (average 2.4). Especially on Pellworm and Nordstrand respondents think that in the event of a catastrophe individuals should help each other (averages 1.6 and 1.5) In the towns this point of view is less strong. Possibly the island effect strengthens neighbourly relationships.

5.3.2 Evaluation of the booklet and the flyer

The question in this section was used to evaluate the booklet and the flyer. Among other purposes it was to find out to what extent the measures recommended in the booklet for protection from storm floods were actually carried out.

Can you remember the booklet on storm flood protection we sent you?

Responses in %	Total	Eckernförde	Glückstadt	Nordstrand	Pellworm
Yes	87.8	88.0	86.4	85.7	90.0
No	12.2	12.0	13.6	14.3	10.0

Table 21: (Question W1-8) Remembering the booklet

A total of 87.8% of the respondents in the first wave remember the booklet. There were only very slight differences between the areas.

Do you remember the booklet "Sturmflut – wat geiht mi dat an?"

Responses in %	Total	Eckernförde	Glückstadt	Nordstrand	Pellworm
Yes, I remember the booklet.	77m9	76.1	84.1	74.1	77.3
Yes, I vaguely remember the booklet.	14.0	16.9	14.3	15.5	9.1
No, I cannot remember the booklet.	8.1	7.0	1.6	10.3	13.6

Table 22: (Question W2-3) Remembering the booklet

In the second wave the number of people who remember the booklet sinks to 77.9%. In the second wave 14% remember the booklet "vaguely" and 8.1% do not remember it at all. However all in all the booklet is remembered even six weeks later. It may be that the booklets were somewhat better remembered because of the accompanying survey than would be the case without the questionnaire. 3.3% of those persons who took part in the survey both times and say that they had read the booklet the first time were unable to remember it six weeks later. 36% of these people are from Eckernförde. It is mostly men with little interest in the topic who have quickly forgotten the booklet. Education or age has no effect on long-term remembering of the booklet.

How much of the booklet did you read?

Responses in %	Total	Eckernförde	Glückstadt	Nordstrand	Pellworm
All of it	67.3	58.9	66.2	61.2	77.9
Some of it	24.1	34.2	20.8	30.6	15.8
Just headings	5.4	5.5	9.1	6.1	2.1
None of it	3.1	1.4	3.9	2.0	4.2

Table 23: (Question W1-9) Reading in the booklet

The total interest in the booklet is high: 67.3% have read every page in the booklet, 24.1% only a few pages and 5.4% just the headings. A tiny minority of 3.1% hasn't read the booklet at all.
The interest in the booklet is highest on Pellworm: about three of four people have read all the pages in the booklet. In Eckernförde on the other hand significantly fewer people have read the book so intensively: 58.9% say they have read the complete booklet. On Nordstrand and in Glückstadt about two-thirds of the people read every page.
Those persons who did not read the booklet or read only the headings have a weaker feeling of being threatened than those persons who read more. Due to the minimum variance (only four respondents say that they haven't read the booklet at all and only seven say that they have only read the headings), it was not possible to test for significance.

Please tell us how much you agree or disagree with the following statements.

Average*	Total	Eckernförde	Glückstadt	Nordstrand	Pellworm
The booklet has comprehensive information about storm flood protection.	1.6	1.7	1.6	1.5	1.6
I find the booklet useful.	1.4	1.5	1.4	1.3	1.4
The booklet is attractively designed.	1.4	1.5	1.3	1.3	1.4
I take the content of the booklet seriously.	1.3	1.4	1.2	1.2	1.3
The texts of the booklet are easy to understand.	1.3	1.3	1.3	1.4	1.3

*(Agree=1, Agree somewhat=2, Disagree somewhat =3, Disagree=4)
Table 24: (Question W1-10) Statements about the booklet

The booklet is taken seriously, and the texts are considered easy to understand. Somewhat less agreement is given the statement that the booklet provides comprehensive information about storm flood protection. The responses to open Question W1 - 16, which ask what information is missing from the booklet, are found in Table 42. Except for the statement "The text of the booklet are easy to understand," the people of Eckernförde agree somewhat less often than the people of the other test areas to the positive statements about the booklet, but the agreement is nevertheless still very high.

How would you judge the booklet "Sturmflut – wat geiht mi dat an?" Which of the following statements would you agree with?

Average*	Total	Eckernförde	Glückstadt	Nordstrand	Pellworm
The booklet is a way of getting information about storm flood topics that I would like to receive regularly.	1.7	1.9	1.5	1.6	1.5
The flyer with regional information provides enough information.	2.2	2.0	2.3	2.4	2.1
The booklet has not influence on the	2.6	2.5	2.6	2.8	2.5

precautions an individual will take.					
I think such booklets are unnecessary.	3.5	3.3	3.7	3.6	3.6

*(Agree=1, Agree somewhat=2, Disagree somewhat=3, Disagree=4)
Table 25: (Question W2-4) Assessment of the booklet

The participants of our survey would like to be informed by a booklet, however simply receiving the flyer would receive equal preference. The average of 2.2 can possibly be explained by the fact that respondents prefer regional information (see Tables 42 and 43). In Eckernförde people are most in favour of receiving just the flyer (average of 2.0). The answers to the question whether the booklet has an influence on behaviour show uncertainty: the average is 2.6. It is satisfactory that the statement "I find such booklets are unnecessary." receive little agreement (average 3.5).
For the open question (cf. Table 26) about the preferred channel of communication, mass media such as television, newspaper and radio reports are mentioned most often. In addition communication from municipalities, educational institutions and information evenings were named.

The following forms of information I think are a better way to giving information about storm protection topics:

Rank	Preferred channel of communication	Number of entries
1	Television, newspaper or radio reports	46
2	Communication by municipality	3
3	Educational institutions	2
3	Information evenings	2

Table 26: (Question W2-4 open): Preferred channels of communication

Have you carried out any of the precautionary measures recommended in the booklet to protect yourself against storm floods?

Response in %	Total	Eckernförde	Glückstadt	Nordstrand	Pellworm
Yes	14,0	8,6	18,3	19,6	12,0
No, had already taken measures	42,3	28,6	42,3	43,5	52,2
No, I am not taking any measures	43,7	62,9	39,4	37,0	35,9

Table 27: (Question W1-11) Implementation of measures due to booklet

The Table 27 shows whether the measures recommended in the booklet for protection against storm floods were implemented. A total of 42.3% had already taken measures before the booklet was distributed. 14% say they had carried out measures because they had read the booklet. 43.7% are against carrying out any measures. There are large regional differences between Eckernförde and Pellworm. More than half of the people on

Pellworm had taken preventive measures before reading the booklet. In Eckernförde on the other hand only 28.6% had. The reason for this lower implementation rate could be related to the weaker feeling of being threatened, the lower interest and the lower level of knowledge in comparison to the other areas. Although on Pellworm the feeling of being threatened is also quite low, there is a higher degree of interest and a higher level of knowledge. This could be a reason for the greater willingness to implement measures. On Nordstrand and in Glückstadt there is a close similarity to the answer frequencies: almost 20% in both areas carry out measures, while more than 40% of the respondents in these areas had already implemented measures.

Have you carried out any of the measures recommended in the booklet for the event of a disaster?

Responses in %	Total	Eckernförde	Glückstadt	Nordstrand	Pellworm
Yes	14.3	8.5	20.9	18.6	12.1
No, had already taken measures	40.8	31.0	37.3	37.2	52.7
No, I am not taking any measures	44.9	60.6	41.8	44.2	35.2

Table 28: (Question W1-12) Implementation of recommended catastrophe measures

The answer frequency to Question 12 whether measures for the event of a catastrophe were carried out or not – does not vary greatly from the results presented for Question 11. Thus when carrying out measures, the respondents do not make a distinction in whether they carry out measures for the event of a catastrophe or for prevention.
The stronger a person is feeling threatened, the more likely they are to have already carried out preventive measures or measures for the event of a catastrophe or recommended measures after reading the booklet. This causal relationship is significant and can be seen in the Tables 29 and 30.

Have you carried out any of the precautionary measures recommended in the booklet to protect yourself against storm floods? (Question W1-11)	Average feeling of being threatened at present (Question W1-4)
Yes	2.29
No, had already carried out measures	2.53
No, I am not taking any measures	2.82

Significance: .001
Table 29: Preventive measures and feeling of being threatened

Have you carried out any of the measures recommended in the booklet for the event of a disaster? (Question W1-12)	Average feeling of being threatened at present (Question W1-4)
Yes	2.53
No, had already carried out measures	2.45
No, I am not taking any measures	2.80

Significance: .004
Table 30: Measures and feeling of being threatened

The more often respondents have already experienced situations in which they are threatened by storm floods, the more likely they are to have already taken preventive measures, measures for the event of a catastrophe or do it as a result of reading the booklet. The significance of the causal relationship can be seen in Tables 31 und 32.

Have you carried out any of the precautionary measures recommended in the booklet to protect yourself against storm floods? (Question W1-11)	Average actual threat in the past (Question W1-5)
Yes	2.62
No, had already taken measures	2.40
No, I am not taking any measures	2.77

Significance: .001
Table 31: Measures and actual experiences (preventive)

Have you carried out any of the measures recommended in the booklet for the event of a disaster? (Question W1-12)	Average actual threat in the past (Question W1-5)
Yes	2.64
No, had already taken measures	2.41

No, I am not taking any measures	2.74

Significance: .001
Table 32: Measures and actual experiences (catastrophe event)

Respondents who say that their homes have been already threatened once by storm floods in the past are more likely to have already taken preventive measures or measures for the event of a catastrophe than those whose house has never been threatened. This significant causal relationship can be seen in the Tables 33 and 34.

