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2nd ERA-NET CRUE Research Funding Initiative
Flood Resilient Communities – Managing the Consequences of Flooding
Final Report

CRUE Final Report

IMRA
Integrative flood risk governance approach for improvement of risk awareness and increased public participation

Prepared by the Joint Project Consortium consisting of

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CRUE Research Report

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The intent of the research reports is to provide relevant information and to stimulate discussion of those having an interest in flood risk management. The results and conclusions of all reports produced under the **Second CRUE Funding Initiative on Flood Resilience** are made available to policy-makers and stakeholders at all levels, research funding bodies, universities, industries, practitioners, and the general public by way of the CRUE website (**http://www.crue-eranet.net**).

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CRUE Final Report

IMRA
Integrative flood risk governance approach for improvement of risk awareness and increased public participation

The project IMRA is part of the Era-Net CRUE Funding Initiative on Flood Resilient Communities.

ERA-Net CRUE was funded within the Sixth EU Framework Programme and introduced structure within the area of European research on flood risk management (FRM). Its vision was to support and develop an extensive co-ordination and integration of regional, national, and European research programmes, projects and policies in the field of Flood Risk Management. Within the CRUE ERA-Net two funding initiatives were introduced.

The second ERA-Net CRUE Research Funding Initiative **"Flood Resilient Communities – Managing the Consequences of Flooding"** was launched in support of the EU Flood Risk Management Directive 2007/60/EC, which was introduced as a result of several severe flood events causing loss of life and property. Within this initiative seven joint research projects with test sites all over Europe are funded and focus on a broad spectrum of issues related to the enhancement of resilience. Besides, the scientific coordination project CORE CRUE is funded within this second call, to support the implement of the call and to disseminate its results.

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A project fact sheet can be found at the end of this document ("Table of project information").

Summary for Decision-Makers

As a research result IMRA provides a toolbox for selecting the right method for the right purpose in order to design a flood risk communication and participation process along a 12-step approach aiming at an optimisation of the efficiency of a flood risk management process.

What the report is about and why the work is important

As the call on "Flood resilient communities – managing the consequences of flooding" (2nd ERA-Net CRUE Funding Initiative) stressed, a particular challenge for governmental institutions and water authorities is to strengthen public participation in the establishment of future approaches to flood risk management (Article 10 of the Flood Risk Management Directive 2007/60/EC; hereinafter also referred to as Flood Risk Management Directive). This becomes necessary in particular in context of setting up flood risk management plans in accordance with Article 7 of the Flood Risk Management Directive. This public participation does not end in itself and is much more than just an information campaign with regard to final results. This becomes clear when looking at § 2 of Article 10: "Member states shall encourage the active involvement of all interested parties into the production, review and updating of the flood risk management plans." This is especially visible when looking at evacuation orders, building protection measures to be taken by private households, risk awareness etc. Having these facts in mind, the "active involvement", propagated by the Flood Risk Management Directive, has to be seen as crucial for the success of the Directive's main objective, the reduction of flood risks.

The IMRA project took this challenge as a starting point and designed its research around the following main questions:

- What is the relationship between true flood risk and the public's risk perception? What factors determine this relationship? What are the implications for FRM policy?
- How can public participation in flood risk management be increased through better risk communication and greater risk awareness?
- How can participation in the establishment of FRM plans be encouraged and improved as a feature of "good governance"?
- What can institutions learn from improved understanding of risk communication approaches, tools and techniques? How can this learning be applied to improve the effectiveness of communications to the public (across a range of FRM activities, e.g., mapping, planning, event management etc.)?
- How can risk be reduced by increased public awareness and participation? Which is the impact of better public awareness and participation in the reduction or alleviation of flood risk?

Main output of the IMRA project is the design of a risk governance approach, which aims at enhancing the disaster resilience of a society (or a region, city, municipality) and includes all relevant actors, rules, conventions, processes, and mechanisms concerned with how relevant risk information is collected, analysed and communicated and management decisions are taken as prescribed in Article 10 of the Flood Risk Management Directive.

The elements of this risk governance approach that are relevant for risk management practice are compiled in a handbook (English, German and Italian versions) consisting of a 12-step approach to flood risk governance and a toolbox of methods for designing a flood risk communication and participation process.

Aims/Objectives, including who may benefit from the research

The overarching goal of the IMRA project is to influence and change real decision-making in the addressed case study areas and to produce best practice examples, which could serve as references for other authorities dealing with flood risk management plans in Europe. Moreover, a practical handbook (in English; also translated to German and Italian), which contains the main lessons learned from the project is the second main result of benefit for Europe, in general, and further countries/authorities facing the given risk setting.

All those stakeholders that are obliged or interested to foster the active involvement of the interested parties are the addressees of the project's results. Stakeholders of both kinds are addressed:

- those who are by law responsible for the implementation of the Flood Risk Management Directive such as (state) water authorities that carry out hazard and risk assessments and set up flood risk management plans and
- those who are responsible to communicate implementing flood risk management plans and other measures (regional authorities, water associations, municipalities)

Especially the handbook (in its English, German and Italian version) offers a practical guide to a systematic approach of flood risk communication and participation. The general public is not directly addressed.

Results/key findings in relation to report objectives

Institutional vulnerability can be seen as one of the main aspects in dealing with risks. To reduce this vulnerability, risk governance consists of risk assessment and risk management, which both have to be embedded in a risk communication process.

The work on the theoretical background and the development of the IMRA conceptual framework (WP1) took into account that socio-cultural, social and individual factors are decisive for the perception and the management of risks. To plan a risk communication strategy it is thus necessary to find out about (a) the status of knowledge and risk perception and (b) the values and attributes that can affect risk perception to the local population. Attitudes, values and other socio-cultural features can be assigned to social groups, to "milieus". Within the project the Sinus Milieus® indicated the different social groups adequately.

When carrying out a risk communication and participation process it has to be differentiated between legal (formal) and informal participation as well as the intensity level of the participation processes. Formal participation means all procedural steps that are required by law to inform or involve the public in a management process, e.g. publication of management plans before approval. Informal participation goes beyond when public institutions voluntarily (although legally not required) inform and involve other stakeholders or the public in order to improve the quality and performance of a risk management/governance process, e.g. public meetings, brochures, work with pupils etc.

The implementation of the conceptual framework was carried out in three case study areas (WP2): river Wupper (Germany), river Möll (Austria) and river Chiascio (Italy) along a 5-step-strategy:

- Inventory of existing data with regard to the so called "true flood risk" based on scientific risk analysis and assessment
- Surveys and discussions on risk perception at the stage of the beginning of the project's work, in the middle and at the end of the project
- Assessment of the performance of the existing management systems in terms of attention paid to risk governance principles
- Regional workshops
- Communication strategy

After implementation the case study results were assessed. Main objective was to gain experience in the applicability of various more or less known methods for communication and participation in flood risk management. The assessment results helped to validate the conceptual framework (WP3).

In the Austrian and Italian case studies long lasting risk awareness is seen as reached and the institutionalisation of stakeholder involvement has been improved. In the German case study, stakeholders approved the networking among each other very much as there was the need to co-ordinate information strategies and actions between the different levels (State, District, water authority, local community).

The validation of the conceptual framework resulted in a more practice-orientated approach of 12 steps for flood risk communication and participation as a part of a risk governance process:

- Step 1: Carry out self-assessment of risk governance performance
- Step 2: Define goals and scope of process
- Step 3: Identify resources
- Step 4: Identify relevant stakeholders
- Step 5: Identify duties and responsibilities
- Step 6: Create a network of stakeholders
- Step 7: Identify the public's view
- Step 8: Agree on objectives
- Step 9: Agree on communication and participation measures
- Step 10: Design an implementation plan for communication and participation measures
- Step 11: Implementation
- Step 12: Evaluation

These 12 steps were finally cross-checked with the analysed methods resulting in a toolbox of steps and methods for informative flood risk management that is in line with Article 10 of the Flood Risk Management Directive.

Implications for stakeholders

Some key implications result from the project concerning the **improvement of the performance of flood risk management systems**:

- *Involve relevant actors:* Make sure to focus the right problem in the right order. Involve actors throughout the whole governance process from assessment to management. The performance of the management system will be improved by participating interested persons and parties. This results from the reduction of uncertainties within the political implementation process, which derive from unexpected (public) resistance. The inclusion of actors, stakeholders and the public throughout the complete governance process may gain more knowledge in the phase of assessment and later in the management process, as well as innovative solutions.
- *Improve the skills of involved individuals:* In addition it is necessary to take care of improving the skills of involved and responsible individuals. In this context of individuals being responsible for the management, it should be pointed out that there are different types of decision makers: elected, local volunteer and professional. The background of the decision maker has an effect on how decisions are made and what information is needed. In countries where this way of working is not common, one should integrate performance management in the work of a public administration, e.g. by training of management and staff.

- *Provide resources:* You will have to provide certain resources (time, money, manpower, etc.) to support the management process. Or the other way round: be aware that your manpower and money are limited resources, thus the effectivity of measures is important.

Other implications have to be emphasised concerning the **improvement of public involvement and risk communication**:

- *Carry out stakeholder analysis:* In the beginning, it is essential to carry out a thorough stakeholder analysis and an analysis of the affected population. When identified, address people with understandable language and with information, which is linked to the recipients' state of knowledge. A large amount of information will not automatically lead to increased risk awareness. Especially in the area of natural hazards, which are normally not an issue in every day's life multiple attitudes affect people's perception on river flooding.
- *Involve the media:* In all cases the media/press should be involved. This sounds quite simple, but it can be quite a challenge to position your information. Media/press will be more open for information transferred by persons they are working together with for quite a long time (seriousness of the information given).
- *Try out alternative communication methods:* Furthermore, alternative ways of information and communication (e.g. exhibitions, interactive participation methods etc.) should be taken. Within the IMRA project very good experience with the method "world café" was collected. Even with groups/persons of different age.
- *Address multipliers:* One should also consider addressing multipliers like teachers or (local) prominent persons. In this context pupils can be involved directly. However, the education of pupils in the topic of river flooding does not have to be just a special event besides the normal curriculum. Surveys document that the group of the pupils wish for an integration of this specific topic in their curricula, because it should be in their own interest for safety. Do not underestimate the value of providing some striking/prominent examples/people, the public knows and can talk about.
- *Tailor your strategy towards the addressees:* In all cases it is important to choose a tailor-made strategy to address the different groups with the appropriate communication methods. Choose the right method for the respective target group.

Further, the **overall quality and fairness of the risk governance process** is linked with acting along certain principles:

- *Stick to risk governance principles:* First of all you should take into account common risk governance principles. It is required to take care of an open and transparent process. Therefore always make sure to provide information and make it accessible for everyone. That includes the usage of the language of the people that are concerned.
- *Self assess the governance process:* Another point is to be open to (self-) assess the quality of the governance process. In doing so, it can be helpful to work closely with people and key persons (multipliers): involve interested people into the process and develop your strategy in close cooperation to stakeholders and public. You have to recognise the people's opinion about you and your reputation. If you cannot reach the people's confidence in you, the complete management process will be threatened.
- *Take social dimension into account:* Be aware of the social dimension of your project. Some of the information you provide will inform people that their houses, real assets or ever their lives are in danger.

Finally, the basis for a **long lasting and/or institutionalised participation and communication process** shall be provided:

- *Make people feel concerned:* It is important to involve people emotionally (positively!), e.g. by involving witnesses, but: do not make people afraid but raise their awareness. This may result in an enhancement of the people's willingness to pay or a rethinking about self protection measures. So you have to make people feel concerned: they must understand that flood risk is something that really is relevant for them and not just an administrative exercise.
- *Inform new residents:* Provide "welcome packages" for new residents related to flood risk management. New citizens are unaware of flood risks (especially when events appeared a long time ago) and are therefore insensible for this matter. Additionally install an own category of flood risk management on the community's website (parallel to other local issues).
- *Involve local groups/actors:* Allocate the co-ordination of the information and communication process to an established and commonly accepted local group or actor (Local Agenda group, environmental group, citizens' initiative). You should take into consideration that people have different perceptions before and after a disastrous event, hence tailor measures respectively. Another fruitful way is to provide emergency training and education for emergency managers.
- *Evaluate your strategy:* Evaluate the communication material and public participation methods; question, which material really improves risk perception. By using such an ongoing evaluation concept you are able to take corrective action when regarding weakening performance (controlling). It will also strengthen your faith in the broad public.

Recommendations for decision-makers

The IMRA project focused very much on communication and participation methods and their applicability within the developed flood risk governance concept. Thus, the following policy recommendations are primarily related to these issues.

For the **European level** it is recommended that flood risk management policy should be stronger linked to regional policy and shall not only involve infrastructure investments but also capacity building for local decision-makers and administrative staff. This could be an issue e.g. in the INTERREG programme (e.g. INTERREG IVC strand). Further, capacity building tools, networks and programmes should be developed to provide stakeholders to carry out an effective flood risk communication and participation process. Scientifically it became obvious that there is a need for developing benchmarking tools for measuring the efficiency of a flood risk management process.

For the **national level a recommendation concerning data related issues should be made: The IMRA project but also other ERA-Net CRUE projects confirmed the need to d**evelop data provision and maps that can easily be understood by the public (setting of common frame with support from media experts). Concerning policy maker issues, a common framework for flood risk management shall be provided, especially with adequate communication and participation methods (which already exists in many Member States). Further, good practice examples (exhibitions, posters, leaflets but also films) shall be provided on how regions or municipalities positively benefited from an active involvement of stakeholders and the public (positive image, openness, pro-active risk management).

Finally, some recommendations shall be made that aim rather at the **regional level**: Although the IMRA project has produced deployment planning guidelines and toolkits, detailed discussions with regions and water authorities during conferences and dissemination events have indicated the need for (a) additional, more practical guidelines, which include the experience of various projects in one handbook and (b) improvement of regional policies for an effective implementation of the Flood Risk Management Directive.

For those reasons, there is the need to make the new findings of the mentioned research projects available to a large range of regional actors by creating an on-line experience exchange and training tool, including additional approaches and experience.

Contents

1 Introduction

As the call on "Flood resilient communities – managing the consequences of flooding" (2nd ERA-Net CRUE Funding Initiative) stressed, "a particular challenge for governmental institutions and water authorities is to strengthen public participation in the establishment of future approaches to flood risk management" [cf. Article 10 of the Flood Risk Management Directive]. This becomes necessary in particular in context of setting up flood risk management plans in accordance with Article 7 of the Flood Risk Management Directive. This public participation does not end in itself and is much more than just an information campaign with regard to final results. This becomes clear when looking at § 2 of Article 10: "Member states shall encourage the active involvement of all interested parties into the production, review and updating of the flood risk management plans."

Decisions in the area of so called "traditional" risks like flooding are normally based on probabilities because they are past-oriented and informed by statistics. Climate change related effects on temperature and precipitation, however, will certainly lead to new uncertainties, because past events might be not representative anymore. Here, the perspective changes from probabilities to just possibilities. With public decision-making not having any precise information at hand, restrictions for private property rights are probably not legally justifiable anymore. Hereby, consensus about thresholds and response actions becomes more important. Moreover, measures, based on mandatory decisions of public administration as well as measures, which are in the responsibility of private stakeholders need to be accepted widely for their implementation. This is clearly visible when looking at evacuation orders, building protection measures to be taken by private households, risk awareness etc. Having these facts in mind, the "active involvement", propagated by the Flood Risk Management Directive, has to be seen as crucial for the success of the Directive's main objective, the reduction of flood risks.

Before turning the attention towards the main objectives of the IMRA project, which stands in focus of Chapter 2, it seems to be necessary to become clear in which way specific terms are interpreted and used within this document.

1.1 Definition of General terms on flood risk management

A first consensus among the IMRA project partners was already reached concerning the definition and mutual understanding of some central terms during the kick-off meeting. In addition, other relevant terms followed during the project lifetime and are discussed in the following section. These definitions can be seen as a basic glossary for the internal project work. The definition of terms is summarised in the Appendix (Glossary of Acronyms and Abbreviations).

Stakeholders and the public

Neither normative concepts like sustainable development or "Good Governance" nor the European Water Framework Directive 2000/60/EC do specify what public participation or the participation of users means in detail.

The **public** means "everybody": an open and more or less unlimited group of persons that are affected by or interested in a topic or a project/a process. A good example of such an unlimited circle is the term

"water users" – no one can be excluded from that description. To differentiate between the public as a whole and more or less organised parts of the public very often the terms "broad public" for all citizens and "stakeholder" for representatives of organised interests or the administration are used.

Stakeholder is a much used term and can be used in a narrow sense of the word or with a broader understanding (Carina and Keskizalo, 2004). Sometimes "stakeholder" is used for groups with a specific long-term objective and a clear institutionalised organisational structure (= organised public e.g. chambers). Often organisations of civil society like human rights and environmental organisations (NGOs) are included in this understanding. In scientific projects the term stakeholders is often used for representatives of the institutionalised public and of (non-institutionalised) organised interest groups. In contrast, the Intergovernmental Panel on Climate Change (IPCC) or the World Bank have a broader understanding of the term stakeholder: it is everybody that is affected or interested by a project/activity.
It is recommended to make clear what the term "stakeholders" should describe from the beginning of the project. Within the project CRUE-IMRA we distinguish between two groups of stakeholders:

- **(Institutional) stakeholders:** Those (organised) groups that represent specific interests ("stakes"). These can be (a) formal decision-makers that are involved in flood risk management in the case study areas and that have official tasks ("administrative" or "decision-making" stakeholders) and (b) those that influence decisions more indirectly (interest groups, NGOs etc.).
- **Public:** The institutional stakeholders have to be distinguished from other stakeholders such as the public/local citizens. When addressing the public with a communication strategy it is important to address the different groups within the public specifically. E.g., older people who still remember flooding events of the past have to be addressed differently than younger people or people that have just moved to a hazard-prone area and that are not at all aware of the flooding hazard.