Have you carried out any of the precautionary measures recommended in the booklet to protect yourself against storm floods? (Question W1-11)	Average threat to house in the past (Question W1-6)
Yes	2.87
No, had already taken measures	2.80
No, I am not taking any measures	2.97

Significance: .008
Table 33: Measures and past threat to house (preventive)

Have you carried out any of the measures recommended in the booklet for the event of a disaster? (Question W1-12)	Average threat to house in the past (Question W1-6)
Yes	2,79
No, had already taken measures	2,82
No, I am not taking any measures	2,98

Significance: .003
Table 34: Measures and past threat to house (catastrophe event)

There is no relationship between the implementation of measures and the length of residency on a location. There is also not a relationship between the age of a person and the implementation of measures. Similarly it could not be shown that families practice prevention measures more often or that homeowners carry out more measures.

The following measures were carried out and named in the open Question 13 (sorted according to frequency of entry):

Rank	Measures	Number of entries
1	Food and drinking water supplies	45
2	Flooding and safety measures in and on house	42
3	(Functioning/battery-run) radio	31
3	Important papers/documents in safety	31
3	Ensure light (torch, candles, …)	31
6	Emergency suitcase/bundle	21
7	Mobile/telephone ready	12
8	Emergency list, evacuation plan	11
8	Independent power supply	11
10	Important telephone numbers	8
11	First aid kit/medicine	7
12	Water pump operational	6
12	Life preserver, island or boat	6
14	Search for dialog with others	4
15	Organize emergency lodgings	3

Table 35: (Question W1-13 open) Which measures were carried out?

Have you taken any further precautionary measures against storm floods since the last questionnaire?

Responses in %	Total	Eckernförde	Glückstadt	Nordstrand	Pellworm
Yes, the following: *Open response possibility*	4,5	1.4	3.2	9.4	5.1
No, I haven't taken any further precautionary measures.	95.5	98.6	96.8	90.6	94.9

Table 36: (Question W2-6) Implementation preventive measures after first survey

95.5% of the respondents did not take any further measures after the first wave of the survey. This clearly shows that the reader carried out measures shortly after reading the booklet rather than later.

Have you taken any further precautionary measures against storm floods since the last questionnaire? Yes, the following:

Rank	Measure	Number of entries
1	(Functioning/battery-run) radio	4
2	Flooding and safety measures in and on house	3
2	Important papers/documents in safety	3
4	Ensure light (torch, candles, …)	2
5	Independent power supply	1
5	Food and drinking water supplies	1

Table 37: (Question W2-6 open) Reported measures taken

If you carried out very few or no measures, what was the reason?

Responses in %	Total	Eckernförde	Glückstadt	Nordstrand	Pellworm
Measures have no effect	16.5	10.9	16.7	13.6	25.6
No time	15.8	14.5	26.2	4.5	12.8
Too much effort	12.7	7.3	23.8	18.2	5.1
Measures are not necessary	39.2	50.9	16.7	50.0	41.0
No interest	2.5	1.8	2.4	9.1	0.0
Other	13.3	14.5	14.3	4.5	15.4

Table 38: (Question W1-14) Reasons for not taking measures

In response to Question 14 from wave 1 (cf. Table 38) – what are the reasons for not taking measures – the respondents gave quite different answers depending on which area they live in. Half of the inhabitants in Eckernförde believe that measures are not necessary. This is not surprising as in Eckernförde, in comparison to other areas, the feeling of being threatened is less, the knowledge about storm floods is assessed as being worst and the interest in the topic is least. The lack of experience with storm floods allows a feeling of safety develop that is expressed in a low level of interest and knowledge. The inhabitants on Glückstadt are more convinced that taking measures is necessary: only 16.7% believe the opposite. Respondents in Glückstadt however say they

have less time. We could conclude that they give measures a lower priority than other activities. 16.7% believe that measures do not have any effect. On Nordstrand 50% say that measures are not necessary. On Pellworm 25.6% think that measures do not have any effect. This significantly higher percentage could have to do with the starkly exposed position of the island and the feeling of helplessness in the face of natural forces. 41% believe on the other hand that measures are not necessary.
The effect of measures is not so much doubted as the necessity to carry out measures on site. It follows that when communicating with the public a greater emphasis should be placed on regional specifics and again and again on risks.
Table 39 shows the response groups to the open question, why no preventive measures were implemented. The most frequently named reason is the lack of a feeling of being threatened, followed by the answer that measures are not necessary at the time and can be done at a later time.

If you carried out very few or no measures, what was the reason? Responses under "other":

Rank	Reason	Number of entries
1	Little feeling of being threatened	14
2	Measures will only be taken when danger is acute	9
3	Further measures not possible/necessary (especially structural measures)	5
4	Tenancy (landlord responsible)	4
4	Resignation	4
6	Adapted to life on the dike/experiences in catastrophe protection	2
6	Measures (booklet) too general/measures are obvious	2
8	Booklet unread	1
8	No time	1

Table 39: (Question W1-14 open): Reasons why measure not carried out

How effective do you think are the following protective measures, which are mentioned in the booklet?

Average*	Total
Getting information for self-protection	1.6
Making a list with important telephone numbers	1.6

Talk to family members about possible dangers and precautionary measures	1.6
Take measures for the protection of interior furnishings	1.9
Put together personal emergency equipment	1.5
Keep a battery-operated radio	1.3
Store varnishes, paints and gasoline canisters in upper stories	1.8
Get information about what to do during evacuation	1.4

*(Very effective=1, Somewhat effective=2, Somewhat ineffective=3, Ineffective=4)
Table 40: (Question W1-17) Effectiveness of protective measures in booklet

The majority of all respondents assess all of the measures listed in Question 17 as "somewhat effective" or "very effective": no average value is below 1.9. As especially effective are considered:

- Keeping a battery-operated radio
- Getting information about what to do in case of an evacuation
- Putting together personal emergency equipment.

A factor analysis of all items about the effectiveness of measures (W1-Q17) showed that all of them were related to the same factor. This means that there is just a basic direction from the respondents concerning the assessment of effectiveness. There is hardly any differentiation of measures in forms of effectiveness. Instead measures tend to be seen as "everything somewhat effective" or "everything somewhat ineffective". This could lead one to speak of a psychological pattern of effectiveness assessment that is manifested at an individual level. A general range of "effectiveness" could be calculated from these items. This general range would correlate with the implementation of preventive measures for protection against storm floods and with the implementation of measures for the event of a catastrophe. This means that the more effective a measure is assessed to be, the more often they would be carried out. This relationship was already referred to in the literature analysis (cf. Chapter 2), as already in earlier studies similar results have been found.

What kind of information about storm flood risks in the booklet are you interested in?

Average*	Total	Eckernförde	Glückstadt	Nordstrand	Pellworm
The danger from storm floods for me personally	1.4	1.7	1.3	1.6	1.4

Facts worth knowing about storm floods	1.3	1.3	1.4	1.3	1.3
Recommendations for precautionary protective measures	1.4	1.5	1.3	1.4	1.4
Recommendations in case of a disaster	1.3	1.4	1.3	1.3	1.3
Information about government storm flood protection	1.4	1.4	1.5	1.3	1.4
Information about climate change and the resulting risks for coastal lowlands	1.5	1.5	1.6	1.4	1.5

Table 41: (Question W1-15) Interest in information in the booklet

All of the topic areas in Question 15 in the first wave were found to be very interesting. The topic that is relatively least interesting to survey participants is information about climate change. However it should not be overlooked that the level of agreement is still high (average 1.5).

What information did you miss in the booklet?

Rank	Missing information	Number of entries
1	Local information	37
2	Recommendation on catastrophe protection	21
3	Recommendation on what to do	18
4	Background to origin of storm floods	12
5	Information sources	10
6	Risk assessment	9
7	Climate change	5
8	Storm floods in the past	3
9	Participation opportunities	2
10	Tourism	1

Table 42: (Question W1-16 open) Information missing from the booklet

From the responses to the open Question 16 from the first wave, we can see which information was missing in the booklet. In first place is the wish for local information. The following regional contents are, for example, wanted:

- "How is storm flood protection where I live changing as a result of climate change?"
- "Which dikes in my region are safe?"
- "Geographical places with height above sea level"
- "Information especially for Halligen and islands"

What content about storm flood protection are you most interested in? Rank the topics by giving the most interesting topic a 1 and the most uninteresting an 8, etc. If you can think of another topic then enter it as "other" and include it in the ranking.

Rank	Topics	Average of the ranking*
1	Information for the event of a catastrophe	2.4
2	Information about preventive measures	3.2
2	Local information about storm flood protection	3.2
4	Information about what to do in the event of a catastrophe	3.8
5	Detailed information about the organization of coastal protection and the work of, for example, local authorities	4.5
6	Detailed information about technical aspects of coastal protection (dike construction, flood gates etc.)	4.9
7	Information about climate change	5.2
8	Other (*open response possibility*)	7.6

* Please rank topics from 1-8.
Table 43: (Question W2-8) Ranking of interest in booklet contents

Information about preventive measures, about catastrophes as well as special information about the region are ranked as the most interesting topics. Also information about what to do after a catastrophe occurs is interesting. The booklet developed in this research project does not contain any recommendation for behaviour after a catastrophe happens. Production of further information material should contain this aspect. Detailed information about the organization of coastal defence, as well as technical aspects are less interesting. This question, as for Question W1-15, shows that information about climate change is less interesting (average 5.2). Table 44 gives the responses under the category "other".

What contents relating to storm flood protection are you interested in? Entries under "other".

Rank	Topics wanted	Number of entries
1	Information for the event of a catastrophe	6
2	Information for preventive measures	4
3	Background on use of monetary funds by government	2

4	Information about aid after a catastrophe happens	1
4	Storm floods in the past	1
4	Serious information about dangers	1
4	Nature preservation on the coast	1

Table 44: (Question W2-8 open) Topics wanted

Are you keeping the enclosed red flyer in a place where you can find it again quickly?

Responses in %	Total	Eckernförde	Glückstadt	Nordstrand	Pellworm
Yes	59.4	57.5	66.7	59.6	54.4
No	17.0	26.0	11.5	17.0	14.4
No, but I am going to do so	23.6	16.4	21.8	23.4	31.1

Table 45: (Question W1-19) Keeping the red flyer

Almost 60% say that they keep the enclosed red flyer (cf. Table 45). 23.6% of the respondents intend to keep the flyer in safe storage, and 17% do not keep the flyer.

Are you keeping the booklet or red flyer?

Responses in %	Total	Eckernförde	Glückstadt	Nordstrand	Pellworm
Yes, I am keeping both the booklet and the red flyer.	66.4	48.5	77.4	66.0	75.9
I am just keeping the booklet.	6.6	2.9	9.7	5.7	8.6
I am just keeping the flyer.	5.0	13.2	1.6	3.8	0
I am not keeping either the booklet or flyer.	22.0	35.3	11.3	24.5	15.5

Table 46: (Question W2-5) Keeping the booklet or red flyer

The results from the second wave (cf. Table 46) confirm the response frequencies just discussed from the first wave. However it is surprising that in response to the question whether the booklet or the flyer is being kept, only 5% say that they are just keeping the flyer. Either the readers do not find the flyer attractive on its own or they do not want to do without any information and keep the flyer together with the booklet. About one out of five people do not keep either the booklet or the flyer. The inhabitants of Eckernförde keep these documents considerably less often than others. When listing missing information in the open response question regional recommendations are mentioned most often.

Is information missing from the enclosed red flyer? Which?

Rank	Missing information	Entries
1	Local references	13
2	Emergency numbers	6
3	Escape route map	5
4	Gathering points	2
4	Radio and TV stations	2
6	Recommendations for handicapped people	1
6	What to do with pets	1
6	Emergency measures when the telephone doesn't work	1

Table 47: (Question W1-20 open) Information missing from the red flyer

Along with these entries there was one remark each that a gender-neutral language should be used and that the street names in Glückstadt could not be understood.

Would you find it useful to have a map showing gathering point for evacuation and escape routes in the red flyer?

Responses in %	Total	Eckernförde	Glückstadt	Nordstrand	Pellworm
Very useful	57.3	56.9	64.0	53.3	54.0
Somewhat useful	29.0	31.9	28.0	40.0	21.8
Not very useful	7.2	6.9	2.7	2.2	13.8
Not useful	6.5	4.2	5.3	4.4	10.3
Average*	1.6	1.6	1.5	1.6	1.8

*(Very useful =1, Somewhat useful=2, Not very useful=3, Not useful=4)
Table 48: (Question W1-21) usefulness of map with gathering points and escape routes

A map on the flyer is found to be "very useful" or "somewhat useful" by a total 80% of the respondents. The inhabitants of Glückstadt are most strongly in favour, while those of Pellworm somewhat less in favour of having a map. This can certainly be explained by the small size of the island.

5.3.3 Communication about storm flood topics

This block contains questions about general communication on storm flood topics so as to use the results in order to develop a communication strategy. Topics were, among others, the regularity of communication and the adequacy of different media.

How often would you like to receive information about storm flood protection?

Responses in %	Total
Any time/often	28.1
Once or several times a year	55.7
Every two to five years	5.7
Every six years or more	10.5

Table 49: (Question W1-26 open) Information rhythm for storm flood protection

In response to the open question, how often you would like to receive information about storm flood protection, 28.1% answered with "any time/often". In spite of the vague formulation it is still clear that regular and frequent communication is desired. The majority of the respondents would like to receive information on the topic once or more often per year.

Are you now receiving good information about storm flood topics?

Responses in %	Total	Eckernförde	Glückstadt	Nordstrand	Pellworm
Very good	8.0	7.6	8.2	16.7	3.1
Good	36.9	30.4	29.4	40.7	46.9
Not very good	44.6	43.0	49.4	35.2	46.9
Poor	10.5	19.0	12.9	7.4	3.1
Average*	2.6	2.7	2.7	2.3	2.5

*(Very good =1, Good=2, Not very good=3, Poor=4)
Table 50: (Question W1-27) Satisfaction with information supply

The majority of respondents is not very satisfied with the provision of information about storm flood topics. 55.1% say they were "not very well" or "poorly" supplied with information. On Nordstrand people were most satisfied with the form of communication: 16.7% say they were "very well" informed and 40.7% found the communication to be "good". On Pellworm the respondents were divided in half. 50% say that they feel they are "well" or "very well" informed and the other 50% say they are "not very well" or "poorly" informed.
In Eckernförde and Glückstadt people are least satisfied with the supply of information. The average in both towns is 2.7. In Eckernförde 19% say they are poorly informed. This assessment is given by only 3.1% of the people in Pellworm. In Eckernförde this may be due to the fact that for many of the respondents the booklet was the first comprehensive contact with the topic and this was held against the information policy. In Glückstadt a flyer about what to do in a storm flood was distributed a number of years ago. For the people on Pellworm there is an Internet page dealing with a number of coastal and storm flood topics. For Nordstrand and Eckernförde there are no communication activities known.

How important do you think the following means are for receiving information about storm flood risks in your area?

Responses in %	Average*	Very important	Somewhat important	Somewhat unimportant	Unimportant
Radio	1.3	77.2	19.0	1.9	1.9
Television	1.4	70.1	20.7	6.1	3.2
Official publications	1.5	63.0	23.7	10.3	3.0
Newspapers, magazines	1.6	60.8	25.0	11.1	3.0
Handouts/booklets	1.9	43.2	37.4	14.7	4.7
Information events	1.9	37.2	37.9	19.3	5.6
Citizen participation	1.9	38.1	35.6	19.2	7.1
Internet	2.2	36.4	26.4	23.0	14.1
Personal talks	2.2	26.7	36.5	26.4	10.5
Mobile phone (texting e.g. water levels)	2.5	25.2	22.6	31.9	20.4
Books	2.6	13.7	27.3	47.2	11.8

*(Very important =1, somewhat important=2, somewhat unimportant=3, Unimportant=4)
Table 51: (Question W1-28) Adequacy of information media

The radio is considered the most important means of communication for information about storm flood risks. Only 3.8% of the respondents find communication by radio to be "somewhat unimportant" or "unimportant". Television is also considered to be a very important means of communication: over 90% find this medium to be "important" or "very important" for communications about storm flood protection. A large majority also prefers official publications: 86.7% rate them as "important" or "very important". Newspapers or magazines are considered to be similarly important: 85.5% of the respondents think this medium is "important" or "very important". Booklets/handouts are ranked as "very important" by 43.2% of the respondents, followed by citizen participation (38.1%) and information events (37.2%). The Internet is thought to be a "very important" communication medium by only 36.4%. Personal talks are considered less often to be "very important": only 26.7% share this opinion. The mobile phone is even less accepted as a communication medium and books are thought to be the least important communication medium. Mass media and official publications are thought to be the best means of communication.
For most of the media discussed here, age does not play an important role in their acceptance. Young people up to 34 are for example just as convinced of the importance of radio communication as the 55-74 age group is. There are slight differences when it comes to assessing Internet and mobile phones: it is more the age group up to 34 that think these media are important. There are larger differences in regard to official publications: especially the 35 to 54 year olds prefer this communication medium (cf. Table 52).

Average* Acceptance of communication media (Question W1-28)	Newspapers/magazines	Official publications	Books	Television	Radio	Mobile phone	Internet	Handout/ booklet	Personal talks	Information events	Citizen participation
To 34 years old	1.4	1.7	2.4	1.3	1.2	2.1	1.5	1.8	2.0	2.5	1.9
35-54 years old	1.4	1.3	2.5	1.3	1.2	2.4	2.2	1.7	2.2	1.8	2.0
55-74 years old	1.6	1.6	2.5	1.5	1.3	2.5	2.1	1.8	2.2	1.9	1.9
75 years +	1.5	1.6	2.6	1.5	1.2	2.5	2.0	1.7	2.1	1.8	1.9

*(Very important=1, Somewhat important=2, Somewhat unimportant=3, Unimportant=4)
Table 52: Acceptance of media by age groups

How would you like to be informed about storm flood protection? Please tell us to what degree you agree with the following statements.