Stakeholders and the broad public can both be involved in public participation projects; but not necessarily at all stages of the project and in the same intensity.

Hazard and risk

The definition of "hazard" and "risk" in the IMRA project follows the understanding of these terms in the risk management research community. The terms flood and flood risk are explicitly defined in the Flood Risk Management Directive 2007/60/EC (Article 2):

- **Flood risk** means the combination of the probability of a flood event and of the potential adverse consequences for human health, the environment, cultural heritage and economic activity associated with a flood event.
- **Flood** means the temporary covering by water of land not normally covered by water. This shall include floods from rivers, mountain torrents, Mediterranean ephemeral water courses, and floods from the sea in coastal areas, and may exclude floods from sewerage systems.

Flood (as the natural hazard) in combination with the potential negative consequences (often described as damage potential) thus result in risk. This can be shown in the following equation (UNISDR 2004, p. 36; 41):

Risk = Hazard potential (Probability x Magnitude) x Damage potential / Coping Capacity.

The term "hazard", however, is not explicitly defined in the Flood Risk Management Directive but there are appropriate definitions used in literature, e.g.:

Hazard is a potentially damaging event, phenomenon or human activity that may have a negative impact on cultural, economic, environmental, institutional, physical or social assets. Hazards may include latent conditions that represent future threats and can have different natural or human-induced origins. Hazards can be single, sequential or multiple in their origins and effects, which can be biological, geological, hydrological, atmospheric, social, psychological or technological. A hazard is characterised by its location, magnitude, frequency and probability (MOVE Project, 2009).

Following the equation above we can, for example, have a probability (e.g. once every 200 years) for an event (e.g. a flood), the magnitude (height of water level), the damage potential (possible economic or social damage or loss), which will be alleviated by response actions like mitigation and reaction measures, which are in their quality determined by the coping capacity (e.g. by poverty, lack of insurance, lack of relief schemes and early warning systems, competent planning efforts, self-help networks and "social capital" etc.).

1.2 Definition of resilience and community

An overarching question for all ERA-Net CRUE projects is how the terms "resilience" and "community" are interpreted and used within each of the projects.

Resilience can be very broadly defined as the ability of a system "to maintain its functions under duress than as its direct resistence to stresses or shocks" (according to Holling 1973, Disaster Recovery Journal 2005, Van der Perk et al. 2000). In the context of the IMRA project resilience can be understood as the capacity of a society or region to absorb stresses and shocks; such as natural hazard impacts. Here it should be stressed that resilience (of a community) goes beyond the scope of the above mentioned definition, because it encompasses another – spatial and societal – dimension. For further contributions to this topic see Chapter 6.5.

Community can also be defined in a narrower or wider way. A narrow definition would restrict members of a community to those people who live inside certain administrative borders (e.g. a town or district). A wider definition in the context of flood risk would encompass all those that are directly or indirectly potentially affected by flood risk, i.e. a group of people that have in common that they are somehow exposed to flood risk and/or will have to be involved in flood risk management activities.
In the IMRA project we will use the broader definitions of these terms.

2 Objectives

The overarching goal of the IMRA project is to influence and change real decision-making in the addressed case study areas and to produce best practice examples, which could serve as references for other authorities dealing with flood risk management plans in Europe. Moreover, a practical handbook (published in English, German and Italian), which contains the main lessons learned from the project is the second main result of benefit for Europe, in general, and further countries/authorities facing the given risk setting.

2.1 Research questions

The following research questions, raised by the call, are addressed by the project:

- What is the relationship between true flood risk and the public's risk perception? What factors determine this relationship? What are the implications for FRM policy?
- How can public participation in flood risk management be increased through better risk communication and greater risk awareness?
- How can participation in the establishment of FRM plans be encouraged and improved as a feature of "good governance"?
- What can institutions learn from improved understanding of risk communication approaches, tools and techniques? How can this learning be applied to improve the effectiveness of communications to the public (across a range of FRM activities, e.g., mapping, planning, event management etc.)?
- How can risk be reduced by increased public awareness and participation? Which is the impact of better public awareness and participation in the reduction or alleviation of flood risk?

The research questions will be answered along selected case studies in Austria, Germany and Italy. In all case studies the following working steps will be commonly carried out in order to guarantee for comparable results:

- Step 1: Inventory of existing data with regard to the so called "true flood risk" based on scientific risk analysis and assessment.
- Step 2: Surveys and discussions on risk perception at the stage of the beginning of the project work, in the middle and at the end of the project.
- Step 3: Assessment of the performance of the existing management systems in terms of attention paid to risk governance principles.
- Step 4: Regional workshops.
- Step 5: Communication strategy.

Moreover, due to an evaluation of the case study work, effects of improved risk communication in practice, which includes communicating residual risks, will be analysed.

2.2 Procedural efficiency as key approach in the IMRA project

Risk governance is a process by which risk information is collected, analysed and communicated, and management decisions are taken. It is therefore related to the institutional and procedural dimension of resilience ("Resilience is determined by the degree to which the social system is capable of organising itself and the ability to increase its capacity for learning and adaptation, including the capacity to recover from a disaster" (ISDR 2002).

The IMRA risk governance approach aims at enhancing the disaster resilience of a society (or a region) and includes "the totality of actors, rules, conventions, processes, and mechanisms concerned with how relevant risk information is collected, analysed and communicated and management decisions are taken" (IRGC, 2005, p. 22).

Deficits in risk governance practices can reduce the capacity of communities for resiliency and adaptation. Therefore two main dimensions have to be considered:

- Misfits in interplay between different institutions, involved in risk assessment, communication and management ("problem of interplay", Young 2002 also regarded as important by the recent EC Communication "A Community approach on the prevention of natural and man-made disasters (2009)")
- Misfits between institutions and stakeholders (Löfstedt 2005).

The first dimension is addressed by the IMRA self-assessment tool, the second by IMRA's communication and stakeholder involvement concept.

A key element to deal with the mentioned challenges is to involve people and stakeholders – as suggested in the Flood Risk Management Directive – from the very beginning. Some of the problems such as distrust in authorities, access to decision-making, difficulties in understanding, non-transparency, missing stakeholders and acceptance can be minimised with governance related approaches.

Many approaches and methods however cannot be easily transferred to other social systems or cultural background due to differences in risk perception, administrative traditions, and access to resources etc. This is a challenge EU legislation always had to deal with and which increases with every new member state. Thus, EU legislation does not force Member States to implement certain instruments or methods – being aware of their failure in cases they are not approved and accepted by the relevant stakeholders and the public. The European Commission sets the frame for procedural requirements (e.g. Strategic Environmental Assessment Directive 2001/42/EC) and Member States have to apply their tools and techniques as well as legislation in order to be able to act along the prescribed common objectives, definitions and certain procedural steps. This also supports the subsidiarity principle. In the end, procedural efficiency leads to improved material standards for risk management and governance and fosters therefore resilience.

The 12-step IMRA approach aims at such an optimisation of process efficiency. In combination with the set of methods that were applied and tested within the IMRA research phase, IMRA provides a toolbox for selecting the right method for the right purpose in order to design a flood risk communication and participation process along the 12-step approach.

In doing so, the possibility to implement different measures, defined in flood risk management plans, can be considerably improved. IMRA wants to make sure that communication and governance strategies are in the core of the overall flood risk management.

3 Research methodology

This chapter describes the research methodology that was chosen to reach the project objectives and to answer the research questions. It is a general description of the methodological approach.

In the implementation phase of the project various methods and methods for stakeholder involvement, communication and participation were implemented and finally assessed and evaluated. This set of methods including the assessment/evaluation results is one main project result and thus this methodological toolbox is presented after the results and discussion in the chapter on "Methods for risk communication and participation".

As in all applied research a variety of methods was used in the different project phases, starting from desk top research to more advanced approaches to stakeholder involvement or survey techniques. The methods that were used in the IMRA project so far are described along the work packages.

Development of conceptual framework (WP1)

In the first project phase **explorative reading** was carried out to validate the research design and to derive first working theses. This first phase was followed by an intensive **desktop research** on available literature and good or best practice results in order to gather information about the state of the art and successful approaches to flood risk management and governance. This phase was accompanied by **explorative interviews** with selected external stakeholders (e.g. representatives from municipalities) as well as with those stakeholders that are directly involved in the project (representatives from the river basin authorities responsible for the rivers Wupper, Möll and Chiascio).

The first project phase ended with the compilation of the draft version of the IMRA conceptual framework. This draft version was then sent to a selected group of researchers for **external review**. These experts were asked to comment on this version and to discuss about the conceptual framework and the project approach in a **scientific colloquium**, which was held in January 2010 in Wuppertal, Germany.

Implementation of concept in case study areas aiming at analysing the effects of improved risk communication and perception of residual risk (WP2)

In WP2 the proposed concept for participatory flood risk management is implemented in three case study areas: the river Wupper in Germany (Task 2.1), the river Möll in Austria (Task 2.2) and the in Chiascio river basin, a feeding river of the Tevere, in Italy (Task 2.3).
The implementation in the three case study areas follows a common work plan in order to guarantee for comparable results. Thereby, the applicability of the used methodology in different environments can be tested. The work plan follows the one outlined in the project proposal using very different methods:

- Step 1: Inventory of existing data with regard to the so called "true flood risk" based on scientific risk analysis and assessment: **desktop research, analysis of historic photographs, quantitative flood risk models**;
- Step 2: Surveys and discussions on risk perception at the stage of the beginning of the project's work, in the middle and at the end of the project: **questionnaires (written, oral and online), qualitative interviews, public meetings**;
- Step 3: Assessment of the performance of the existing management systems in terms of attention paid to risk governance principles: **tailored assessment tool (based on balanced scorecard approach with selected key performance indicators)**;

- Step 4: Regional workshops: **stakeholder and public workshops**;
- Step 5: Communication strategy: **desktop research, analysis of best practice examples, qualitative interviews**.

Validation of concept (WP3)

WP3 aimed at a validation of the IMRA concept. The results were assessed in a **self evaluation** according to the following criteria:

- Objectives
- Barriers
- Results
- Conclusions and implications
- Validation/further development of conceptual approach

The evaluation results were discussed internally with the project partners (of which some are practice partners) and finally presented and discussed in the 2nd IMRA **Scientific Colloquium**.

Networking and dissemination activities (WP4)

WP4 supports the activities of all other work packages assuring a strong awareness of project objectives and results to the main project audiences: the scientific community and national, regional and local decision makers in the field of flood risk management. The activities and the related products of this WP will follow, step by step, all the achievement of previous WPs, translating into dissemination actions the results reached by the tasks.

The activities of this WP are divided into three different tasks, using the following methods:

- Task 4.1: Dissemination: **project branding, leaflets, publications, practical handbook**;
- Task 4.2: On-line presence: **IMRA website and case study websites**;
- Task 4.3: Networking: **participation in conferences, invitation of other ERA-Net CRUE researchers to scientific colloquium, send information to co-ordination unit**.

Project Management, Monitoring and Evaluation (WP5)

WP5 is dedicated to the project management and the project's monitoring and evaluation. In this WP the following methods are used:

- Project management: **e-mail list, project meetings, internal review of draft versions of reports**;
- Monitoring/evaluation: **assessment of the achievement of project goals and milestones (table), possibility to apply balanced scorecard approach to project)**.

4 Case studies

The case studies presented here follow the common structure as prescribed for all ERA-Net CRUE projects. However, in order to provide the case study results in a more detailed way, single case study reports are published after the final report and will be communicated in the case study areas (see IMRA deliverables IV-4.1.3.1a, IV-4.1.3.2a, IV-4.1.3.3a: Reports on local case study results).

4.1 River Möll, Austria

4.1.1 Main Characteristics

- Major Type of Flood: mainly fluvial
- Size of Catchment Area:1,105 km²
- Past Flood Events: September 1965; November 1966
- Environmental Settings: River Möll rises as a torrent from a glacier tongue at about 2,000 m a.s.l. and flows into river Drau after 70 km at 550 m a.s.l. Its tributaries are mountain torrents with steep inclines and an inherent risk potential for landslides and a strong impact on the bed load of the river Möll.
- Socio-economic Settings: 8,600 residents; important economic fields are agriculture (grassland and forestry), hydropower and tourism.

Fig. 1: Flooding in Möll valley

Source: AKL

4.1.2 Level of stakeholder Involvement

- The Regional Government of Cartinthia, Dep. 18 Water Management - full project partner
- The mayor of Großkirchheim: cooperation (information, consultation and common decision-making)

- Austrian Service for Torrent and Avalanche Control: cooperation (common activities, information, consultation, decision-making)
- Representatives of the civil society: fire brigade, mountain rescue, flood witnesses, water association of river Möll (information, consultation, common decision-making)
- Broad public: cooperation (information, consultation)
- Federal Ministry of Agriculture, Forestry, Environment and Water Management: cooperation (information, consultation; Austrian funding body)

4.1.3 CRUE Activities

Last devastating floods happened 45 years ago but a flood risk still exists. With no current flood events the risk awareness has to be enhanced. After an analysis of the social milieus (see Section 5.3.5.1, p. 39 and Section 6.2.2, p. 61) adequate communication strategies were chosen and applied. The validation of activities was tested by questionnaires (status of risk awareness before and after project activities) and discussed with stakeholders.

4.2 Chiascio River basin, Italy

4.2.1 Main Characteristics

- Major Type of Flood: Pluvial, fluvial.
- Size of Catchment Area: 727 km².
- Past Flood Events: 1936 (last large event), November 2005, December 2008, January 2011.
- Environmental Settings: River basin is delimited by Appennino mountains (height of over 1,000 m a.s.l.), characterised by calcareous and permeable rocks. Groundwater circulation feeds some perennial springs that originate short watercourses with significant flows also in the dry season. The Chiascio is a tributary of the Tevere River.
- Socio-economic Settings: Intense agricultural activities, several industrial production and urban agglomerates; about 67,000 inhabitants.

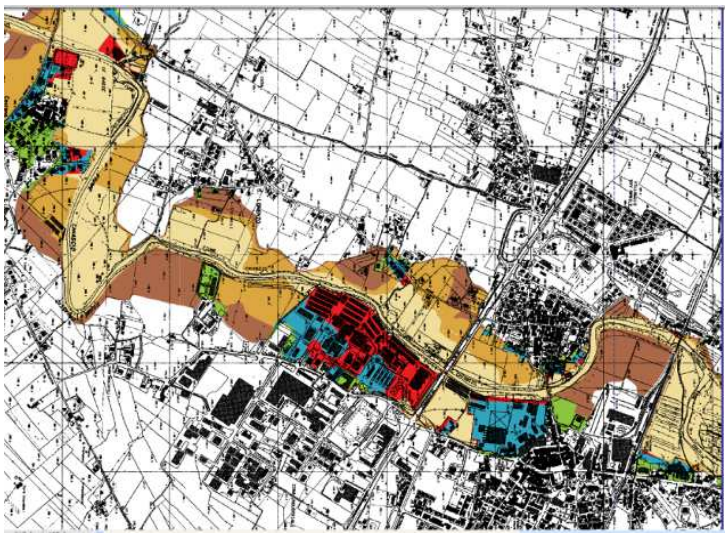


Fig. 2: Risk map for Chiascio River

Source: AB Tevere

4.2.2 Level of stakeholder Involvement

- IMRA partners as project developers together with AB Tevere, which is the institution in charge of the development of the Hydrogeological Setting Plan (being the flood risk management plan according to the Flood Risk Management Directive);
- Local administrators as main managers of the risk phenomena and partners for organisation of participation activities for improvement of risk awareness of population;
- Students, teachers, schools as vehicles to reach broad population;
- Ministry of Environment: cooperation (information, consultation);
- Institute for Environmental Protection and Research (Italian funding body): cooperation (information, consultation).

4.2.3 CRUE Activities

Selection of case study due to interference between the potentially flooded areas and current land use as well as active local communities interested in public participation. Project activities included:

- Inventory of existing data with regard to the so called “true flood risk”;
- two workshops with local politicians, technicians and representatives of the population and one additional workshop for the same target group but in the framework of the communication strategy (see below);
- two questionnaires on the awareness and knowledge on flood risk;
- a self-assessment of the performance of the existing management systems on risk governance principles at the AB Tevere;
- realisation of a communication strategy for the general public in order to raise awareness on the flood risk. Activities: public hearings with politicians, technicians and the wider public; thematic lessons in schools; realisation of a video on the flood risk of the area; a final exhibition of material prepared by the local students.

4.3 River Wupper, Germany

4.3.1 Main Characteristics

- Major Type of Flood: mainly fluvial, partly pluvial
- Size of Catchment Area: 813 km²
- Past Flood Events: February 1909, December 1925, February 1946, 1960s, December 2007, January 2011
- Environmental Settings: The Wupper is a tributary of the river Rhine and owns a medium discharge of about 15.4 m³/s linked with an annual precipitation of up to 1,425 mm/m². The riverbed of the Wupper lies on a sea level between 441 m (spring) and 34 m (mouth).
- Socio-economic Settings: Case study town of Leichlingen; population of about 25,000; part of the Rhein agglomeration area, regional centre of fruit growing; public seems not to be really aware of the potential flood risk due to the fact that the last large flood occurred 1925.

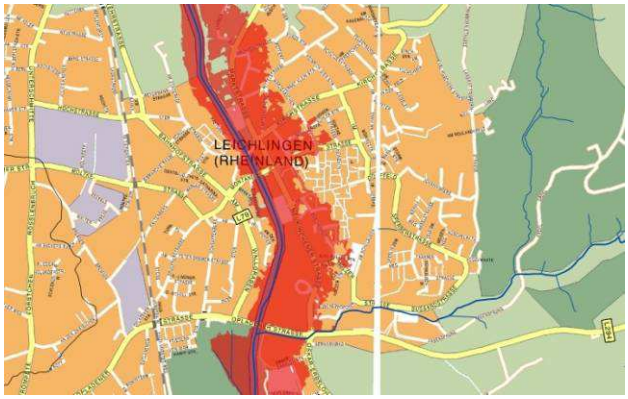


Fig. 3: Flood prone area (Q_{max}) in the city of Leichlingen

Source: Wupperverband

4.3.2 Level of stakeholder Involvement

- Main stakeholder for flood risk assessment and management, the Wupperverband, is directly involved in the project as associated partner.
- Other regional and local stakeholders (State of North Rhine-Westphalia, water authorities, local administration, fire brigades, NGOs etc.) are involved through stakeholder workshops and participation in selected activities.
- Public as well as students and teachers are involved by different activities and an accompanying media campaign with coverage in press, local radio and local TV.
- The BMBF (German Federal Ministry of Education and Research; German funding body) was informed about the project through the reporting procedure.

4.3.3 CRUE Activities

Selection of case study area of Leichlingen because flood risk perception was quite low due to existing protection measures and long time since last severe flood.

- Inventory of flood risk/administrative settings; survey on flood risk perception.
- Online chat: Answer questions to flooding and flood prevention.
- World Café in with local citizens: Inform about flood risks and learn from citizens' personal experience / information needs.
- World Café with pupils from local school; Excursion and "CrossingWupper" event with youth groups: Inform about flood risks; learn how younger people wish to be informed; pupils as multipliers.
- Information stand in pedestrian zone: Inform about flood risks and individual prevention measures.

5 Results and discussion

Chapter 5 provides an overview of the results achieved in the project and discusses them in context with the three case studies. The chapter is structured along the work packages that originally built the IMRA project. Exceptions are WP 4 and 5, which are presented together in Section 5.4. Section 5.5 was inserted to give the main results of the research activities and their discussion an extra space.

5.1 Theoretical background and IMRA conceptual framework (WP1)

The description of the state of the art and the development of the IMRA concept were based on a desktop research taking into account the results of current and finished research projects on the management of risks such as:

- TRUSTNET & TRUSTNET-In-Action: Inclusive governance of hazardous activities. EU "Concerted Action" in the framework of the specific research and technological development programme (1997-2003 & 2003-2006)
- CARPE DIEM – Critical Assessment of available Radar Precipitation Estimation techniques and Development of Innovative approaches for Environmental Management. European Commission, Fifth Framework Programme for Research and Technological Development, Thematic Area “Energy, Environmental and Sustainable Development”, Key Action "Research and Technology Development Activities of a Generic Nature, Fight against Major Natural Hazards". (2001-2004)
- MUSIC – Multi-Sensor Precipitation Measurements Integration, Calibration and Flood Forecasting. European Commission, Fifth Framework Programme for Research and Technological Development, Thematic Area “Energy, Environmental and Sustainable Development”, Key Action "Sustainable Management and Quality of Water". (2001-2004)
- ARMONIA – Applied Multi-Risk Mapping of Natural Hazards for Impact Assessment. European Commission, Sixth Framework Programme for Research and Technological Development, Thematic Area "Global Change and Ecosytems". (2004-2007)
- INNIG – Integriertes Hochwasserrisikomanagement in einer individualisierten Gesellschaft. German Federal Ministry of Education and Research, initiative “Risk management of extreme flood events”. (2005-2006)
- MIDIR – Multidimensional Integrated Risk Governance. European Commission, Sixth Framework Programme for Research and Technological Development, Priority 4.3.1.1 "Integrative approaches to risk governance". (2006-2008)
- FloodScan – Large scale adjustment of new technology for fast, precise and cost-efficient hydraulic 2d-modelling of flood (hazard) areas by combining laser scanning with remote sensing data; Task 9 "Report on existing information tools". EU Life Programme. (2006-2009)
- INCA – Linking civil protection and planning by agreement on objectives. EU Civil Protection Financial Instrument. (2009- 2010)
- Danube FLOODRISK – Stakeholder oriented flood risk assessment for the Danube floodplains. EU Transnational Cooperation Programme South East Europe. (2009-2012) *(The IMRA project*

partner Umweltbundesamt GmbH Austria is also a member of the Austrian project team of Danube FLOODRISK and actively involved in the work package for stakeholder inclusion.)

The following summary of WP1 points at the most important aspects that will be then addressed in the case studies.

5.1.1 Basics of participation

The public can be included due to legally required or due to voluntary participation in flood risk management projects.

Legal (formal) participation

- All participation activities are defined by law (e.g. participation of the public with an Environmental Impact Assessment).
- Formal processes are mandatory.
- Legal regulations lay down who takes part, how far rights of participation extend, how the process is structured and what is done with the findings.
- Clear status of the participants as e.g. a party with well-defined rights.

This formal participation can be supplemented by voluntary participation activities.

Informal participation

All additional voluntary participatory activities that are not required by law are informal. Informal processes should not be seen as a substitute or competing with formal processes, but can supplement these. These kinds of participatory activities of cause have to take place within the framework of existing legal requirements. Formal participation can be interrupted by informal participation activities like mediation, if needed. Informal and formal procedures should be adjusted in a way that no parallel or, in the worst case, impeding processes take part. Informal processes are entirely voluntary and can take many forms. Who takes part, which methods are used and which rules are used are either determined in advance by a project team or agreed by the participants of such an activity themselves. Informal participation can be used for politics, plans and strategies and is often found in local and regional processes (e.g. Local Agenda 21) and projects.

What can you gain from informal participation?

- Getting a feeling for public opinion trends.
- New information, data and knowledge to understand situations and to come to a better quality of result.
- Open discussion and maybe a solution of conflicts.
- Better implementation due to enhanced acceptance of common solutions.

How binding the solutions or results of a voluntary participatory process are, depends on what has been agreed about how to treat the results. Results can potentially become legally binding e.g. via a mediation contract, a city council decision etc. (Arbter et al., 2005).

Additional public participation activities are (after Standards of Public Participation, 2008) particularly recommendable where:

- many people are affected by or interested in the topic;
- the topic might be controversial;
- the implementation of the policies, plans, programs, and legal instruments requires the cooperation with those affected and interested;
- a broader comprehension, acceptance, and a result of high quality are aimed at or for
- settings characterised by uncertainty and ambiguity.

5.1.2 Intensity levels of participation

Participation can take many forms, can be done with varied participants and can have different degrees of intensity: ranging from non-committal activities with a focus on information activities to consultation activities up to a real inclusion of the public in the decision-making process or at least the pre-decision-making.

The kinds of intensity for public participation can vary within a process. Basis for all participation processes is free access to information. But simple information activities like a website or a dissemination flyer do not count as "real" participation activities. They do consist only of one-way-communication and the main characteristic of participation activities, the element of dialogue is missing.

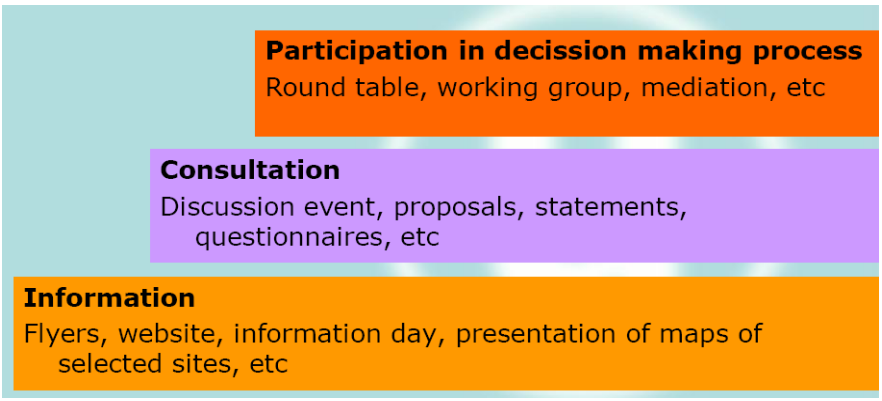


Fig. 4: Intensity degrees of participation processes

Source: after Arbter et al, 2005, p. 9

5.1.3 Basics of risk communication

Flood risk and especially the residual risk beyond technical protection measures is part of a whole set of risks individuals and societies live with – often not perceived at all. In recent years however, individuals and societies have become more and more aware of risks they are facing: apart from current risks that dominate the political discussions (e.g. terrorism) the variety of natural, technological and socio-political risks is increasing. The key problem is not the existence of risks but the practice (or the lack of it) of how to deal with them.

These aspects and problems make a new approach necessary: More public participation in risk assessments and decision-making is needed in order to make the decision-making process more democratic, improve the relevance and quality of technical analysis and increase the legitimacy and public acceptance of political decisions. This has to be supported by a tailor-made communication strategy in order to reach the intended recipient of the information. Finally there is the need for improved stakeholder cooperation.

These needs and challenges apply today also for flood risk management for two reasons: First, due to regulations like the Flood Risk Management Directive where it is said that "Member states shall encourage the active involvement of all interested parties into the production, review and updating of the flood risk management plans" – a demand that aims at a new quality of participation and communication processes. Second, uncertainties in flood hazard and risk assessment rise due to the expected climate change.

5.1.4 "True" risk and perceived risk

As already mentioned, in most cases there are differences between the "true" scientific or "objective" risk and the risk that is perceived by individuals or the society. Two central terms that have a major influence on risk perception are uncertainty and ambiguity.

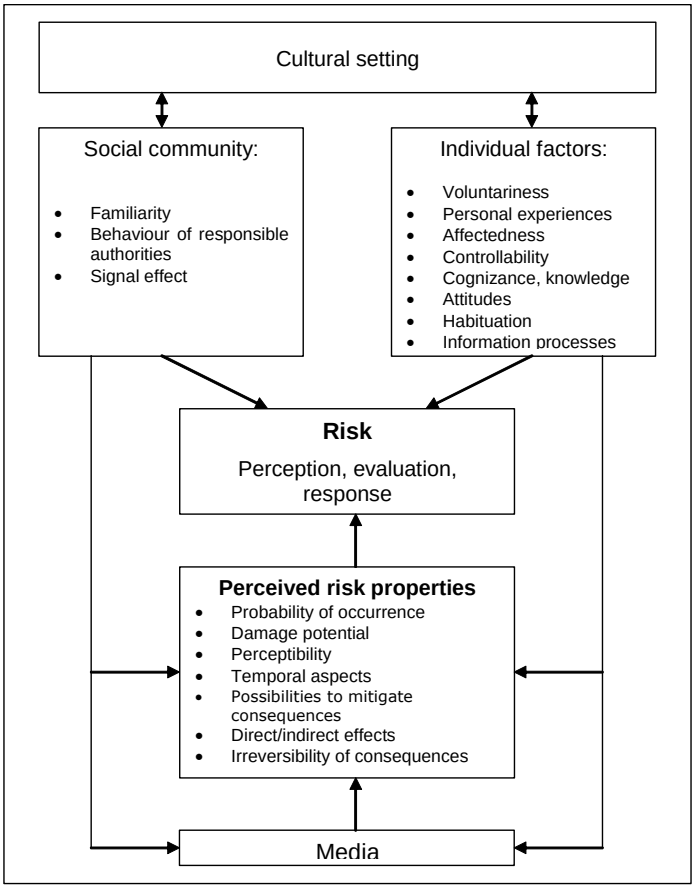


Fig. 5: Factors influencing risk perception

Source: WBGU 1999, 158

Socio-cultural, social and individual factors are decisive for the perception and the management of risks. These factors lead to major disparities of risk perception among countries, communities, certain social groups and individuals and thus to major differences in how people and societies deal with risks. For a successful management of flood risks it is essential to give greater consideration to these factors.

5.1.5 Need for a communication process

Ensuring a stakeholder-focused process means consulting and involving stakeholders – like people living in the vicinity of risky infrastructure and likewise consumers as well as organisations – that represent their interests. Furthermore, the current absence of (clear) risk governance principles makes institutional settings vulnerable and may lead to increased risks (e.g. as in the aftermath of hurricane Katrina in 2005). In this regard, research on risk governance has to be understood as co-operative research: a form of research process, which involves both researchers and non-researchers in close co-operative

engagement. This also meets the demand of the White Paper on European Governance (European Commission, 2001).

Strong stakeholder-oriented elements have been integrated in recent disaster management strategies like the United Nations International Strategy for Disaster Reduction (ISDR, 2005). Also, the U.K. Consumer Council clearly pointed out in its paper 'Winning the risk game' that a series of risk issues, such as BSE, rail safety, and genetically modified foods have severely dented consumer confidence and trust in those authorities expected to inform and protect (Dibb, 2003). In addition, misfits in interplay between institution and stakeholders have been identified as an important reason for institutional vulnerability (Greiving, 2005).

Aiming at the development of integrative models and concepts that link the different phases of risk governance mentioned before, attention has to be paid to the given differences in characteristics of the several risk types, both on the collective level and the individual perception of risk (see e.g. IRGC, 2005). These factors might contribute in each single case in a different manner to the perception and estimation of risk. In addition, they are strongly interlinked with more collective social-political factors (WBGU, 1999). Moreover, differences in the individual perception and estimation of risks should be considered (Dubreuil et al., 2002).

Such a discourse-oriented decision process combined with an intensive as well as active participation and information guarantees in most cases an effective implementation of decisions made by national policy or public administration by the government as well as private actors. In those cases, where a consensus is not achievable, the participants, involved in decision-making, come at least to a better understanding of the different interests and values. In consequence, the involvement of all social groups into a stakeholder dialogue is regarded as crucial for the envisaged IMRA risk governance concept.

5.1.6 Target group oriented communication

Scientists, and especially those coming from engineering studies, tend to stick to the belief that it is possible to reach everybody with one communication means e.g. to reach all people potentially affected by flood risk with one kind of flyer.

From communication theory and market research we know that information material and activities have to be tailor-made to get through to the requested target-groups. For instance, the target groups within the CRUE-IMRA project could be either, on the one hand, key persons or, on the other, potentially strongly affected but hard-to-reach target groups.

As stated before risk perception is affected by attitudes and values. To plan a risk communication strategy it is necessary:

- to find out what the status of the knowledge and risk perception of the local population is (WP2, Step 2),
- to find out which values and attitudes the target groups have that can affect risk perception.

Attitudes, values and other socio-cultural features can be assigned to social groups, to "milieus". Research about social milieus is traditionally performed by market research and psychology (see also Section 5.3.5.1, p. 39 and Section 6.2.2, p. 61). It is not foreseen or possible within the CRUE-IMRA project to perform a detailed socio-cultural analysis of the target groups in the regions of the subprojects. But an overview on the national level, which kind of target groups do exists, what their attitude and values are and what kind of information material could reach them can give valuable input to a risk communication strategy.

To have a basis for this discussion we decided to use the Sinus Milieus®, developed by the market research companies INTEGRAL (Austria) and SINUS Sociovision (Germany). These Sinus Milieus® give

an overview of social groups on the national level for all case studies. Integral (2009) points out that the Sinus Milieus® combine demographic characteristics such as education, profession and income with the real living environments of the people, which means with fundamental value orientations and attitudes towards working and leisure time, family and relationship, consumption and politics.

How to use the national social milieu figures for the case studies?
Understanding how values filter information and colour perceptions is of critical importance to the design and implementation of public information campaigns (Roser-Renouf and Nisbet, 2008). It should not be neglected that there are also sceptical voices (Sjöberg, 2000), which do object that the social context per se by no means is the sole determinant of risk perception. Unfortunately up to now no better explanation than the social milieu approach does exist for building up communication strategies and it therefore will be used as a working hypothesis.

Social milieus for the local or the regional level can be identified and described by market research companies or similar institutions/organisations. Within the IMRA project such a detailed analysis is not foreseen but the Sinus Milieus® can act as a means to discuss how to reach local target groups in the case study areas. After Kleinhückelkotten (2006) the main question is not: "What is wrong with these people, why won't they understand?" but "What is wrong with us? What don't we understand about our target audience?"

In the Austrian case study e.g. the project team hypothesised that most of the local population of the village Großkirchheim do belong to the rural and traditional milieus and the middle class. Additionally the results from the last elections were taken into account. These assumptions were discussed with the mayor and local stakeholders, which have knowledge about the professions and education of the local population. The results for these assumptions for the case studies are shown in the respective sections in the case study chapters.

5.1.7 Concept and principles of risk governance

The problem of interplay among institutions (lack of vertical and horizontal cooperation) often is a major reason for the ineffectiveness of management strategies and measures. The institutional vulnerability can thus be seen as one of the main aspects in dealing with risks because the whole disaster cycle from mitigation, preparedness, response to recovery is embedded in an institutional system.

Risk governance can be defined as a process by which risk information is collected, analysed and communicated and management decisions are taken. It aims at enhancing the disaster resilience of a society (or a region) and includes "the totality of actors, rules, conventions, processes, and mechanisms concerned with how relevant risk information is collected, analysed and communicated and management decisions are taken" (IRGC, 2005, p. 22). This definition focuses on three elements of risk governance: risk assessment and risk management that have to be embedded in a risk communication process among scientists, politicians and the public.

Risk governance aims at increasing the resilience of societies by – among others – a reduction of institutional vulnerability. Thus, risk governance addresses the "totality of actors" with a specific collection and communication of risk information (IRGC, 2005).