Average*	Total	Eckernförde	Glückstadt	Nordstrand	Pellworm
In the mass media (television, radio, magazines, newspapers) there should be information about the topic.	1.2	1.3	1.2	1.2	1.2
In the digital media (Internet, mobile phone) there should be information about the topic.	2.2	2.3	2.3	2.2	2.1
In exhibitions and information stands there should be information about the topic.	1.8	1.8	1.8	1.9	1.9
In advertisements and television spots in the mass media there should be information about the topic.	1.2	1.2	1.3	1.2	1.2

In the school the topic should be dealt with.	2.4	2.3	2.2	2.5	2.4

*(Agree=1, Agree somewhat=2, Disagree somewhat=3, Disagree=4)
Table 53: (Question W2-7) Adequacy of communication media for information

Question 7 from the second questionnaire is also about the topic of communication media. And in this question the mass media again do best with an average of 1.2. The school as a place where the topic should be discussed also receives high approval. With an average of 1.8 exhibitions are also considered by respondents as meaningful. As in the first questionnaire (cf. Table 51) Internet and mobile phone are thought to be less suitable (average 2.2). Advertising and television spots receive the least approval. The response frequency among the test areas does not show any large discrepancies.
There is a causal relationship between the momentary feeling of being threatened and the communication media listed in Question W2–7 (except for exhibitions). The greater the feeling of being threatened, the more agreement to communication by mass media, digital media, in school and in advertising formats there is. This relationship could not be found for exhibitions.
A relationship between age of respondent and approval of communication media listed in Question W2-7 could not be found. Just for digital media, as in the first wave, could we find that people aged till 34 approve of them more than older people do. Due to the minimal variance however we could not determine any significance.

What do you think about the following statements?

Average*	Total	Eckernförde	Glückstadt	Nordstrand	Pellworm
I would like to receive regular information in the future about storm flood protection.	1.5	1.6	1.3	1.7	1.4
I would like detailed information about storm flood protection in my region and in Schleswig-Holstein.	1.5	1.6	1.4	1.6	1.3
I would like to participate personally in long-term decision-making processes in Schleswig-Holstein.	2.6	2.8	2.5	2.5	2.5
I would volunteer to help on the dike in case of a disaster.	2.1	2.3	2.2	1.9	2.0

*Agree=1, Agree somewhat=2, Disagree somewhat=3, Disagree=4)
Table 54: (Question W1-29) Approval of participation statements

Both of the first statements in Question 29 in the first questionnaire (cf. Table 54) are given a high approval rate by respondents so that there is not difference regarding the preference for detailed information especially about the region (statement 2) and for general information (statement 1). The average for both statements is 1.5. This reflects once again the high interest in the topic. The third statement on participation by the

public is somewhat less positively agreed to, however with an average of 2.6 the potential for participation by the public in decision-making processes is still high. The majority of respondents would volunteer for helping on the dike in the event of a catastrophe.

5.3.4 Increased thinking about climate change

The following questions should investigate how the population assesses climate change, whether possibilities to take action are seen and to what extent the public assumes that climate change is having an influence on life on the coast and storm flood protection.

Is climate change going to happen?

Responses in %	Total	Eckernförde	Glückstadt	Nordstrand	Pellworm
The climate has already changed.	65.9	68.0	65.0	65.5	65.2
Climate change will take place in the next few decades.	24.2	24.0	25.0	20.0	26.1
The climate has already changed and will continue to change.	7.6	5.3	7.5	12.7	6.5
Climate change is not going to happen.	2.3	2.7	2.5	1.8	2.2

Table 55: (Question W1-23) Start of climate change

Only a very small minority of 2.3% do not believe that climate change is taking place. Over two-thirds of the respondents say that the climate has already changed. A further 7.6% think that climate change will continue to cause further change in the climate. 24.2% of the respondents believe that climate change will happen in the next few decades.

Do you believe that a possible change in the climate is caused by human influences?

Responses in %	Total	Eckernförde	Glückstadt	Nordstrand	Pellworm
Yes	84.6	90.0	81.6	87.0	81.6
No	5.6	3.8	8.0	3.7	6.1
Don't know	9.7	6.3	10.3	9.3	12.2

Table 56: (Question W1-24) Human influence on climate change

A large majority of 84.6% believe that climate change is anthropogenic, with only 5.6% thinking that climate change is not due to human influence and 9.7% not having an answer.

Do you believe that as an individual you can do something to slow down climate change?

Responses in %	Total	Eckernförde	Glückstadt	Nordstrand	Pellworm
Yes, as an individual I have an influence	57.8	56.9	56.3	49.1	67.7
I do not believe that as	35.3	38.9	37.5	40.4	24.6

an individual I have an influence on climate change.					
Don't know	7.0	4.2	6.3	10.5	7.7

Table 57: (Question W2-12) Influence of individual on slowing down climate change

A majority of 57.8% is of the opinion that an individual can make a contribution to slowing down climate change. 35.3% think that the individual has not influence.

What effect do you think climate change will have in the future on your life?

Number of entries in %	Total	Eckernförde	Glückstadt	Nordstrand	Pellworm
I won't notice any changes in my life.	8.9	8.3	6.3	16.1	6.1
In the future I will have to take greater preventive measures against storm floods.	22.5	19.4	26.6	30.4	15.2
I won't experience any changes, but my children will.	61.6	63.9	59.4	48.2	72.7
Don't know	12.5	11.3	15.6	14.3	9.2

Table 58: (Question W2-13) Effect of climate change on personal life situation

The effects of climate change are expected in the future and so 22.5% of the respondents believe that in the future they will have to carry out protective measures. 61.1% are convinced that climate change will leave noticeable changes but they believe that they will not experience these changes in their own lifetimes. Only 8.9% believe that they will not experience any changes resulting from climate change.
Those people who say that they will not experience any changes in their lives as a result of climate change are feeling less threatened. The respondents who say that they will have to take more protective measures in the future are feeling more threatened.

Statement: I will not notice any changes in my lifetime. (Question W2-13)	Average momentary feeling of being threatened (Question W2-15)
No	2,7619
Yes	3,2727

Significance: .005
Table 59: Climate change effects and the feeling of being threatened

Statement: In the future I will have to take greater protective measures against storm floods. (Question W2-13)	Average momentary feeling of being threatened (Question W2-15)
No	2,9031
Yes	2,4737

Significance: .001
Table 60: Protective measures and feeling of being threatened

Climate change in a few decades will result in storm flood events in Schleswig-Holstein that present protective facilities will unable to offer protection. Do you agree with this statement?

Responses in %	Total	Eckernförde	Glückstadt	Nordstrand	Pellworm
Agree	39.5	41.8	39.8	41.1	36.5
Agree somewhat	39.5	45.6	42.2	35.7	34.4
Disagree somewhat	17.8	8.9	15.7	21.4	25.0
Disagree	3.2	3.8	2.4	1.8	4.2
Average*	1.9	1.8	1.8	1.8	2.0

*(Agree=1, Agree somewhat=2, Disagree somewhat=3, Disagree=4)
Table 61: (Question W1-25) Future capability of protective facilities

The statement that climate change will lead to storm floods that current protective facilities will be unable to protect against is agreed to by 79% of the respondents or "somewhat". Only 3.2% disagree with the statement.
The respondents are convinced that climate change is taking place and that storm floods are going to become stronger, however there is not a feeling of panic, which can be seen from the moderate feeling of being threatened (cf. Questions W1-4 & W2-15).

Do you believe that in your region the coastline can be preserved over the long term?

Responses in %	Total	Eckernförde	Glückstadt	Nordstrand	Pellworm
Yes, permanently	19.0	23.2	17.2	13.0	21.5
Yes, about another 100 years	21.0	18.8	25.0	16.7	23.1
Yes, about another 50 years	26.2	31.9	17.2	24.1	30.8
Yes, about another 15 years	9.1	10.1	6.3	13.0	7.7
Don't know	24.6	15.9	34.4	33.3	16.9

Table 62: (Question W2-14) Preservation of the coastline

In the short term, damage to the coastline is not expected (only 9.1%); in the long term however to a large extent it is. The estimate that the coastline can be preserved over a long period of time is held by 19%. 21% think that the coastline can be held for about 100 years, 26.2% believe that 50 years is possible and 9.1% are of the opinion that the coastline can be preserved only about 15 years in its present form. 24.6% answered the question with "don't know". We can see that there is a high degree of uncertainty among the respondents here. It is assumed that climate change is taking place or will be noticeable, but when estimating the consequences opinions differ considerably.

5.3.5 Participation, voluntary involvement and neighbourly help

The following question should investigate whether and to what extent the respondents are taking part in decision-making processes about storm flood protection and whether there is a need for more opportunities to participate.

Do you take an active role in decision-making about storm flood protections?

Number of entries in %	Total	Eckernförde	Glückstadt	Nordstrand	Pellworm
I do not take part in decision-making, because…	87.1	93.0	92.2	82.1	79.7
I do take part in decision-making, because…	11.9	5.6	9.5	18.5	15.6
I would take part in decision-making processes if there were more opportunities.	23.3	15.5	31.3	23.6	23.8

Table 63: (Question W2-9) Participating in decisions about storm flood protection (1)

87.1% of the respondents do not take part in decision-making in the area of storm flood protection. 11.9% say that they are involved in decision-making and 23.3% would participate if there were more opportunities. This makes clear that there is a need in the population to take part in decision-making processes.