Specific Outcomes

It has to be differentiated between legal (formal) and informal participation as well as the intensity level of participation processes. Socio-cultural, social and individual factors are decisive for the perception and the management of risks. To plan a risk communication strategy it is necessary to find out about (a) the status of knowledge and risk perception and (b) the values and attributes that can affect risk perception to the local population.

Lessons Learned

Attitudes, values and other socio-cultural features can be assigned to social groups, to "milieus". Within the project the Sinus Milieus® indicated the different social groups adequately. The institutional vulnerability can be seen as one of the main aspects in dealing with risks. To reduce this vulnerability, risk governance consists of risk assessment and risk management, which both have to be embedded in a risk communication process.

5.2 Implementation strategy of the conceptual framework in three case study areas (WP2)

This chapter presents the outline and main elements of the IMRA conceptual framework for participatory flood risk management.

Risk governance and its core element risk communication are relevant for different risk settings in general and for different river basin districts in particular. In order to prove this conceptual framework, three different river basin districts are integrated into the IMRA project as case studies, representing:

- a mid-European hilly land river basin district, densely built-up, mainly prone to winter floods and flash floods: the river Wupper (Germany);
- an alpine river basin, prone to flash floods and debris flows: the river Möll (Austria);
- a Mediterranean river basin, prone to torrential floods: the river Chiascio (Italy).

Each case study is represented by the responsible flood risk management authority and a cooperating research partner. Both partners own comprehensive knowledge about flood risks on the one and communication skills on the other hand. From the project's point of view this is seen, as a prerequisite for a successful dealing with the given risk settings. Experiences of former projects (see introductory paragraph to Section 5.1) showed that only the full and direct participation of the responsible authorities in a project guarantees the implementation of the elaborated approaches in the given case study and leads thereby to an impact on real decision-making.

However, it is necessary to modify this basic concept for any application such as in the IMRA project, because every case has its own context and characteristic, which depends on characteristics of the risk setting itself (e.g. existing level of acceptance with respect to risk governance), political (e.g. legal system), economic, social (e.g. risk culture), institutional and other aspects. These characteristics have a large influence on the implementation of the IMRA concept for participatory flood risk management. Therefore aspects/questions, which should be stressed in this context, are:

- What kind of risk type does exist?
- What kind of administrative/institutional type characterises the case study?

- Which parts of the concept have to be modified?
- How are the structure and type of the affected stakeholders?
- How to deal with stakeholders that do not speak English?
- What does the access to local stakeholders/decision makers look like?

Even if this approach is promising it should be stressed that also problems or hindrances could be connected to it or its realisation:

- The analysis of the scientific literature concerning different projects handling with risk governance has shown that research on risk as well as risk management practice is fragmented by subjects according to the budget-holding organisations involved. This might be evaluated as a problem according to the responsibilities, which may lead to failure of the risk governance process in times of e.g. immediate danger.
- Another problem is the understanding of "risk". Risk can be understood in a broad sense as a combination of the probability of occurrence and the extent of the consequences of the impacts understood as adverse effects. However, significant differences between "true" and "perceived" risk exist (interpretation differently according to individual and social contexts). Subsequently there should also be a distinction between the factual and "socio-cultural" dimension of risk. It should be underlined that public decision-making, which is only based on the factual dimension of risk leads to distrust and increases the vulnerability – both of institutional settings, but also of affected individuals. As a consequence more public participation in risk assessments and decision-making is needed in order to make the process more democratic, improve the relevance/quality of technical analysis and increase the legitimacy and acceptance of public decision-making.
- Further, there is a distinction of the problems related to, on the one hand to the context, and on the other hand to organisational aspects. It is obvious that some of the mentioned hindrances or problems could fit to both categories.

Context related problems/hindrances

- Problem of politicians (oppositions) that do not want to be involved because they need the opponents' failures to strengthen their own politics;
- Different cultural habits/ways of dealing with risks but also distrust in authorities;
- No/low access to real decision-making;
- Problems of understanding (missing common languages, different knowledge base);
- Non-transparency of the process/problem.

Problems/hindrances related to organisational aspects

- No proper representation of all stakeholder groups in the participation process;
- Problems of understanding (missing common languages, different knowledge base);
- Lack of time and financial resources for intensive participation;
- Lack of engagement/interest of potentially affected stakeholders;
- Lack of acceptance (valid for all involved actors), e.g. caused by poor integration.

The conceptual framework is structured along the 5 steps of the case study implementation.

5.2.1 Strategy step 1: Inventory of existing data

Existing data on flood risk has to be collected. These data sets contain information about the flood hazard and in accordance to Art. 6 § 5 FRM Directive (at minimum the economic damage potential as well as population at risk).

- Objective: Inventory of existing data with regard to the so called “true flood risk” based on scientific risk analysis and assessment.
- Based on: “Context analysis“

Inventory of political-administrative settings in the case study area

- General description of national political-administrative system
- Legal framework for coordination in the case of river floods
- Implementation of legal framework (especially Flood Risk Management Directive) into practice
- Main characteristics of organisational structure in the area of river floods
- Funding structure for protection measures
- Current instruments/approaches of public participation/risk communication

Inventory of existing data, maps and plans in the case study area

- Existing data
- Existing maps
- Existing plans

Description of “true flood risk”

- Flood hazard
- Economic damage potential
- Population at risk

5.2.2 Strategy step 2: Surveys and discussions on risk perception

Surveys on the flood risk perception of the local population were implemented two times throughout the project. Generally, the size of the groups of interviewees should dependent on the population size of the case study areas and could e.g. be done by means of focus groups. The interviewees should be the same in all question periods, to record changes in their risk perception during the project.

- Objective: “Surveys and discussions” on risk perception at the stage of the beginning of the project’s work, in the middle and at the end of the project.
- Based on: WP1 section on the discussion between “true” and “perceived” risk.

Selection of survey and discussion method
Each case study selects the method most appropriate to the local context. This could be done by working with focus groups (as envisaged e.g. for the Austrian case study) or a survey covering the entirety of the affected people in a flood risk area. Important, however, is that the methodological approaches within each case study are the same during the project lifetime in order to guarantee the comparability of the results.

Identification of affected public for survey and discussion

Development of survey/discussions, carrying out, analysis of results
The aim of the survey is to record changes in the risk perception of the affected people during the project. The questions in the survey should – among others – cover the following topics:

- Basic knowledge of (residual) flood hazard/flood risk.
- Individual perception of (residual) flood risk.
- Individually felt level of protection/reliability of protection measures.

- Own feeling of responsibility for implementing (small) measures?
- Own capacity to implement measures?
- Usage and preference of different types of media/information sources.
- Basic information of interviewee (age, gender, children, house/land owner etc.) in order to be able to characterise individuals according to the Sinus® groups.

5.2.3 Strategy step 3: Assessment of the performance of existing management systems

Step 3 assesses the existing management systems applying the risk governance assessment and monitoring tool. The key performance indicators of the tool, adapted to the special characteristics of flood risks and the legal, administrative and physical environments of the case study areas are used. Addressees of this assessment are the relevant stakeholders involved in flood risk management in the three case study areas (mainly water authorities but possibly also other stakeholders like e.g. land-use planning authorities, chambers of commerce and tourism, environmental NGO's). Their concerns will be identified by means of the stakeholders' interest analysis.

- Objective: Assessment of the performance of the existing management systems in terms of attention paid to risk governance principles.

Check indicators of risk governance principles and add additional indicators (Part A indicators)
There already exist general approaches on ideal risk governance monitoring frameworks (e.g. Greiving et al., 2007). For the management process of flood risks additional indicators are needed that e.g. help to describe the co-ordination and co-operation among stakeholders.

Table 1 provides an overview of the selected keywords, the explanatory key-question for every keyword, objectives of the keywords and finally the specific Key Performance Indicators for the original set of indicators as well as for context-specific indicators in the IMRA project.

Table 1: Overview of IMRA Key Performance Indicators

Keyword	Key question	Objective	Key Performance Indicator
Principles	What are the guiding principles?	Definition of guiding principles and a consistent "target system".	Degree of operationalisation of the guiding principles.
Trust	How far is attention paid to relevance of an atmosphere of mutual respect and trust?	Between all relevant stakeholders and decision makers an atmosphere of mutual respect and trust exists.	Reflection of trust concerning people/institutions.
Objectives	What are the concrete protection goals for subjects of the protection?	Definition of a comprehensive and obligatory understanding of the damage-protection-relation.	Degree of obligation concerning the protection goals for the subjects of the protection.
Accountability principle	How far is accountability defined at each level (process, each risk)?	Each actor knows his responsibilities and acts accordingly.	Definition of the responsibility.
Justification	How far is the activity concerning the management of existing risks justified?	Justification of action in the area of risk management.	Definition and agreement on a justification concerning the exposure to risk.
Representation	How far are all relevant social groups (and their representatives, stakeholder respectively) and their expectations known?	Identification of all relevant social groups and their expectations.	Degree of high profile of all social groups and their expectations.
Access to information	How far is information for all stakeholders accessible?	Access for all stakeholders to the relevant information.	Degree of the availability and understandability of the relevant information for stakeholders.
Tolerance process & outcome	How far do the stakeholders tolerate/accept the risk governance process and its outcomes?	All involved stakeholder tolerate/accept the risk governance process and its outcomes.	Degree of the tolerance/acceptance on the part of involved stakeholder.
Dialogue	To what extent is a constructive dialogue with the relevant stakeholders available or conducted?	Establishment of custom discourse-processes concerning risk topics.	Quality of discourse-processes with relevant stakeholders (i.e. public or private representatives).
Financial Resources	To what extent do the available financial resources meet the requirements of the defined Risk Governance Process?	Allocation of sufficient financial resources for a successful risk governance process.	Degree of realisation of a financial concept.
Staff Resources	To what extent do the staff resources (technical qualification and number of people) meet the requirements of the process?	Allocation of adequate staff resources.	Realisation of a staff assignment concept.
Role	How far has the role of experts been defined?	If experts are involved, their role within the decision-making process has to be defined.	Degree of definition and agreement concerning the role of experts.
Co-ordination	To what extent are responsibilities fragmented among stakeholders?	Improvement of co-ordination by allocating responsibilities to relevant decision preparing or decision-making structure (board, working group etc.).	Realisation of a concept to co-ordinate decision-making procedures.
Co-operation	Are the responsibilities for relevant stakeholders defined?	Clear definition of responsibilities as a basis of a smoothly running and efficient co-operation process.	Degree of definition and agreement concerning the responsibilities of stakeholders.

Source: own elaboration according to Wanczura et al. 2007

A so called "Scorecard" helps to assess the performance of a risk governance process. To each of the indicators mentioned above, measuring values as well as classes of the quality or degree of performance are allocated. In the IMRA self-assessment of relevant stakeholders the original 12 indicators elaborated within the MIDIR project are also used, but supplemented by co-ordination and co-operation indicators. Their scorecard values are shown in the table below.

Table 2: Additional scorecard entries for IMRA risk governance performance

Keyword KPI	**Red** Not started	**Orange** Beginning	**Yellow** Developing	**Green** Performing	**Blue** Improving
Co-ordination Realisation of a concept to co-ordinate decision-making procedures.	No consideration to what extent responsibilities are fragmented among stakeholders	Fragmentation of responsibilities identified	Development of concept to co-ordinate decision-making procedures	Agreement on concept to co-ordinate decision-making procedures	Concept to co-ordinate decision-making procedures implemented
Co-operation Degree of definition and agreement concerning the responsibilities of stakeholders.	No consideration of responsibilities stakeholders have	Relevant stakeholders identified	Responsibilities identified that each stakeholder has	Agreement on the process how responsibilities are allocated to decision preparing or decision-making structure	Decision preparing or decision-making structure (board, working group) in operation

Source: own elaboration

Apply indicators for relevant stakeholders
The self-assessment of the governance process should be carried out several times during the process. The aim is to identify progress, e.g. in recreating trust in public decision-making.

5.2.4 Strategy step 4: Regional workshops

Two stakeholder workshops in each case study area were organised.

- Objective: Organisation of regional workshops

First workshops
Target group of the first workshops should be those stakeholders that have a responsibility for the implementation of the flood risk management process (see Step 3). The preliminary results of the Steps 1, 2 and 3 can be presented and discussed. Main topics of these events may be the following questions:

- How to involve the public effectively in the process of setting up flood risk management plans from the early beginning?
- To what extent has risk perception of individuals played a role for flood risk management of public authorities and how is it possible to make better use of it for future processes?
- How could proper risk awareness not only be achieved, but then kept for a long time?

Second workshops
The second round of workshops should be used for presenting the final results together with all relevant stakeholders. In this context it serves as a final validation of the project's work in the stakeholders' view and is as well a dissemination activity. Moreover, during these events an advertisement activity will be carried out in order to disseminate the different forms of risk communication methods (e.g. the Social Network) and to connect experts and common people for the sharing of knowledge about flood risks. This activity will allow to involve a large amount of people in the next communication step.

5.2.5 Strategy step 5: Communication and participation approaches

- Objective: Development and implementation of communication strategy

Identification of the "relevant" stakeholders
A multitude of handbooks and guidelines on stakeholder involvement methods can be found in literature, describing various kinds of dialogue concepts applicable to different settings (see e.g. Bischoff et al., 2005; Steyaert et al., 2007). However, a detailed description of a methodological procedure on how to identify the "relevant" stakeholders and get into contact with them is missing.

Design of general communication strategy
The next application step covers the design of a communication strategy based on the need for a discourse- and risk reduction-oriented risk management/communication strategy as outlined before.
For flood risks "beyond" technical protection measures a risk oriented management strategy is needed that aims at reducing disaster potentials, strengthening resilience and an improvement of emergency management. In this case especially discourse-oriented management strategies are needed like strengthening long-term responsibility or use the discourse among stakeholders and the public to implement restrictions, bans or even relocation measures.

Identification of relevant groups
According to the social milieu approach (see also Section 6.2.2, p. 61), different social groups need differently designed information material and various communication channels. As an example the main criteria for a media campaign for the social milieus of post-materialists, the established ones, the modern performers and the traditionalists/middle class are shown (after: Kleinhückelkotten, 2007):

Post materialists:
- Post-materialists are the post-68 generation with post-materialist values, intellectual interests and a liberal disposition.
- Communication campaign: Stories in regional newspapers, informative, intellectual and innovative designed posters, wall papers, workshops, round tables.
- Cooperation partners for such a media campaign could be: cultural institutions and associations, schools, universities, ecological NGOs.

Established:
- The social milieu of the self-confident establishment is characterised by a success-ethics, a can-do mindset and pronounced demand for exclusiveness.
- Communication campaign: articles in respected (quality) newspapers, detailed, intelligent, sophisticated information material, not flashy or obtrusively.
- Cooperation with institutions and persons with a high social status, local and regional managers of administration, local chamber of commerce.

Modern Performers:
- Modern performers are young, success-oriented, have an intensive private and professional lifestyle, are flexible and interested in multimedia.

- Communication campaign: professional and creative folder and posters, internet/social networks, authentic and unconventional.
- Cooperating partners for such a media campaign could be: schools, universities (e.g. department for media design), newly founded companies.

Traditionalists/Middle class:

- Traditionalists belong to the petit bourgeoisie or the working-class; the middle class includes the status-oriented modern mainstream that looks for social and professional establishment, security and harmony.
- Communication strategy: simple, informative and clear designed information sheets in churches, sport clubs, banks and post offices, at village fairs bulk mailing, local newspapers, official gazette.
- Cooperating partners could be: kindergartens, schools, leisure clubs, local politicians, public libraries (after: Kleinhückelkotten, 2007).

These examples of target group oriented design of information material were extended to other social milieus due to the demands of the subproject regions where needed.

5.2.6 Adjustment of research and implementation strategy

During the project two Scientific Colloquia were held. Both colloquia had external experts participating, from other ERA-Net CRUE projects (DIANE-CM, FREEMAN, RISKMAP, URFlood) but also from outside the ERA-Net CRUE community. The colloquia had the following aims:

- 1st IMRA Scientific Colloquium (January 2010, Wuppertal): Review of the initial scientific and practical approach (IMRA concept) in order to adjust the concept according to the discussion results.
- 2nd IMRA Scientific Colloquium (April 2011, Vienna): Presentation, discussion and review of the results and validation of the implementation of the IMRA concept in the three case study areas in order to design a final version of the flood risk communication and participation approach.

To this respect the input from the other projects and the sharing of experiences was of mutual benefit for all participating projects. In special the following points were adjusted or added after the input from the other ERA-Net CRUE projects DIANE-CM, FREEMAN, RISKMAP and URFlood as well as from other external experts:

- Consideration of the social learning concept as a reference concept.
- Creation of feedback loops to inform the public about the aim and results of the communication strategy.
- Loosening of the strict distinction between the “true” and perceived flood risk.
- Dos and Don’ts of risk communication and participation.

Specific Outcomes

All-purpose 5-step-strategy was defined for the implementation of the conceptual framework in the case study regions.
Improvement of (self-)assessment of the performance of existing management systems by using the IMRA Key Performance Indicators

Lessons Learned

Potential Problem: Politicians (oppositions) that do not want to be involved because they need the opponents' failures to strengthen their own politics.
According to the social milieu approach different social groups need differently designed information material and various communication channels.

5.3 Case study results and validation of conceptual framework (WP3)

The 5-step strategic approach was implemented in the three case study areas. Each case study applied the same research framework but in detail chose different ways for the implementation (different methods, approaches, techniques) due to the case study-specific conditions. The aim of the case study approach was to test the applicability of the process oriented approach. The case study results were evaluated internally and as well in a Scientific Colloquium held in April 2011 in Vienna. Finally the IMRA conceptual framework was validated. Aim of the validation was to analyse the robustness and flexibility of the architecture of the scientific concept concerning its usefulness for the practical work of river basin authorities. Additionally it is pointed out how on the one hand the overarching goals of the project and on the other hand the expectations of the partners are fulfilled as well as overarching questions of ERA-Net CRUE can be answered.