Do you take an active role in decision-making about storm flood protections?

I do not take part in decision-making because…	
Number of entries in %	Total
I am not interested in the topic	3.6
I don't have any time for it.	25.9
Participation does not any effect.	25
As a citizen I am not responsible for it.	15.2
I do not know enough about the topic.	44.6
Other (*open question*) (*cf. Table 65)*	241

Table 64: (Question W2-9) Participation in storm flood protection decision-making (2)

The two most common reasons for not participating are too little knowledge (39.8%) and not enough time (22%). The opinion that participation doesn't have any effect is held by 21.3% of the respondents. 16.5% feel that citizens are not responsible. Only 2.4% are not

interested in participation. In Table 65 the responses for the open category are listed. The reason most often given is being prevented because of age, illness or family (20 entries).

I do not take part in decision making because… entries in "other"

Rank	Reasons	Number of entries
1	Prevention reasons (age, illness, family)	20
2	Don't know how or where (otherwise interested)	8
2	Was never asked/poor communication	8
4	Do not feel affected	7
5	Was once active	4
6	Municipality (authorities) is responsible	3
7	Resignation	1
8	Personal disadvantage through participation	1

Table 65: (Question W2-9 open) Reasons against participation

Do you take an active role in decision-making about storm flood protection?

I do take part in decision-making, because	
Number of entries in %	Total
The topic is important	91.7
I enjoy it.	16.7
As a citizen I can make lots of good suggestions.	25.0
Other (*open question*)	8,3

Table 66: (Question W2-9) Involvement in storm flood protection decision-making (3)

91.7% of those who say that they are involved in decision-making process do this because the topic is important for them. 16.7% participate because they enjoy it and for 25% the motivation has to do with the conviction that as citizens they can make lots of good suggestions.
Under the category "other", reasons for participating include "profession" (4 entries) and own affectedness (2 entries).
The feeling of being threatened has an influence on a person's assessment of the importance of citizen participation. The stronger the feeling of being threatened, the more likely one considers citizen participation to be important.

Do you volunteer for work in storm flood protection (e.g. dike association, volunteer fire department etc.)?

Responses in %	Total	Eckernförde	Glückstadt	Nordstrand	Pellworm
I do volunteer to work in storm flood protection.	9.1	2.9	0	10.7	23.4
I do not volunteer.	90.9	97.1	100.0	89.3	76.6

Table 67: (Question W2-10) Voluntary work in storm flood protection

A large majority of 90.9% are not doing voluntary work. However while the people on Nordstrom and Pellworm are most involved in voluntary work, the people interviewed in Eckernförde and Glückstadt take on no or almost no voluntary work in coastal protection.

How important do you think neighbourly help is for coastal protection?

Number of entries in %	Total	Eckernförde	Glückstadt	Nordstrand	Pellworm
Important	85.4	87.5	84.6	87.9	81.8
Unimportant	2.3	2.8	3.1	0	3.1
I exchange information with my neighbours about the topic and would help them as much as I could in the event of a catastrophe.	51.2	40.3	44.6	61.4	60.6

Table 68: (Question W2-11) Importance of neighbourly help

A total of 85.4% of all respondents find neighbourly help to be “important”. Only 2.3% say that they think neighbourly help to be unimportant. Over half of the respondents are already exchanging information about the topic with their neighbours and would help them in the event of a catastrophe.

5.3.6 Knowledge questions and criticism

With the following questions we are testing which facts can be remembered from the booklet.

Name the most important storm flood protection facilities in your area.

Rank	Answer group	Number of entries
I	Institutions	208
1	Authorities	68
2	Fire department	49
3	THW (disaster relief organisation)	15

4	Dike associations	14
4	Schools	14
6	Police	10
7	Church	8
7	Media (radio/television)	8
9	Red Cross	6
10	Armed forces	4
10	Aid organisations	4
12	DLRG (German life-saving organisation)	3
12	Town hall	3
14	Doctors/ambulance service	2
II	Structural measures	200
1	Protection by dikes	112
2	Dike openings/flood gates/dike gates/port gates/locks/barriers	52
3	Other structural facilities	21
4	Shipyards	12
5	Sirens	6
5	Sand bags	6
7	Elevated features (low hills/dunes)	3

Table 69: (Question W1-22 open) Entries of important coastal protection facilities

Institutions and structural measures were both named about as often when the open question about institutions of coastal protection was answered. In the category of institutions authorities were mentioned most often and in the category of structural measures dikes were the most common.

Did you know that in the event of a storm flood you could be required by law to help secure the dike?

Responses in %	Total
Yes	67.8
No	32.2

Table 70: (Question W1-30) Knowledge about possible legal obligations to help

Two-thirds know that they can be legally obliged to help in the event of a catastrophe. One-third of the respondents did not know this.

Do you know about how much money is spent annually per Schleswig-Holstein resident for coastal protection?

Responses in %	Total
Yes	30.5
No	69.5

Table 71: Question (W1-31) Knowledge about coastal protection costs per citizen

About 30% of the respondents say that they know how much money per year for each inhabitant of Schleswig-Holstein for coastal protection. However many of the numbers entered in the space of the open category were not right. Almost 60% of those who answered the question with "yes" knew the right number (15 euros).

Now you have the opportunity to give us your honest opinion about the booklet and questionnaire:

Responses in %	Total	Eckernförde	Glückstadt	Nordstrand	Pellworm
Strong criticism	6.6	7.4	3.7	0	10.7
Light criticism	9.4	14.8	7.4	8.7	7.1
Neutral	11.3	14.8	11.1	13.0	7.1
Light praise	35.8	29.6	40.7	34.8	39.3
Strong praise	36.8	33.3	37.0	43.5	35.7
Average*	3.9	3.7	4.0	4.1	3.8

*(Strong criticism=1, Light criticism=2, Neutral=3, Light praise=4, Strong praise=5)
Table 72: (Question W2-16) Praise and criticism of the booklet, flyer and survey

In the second questionnaire the respondents had the possibility in Question 16 to express praise and criticism about the booklet, flyer and how the survey was conducted. The statements were put in the categories of strong criticism, light criticism, neutral, light praise and strong praise. Light or strong praise were expressed by a total of 72.6% of the respondents, compared to only 16% light or strong criticism. 11.3% gave neutral recommendations. The survey, booklet and flyer were praised most strongly on Nordstrand, while in Eckernförde the approval was lower (average in Eckernförde at 3.7 – on Nordstrand at 4.1). A more exact overview of the responses can be found in Tables 73 and 74.

Now you have the opportunity to give us your honest opinion about the booklet and questionnaire:

Rank	Answer groups	Number of entries
1	Booklet: general praise and thanks (interesting, informative etc.)	71
2	Survey good	9
3	Keep it up and give us more information on the topic!	8
4	Booklet provides a good overview and clear representation of facts	7

5	Good that there is information about the Baltic Sea	1
5	Low German title is good	1
5	Good, that the topic is dealt with in a scientific way	1

Table 73: (Question W2-16 open) Praise of booklet, flyer and survey

Now you have the opportunity to give us your honest opinion about the booklet and questionnaire:

Rank	Answer groups	Number of entries
A	General and content criticism of booklet	31
A1	Too little information about local facts/about the region	7
A2	Booklet too general	5
A3	Booklet uses the trendy topic climate change and plays with fears that are hard to assess properly (panic making)	4
A4	Criticism of flyer	3
A5	Information too extensive, hard to read	2
A5	Too little about history and background of flooding	2
A5	The booklet should be more detailed	2
A8	Exaggeration of immediate danger from storm floods, lowers interest	1
A8	No information about people renting a house	1
A8	Too little about Baltic Sea storm floods in the past years	1
A8	Tips about prevention in buildings do not have any effect	1
A8	No information about security of nuclear power plants in coastal areas when flooded	1
A8	Too little information about opportunities to participate	1
A8	No translations for non-German speakers (Turkish, Italian)	1
A8	Table of contents missing	1
B	Criticism of the questionnaire	14
B1	Too much personal data required (not anonymous enough)	4
B2	Questions too vague/do not differentiate enough (e.g. Question 13)	3
B3	Too many questions	2

B3	Too anonymous	2
B5	Questionnaires better separated in general and special questions	1
B5	Online questionnaires should be available	1
B5	Question 9 unclear	1
C	Criticism of how impact study was conducted	6
C2	No one available by telephone	2
C2	Surveys should not be repeated continually	2
C4	Topic would be addressed in autumn (topicality)	1
C4	The survey staff should come from the region	1
D	Criticism of politics/society	7
D1	The topic is a political problem (more coastal protection politics!)	3
D1	Protective measures depend on public finances	3
D3	Storm flood protection is not a public topic	1
E	Criticism of layout of booklet	4

Table 74: (Question W2-16 open) Criticism of booklet, flyer and survey

5.3.7 Sociodemography

After the content questions additional sociodemographic information was obtained. The results are shown briefly below.

How old are you?

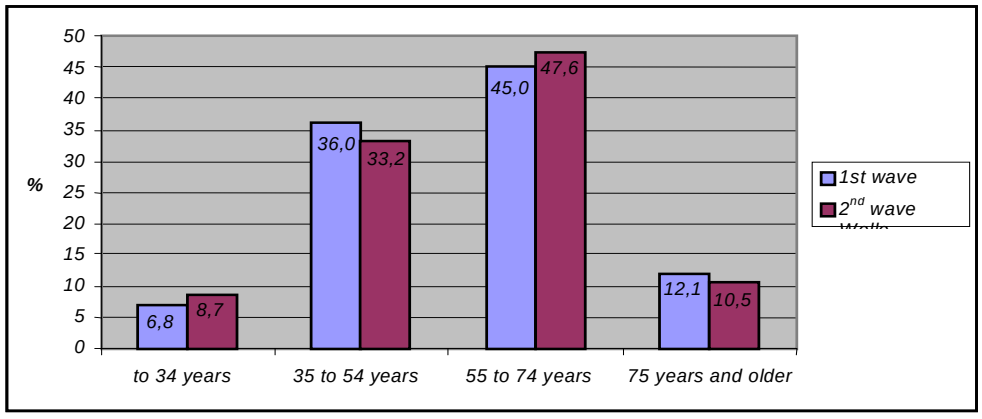


Figure 8: Age groups of first and second wave

The 55 to 74-year-old age group in both waves is the most strongly represented (45% in the first wave, 47.6% in the second wave). In both waves about one third of the people

between 35 and 54 years old. People younger than 34 years old had the lowest level of participation in the survey (6.8% in the first wave and in the second 8.7%).

Are you male or female?

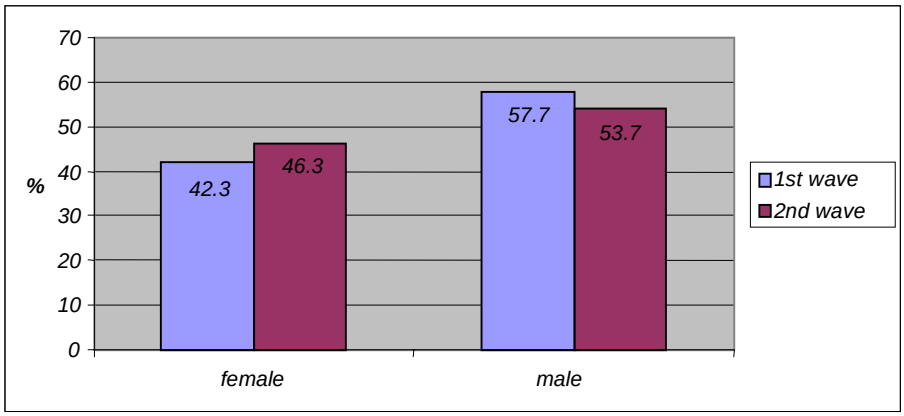


Figure 9: Gender
In both waves somewhat more men than women took part in the survey.

What educational qualification or degree do you have?

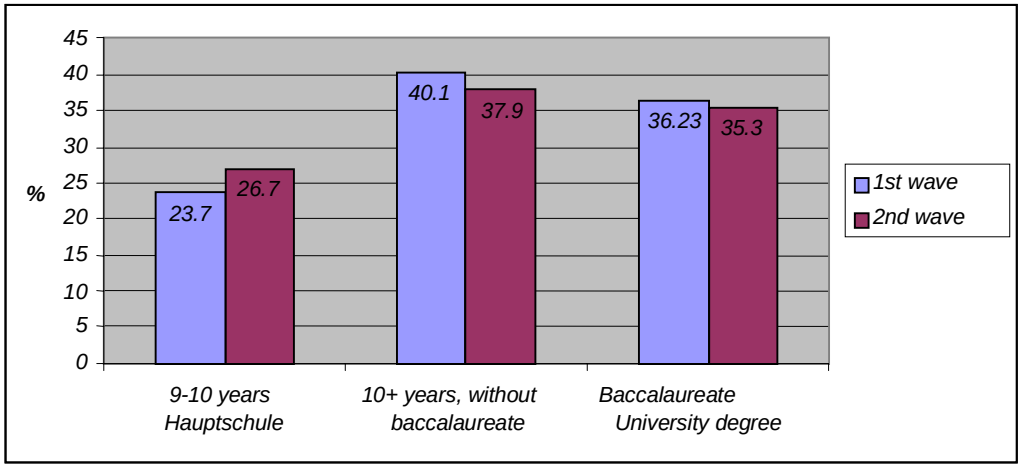


Figure 10: Educational qualification

The percentage of persons who have attended school 10 or more years without taking a baccalaureate (Abitur) is only marginally higher than the percentage who has a baccalaureate. The smallest group taking part in the survey were those persons with 9-10 years of school.

How long have you been living near the coast?

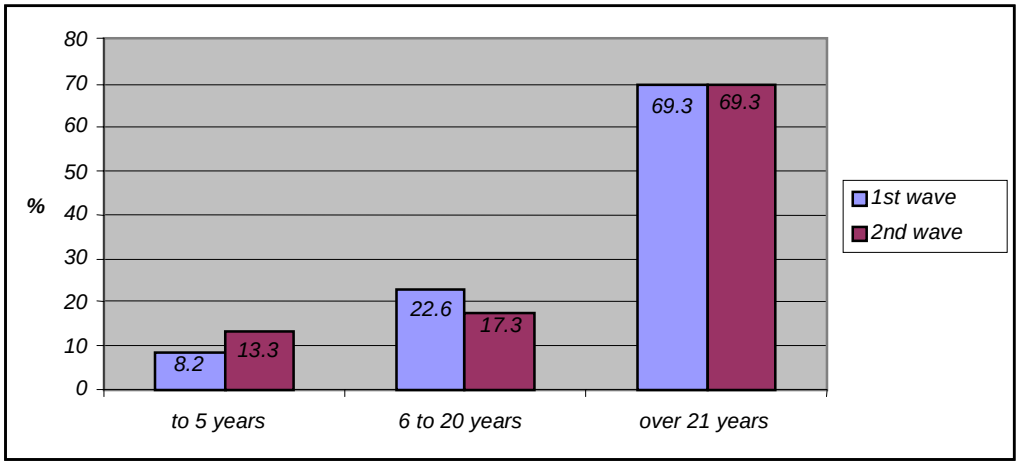


Figure 11: Length of residency

More than two thirds of the respondents say that they have lived for over 21 years near the coast. The percentage of people who say that they have been living near the coast between six and 20 years is at 22.6% (first wave) and 17.3% (second wave) considerably lower. The number of people who have moved to the coast in the last few years is at 8.2% (first wave) and 13.3% (second wave) was even lower.

Do you own your home or are you renting?

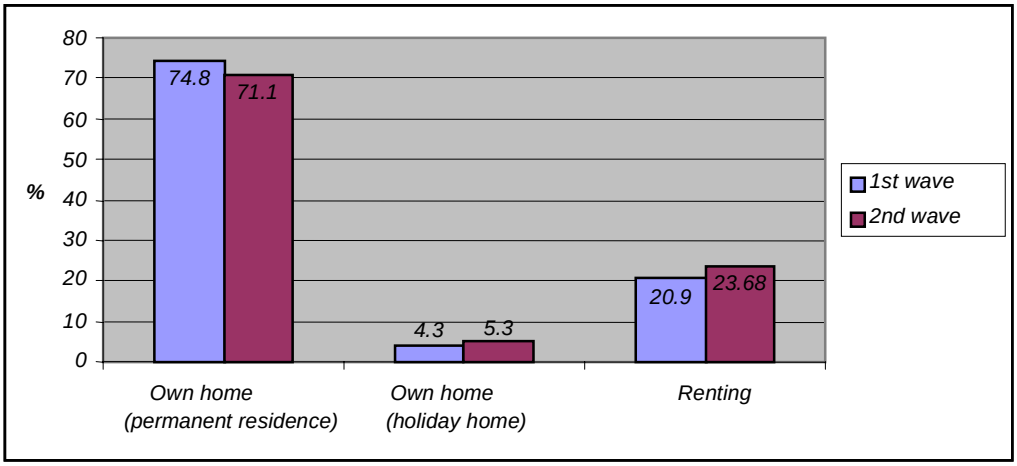


Figure 12: Type of property

Over 70% of the people in both waves live in their own home and permanent residence. The number of people renting is in both waves slightly higher than 20%. Less than 5% of the respondents received the booklet and questionnaire in their holiday home.

How many adults live in your household?

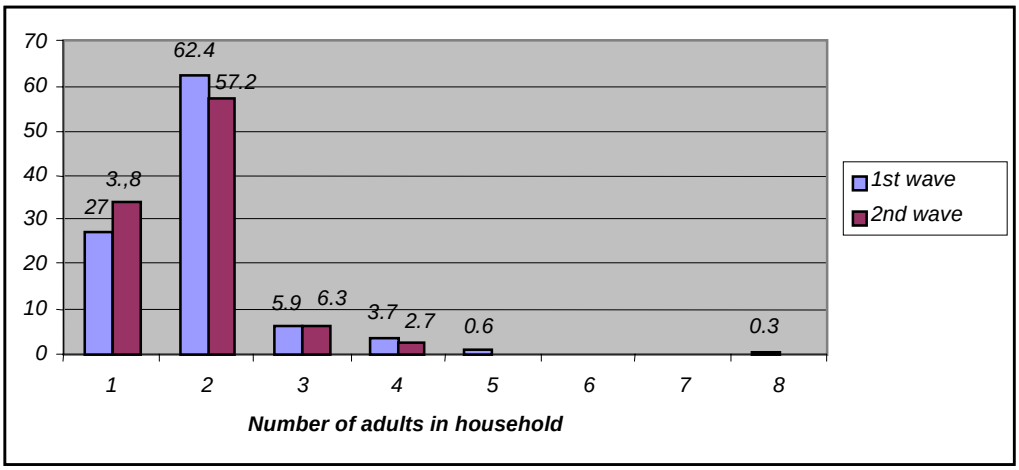


Figure 13: Adults in household

In more than 90% of the households there are one or two adults. There are three or four adults living in less than 10% of the interviewed households.