Table 3: Overview of research activities in the case study areas

	Chiascio (Italy)	**Möll (Austria)**	**Wupper (Germany)**
Step 1: Inventory	January-June 2010	January-June 2010	January-June 2010
Step 2a: 1st Survey	May-June 2010	March 2010	July/August 2010
Step 3a: 1st Self assessment	25 June 2010: Self assessment by AB Tevere	15 April 2010: Self assessment by AKL	16 April 2010: Self assessment by the Wupperverband July 2010: External assessment by stakeholders
Step 4a: 1st Workshop	25 February 2010: Bastia Umbra 15 April 2010: Bastia Umbra 27 May 2010: Assisi	5 May 2010: Großkirchheim	20 May 2010: Wuppertal-Buchenhofen
Step 5: Communication strategy *(for full coverage of communication and participation activities see section 5.3.3)*	Public meetings Press releases Brochure showing IMRA project and Chiascio case study Five meetings in the primary and secondary schools of Chiascio municipalities with students, teachers and IMRA project staff	May 2010: Public exhibition in Großkirchheim Press releases 2011 February 2011 Workshop „Understandability of information material“ Press releases and articles 2012	1 July 2010: Public meeting Leichlingen July 2010: Press releases December 2010-May 2011: Various communication and participation activities
Step 2 2nd Survey	June/July 2011	March 2011	June/July 2011
Step 3 2nd Self assessment	July 2011: Self assessment by AB Tevere	8 March 2011: External assessment by ministry	12 May 2011: External assessment by stakeholders 14 July 2011: Self assessment by the Wupperverband
Step 4 2nd Workshop	6 June 2011: public meeting with stakeholder and wider public; exhibitions of students works with award of the schools that participated in the project	27 May 2011: Großkirchheim	12 May 2011: Wuppertal-Buchenhofen

As a result the conceptual framework was developed towards a more practice-oriented approach of 12 steps for flood risk communication and participation as a part of a risk governance process. This set of procedural steps together with a toolbox of methods was the basis for the IMRA Handbook that was published in parallel to this report in English as well as in the local languages of the case studies.
The following section presents the case study results as well as the validation results.

5.3.1 Inventory of flood risk

The inventory of flood risk was carried out in all case study areas. The results gave an overview of the existing flood risk assessment and management activities. The inventory revealed large differences between the case studies and also had implications on the fine tuning of the research design in the case study areas.

The most important observations were:

- Differences in the size of case studies, although all were local level case studies
- Differences in the implementation phase of the Flood Risk Management Directive
- Differences in the availability of flood hazard and risk maps as well as flood risk management plans
- Differences in the social milieu

In all case studies quite large differences between "true" flood risk and perceived risk could have been observed. In general the perception was lower than the assessed risk, however this difference was analysed only qualitatively. On the other hand, the discussion at the 1st Scientific Colloquium showed that – if stakeholders take the perception of the public for granted – there is no need to "convince" the public of the true flood risk but to accept the public's views and feelings and to start a communication and participation strategy from there.

Specific Outcomes

The result of the validation of conceptual framework was a more practise-orientated approach of 12 steps for flood risk communication and participation as a part of a risk governance process.

Lessons Learned

In all case studies quite large differences between real flood risk and perceived risk could have been observed. In general the perception was lower than the assessed risk, however this difference was analysed only qualitatively.
There is no need to "convince" the public of the true flood risk – if stakeholders take the perception of the public for granted – but to accept the public's views and feelings and to start a communication and participation strategy from there.

5.3.2 Surveys

5.3.2.1 Objectives

The first round of surveys had the main objective to gather information about how people think of flood risk, what their experiences with past events was and to identify preferred communication channels. The

goals of the questionnaires were similar in all three case studies, but the kinds of methods to distribute and collect the information were quite different.

The second round of surveys repeated most of the first questions in order to see if any change has occurred during the project time and to evaluate the elements of the communication and participation strategy.

Goal of the two rounds of questionnaires was in Austria to gain insight in risk awareness of people living in red and yellow hazard zone. The second survey with the identical sample of persons should help to gain an impression on changes in attitudes and knowledge due to the information activities of the project.

In Germany the project partners wanted to learn about the general information, experiences with floods and other natural hazards, information level about floods (how informed people are, the way people prefer to be informed about flood risks), prevention and emergency measures in case of flood events as well as personal information. The results of the questionnaire were used to adapt the research design as well as to design the elements of the communication strategy.

The Italian partners aimed at finding out the level of awareness and knowledge of the Chiascio population on flood risk. The 2nd questionnaire focused on the change of awareness due to the implemented communication strategy.

Target group of questionnaires:
In Austria the target groups were residents of Großkirchheim with particular reference to persons living in a red or yellow hazard zone and in Germany residents and shop owners of the city of Leichlingen that live in flood-prone areas. In Italy the target groups were the population and concerned actors in involved municipalities along the Chiascio River.

The number of questionnaires filled out:

- 1st round of survey: in Austria 69 (people directly contacted, personal interviews); in Germany 105 (750 questionnaires delivered to private households and shops, further opportunity to fill out survey online) and in Italy 220 (of 2,000 distributed).
- 2nd round of survey: in Austria 69 persons (personal interviews), in Germany 111 (750 questionnaires delivered to private households and shops, further opportunity to fill out survey online was taken), in Italy 87 (mainly distributed online).

5.3.2.2 Adjustments regarding the scientific concept

All questionnaires based on a draft provided by TUDO. In all three case studies the surveys were adapted to the respective local conditions and focus. In all case studies the project teams decided due to the short timeframe between the surveys to make only two and not – like originally planned – three rounds of the survey and made other additional activities instead:

- the Austrian team decided for a workshop with lay persons about “comprehensibility of available information material” in lieu of the third survey;
- the German team compiled an additional report on case study interim results (in German) in December 2010 and presented this in a press conferences to better communicate the project to the public; further, an additional brochure for self-help during flooding events for citizens of the City of Leichlingen was designed and printed;
- the Italian team organised an interview round with the main stakeholders before the development of the long questionnaire in order to elaborate the most important questions for them. Furthermore additional communication activities were implemented: e.g. the Italian partners had bilateral meetings with the teachers of the involved schools of the school competition for defining the planned activities in the schools together.

The Austrian additional adaptations were:

- Interviewers going from house to house in yellow and red hazard zones were planned, but some people refused to participate, instead of it interviews in the local pub.
- Many people are not used to surveys and need "translation".

In Germany there was

- an adjustment after the test phase, with feedback from stakeholders and feedback from a public meeting;
- announcement to stakeholders and the public in meetings as well as in the newspaper and in a radio reportage.
- return rate around 15 %; quite high compared to other surveys delivered in post boxes (often only around 5 %).
- also for the Wupper case study understandability of information output and dialogue were important themes; thus these were considered to be very important for the communication strategy.

In Italy there was

- no selection of representative panel (due to budget constraints), distribution randomly through local NGOs, schools, bars, public bodies, volunteer organisations;
- first questionnaire was too long and too technical;
- the panel of 1st and 2nd questionnaire was not being the same due to privacy law in Italy.

5.3.2.3 Results of questionnaires

In Austria the most surprising result from the first round was:

- the majority of interviewees do not want more information about flood risk.
- Not very surprising was that many people see no personal responsibility (prevention, adaptation, financing) concerning flood risk.

In Germany the main results were:

- Only very few people under 30 responded.
- People estimated that Wupperverband and the local and district fire brigades/disaster management units are most competent institutions in dealing with flood hazards; at the other end, insurance companies were thought to be the least competent.
- People mainly wish to be informed by the press as well brochures and the internet, followed by public meetings/exhibitions.

In Italy for the most part, respondents are:

- employed in the services field (22,6%), housewives (16,4%) and employed in the industry field (10,8%), employed in the agriculture field (4,6%) and the others respondents are employed in other fields.
- In respect to the field of employment, the most involved seem to be those working in education.

5.3.2.4 Impact and usability

In Austria the analysis of the usability was made after the second survey survey to evaluate the impact of the communication activities. The results are now used for a further update of the risk communication strategy. In Germany and in Italy the results were directly used as a communication basis, to design the communication strategy, to refer on when addressing people; the media used survey to report on the topic in general.

The question on “What is the relationship between true flood risk and the risk perception of the participants of the surveys?” showed in the Austrian case that there is a relatively high correspondence. However, the analysis is more complicated because the interviewer reported that many people said “Let’s

hope that there is not such a high risk" or "Don't speak of the devil" (in the meaning of a self fulfilling prophecy) and therefore tended to answer with a lower rating. The German partners assume that those who participated in the survey have a rather high perception of flood risk, which somehow corresponds to the true flood risk (may vary due to personal experiences); however, the large majority did not answer, especially younger people did not answer; this could mean that the majority of people is not aware of flood risks or at least underestimates the risk; this was also the impression of stakeholders and participants in public meetings. In Italy the project partners concluded that the risk perception is lower than the "true" risk (see also section on "Inventory of flood risk").

5.3.2.5 Conclusions from the questionnaires

Austrian case study:

- People were not used to questionnaires and after a while of giving straight answers „got warm" and many started storytelling. Sometimes the student had to filter the information from the storytelling, because the interviewees digressed.
- The interviews had also the side-effect that a first contact with flood witnesses could be established and short interviews documented with a voice recorder.
- Only half of the interviewees agreed to participate a second time in the whole questionnaire.

The German partners see the surveys as:

- a good instrument to get a feeling of how interested people are,
- important to have specific questions answered,
- good communication instrument as such because people start thinking about the issue while answering the questions,
- important to focus the attention of the press/media, stakeholders and the public on the issue of flood risk management and to keep the process going (relate to survey results that will be published a few weeks later, relate to survey on following activities),
- instrument to reach a broad range of people; however: only selected people answered (age of 50 and over, more men than women answered, few younger people, majority of those who answered had an academic/higher education background, majority were home owners),
- people preferred to fill out written surveys instead of doing it online.

In Italy:

- The conclusion is that there is a very poor knowledge and understanding of the phenomenon, regardless of age and qualification. Although with a low percentage, knowledge of the phenomenon increases with increasing degree.
- An interesting point comes from people with an age over 61 years: unlike the other respondents, they say, they know both: the extent of areas subject to danger of flooding in their town, and the location of areas at risk of flooding.

Virtual social networks:
To establish a virtual social network was only a goal for the Italian case study: Goal was to involve stakeholders and voluntaries organisations in discussing risks of flood and its perception.

Specific Outcomes

Empirical results from the surveys accomplished in the three case study regions.

Lessons Learned

Questionnaires can be used to focus the attention of the press/media, stakeholders and the public on the issue of flood risk management and to keep the process going (relate to survey results that will be published a few weeks later, relate to survey on following activities)

5.3.3 Assessment of risk governance process

The approach of the risk governance process in the case studies (based on the so-called MIDIR indicators that were developed in the EU project MIDIR) is seen as useful to some extent by all three case study regions. The German partners mentioned that it is useful for internal benchmarking/assessment but that the tool was hardly used by external stakeholders in order to assess the work of the regional water authority (Wupperverband) in the 1st round. The Italian partners pointed out that such an approach was completely new for the Tevere River Basin Authority.

Barriers
In Austria the indicators were not easy understood ("What do they mean with..."). In Germany the external stakeholders mostly did not assess the performance of flood risk management. The reason is that it needed some preparation to understand the logic of the approach. In Italy all indicators had to be explained in detail with the main stakeholder, the Tevere River Basin Authority as management through indicators was new for them.

Adjustments
In Austria some additional effort for an "interpretation" of indicators was needed, sometimes re-interpreted during the two self assessments. In Germany the Wupperverband adjusted the indicator set according to their own use. Further, the assessment tool was presented more intensively during the 2nd workshop with the result of a much better participation. As in the two other countries, also in Italy the indicator system was adjusted to the institutional and legal background.

Results
In Austria the self assessment was done first by AKL for the valley of the river Möll and than by the Federal Ministry of Agriculture, Forestry, Environment and Water Management for the Austrian situation. The results of the two assessments showed similarities in most of the positions, no grave differences. In Germany there were some similarities but in some points the Wupperverband estimated his position much better than the external experts did. In Italy some changes of some indicators took place between the first and second assessment, e.g. the indicators for dialogue and cooperation improved (through the communication activities). In addition the use of the indicators became more familiar in the second assessment.

Conclusions
The application of the indicator set is seen as a good tool for structuralising and prioritising topics of risk governance.

The Austrian partners see it this way that

- Austria has a tradition of administration and law how to deal with flood risk and many areas the indicators deal with are formally, clearly defined and without much scope. Many principles, goals, responsibilities etc. cannot be influenced by AKL because they are defined by law or other regulations.
- But the Indicators are seen as a tool (similar to a SWOT analysis) to structuralise and prioritise the discussion on cooperation fitness in areas that are informal and/or without administrative tradition.
- The MIDIR indicators show where room for improvement exists, but an improvement of the situation is often depending on resources allocation (e.g. for participation activities) that is not in the responsibility of the partners.

The German partners concluded that the indicator set

- is most important as an internal assessment tool in order to structuralise and prioritise issues on flood risk management.
- The Wupperverband would have wished to receive earlier responses in order to improve the quality of their work.

The Italian partners summarise that

- An assessment with indicators seems to be a good way to analyse the performance of the organisation, as it provides a clear structure.
- It is a new way of monitoring in the administration. It seems that these kind of benchmarking and monitoring processes are more common in the Northern part of Europe.
- Only discussing the indicators and the values, highlighted some issues that were previously not taken into consideration.
- However, some difficulties occured, as the Tevere River Basin Authority is not managed by indicators so far. In addition it has many legal restrictions and therefore many indicators are out of its direct influence.

Specific Outcomes

Approach for the assessment of risk governance processes, based on the so-called MIDIR indicators.

Lessons Learned

The indicators were not easy to understand for involved stakeholders. Some additional effort for an “interpretation” of the indicators was needed. It seems that the language/terms chosen were too academic.
This tool can be a new way of monitoring in the administration.

5.3.4 Stakeholder workshops

5.3.4.1 First workshops

The objectives of the first workshops organised in the first phase of the project were not exactly the same in all test regions, except that all of them started with a short project presentation. There are similarities between the Austrian workshop and the second Italian workshop held in the first phase of the project by using the questions planned for the first workshop in the project proposal. It has to be mentioned that these questions should gave orientation for the planning of the workshop but then were adjusted to group processes and needs.

The Austrians mainly focused in their workshop after a short project presentation on the questions foreseen for the first workshop in the project proposal

- How to involve the public effectively in the process of setting up flood risk management plans from the early beginning?
- How could proper risk awareness not only be achieved, but also kept for a long time?
- To which extent has risk perception of individuals played a role for flood risk management of public authorities and how is it possible to make better use of it for future processes?
- Additional question: How good is the cooperation between institutions responsible for flood risk management? Is there a need for improvements (foreseeable)?

The German test case wanted

- to bring together the relevant stakeholders from the case study areas Wupper (Leichlingen) and Morsbach (Remscheid/Wuppertal),
- identify the responsibilities of the stakeholders in flood risk management and
- discuss the next steps (feedback on planned survey, presentation of assessment tool).

In the Italian test case two workshops were implemented in such first phase, one for the concerned institutional stakeholders and the second the wider public. In the workshop involving institutional stakeholders the aims were:

- to explain the relationship between the European Directive 2007/60/EC and the existing Hydrogeological setting Plan (PAI);
- to introduce information, methods, results and the update of the Hydrogeological setting Plan (PAI);
- to discuss with local stakeholders how to improve their perception and awareness of existing hydraulic risk within their territories in order to support the political and administrative decisions in the areas of the case study;
- to propose an active involvement / information of stakeholders and the public; and for the future
- to reorganise, where possible, the hydraulic risk management processes through the application of the IMRA concept,
- to produce good practice that could motivate other administrative structures to apply the concept and
- to develop and publish a manual on methods and experiences at the end of the project.

Second Italian workshop (involving the wider group of stakeholders) had the aim

- to improve the exchange between public authorities and population on flood risk;
- to introduce the IMRA questionnaire,
- to introduce planned communication and information activities to be developed together with the local community and especially with schools;
- to raise a discussion on issues such as: How to really involve public in the process of setting up flood risk management plans from the early beginning? Has the perception of risk played a role in the management of flood risk by the public authorities? And how can we utilise the result for the future the best way? How could risk awareness not only be achieved, but kept for a long time?

In all case study regions the most important groups dealing with flood risk management as well as multiplicators could have been reached. Due to the geographical location, the size and the focus of the case study, the participants were not exactly from the same kind of sectors in all case study regions. E.g., members of the avalanche commission and mountain rescue participated only in the Austrian project, managers of schools only in the Italian project.

Also some **barriers** occurred during the stakeholder workshops. In Austria – maybe due to the rather traditional structure of the people – not all female flood witnesses that were invited participated in the first workshop (similar reluctance of female population to participate was seen during the questionnaire). In Germany it was difficult to motivate representatives of home owners and the Chambers of Commerce. Further, representatives of environmental NGOs hardly followed the invitation. In Italy the motivation of institutional stakeholders depended largely on personal interest; a conflict occured between urban and territorial planning and limitations for these plans induced by Tevere River Basin Authority. As a consequence, participation was limited to those technicians of public administrations who have a motivation to participate and where conflicts between the plans are minor. Public administrations with bigger conflicts only participated in the first meeting.