How many children live in your household?

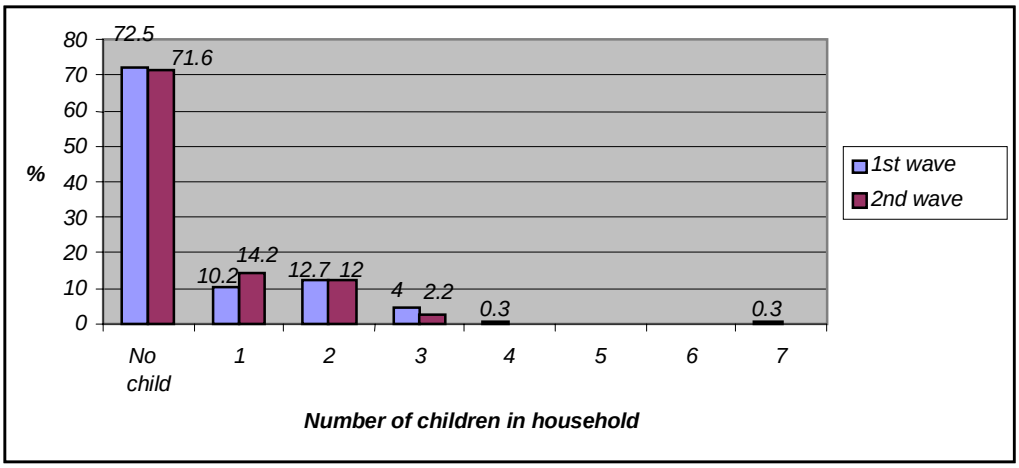


Figure 14: Children in household

More than 70% of the respondents say that there are no children living in their household. In about 20% of the households there are one or two children.

5.4 Summary of the results of the impact study

In this chapter we will present a brief summary of the results of the impact study organized according to the topics from the questionnaire.

Risk perception and dealing with storm flood protection

In the areas surveyed there was a strong to very strong interest in storm flood protection: more than 90% of the respondents say that they were “somewhat” or “strongly” interested in storm flood protection. 37% of the respondents say that the booklet made them think more about the topic. About half of all persons talked in the family, with friends or acquaintances about the booklet. Slightly more than 50% of all respondents say

that especially when there was an occasion they would speak with others about storm flood protection. About half thought their own knowledge about the topic was “high” or “very high”, while the other half was of the opinion that they had “little” or “very little” knowledge about the topic.
The feeling of being threatened is somewhat less strong in the areas surveyed, with over 50% saying “little” or “not at all”. In Glückstadt the perceived threat is assessed as the highest, while in Eckernförde the feeling of being threatened is reported to be least. The more an individual has personal experience with storm floods, the greater is the feeling of being threatened, as it is when one’s own house was threatened in the past. The reported feeling of being threatened was less in the second wave than in the first one – this could be due to the fact that the storm flood season was long over and in the summer storm floods are not anticipated. There is no significant correlation between the feeling of being threatened and the age or gender of the respondent. The same is true of educational qualification, length of residence or whether the home is owned or rented.

Evaluation of the booklet

A total of 87.8% in the first wave remembered the booklet “Sturmflut – wat geiht mi dat an?” In the second wave the number who remembered it dropped to 77.9%, while those who “vaguely” remember it in the second wave were 14%. All or some pages of the booklet were read by over 90% of the respondents. 70% of the respondents, for each statement, took the booklet seriously, found it useful, considered it easy to understand and well designed. The statement that the booklet was comprehensive in its coverage of the topic was agreed to by a smaller percentage of the respondents. There should be more local information and recommendations for catastrophe protection. The flyer is taken to be “useful” or “very useful” by 80% of the respondents.
Both the precautionary measures for protection against storm floods and for the event of a catastrophe were carried out by about 14% of the respondents after reading the booklet. Slightly more than 40% of the respondents either do not take any precautionary measures or had already taken these precautionary measures before the booklet was sent. There is a correlation between the reported feeling of being threatened and the implementation of measures: the greater the feeling of being threatened, the more willing an individual was to take precautionary measures. In Eckernförde somewhat fewer measures were taken while on Pellworm more than half had already carried out preventive measures. The measure most often reported was setting up a supply of food and drinking water as well as carrying out flooding and security measures to protect the house.
The more effective the preventive measures were considered to be, the more likely they were to be carried out. The most common reason for not carrying out measures was the assumption that they were not necessary.
In the survey there was a difference between the test areas. On the west coast a greater feeling of being threatened was reported as well as implementing measures. The interest and the knowledge about storm flood protections are higher. On the east coast as a result there should be more sensitising at a fundamental level for the topic. We will discuss how this can be done in the sixth chapter on the development of communication strategy.
The greatest interest in information is for recommendations for the event of a catastrophe, for precautionary measures and for local information about storm flood protection.

Communication about storm flood topics

Regular communication about the topic (at least once a year) is approved by a considerable majority of the respondents (over 80%). Radio and television are each considered by 70% of the respondents as “very important” and so receive the highest approval rate. Official publications and magazine/newspaper reports are considered by 60% of the respondents as “very important” and so also receive a very high approval rate. In contrast the Internet was only considered by 36.4% of the respondents as “very important”.

Thinking about climate change

The great majority is convinced that climate change is already taking place or will happen in the future. Only 2.3% of the respondents believe that climate change will not take place. 84.7% believe that climate change is anthropogenic. 57.8% share the opinion that every individual can make a contribution to slowing down climate change. The majority of people think that they will not personally experience any effects of climate change, but following generations will. 22.5% however are convinced that they will have to take greater precautionary measures in the future and thus the majority is convinced that the population will have to adapt to climate change in the future. Over 80% agreed "somewhat" or "completely" with the statement that in a number of decades climate change will lead to storm flood events that existing protective facilities would not be able to offer protection against. It becomes clear there is great uncertainty in the public as to whether protective facilities will offer sufficient safety in the coming decades. People who believe that they will have to take increased protective measures in the future, do tend to report a greater feeling of being threatened, however there is not a panic in the population, because if there was then the feeling of being threatened would have to be considerably greater.

Participation, volunteer involvement and neighbourly help

More than 80% of respondents do not take an active role in decision-making about storm flood protection. However 23.3% of the respondents would take advantage of opportunities to participate in the area of storm flood or coastal protection. This shows that there is a need for opportunities to participate. A clear majority of 90.9% do not volunteer to work for institutions active in the area of coastal or catastrophe protection. Neighbourly help is considered to be important by 85.4%. About half of the respondents say that they would exchange information with their neighbours or help them in the event of a catastrophe.

6. development of a differentiated communication strategy

By risk communication strategy we mean the way in which the objective of the risk communication of an actor (e.g. a communal authority) is to be reached over the long term (see Bouwdienst Rijkswaterstaat 2004: 51). In principle when developing a strategy it is important to attend to the objectives and messages, the target group, the sender of information, the frequency of communication, the means of communication and the style of language. The objectives of risk communication can be summarized as follows (see Covello et al. 1987: 112f.):

- Information about and explanation of risk
- Initiation of changes in behaviour and precautionary measures
- Information in emergencies and catastrophes
- Joint problem and conflict resolution by political decision-makers, scientists and the participation of the public

In addition, educating the public and political decision-makers about storm flood risk can increase the understanding of the necessity of coastal protection and so the legitimation of expenses for coastal defence over the long term.

First of all though the affected population in the coastal lowlands of Schleswig-Holstein – that is about 345,000 people – should be educated about these risks. With the distribution of the storm flood protection booklet developed in this project to people in the coastal lowlands a foundation has been laid. The booklet aims at informing and educating about storm flood risks, familiarizing the public with government preventive measures and giving

recommendations about the right behaviour during flooding. Using the findings of the impact study, which was carried out after distributing the booklets (see Chapter 5), we make recommendations for the development of a communication strategy:

- There are differences in risk perception between the regions on the east and west coast. These can be seen in the differing readiness to carry out precautionary measures. On the east coast households tend to carry out measures less often, because they are less convinced that preventive measures are necessary. More sensitising of the population, especially on the Baltic Sea, should take place so that preventive measures are carried out more often.
- There should be regular communication about the topic coastal and storm flood protection (e.g. once a year). There is a clear need for this in the public. In addition the message should be communicated continuously so that over the long term the willingness to take preventive action is increased and there is a greater sensitising for the topic.
- Further communication should include information about catastrophe protection, local topics related to storm flood protection and preventive measures. Also information for behaviour after the event of a catastrophe would be interesting.
- In addition, considering the uncertainty in the population, it would seem to be meaningful to educate them about the local effects of climate change. Mass media such as radio, television and official publications are considered the most important means of communication. This should be taken into account more strongly when increasing communication activities.
- Since there is a demand for opportunities for citizens to participate in decision-making in storm flood and catastrophe protection, such opportunities should be expanded.

In order to best accommodate different target groups, a combination of different communication material is necessary. Good examples include the activities of the Environment Agency in Great Britain, the campaign Nederland leeft met water in the Netherlands or the German activities in Hamburg and Cologne (see Chapter 3).
In the literature there are numerous ways of distinguishing between target groups, e.g. Rohrmann (cf. 1991: 356):

- Operators/emitters: cause or source of risks
- Exposed: the persons facing the risk
- Regulatory agencies: administration and courts
- Scientists: experts for assessing technology and analysing risks
- Media: journalists from the press, radio, television and authors

When developing a communication strategy for storm flood protection in Schleswig-Holstein the category “operator” is unneeded as the possibility of storm floods is not a risk that is caused by major technical facilities or the like. We focus at first on the population and then in the second step on experts and other claimant groups.
If we first consider the population in Schleswig-Holstein, we see that there are other sub-groups in this group. Those people who have already been affected once or more often show a greater feeling of being threatened and so are more likely to take preventive measures. Also those people who live in an area endangered by flooding, who are familiar with storm flood protection and who are interested in the topic are (like those people with experience of flooding) more likely to be interested in detailed information and recommendations about storm flood and coastal protection. This group of people has such a strong interest that they are likely to be ready to actively search for information.
This group of people should be clearly separated from those people who are affected but are less aware of storm flood risk and are more likely to be uninterested. These people need to be, more than the other groups just mentioned, educated about the basic risk and persuaded that a coastal protection and the carrying out of preventive measures are important topics. These people are unlikely to take advantage of communication services.

Instead they must be “pushed” to the topic by the use of certain media.

The people in Schleswig-Holstein who do not live in flood endangered coastal lowland areas (about 2.5 million) should also be educated about these risks. They do not need information about how to behave in a catastrophe so much as more general information about why coastal protection is necessary for the state. Since this group of people has a more political interest in the topic, the communication form should take account of this background. Table 75 shows an overview of each target group and the challenges facing communication.

Target groups	Challenges
Affected population interested in the topic and aware of the risk	“Freshen up” awareness Expand knowledge Give recommendations on what action to take
Affected population who are more uninterested	Awaken interest Sensitise for the topic
Unaffected population	Promote acceptance of coastal protection

Table 75: Challenges in communication with different target groups

How should the selection and combination of the communication material be made so that they best meet the communication needs of the individual groups?
From the definition of the target groups portrayed above we can deduce a number of challenges on the communication material to be used. Those people who have a high interest and are aware of the risk are more likely to be interested in detailed information. This group is more likely to be willing to make a greater effort searching for information. And so communication material that gives a comprehensive view of the topic, such as the Internet, booklets, exhibitions or feature articles in television or radio, are appropriate.
The target group that is less interested in storm flood protection, but is still affected, will tend to be less attracted to these media, as their use is bound up with a greater search effort or more time, for example an Internet page must be actively opened and a booklet requires a certain amount of reading effort. Media that are used by most people daily, such as newspapers, television and radio are better suited for this target group. Advertisements and television spots are seen for only a few seconds but they can sensitise people effectively for a topic. And if that is successful then a foundation has been laid for an interest that can be met using the communication material discussed above.
In the impact study it became clear that regional topics meet with a particularly high interest. That is why additional media should be used which meets these requirements. Especially official publications appearing in regional newspapers are able to communicate regionally specific contents to the public. Also flyers can target individual regions. Information stands on site (e.g. on the dike) offer the opportunity to join together the theory of storm flood protection and what is happening at a particular location.
Innovative, original use of the media offers the opportunity to attract the attention of people to content that is otherwise “foreign” to them. For example, a calendar with impressive photos can be used to incidentally inform people about storm floods. A theatre play with reference to life on the coast or to storm floods could be used to attract attention to the topic. Texting services giving the current water levels or other

information offers the opportunity to reach people in a catastrophe and to provide them with concise but important information. Table 76 gives an overview of the different challenges facing communication, the appropriate communication means and their target groups.

Challenge for communication	Suitable communication material	Target groups
Comprehensive presentation of topic Provision of background information Recommendations on what to do	Internet (e.g. in combination with risk maps, newsletters, podcasts etc.) Booklets Exhibitions Television and radio reports (depending on length) Personal talks	Affected population who are interested in the topic and are aware of the risk
Sensitising people who are not actively searching for information	Mass media (Radio, television, newspaper) Advertising Personal talks	Affected population which is more uninterested Non-affected population
Information about regional topics	Official publications Regional newspapers Flyers Information stands	Affected population (whether interested or feeling threatened or not)
Innovative access to the topic	Calendar Postcards Theatre performances Information per texting	Affected population (whether interested or feeling threatened or not)

Table 76: Challenges for communication media and combination with target groups

It should be kept in mind that in this classification of target groups and the corresponding assignment of media the target groups are not homogenous. Among the interested population there are young people as well as older people. As a result there should be a number of media for one target group. The impact study showed for example that digital media are more likely to be used by young people than by older people. Official publications on the other hand are more likely to be read by the 35-54 year olds.
In general, moving pictures have a special influence on our willingness to carry out preventive measures: “From the psychological natural hazard research it is known that information in images shows a greater effect on the intention to undertake precautionary self-protection than pure textual information“ (Grothmann 2005: 203). In general people respond most to mass media, while Internet pages or books are less in demand. (see Tables 51 and 53). Other special target groups such as companies, farmers, experts, members of authorities can receive information from booklets or flyers that are specially

developed for these target groups. This information could also be placed in an Internet page.
When making the booklet we developed recommendations in Chapter 4 for designing communication material. In general the requirements for the presentation – regardless of the media – are that

- Information is sound and correct.
- Messages are communicated clearly and concisely, and the complexity of the facts is appropriate.
- The material is well illustrated and intuitively communicates the scientific background, the possibilities to take action and the conclusions from the authorities.
- Contact persons are named.
- The layout is uniform in order to create a recognizability effect.
- Not too many disaster photos are shown, in order not to question the controllability of the risk.

The combination of the media should be such that each medium refers to another. This allows an individual to put together his or her own info package. In a booklet, like the one developed as part of this study, there should be references to Internet pages with further possibilities to download information. These references make the communication transparent and comprehensive.
Such a specialised but still comprehensive communication strategy places high demands on an institution. The following points are important when an authority puts a strategy, for which only a theory has been formulated, into practice (see Renn et al. 2005: 15):

- Organisational integration
- Public relations
- Responsibility
- Training
- Further education

In order to practice risk communication successfully, it is necessary that all the relevant departments, authorities and offices be informed about the strategy and communication materials, or (can) collaborate in developing them. Official publications should be targeted and optimised. The public relations should be an interface between the work in the government authorities and the social environment. Those responsible for putting the communication material into practice should be named. It is also important that staff be trained and schooled, e.g. in dealing with media.

7. outlook

Against a background of climate change, of more intense and frequent storms as well as a rising sea level, the challenges for coastal and storm flood protection are growing. The increasingly intensified used of land and space raises the potential damage in the lowland regions. The varying claims by actors need to be coordinated in order to ensure the security and safety of the residents over the long term.
A sustainable development of the coastal areas thus requires not only communication that increases the awareness of risk and aims at adequate behaviour, but also takes a perspective that includes a long-term interaction between environment and society. Communication about current and future storm flood risks under conditions of climate change also requires, alongside information strategies, dialog-oriented possibilities for communication and participation (see Heinrichs & Grunenberg 2007: 29f.). A number of studies show the importance of citizen involvement. With the media discussed in this investigation it is possible to develop an audience-oriented communication, but for many of the media it runs in one direction only. Wishes, claims and knowledge of the population cannot be adequately taken into account and made use of. By letting the population participate in decision-making and taking their suggestions into consideration, the needs

of the population can be better met and so the acceptance for measures increased in the long term.

Risk communication that educates about risk and offers recommendations for behaviour in the event of a catastrophe is in this sense the starting point for a future-oriented process of understanding between state institutions and citizens. The goal of this should be a discourse by these actors about risk, residual risks and the necessity of acting to reach a sustainable adaptation to changing social and biophysical parameters. On the one hand it is about increasing the awareness of risk about storm floods based on natural science-technological risk analysis. On the other hand the social-political evaluation of risk and options to act by citizens needs to be considered. This means a cross-sectoral initiation of search, learn and development processes which focuses anticipatorily on the creeping changes like climate change and the rise in the sea level. It should be cross-sectoral in order to connect coastal protection with other areas such as population and economic development, ecological carrying capacity and social justice. Such a communication oriented towards sustainability pursues a broader systemic-transforming perspective than the management oriented risk communication oriented towards individuals and groups (see Gray & Wiedemann 1999). The participation of claimant groups and citizens in communication and decision-making processes for sustainable development in coastal and storm flood protection through participative processes, such as round tables, future conferences etc., is central.

Especially with a view to the local and regional consequences of global climate change there is a growing need to relate the varying claims on communication to behaviour in the event of a disaster, to the increase of risk awareness and to the development of sustainable coastal protection systematically to each other. The concept of "adaptation communication" could serve as a framework for such a project (see Heinrichs & Grunenberg 2007).

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