5.3.4.2 Workshop adjustments regarding scientific concept

In Austria as well as in Germany the research questions were simplified and translated. Additionally in Austria it was asked: Do we have a good cooperation between institutions responsible for flood risk management? Where are improvements needed?

The German project partners focused on an additional aspect of discussion: the identification of responsibilities of the stakeholders in flood risk management as this is still a "grey area".

The Italians adapted their concept in a way that the research questions were discussed but to a minor extent; the question "to what extent has risk perception of individuals played a role for flood risk management of public authorities and how is it possible to make better use of it for future processes?" was less important, as flood risk management plans are already in place and participation processes were organised according to the existing law; so the main focus of the workshop was therefore on the existing flood risk management plan and its implications on urban planning.

5.3.4.3 Workshop results and conclusions

Both the Austrian and the Italian partners used the workshop to collect ideas for communication activities. The German and Italian case studies also collected feedback and commitment to their questionnaires, which was not a discussion theme in Austria. Otherwise the results of the workshop reflect the different intentions of the meetings.

The Austrian results were:

- Ranking of the most important activities for dissemination;
- Suggestions for improving public participation
- Information on current level of cooperation and ideas for improvement.

The German workshop resulted in:

- Feedback to the planned survey: The research team received feedback from stakeholders in order to improve and tailor the questionnaire; the acceptance and support of the planned survey by the stakeholders was reached.
- Identification of responsibilities: The results were discussed on the basis of the tasks of the flood risk management. It was visible that estimations spread. The spreading either meant that there exist different responsibilities or that there are different opinions regarding the distribution of responsibilities.

- Participants were asked to make their own estimation concerning the quality and performance of the risk governance process anonymously after the stakeholder workshop.

The Italian results were that

- Public participation has to be taken serious and should be integrated in plans by authorities in order to motivate people to participate;
- Collection of ideas of communication activities (Design competition in elementary schools; competition for multimedia product and photos on flood risk in secondary schools - with preliminary introduction of topic by experts);
- Organisation of distribution and collection of questionnaires.

In Austria the conclusion of the project partners was that they received valuable impact to the project but – as a side-effect the very positive dynamic during the workshop – some high expectations of stakeholders arose that were beyond the project timeframe and resources as well as project partner's responsibilities.

The German partners saw the workshop as an important first step that all stakeholders for flood risk management came together for the first time for this purpose. It was important to identify responsibilities and gaps in responsibilities. The next workshop was used to fill out the assessment sheets of the governance approach carried out by the Wupperverband.

The Italian partners pointed out a few facts: the communication strategy can have a high impact on flood awareness; the involvement of institutional stakeholders is limited and depending on individual motivation; by law the Tevere River Basin Authority has a high status, but in day-to-day live decisions of the regional administration and civil protections have a higher priority for local decision-makers.

5.3.4.4 Second workshops

In all case study regions the second round of workshops was carried out in May 2011 and was used for presenting the final results and served as final validation of the projects' work in the stakeholders view and thus was a dissemination activity as well.

Additionally the German partners used this last workshop to ask the stakeholders to assess the flood risk governance process from their external perspective and to discuss how project results can be integrated into daily work on flood risk management by stakeholders. The Italian partners presented the results of the communication strategy (exhibition of projects from various schools) and informed about the 2nd survey.

5.3.4.5 Intensity of participation and quality of stakeholder involvement

The intensity of participation reached in all three projects from information (e.g. by folders, public meetings) to consultation (workshops, informal meeting with stakeholders). In the Austrian and the German case studies the stakeholders were also included in the decision-making process e.g. in Austria rating of the further dissemination activities or concerning the design of maps. In Germany the poor condition of the Wupper side walls was mentioned by the participants. Although this question has already been juridical answered in the past (side walls are no official flood protection infrastructure and thus the land owners are responsible for the maintenance of the side walls) there is the factual – and consequently the political – problem that land owners do not have resources and/or willingness to renew the side walls. Thus, the Wupperverband intends to raise this question again and identify options to solve the problem together with the City of Leichlingen (mayor, administration), land owners and other relevant stakeholders.

In The Austrian and German cases there was intensive work with a small group of stakeholders. In Germany there was additionally also an information exchange with a rather large group of stakeholders. The Italian partners mention a good collaboration with some institutional stakeholders, with other less (reason: case study area is very big); very high success of work in schools.

5.3.4.6 Conclusions for all activities of stakeholder integration

Concerning the conclusions for all the activities of stakeholder integration in the Austrian and German case there could be seen reluctance to open the planning process at the expert level to the public or representatives of the public. The difference is that in the Austrian case this reluctance came rather from the administration (the experts themselves) and in the German case from some politicians. Both the Austrian and German case study had the strong impression that the local situation and individual attitudes indeed are decisive for the approach and the results of the approach.

Austrian case study:

- High expectations of stakeholders can only be fulfilled partially by the project team due to restricted responsibility/influence. Nevertheless, the stakeholders were positively surprised that their suggestions resulted in practical activities.

The German case study:

- Expectations of stakeholders were at medium level, stakeholders approved the approach to bring everybody together for the first time.
- Local situation and individual attitudes indeed are decisive for approach and results of approach.

In Italy it is seen that

- stakeholder involvement is mainly limited to information due to the history and current legislation in Italy (flood risk management plans are already in place and will be updated only after 2015; making use of Article 13 – Transitional measures of the Floods Directive)
- institutional stakeholders are only partly interested in flood risk as it does not have a high priority in regard to other issues (disastrous event a long time ago) – motivation depends on personal interest, therefore no pattern can be identified on how to involve stakeholders.

Specific Outcomes

In all test case regions the most important groups dealing with flood risk management as well as multiplications could have been reached.
For detailed results and conclusions see each case study workshop in part 5.3.4.3
The intensity of participation reached in all three projects from information (e.g. by folders, public meetings) to consultation (workshops, informal meeting with stakeholders).

Lessons Learned

In the German case study the workshop was successful in bringing together the relevant stakeholders and in identifying the responsibilities of the stakeholders in flood risk management.
The involvement of institutional stakeholders is limited and depends on individual motivation.

5.3.5 Communication and participation activities

Before the communication strategies were designed in the case study areas the analysis of the social milieu in each case study was carried out (see also section “Inventory of flood risk”).

5.3.5.1 Social milieu approach and design of communication and participation strategy

In the Austrian and Italian case study the social milieu approach (see also Section 6.2.2, p. 61) was seen as useful. In Austria it was used for the definition of target groups and the planning of all communication activities. In Italy it was useful as one parameter for the identification of the communication activities. In the German test case it was seen as useful to some extent, because it helped to look carefully to whom to address the communication strategy.

Data and information used for the analysis of social milieus were in Austria statistical data from *Statistik Austria*, additional data was researched by internet. In Germany statistical data from *Information und Technik Nordrhein-Westfalen* and the City of Leichlingen; in interviews with local stakeholders/key questions on social milieus were asked. And in Italy the data came from the ISTAT 2008 Yearbook and ISTAT 2009 Yearbook: regional data about Umbria and data by Internet research.

The barriers for the analysis of the social milieus were in all three case studies the same: there is not very detailed socio-demographic data available at such small scale. In Germany qualitative information by interviews was needed.

The results of the analysis of social milieus showed in the Austrian case study that most parts of the population belong to the social milieus of rural-traditionalists, the working class and the middle class. In the German case study most parts of the population belong to the social milieus of rural-traditionalists and the middle class. The large part of population of the Italian case study region can be classified as ambitious Middle Italy, usually sensible considering the perspectives of new generations.

In the Austrian case study all methods and also the selection of multipliers was adjusted to the social milieus: stakeholder workshop, exhibition, school projects. In Germany the approach as such helped to look carefully whom to address with the elements of the communication strategy; however, this step was not directly linked to certain social groups. In Italy communicating with students and teachers during meetings in different schools (with videos, games, competitions) in order to involve their families was also chosen according to the social milieu of the region.

Conclusions for the social milieu approach
In Austria and Germany it is seen as a very useful tool for planning target group oriented risk communication activities. The Italian partners regard it as important to decide on the kind of actions addressed.

The following table provides an overview of the communication and participation activities in the three case study areas that were derived from the results of the assessment of flood risk as well as from the social milieu analysis.

Table 4: Implemented activities in the communication and participation phase

Chiascio (Italy)	Möll (Austria)	Wupper (Germany)
• Public events in the most concerned municipalities for a broad public, informing them on the flood risk and the Hydrogeological Setting Plan (PAI) in February and April 2010 • Project in schools. Students are invited to prepare original works (photos, drawings, poems and so on) the flood risk of the Chiascio River. Every participating school have received an award to spend in goods for the school; preparatory meetings with school teachers to discuss the agenda (period: December 2011 to March 2011) • Exhibition: The final material of the school has been presented in a public event, together with an exhibition of the students work and related press work (6 June 2011) • Video on the flood risk in the Chiascio river basin, with the interview of testimonies of the last big flood event of 1936 (first version February 2011, final version June 2011) • Brochure showing IMRA Project and Chiascio case study, including the results of the work of the school students (June 2011) • Final dissemination event in case study area (7 June 2011) • Report on Chiascio case study for local stakeholders and the public (in Italian, September 2011) • IMRA-CRUE Handbook in Italian (September 2011)	• Exhibition "45 Jahre Hochwasserereignisse 1965/1966", 6 May 2010 • Public presentation of flood risk activities 1 February, 2011) • Workshop "Comprehensibility of available information material" • Articles in the community newsletter • Media coverage between May 2010 and September 2011) • Folder about flood risk (German) • Flood risk mapping for children • IMRA-CRUE information material designed for different target groups in German • Report on Möll case study for local stakeholders and the public (in German, September 2011)	• Public information workshop in Leichlingen (1 July 2010) • Press conference on survey results (15 December 2010) • Online chat (23 February 2011) • World Café in Café in Leichlingen (2 March 2011) • Public presentation during river Wupper exhibition in Leverkusen-Opladen (4 April 2011) • School lecture with World Café (11 April 2011) • Field trip with youth group to Diepenthal dam (23 May 2011) • Public stand in pedestrian zone in Leichlingen (28 May 2011) • Media: Intensive coverage in media (press, TV, radio) between July 2010 and June 2011) • Report on Wupper case study for local stakeholders and the public (in German, September 2011) • IMRA-CRUE Handbook in German (September 2011)

5.3.5.2 Möll case study (Carinthia, Austria)

Workshop "Comprehensibility of information material"
This workshop was an emerging goal of the Austrian case study and was performed in lieu of the third survey. Goal was to test the comprehensibility of information material by laypersons. The information material that was tested, consisted of a hazard zone maps and maps concerning the flood protection project of Großkirchheim (ecological planning, inundation boundaries and water depth), a general folder about hazard mapping and a folder about hazard maps in a community. Target group were stakeholders from civil society and laypersons living in red and yellow hazard zones. Barriers were that some invited laypersons had the feeling that they knew too less to participate in such a discussion and declined to come even when it was guaranteed that exactly laypersons like them were needed (focus group).

Main results were the need for one easy to understood map for the fire brigade and other civil protection units and the wish to get an individually designed folder about hazard mapping for Großkirchheim that should be distributed via the community gazette. The results were seen as very useful by administration. AKL decided to use the results to make some changes in map design and information material. A folder for hazard mapping in Großkirchheim was produced later. Conclusions were that the workshop was not easy to design or to agree on a method because no template existed for such an event. The workshop was seen as very useful exercise for the partners from administration.

Exhibition "45 Jahre Hochwasserereignisse 1965/1966"
In the Austrian project an exhibition was not foreseen but emerged during the discussions how risk awareness could be established. Aim was

- to include the knowledge of local flood witnesses
- a strong focus on the local area,
- a small amount of scientific text but emotional statements of flood witnesses to personalise the events.

The venue was shared with a digital exhibition of the Torrent and Avalanche Control to give information about other natural hazards. The opening was moderated by the mayor, with contributions of AKL, WLV and flood witnesses, entertainment of the music school and a buffet. The witness and former freelance journalist Oswald Zuegg donated his photo-collection from the floods 1965/66 to Großkirchheim.

140 persons attended, other valley municipalities expressed interest in the exhibition. The exhibition had quite a large impact: Core activity of communication with broad public; very important information activity as well as social event, strong emotional and authentic statements due to personal statements of flood witnesses, informal talks and discussions on the buffet long after formal part was finished, very good feedback from stakeholders and public. Interest of other communities in similar exhibition. Concluding, many resources (also from outside of the project) needed but very successful on information and social level, could not have happened better.

5.3.5.3 Wupper case study (Leichlingen, Germany)

In the Wupper case study a series of activities was carried out between February and May 2011.

Online chat
An online chat was offered in February 2011 for the public to discuss questions on flood risk management. Experts from the Wupperverband and TU Dortmund answered questions. Only few people participated in online chat (approx. 10 questions in 2 hours). However, experiences were gathered how to organise the event and it is planned to use this method in the future if a flood event occurs.

World Café
World Café in a local Café in Leichlingen in March 2011. Aim was to invite people to exchange knowledge on flood risk management and experiences and to identify most striking questions. About 20 people

participated in world café; intensive discussion; method was approved by participants; however, only a small group of potentially affected people was reached.

Public presentation
Public presentation during river Wupper exhibition in Leverkusen-Opladen. Interested audience of about 20 people that received information about flood hazards, flood risks and the latest administrative activities concerning the implementation of the Flood Risk Management Directive.

Involvement of youth groups/pupils
In April 2011 a lecture and combined world café on flood risk perception, risk management measures and preferred information channels was given in a school in Leichlingen. The idea was to use pupils/younger people as multipliers.
In May 2011 a youth group was taken on a field trip to the Diepenthal dam to explore basics of flood risk management. About 15 juveniles participated.

Public stand/small exhibition
Together with the City of Leichlingen (planning department, waste water department) the Wupperverband and TU Dortmund informed about flood protection measures and presented previous activities of the project in May 2011.

The direct impact of the activities was rather low but in combination with media quite successful (media needs some "real" activities from where to start a reportage). The impact of surveys was most likely higher than the activities. Concluding, low to medium resources are needed; however only successful in combination with press campaign.

5.3.5.4 Chiascio case study (Italy)

Activities in schools (game: Mini-Pai), video on flood risk, school competition with concluding exhibition and event
In the discussion with institutional stakeholders school children were identified as main target groups in order to reach a large number of the public. Communication activities focused therefore on them with:

- Development of a video to present flood risk in general, but with a specific focus on the Chiascio and with involvement of local witnesses of large flood events
- Project session in schools, presenting a video on flood risk and a group work game (“Mini-Pai). Aim of the session was providing information on flood risk, stimulating a participatory behaviour and producing capacity building respect to the flood risk in the area where they live. The main feature of the MONOPAI interactive group game was that a group of students had to allocate a defined number of various types of infrastructure (schools, houses, agricultural areas, train station, hospitals etc) on a stylised flood risk map. In addition the group had to write down the reasons for their choices and present them to the whole group. The Italian IMRA partners produced the kit with all necessary material for the game (risk map, small pictures representing the various infrastructure, legends, description of game, paper, glue).
- School competition for creative contributions on the topic of flood risk. Aim is to transfer the knowledge that the students gained during the project session to other people they know (e.g. their parents).

186 students from five schools (one high school, three middle schools and one primary school) participated in the project sessions with high interest. This can be seen as a yery important information activity as children are easy to be interested through the game. Concluding, the work with children and activities referred to the territory (e.g. witnesses in the video) were very successful to raise an interest to the topic.

5.3.5.5 Media coverage

Goal of the media contacts

- Austrian case study: information about activities in the community, on-going flood projects and residual risk via media mix of public media, exhibition, discussion events and official announcements.
- German case study: wanted to promote and report on activities, inform about project, increase flood risk perception.
- Italian case study: information about the questionnaire to raise interest; information about work in schools and final event planned.

Barriers for the media contact

Barriers in Austria and in Italy were that there was no recent event and therefore no media interest in the topic. In Austria information activities via internet were refused by the mayor because of potentially negative effects on tourism. A high media attention happened due to the exhibition. In Germany there was no recent event so it was first difficult to establish media contacts. However, with the planned activities (survey, public meeting) this became easier. Concluding, the planned activities were important to raise interest for the media. The flood event of the river Wupper from January 2011 in the end even helped more to raise the media's interest.

Concerning the results and impact, the partners see that people know about project, learn about flood risk management activities. The German partners pointed out that it was positive how good media coverage was and that it is an important basis for any work.

Specific Outcomes

A great many of activities were implemented in the communication and participation phase in all three case studies (see. Table 4).

Lessons Learned

The barriers for the analysis of the social milieus were in all three case studies the same: not very detailed socio-demographic data is available at such small scale.
A barrier in connection to media contact can be the fact that there is no recent event and therefore no media interest in the topic. Otherwise, information activities could also be refused from the political side, because of expected negative effects on tourism (especially when the region depends on this commercial sector).

5.4 Administrative activities: Dissemination and project management (WP4+5)

Dissemination activities had a supporting role to the IMRA work and are accompanying project activities over the whole project time. As described in Chapter 2.3, they were divided in three tasks. The activities implemented are described in the following using this division. An overview is given in Table 5, p. 48.

5.4.1 Dissemination, including project branding, leaflets, publications, practical handbook

Project brand: A project logo has been developed and has been used so far as identification on all project materials (as e.g. deliverables, presentations, meeting agendas etc). It will be also part of all dissemination material.

Fig. 6: IMRA logo

Leaflets and posters: Various dissemination materials have been developed. For general information on the project, a leaflet and three posters were designed in English language. For the single case studies, each country developed its own material. E.g. in Italy a poster and a project description were designed and disseminated together with the invitations to the various meetings or at the meeting venues.

Handbook and publications on local case study results in local languages: The main dissemination document is the "Planning and implementing a communication and public participation processes in flood risk management – Procedural guidelines and toolbox of methods". It is published in English, German and Italian and will support the transfer of project results to other actors in the field of flood risk management.
This IMRA Handbook aims to provide an up-to-date and innovative tool to support the technical staff involved in regional administrations, water authorities and river basin authorities and districts in planning, implementing and evaluating a communication and public participation process as part for Flood Risk Management. The handbook is based on the research activities and results of the IMRA project, but is clearly praxis oriented.

The handbook is structured as follows:

1. Introduction: providing the background and general introduction on the handbook and the way to use it
2. Step-by-step guide of communication and participation process: description of logical and procedural steps of a communication and participation process, linking it to communication and participation methods of Part 3
3. Innovative and well-proven communication and participation methods, providing a collection of (innovative) methods and their assessment for the purposes of the implementation of the Flood Risk Management Directive. They are divided in four sections, covering various aspects of communication and participation processes (General methods (Chapter 3.1), Information methods (Chapter 3.2), Consultation methods (Chapter 3.3), Common decision-making methods (Chapter 3.4)). The descriptions of each method follow a common structure, providing brief information on:
    - Purpose
    - Area of application
    - Aim of method and context
    - Addressees/target group
    - Scale of application
    - Costs and human resources necessary for the implementation
    - Necessary skills
    - Main features of method

- Expected results
- Assessment of Results
- Degree of implementation

In addition it gives an example of a practical application of the method (based mainly on experiences of the IMRA case studies) and lists sources of further information and key references. It also indicates references to the steps of the communication and participation process of Part 2 to which the method is suitable.

A professional graphic design creates a visual motivation to study the handbook.

Other dissemination material and press releases: Other dissemination material and work with the media, e.g. the final booklet of the Italian case study in Italy or the exhibition in Austria or the public information stand in Germany were realised and are listed in the table "Overview of dissemination and case study activities".

Technical articles: IMRA project partners decided to write an article on the research and experiences of the IMRA project for the special issue of Natural Hazards and Earth System Sciences (NHESS), which is planned as one of the common dissemination activities for the 2nd CRUE Funding Initiative on Flood Resilience. The working title of the article is: "Improving the Active Involvement of Stakeholders and the Public in Flood Risk Management. New methods and case study results from Austria, Germany and Italy". IMRA partners will additionally participate in other articles for the same journal, e.g. the Italian IMRA partners will write an article together with all other Italian partners in the 2nd ERA-Net CRUE Funding Initiative on Flood Resilience on "Flood risk management in Italy: challenges and opportunities for the implementation of the EU Flood Risk Management Directive". And further: "The role of flood awareness and risk perception in flood management across Europe" (same issue of NHESS journal). Articles will be written and published only after the end of the project.

5.4.2 On-line presence

Some dissemination activities and an on-line presence have been implemented aiming to support the activities of IMRA, according to the Work Package 4 goals to assure a strong awareness of project objectives and results.

The strategy of dissemination and networking for the IMRA project has enabled the design and the implementation of a set of on-line resources including the dynamic Web site of the project, the definition of on-line groups of citizens and stakeholders using Facebook (Chiascio IMRA - IMRA Stakeholders), an on-line resource service devoted to support specific activities, such as the administration of on-line questionnaires.

Fig. 7: Clipping from IMRA website

The web site is located at the URL: http://www.imra.cnr.it. It has been designed and developed both, 1) in order to provide and access contents and resources by the different partners of the project, supporting their communication and discussion, and 2) for the dissemination and promotion of the project contents and results in the stakeholders' communities and between citizens in all the case study areas and, more generally, in all the European States. For this reason it has been designed for supporting three different languages: English, German and Italian. This choice allows the diffusion of best practice arising by the experiences of the three case studies project.

The target users for the website are:

- Stakeholders in general, scientists, students, technicians, citizens;
- the IMRA partners.

According to the two target users the website will allow different levels of authorisation for the access:

- The first level considers the public access for its information and data. The actors are users of the information contained in the Website, e.g. people interested in flood risk;

- The second level refers to all documents and information that will be available/provided only by the IMRA partners: The actors can be both, users and providers of information and data related to the different case study areas and users of the general information of the project;
- The third level refers to the Web administrator who has designed the structure of the Web and can put documents and contents related with all the general information on IMRA into the Web page.

5.4.3 Networking

The aim of Task 4.3 of the project is to network the project activities and results with the scientific community and other experts including existing networking structures.

Networking among the ERA-Net CRUE projects is facilitated through the scientific coordination project. During the common kick-off meeting partners of the various projects got in contact. The IMRA team supported the networking by contacts to other projects during the project implementation. Experts from DIANE-CM, FREEMAN, RISK MAP and URFlood were invited to and participated in the first Scientific Colloquium in January 2010 and the Second Scientific Colloquium in May 2011.

In addition, the IMRA coordinator participated in all 2nd CRUE Funding Initiative on Flood Resilience initiatives that were organised, e.g. the meetings in Rome, Madrid and Graz as well as a further meeting in Hannover.

On case study level there are contacts in Italy to the Italian URFlood partners from the Centro Interuniversitario di Ricerca in Psicologia Ambientale and the FREEMAN partner Centro Euro-Mediterraneo per i Cambiamenti Climatici, in Austria to the Austrian partners from the TU Graz from the SUFRI project. The German partners kept contact with the research team of the former INCA project (see below) as well as the Nations University, Institute for Environment and Human Security, which is participating in a research project on urban flash floods in the Wuppertal area.

In Austria there was an informal meeting of the three Austrian ERA-Net CRUE-Net projects to exchange thir experiences on 9 March 2011.

Activities and first results of the project are also disseminated in other research projects in the field of natural risks and civil protection, as e.g. MOVE and ENSURE (both FP7 research projects on vulnerability) and INCA (project funded by the Civil Protection Financial Instrument of the European Community).

In March 2011 the IMRA and SUFRI project partners together submitted the project proposal “TORGAS – Learning application network on transfer of risk governance and awareness skills to water authorities” to be funded under the INTERREG IVC strand.

Table 5: Overview of dissemination and case study activities

Date	Place	Description
15 January 2010	Wuppertal (Germany)	Scientific Colloquium with participation of representatives from 4 other ERA-Net CRUE projects (DIANE-CM, FREEMAN, RISK MAP, URFlood)
May 6, 2010	Großkirchheim (Austria)	Exhibition: "45 Jahre Hochwasserereignisse 1965/66": presentation of ongoing flood risk measures, interviews with flood risk witnesses of past floods
From September 2009 to January 2010		Design and implementation of the IMRA Website project containing general information of the project
From December 2009 to February 2010		Implementation of the multilingual website for case studies areas, and definition of Facebook groups for the Italian case study
From February 2010 to July 2010		Updating of the content by all partners
May/June 2010		Leaflet IMRA project in English
May/June 2010		Posters IMRA project in English
April 15, 2010		Leaflet on the Chiascio area used in the workshop with stakeholders in Assissi
February 2010		Poster on the Italian case study
		Poster on the Austrian case study
		Poster on the German case study
From February 2011 to April 2011	Chiascio municipalities	Design and implementation of "MONO – PAI" (board game on flood risk management)
15 April 2011	Vienna (Austria)	2nd Scientific Colloquium with participation of representatives from 4 other CRUE-ERANET projects (DIANE-CM, FREEMAN, RISK MAP, UR-Floods)
May 2011	Leichlingen	Brochure on flood risk management and self protection options
28 May 2011	Leichlingen	Posters for public stand in Leichlingen pedestrian zone
May 2011		Information and promotion of final event and final results of Chiascio case study on various websites, e.g. ISPRA, IRPPS-CNR, IMRA project website
6 June 2011	Assisi (Italy)	Final event of Chiascio case study, including press articles in local newspapers, public exhibition and presentation of work
6 June 2011	Assisi (Italy)	Brochure showing IMRA Project and Chiascio case study
From June 2011	Tevere river basin authority website (Italy)	Design and implementation of pages about IMRA project containing general information of the project and focus on "School project"
September 2011	all case study areas	Handbooks in German, Italian and English

Source: own elaboration

5.4.4 Publications

Articles

- Fleischhauer, M., S. Greiving, M. Scheibel, T. Stickler, N. Sereinig, G. Koboltschnig, P. Malvati, P. Grifoni, K. Firus (2011): Improving the Active Involvement of Stakeholders and the Public in Flood Risk Management. New tools and case study results from Austria, Germany and Italy. Abstract accepted for NHESS special issue "Flood resilient communities - Managing the consequences of flooding" (in preparation)
- O'Sullivan, J., I. van der Craats, S. Greiving (2011): The role of flood awareness and risk perception in flood management across Europe. Abstract accepted for NHESS special issue "Flood resilient communities - Managing the consequences of flooding" (in preparation)
- Bonaiuto, M., Jaroslav Mysiak, K. Firus, P. Grifoni, G. Carrus, P.Malvati, C. Ferranti, V. Vitale (2011): Flood risk management in Italy: challenges and opportunities for the implementation of the EU Flood Risk Management Directive. NHESS special issue "Flood resilient communities - Managing the consequences of flooding" (in preparation)

Conference Papers

- Stickler, T., M. Fleischhauer, S. Greiving, N. Sereinig, G. Koboltschnig, P. Malvati, P. Grifoni, K. Firus (2011): Planning and Evaluating with New Participatory Flood Risk Management Tools - Findings from case studies in Austria, Germany and Italy. Paper accepted for UFRIM Conference, Graz, September 2011.
- Greiving, S., Lindner, C, (2011): Assessment of flash flood risk in a continuous urban fabric by the example of the City of Dortmund. Paper accepted for UFRIM Conference, Graz, September 2011.
- Greiving, S.; Lindner, C.; Wanczura, S. (2011): Linking actors and policies throughout the flood risk management cycle. Paper accepted for UFRIM Conference, Graz, September 2011.
- Stickler, T., Sereinig, N., Greiving, S. & Fleischhauer, M. (2011): New Tools to Plan and Evaluate Participatory Flood Risk Management - Concept and empirical findings. Paper accepted for 12th Congress INTERPRAEVENT, Grenoble, April 2012.
- Koboltschnig, G., Korber, S., Sereinig, N., Stickler, T. (2011): Risk dialogue as an essential part of the integral flood risk management: experiences from an Austrian case study. Paper accepted for 12th Congress INTERPRAEVENT, Grenoble, April 2012.

Other publications

- IMRA project (2011): Handbook for flood risk management. (in preparation)
- IMRA project (2011) Handbuch Hochwasserrisikomanagement (in preparation)
- IMRA project (2011): Manuale per gestione del rischio alluvione (in preparation)

5.5 Main results of research activities and discussion

5.5.1 Long lasting risk awareness

In the Austrian and Italian case studies long lasting risk awareness is seen as reached. In Austria the long lasting risk awareness was reached due to exhibition and flood risk witnesses, but must be refreshed in some years. In Italy it will most probably be reached through the activities in schools and the public event and the video.

In Germany it is seen as reached to some extent**:** Some interest by people was improved; older generations made remarks that such an approach is long overdue; on the other hand, even the flood event from January 2011 did not seem to increase the attention for river floods in the public very much (low participation in online chat and world café).

5.5.2 Institutionalisation of stakeholder involvement

It is regarded as reached by the German project partners: Stakeholders approved the networking among each other very much; there was also a need to co-ordinate information strategies and actions between the different levels (State, District, water authority, local community). In Italy some first steps are made with workshops; however due to the existing plans and no update in the near future no real involvement is possible. An additional targeted result of the Italian Case study was the awareness raising on the existing Hydrogeological Setting Plan and the important role of the Tevere River Basin Authority. In Austria there are first positive signal for further common activities, which were confirmed in the second stakeholder workshop.

5.5.3 Remaining differences in risk perception

Concerning the public (analysis of questionnaires)
The German project partners have the impression that those who were aware of risks already before are now even better informed; it seems that others could hardly have been reached; possible that differences still remain in that group.

Concerning the stakeholders
In Germany the stakeholders approved the networking among each others very much; no differences in risk perception. In Austria there were also no differences in risk perception on the stakeholder level. In Italy this question was finally clarified after the 2nd stakeholder workshop.

Concerning the project team
In all three test cases there were no differences in risk perception between the project partners.

5.5.4 Conclusions for vulnerability issues

Institutional vulnerability
In the German case study the self-assessment tool that was applied by the Wupperverband helped to identify priorities for the improvement of institutional vulnerability in relation to governance principles. In terms of co-ordination and co-operation the workshops helped to bring stakeholders together and to establish a common basis for further work. The Italian partners think that vulnerability can be reduced considerably just by a higher awareness on the risk and the existing plans.

Conclusions for individual vulnerability
In the German case study the vulnerability could have been reduced for a selected group of individuals (those who showed interest in public meetings, information etc.) due to an increase in risk perception and knowledge about individual protection measures. Like in the case of institutional vulnerability the Italian partners came to the conclusion that vulnerability can be reduced considerably just by a higher awareness on the risk and the existing plans.

Validation/further development of conceptual approach
The research results were the basis for the design of the practical implications. The 5-step approach proved to be a good research design and also a good starting point for the practical activities in the case study areas. However, the 5-step approach mixed process oriented elements with methodological elements.

For designing the research output the conceptual approach was thus further developed and will presented in the handbook by a procedural 12-step guideline that is accompanied by a methodological toolbox (see chapter “Research methodology”).

5.5.5 Impact of better public awareness and participation on reduction/alleviation of flood risk

In all three case studies the elements of the communication strategy that were implemented were the start of an information and communication process which aims at involving the stakeholders as well as the public. In general, the project activities had some impact so far, however this shall not be over-estimated and hast to be carefully distinguished between the case studies.

Wupper case study
In the Wupper case study the impact of the stakeholder workshops and the self assessment on the group of relevant stakeholders was quite high because for the first time all stakeholders relevant for the implementation of the Flood Risk Management Directive met and discussed especially on the issue of communication and participation. It helped to identify responsibilities of the stakeholders and revealed open issues. For the further communication strategy the responsible authorities from the State of North Rhine-Westphalia, the Wupperverband and the local communities can build on these results.
Concerning public awareness the impact of the communication activities have to be rated rather low although he 2nd survey revealed a slight increase in the awareness of flood risk. About a third of the people who answered the survey had recognised either of the activities. However, local stakeholders had the impression that there was no broad impact on the local population so far – and of course it is not clear if and how those people that have been better informed through the activities will participate in the process and maybe even will take self protection measures.
Nevertheless, the exemplary implementation of different communication methods helped the local, regional and State authorities to gain experiences and to design the future communication and participation process.

Möll case study
In the Carinthian case study along the river Möll all local stakeholders already knew each other but had no common understanding of the residual risk. The stakeholders had a clear understanding of their duties and responsibilities but saw some potential for improvement in the spatial planning coordination and disaster prevention training. It was highly appreciated that the cooperation within the project resulted not only in “talking” but in specific actions and requirements.
The communication activities of questionnaires and the exhibition had a rather high impact on the local population to establish some peer-to-peer communication within the local community. But continuous activities have to follow to stabilise the risk awareness. But there is still a very low feeling of personal responsibility for risk prevention or financing flood risk protection activities.
The workshop on comprehensibility of information material gave valuable input to the provincial as well as the national authorities responsible for food risk maps. A further result was a folder concerning flood risk in Großkirchheim that was designed after the suggestions of the lay participants of the workshop.

Chiascio case study
Some important aspects from the implementation of the communication strategy in the Chiascio case study area are:

- The presentation of the topic of flood risk in general contributes already to an awareness raising of the importance of the topic, especially at the stakeholders in the public administration. This became obvious from the several meetings.
- Key people who have a particular interest in the topic (as e.g. the technician of the municipality of Assisi or some teachers in schools) are of high importance to promote any activity and involvement.
- Participation has a large range of possibilities for activities. In Italy participation of stakeholders in the form of “Conferenze programmatiche” is a common practice (and legally binding) for the

acceptance of the Hydrogeological Setting Plan (PAI). The Conference, attended by the Region, the Provinces and the concerned municipalities, together with the River Basin Authority, expresses an opinion on the draft plan with particular reference to the integration of content on a local scale and provides the necessary hydrogeological requirements and planning measures.

- The River Basin Authority publishes and makes the adopted plan available for consultation and for observation to the general public, and gives the public a minimum period of six months for submission of written comments. These will be evaluated - accepted or rejected- before the final approval. At the moment the active participation during the "development" of the plan it is still not relevant, as the plans are all in place.
- The involvement of the general public in the set-up of plans is a new concept and this was an important outcome of the stakeholder workshops implemented during the IMRA case study. In fact, as required by European Directive 2007/60/EC, the active participation must be something more than an information campaign, should have the objective of improving the quality and applicability of these results and may have a dynamic assessment and management of flood risks, influencing the decision-making process differently than it is now (that is, in retrospect).
- During the IMRA project we decided to address the school population trying to convey "the message" to people considered more receptive and using them vehicles to forward the information to their families. In this activity we have observed that young people do not know their territory. This worked very well.

Specific Outcomes

In the Austrian and Italian case studies long lasting risk awareness is seen as reached. In Austria every year events like a river event combined with civil protection training activities will have to be done, to stabilise the risk awareness.
The institutionalisation of stakeholder involvement has been improved. In the German case study, stakeholders approved the networking among each other very much; there was also a need to co-ordinate information strategies and actions between the different levels (State, District, water authority, local community).

Lessons Learned

For the German case study it is assumed that those who were already aware of risks are now even better informed; it seems that others could hardly been reached; possible that differences still remain in that group

6 Methods for risk communication and participation

This chapter can be seen as the conceptual output of the IMRA project. It presents the two columns of the IMRA concept: procedural requirements on the one hand and a methodological toolbox on the other hand. The chapter ends with a discussion of transferability issues and an overview of the applicability of methods.

6.1 Procedural 12-step guideline

A successful communication and participation process needs a planning, preparation, implementation and evaluation phase, in particular:

- Identify your own position
- Identify your strategic partners
- Decide on measures
- Implement
- Evaluate

Each phase is composed of one or more steps. In total, 12 steps were identified and are described in the following, with reference to methods, which can be applied for each step. This should give you support to implement your specific communication and participation activity.

In Section 6.7 you find a series of matrices, helping you to identify the relevant steps and methods for your specific purpose/situation

6.1.1 Identify your own position (Steps 1-3)

To start a communication and participation process you should start with yourself, analysing your own position. This part is composed of three steps:

- Step 1: Carry out self-assessment of risk governance performance
- Step 2: Define goals and scope of process
- Step 3: Identify resources

6.1.1.1 Step 1: Carry out self assessment of risk governance performance

Risk governance can be defined as a process by which risk information is collected, analysed and communicated and management decisions are taken. It aims at enhancing the disaster resilience of a society (or a region) and includes “the totality of actors, rules, conventions, processes, and mechanisms concerned with how relevant risk information is collected, analysed and communicated and management decisions are taken” (IRGC, 2005, p. 22). This definition focuses on three elements of risk governance: risk assessment and risk management that have to be embedded in a risk communication process among scientists, politicians and the public.

In the EU Flood Risk Management Directive it is said that flood risk management plans shall be coordinated at the level of the river basin district. Thus, responsible management units have been defined for taking care of the management process. In most cases these are the responsible water boards.

Step 1 describes a method and indicator system that enables decision-makers to monitor the performance of a risk governance process.

6.1.1.2 Step 2: Define goals and scope of process

Before starting with a communication and participation process the goals of this process have to be defined. So decision makers have to ask themselves what the aim of this process is. This is not about the objectives of certain flood risk management measures but rather the objectives of the communication process.

In the Flood Risk Management Directive it is stated in Article 10 that “Member States shall encourage active involvement of interested parties in the production, review and updating of the flood risk management plans”. Thus, stakeholders and the public have to be enabled to make informed decisions. Negative behaviour shall be prevented through this process. The appropriate way of a potentially successful active involvement of the interested parties has to be defined as a goal of the process and also determines its scope.

6.1.1.3 Step 3: Identify resources (money, time, personnel)

A lot of recommendations for flood risk management come as a result from research projects where extra resources in terms of personnel, money and even knowledge are available. In many cases these resources are not available in daily work, e.g. after a funded project has ended. So the scarcity of resources has to be taken into account.

Thus, it is important to identify available resources:

- Personnel/time: How many staff people, person days etc. are at hand to design and accompany the communication and participation process?
- Money: Which financial resources are available? Is there an opportunity of any extra funding?
- Knowledge: Is the staff equipped with necessary skills such as communication skills, application of methods etc.

The identification of resources is to a certain extent an iterative process with the definition of goals. The potential resources that are at hand might extend or limit the implementation of the predefined goals.

6.1.2 Identify your strategic partners (Steps 4-7)

After having identified your own position, you can move on to identify your strategic partners. This part is composed of four steps:

- Step 4: Identify relevant stakeholders
- Step 5: Identify duties and responsibilities
- Step 6: Create a network of stakeholders
- Step 7: Identify the public’s view

6.1.2.1 Step 4: Identify relevant stakeholders

For all kinds of stakeholder involvement there are some key questions that have to be answered in the planning phase:

- What is the goal of the stakeholder involvement?
- What are the resources for the involvement process?
- Who are the relevant stakeholders needed for a successful process?
- What are their assumed interests and expectations?
- In which role and at which time should they be involved?
- How can they be motivated?
- What kind of intensity of the dialogue process and what methods are suitable / applicable for the stakeholders?
- How will the results of the process be used?

The main criterion for the selection of participants is:

What is the goal of the involvement of the public or of stakeholders?

- Do you want to get a feeling about opinions and moods, needs and trends?
- Do you want to activate the participants?
- Do you need them for additional information or data?
- Do you want to speak about conflicts?
- Do you want them to participate in a problem solution?
- Do you need them for the implementation of activities?
- Other criteria for the selection of participants are:
- The level of the project/process: local, regional, national, international.

Participation of the public can be done at international, national, regional or local level. In contrast to a usually rather low interest of the public in activities on the national and international level, the motivation to engage on the regional and local level is relatively high. Activities on the local level are closer to the social reality of people; impacts of decisions can be more easily understood and seen.

To get an overview on which interests are represented by whom and what contribution stakeholders can bring for a project, it is recommended to systematise the information. Such a diagram can also be used to document the process of your stakeholder selection to guarantee the transparency and traceability of your decisions on whom to involve in the project and why. The question of the representation of all possible interests is a crucial one in all participatory processes. The acceptance and the result of a process can be undermined by criticism concerning the valid representation of concerns.

6.1.2.2 Step 5: Design and scope of participation process

All additional voluntary participatory activities that are not required by law are informal. Informal processes should not be seen as a substitute or competing with formal processes, but can supplement these. These kinds of participatory activities of course have to take place within the framework of existing legal requirements. Informal and formal procedures should be adjusted in a way that no parallel or in the worst case impeding processes can happen.

Informal processes like stakeholder participation are entirely voluntary and can take many forms. Who takes part, which methods and which rules are used are either determined in advance by a project team or agreed by the participants of such an activity themselves.

How binding the solutions or results of a voluntary participatory process are, depends on what has been agreed about how to treat the results. Results can potentially become legally binding e.g. via a mediation contract, a city council decision etc.

Participation can take many forms, can be done with varied participants and can have different degrees of intensity: ranging from noncommittal activities with a focus on information activities to consultation activities up to a real inclusion of the public in the decision-making process or at least the pre-decision-making.

During the last decade it became quite trendy to involve stakeholders in research projects. Some stakeholders have mixed experiences with this kind of participation and might be rather willing to participate if they get a clear picture of what is expected from them, how much effort it will be for them to participate and how the results of the stakeholder involvement will be used. Such a short explanation can be e.g. added as an annex to an invitation letter.

6.1.2.3 Step 6: Create a network of stakeholders (e.g. through stakeholder workshops)

Participating in a risk dialogue can be a form of social learning. The output of the participation includes not only policies (decisions) but also the development of the social and political capacities of each individual (Pateman after: Teorell, 2006).

In participation processes with deliberative elements some form of empowerment can happen. Deliberation combines different forms of argumentation and communication, such as exchanging observations and viewpoints, weighing and balancing arguments, offering reflections and associations and putting facts into a contextual perspective. Deliberation can produce common understanding of the issues or the problems based on the joint learning experience of the participants with regard to systematic or anecdotal knowledge and it may produce a common understanding of each parts position and argumentation and thus assist in a mental reconstruction of each actor's argumentation. (…) People may not be convinced that the arguments of the other side are true or morally strong enough to change their own position, but they understand the reasons why the opponents came to their conclusion. (Renn & Schweizer, 2009). Additionally participants may get some insight into political processes and decision-making structures.

6.1.2.4 Step 7: Identify the public's view (e.g. with interviews, surveys, key persons)

Risk communication means a dialog with stakeholders as well as with the public. The means and methods to involve the public can be found discussing with stakeholders.

To plan a risk communication strategy it is necessary:

- to find out what the status of the knowledge and risk perception of the local population is by interviews with stakeholders or surveys targeting the broad public.
- to find out what values and attitudes that can affect risk perception the target groups have. This can be done by an analysis of social milieus.

The aim of a survey can be not only to gain an impression of the status quo of risk perception but also - if done repeatedly- to record changes in the risk perception of the affected people during the project. For this purpose it is advised to use the same group of interviewees.

Qualitative questionnaire

Core of a qualitative interview is a field manual that guides through the most important topics. It is up to the interviewer how to formulate the questions in detail and in which sequence the questions are asked. In contrast to a quantitative interview, the qualitative one can be done more like a dialogue, additional themes can be discussed. During an individual interview a high quality of information can be reached to generate a spectrum of options and information.

Quantitative questionnaire
Quantitative methods try to gain results from a sample as big and representative as possible and they can be applied through questionnaires or quantitative interviews. Often a questionnaire is the only feasible way to reach a number of persons large enough to enable a statistically analysis of the answers.
The questions of a quantitative questionnaire have to be formulated carefully because in contrast to a qualitative interview clarifying questions are not possible.

6.1.3 Decide on measures (Steps 8-11)

Once you concluded the identification of your own position and your strategic partners, you can move on to decide on the adequate measures for the communication and participation strategy. This includes:

- Step 8: Agree on objectives
- Step 9: Agree on communication and participation measures
- Step 10: Design an implementation plan for communication and participation measures

6.1.3.1 Step 8: Agree on objectives

The definition of precise objectives is an important step in a communication and participation process as it tailors the measures to be chosen, the timescales and the resources.

Objectives should derive from the communication needs' analysis which was performed in Step 7 as well as from the outcomes of Step 1 to 6. They should be shared and agreed with relevant stakeholders. Objectives will differ in regard to the degree of communication you plan to implement (Information, Communication, Common Decision-making).
Usually it makes sense to define an overall objective and then sub-objectives in regard to different target groups.

An important question you should answer with your objective is the following: what are the results that each target group should achieve by the end of the initiative? Each of these results should be defined as one sub-objective.

Define your objective/-s considering the following components

- Specific: the objective should describe in detail what you intend to achieve;
- Measurable: you should be able to evaluate the achievement of the objective in quantitative or qualitative terms;
- Realistic: you should be able to realise the objective in the given timeframe and with the given resources;
- Relevant: the objective should be relevant for you and your target group, as identified in the steps before;
- With a defined time horizon: you should set a time frame.

6.1.3.2 Step 9: Agree on targeted communication and participation measures

Additionally to institutional stakeholder participation, activities for the broad public can be included. The broad public as a whole is not easy to reach and to motivate.

Many scientific projects suffer from believing that it is possible to reach all possible target groups within a population with one kind of information material. Reality and social marketing show that it is not possible to reach everybody with only one singular mean and that all information and participation activities must be designed for the target group or the target groups you want to reach with your message.

Decide if you want to invite everybody possibly concerned or interested in your activities or if you want to work with a randomly or statistically selected representatives.

Possible target groups of the broad public within risk management projects could be:

- Persons that experienced a flood in the past or were affected with material losses due to a flood in the region within a timeframe
- Persons that do see themselves/their family/their region endangered by floods
- Persons that never experienced a flood and do not see themselves at risk.
- Other selection criteria could be:
- Gender
- Education, social status and lifestyle
- Age
- Lifestyle
- Geographical spread
- Persons that are known to be interested in a theme (e.g. members of an association, writers of letters to editors/medias; internet blogger, persons in contacts with politicians, administration)

A statistical representative group is not easy to get. Opinion research centres do have the necessary statistical data available but this is relatively expensive.

Social milieus

Risk perception is affected and filtered by attitudes and values. Attitudes, values and other socio-cultural features can be assigned to social groups, to “milieus”. Research about social milieus is traditionally performed by market research and psychology. After Kleinhückelkotten (2006) the main question is not: “What is wrong with these people, why won’t they understand?” but “What is wrong with us? What don’t we understand about our target audience?”.

These social milieus are not just a theoretic exercise but can be used to design tailor-made communication strategies. Understanding how values filter information and colour perceptions is of critical importance to the design and implementation of public information campaigns (Roser-Renouf & Nisbet, 2008). It should not be neglected that there are also sceptical voices (Sjöberg, 2000), which do object that the social context per se is by no means the sole determinant of risk perception. Unfortunately up to now no better explanation than the social milieu-approach does exist for building up communication strategies and it will therefore be used as a working hypothesis.

Social milieus for the local or the regional level can be found out and described by market research companies or similar institutions/organisations. Within risk management projects it is mostly not possible to perform a detailed socio-cultural analysis of the target groups in the regions of the subprojects. But an overview at the national level on what kind of target groups do exist, what their attitude and values are and what kind of information material might reach them can give valuable input to a risk communication strategy.

6.1.3.3 Step 10: Design an implementation plan for communication and participation measures

Once all previous steps are implemented, an implementation plan has to be developed which identifies and links:

- Objectives (identified in Step 8)
- Target groups (identified in Step 4)
- Specific planned measures (identified in Step 9)
- Responsibilities and related tasks
- Timeline, planning moments of evaluation
- Resources needed for each measure, considering results of Step 3

- Other issues (if applicable), as e.g. training needs for staff to be able to implement measures, need for external support of experts, etc.

6.1.4 Implementation (Step 11)

After all planning activities, it is now time for the implementation of communication and participation measures. It is the most relevant and time-consuming activity of the whole process. Therefore it is a phase composed by only one step:

- Step 11: Implement communication and participation measures

6.1.4.1 Step 11: Implement communication and participation measures

The chosen communication and participation measures shall now be implemented according the implementation plan, respecting it in all its aspects. Continuous monitoring of activities in regard to the plan is necessary. The plan should be updated regularly, integrating the changes.

An important aspect of this step is to organise a continuous feedback with the target audiences: opinions on the efficacy of the materials/activities should be collected. Additionally it is important that participants receive information about results of activities (e.g. analysis of a survey, final results of a meeting) as well as information on how and for which purpose these will be used.

6.1.5 Evaluation (Step 12)

Risk communication and participation processes need to be monitored and evaluated in order to improve them as a part of an iterative process. Therefore it is necessary to carry out an ex-post evaluation of the participation and communication process.

- Step 12: Evaluate the process

6.1.5.1 Step 12: Evaluate the process

The aim of monitoring the communication and participation process is to observe the effects of the implementation of measures. Evaluation goes beyond this point as it also evaluates the results and the process as such against certain evaluation criteria. Indicators are (IRGC 2005, p. 44):

- intended impacts: How and to which degree were the intended impacts of the process reached?
- non-intended impacts: Did any non-intended impacts occur? Who was affected and to which degree by these impacts?
- policy impacts: Did the process have any direct or indirect impacts on the design of policies?

Methods for carrying out the evaluation process can be e.g. repeating the institutions' self-assessment of risk governance performance, the survey on public risk perception or a 2nd stakeholder workshop.

6.2 General methodological approaches

The following section describes methods and approaches to designing and implementing a flood risk management communication and participation process. The methods are illustrated by examples from the IMRA project. The examples are not equally shared over all case studies because the implementation of the methods by the project partners required very different inputs of resources, e.g. the public exhibition in the Möll case study area or the school project in the Chiascio case study required much more financial and personnel input than e.g. the world café in the Wupper case study.

6.2.1 Stakeholder analysis tool

6.2.1.1 Context and Aim of Method

Support for the selection of all relevant stakeholders at the beginning of a participation process, basis for a context and /or conflict analysis. Additionally the tool enhances the transparency of the stakeholder's selection process.

Field of Application

Risk communication, Participation, Risk governance
Basis for stakeholder selection and support for planning the participation process.

6.2.1.2 How to apply the method

Input and Resources

	first time the method is applied	further applications
Costs:	No costs	No costs
Working days:	2	0 (only done in the planning phase)

Expected results

Result 1: Overview whom to invite for participation and why
Result 2: Transparent selection process

Assessment of Results

- Could all stakeholders that are relevant for the process be motivated to participate in the process?
- Have people stuck in the process been forgotten or needed to be included into the project at a later stage?

Scale of Application

Applicable for all participation planning processes

Degree of implementation

Scientists

6.2.1.3 Example

Table 6: Stakeholder analysis tool for flood risk projects

Stakehol-ders	Goal	Interest	Influence	Affected by project	Legal status	Organi-sation degree	Level	Conflicts
e.g.	local data, know-ledge, support, imple-men-tation, end user	Forecast for planning, risk manage-ment, economic develop-ment	high, medium, low	high, medium, low	e.g. party	high, medium, low	local, regional, national, internatio nal	
Harbours								
Tourism								
NGOs								
Transport/ logistics								
Hydro-power plants								
Insu-rances								
Ware-housing								
Admini-stration								
Civil defence								

Source: Bundesministerium f. Verkehr, Innovation u. Technologie (2008) after Hostmann et al., 2005

6.2.2 Social milieu approach

6.2.2.1 Context and Aim of Method

Attitudes, values and other socio-cultural features that influence risk perception can be assigned to social groups, to “milieus”.

To have a basis for a discussion available, social milieu analyses like e.g. the Sinus Milieus®, developed by the market research companies INTEGRAL (Austria) and SINUS Sociovision (Germany), can be used. These Sinus Milieus® give an overview of social groups on the national level for all case studies. Integral (2009) points out that the Sinus Milieus® combine demographic characteristics such as education, profession and income with the real living environments of the people, which means with fundamental

value orientations and attitudes towards working and leisure time, family and relationship, consumption and politics.

What are the main overarching aims of the method? The social milieus are used to plan the risk communication strategy: to find out the target groups, what to communicate, how to communicate and which channels to use.

Field of Application

Risk communication, Participation, Risk governance

6.2.2.2 How to apply the method

Input and Resources

	first time the method is applied	further applications
Costs:	From 0,-€ (for an analysis on social milieus based on available Data) up to 50,000,-€ for a detailed analysis done by a market research institute	
Working days:	Minimum 1 day for web research, 5-10 for more detailed analysis	Normally done only at the beginning of a project.

Expected results

- Clear picture of target groups and their socio-cultural background and how it possibly influences risk perception
- Risk communication strategy tailored for target groups

Assessment of Results

Assessment of results can be done via a questionnaire (knowledge of risk before – after) if same sample group

Participation level in events and other actions initialised by the project team

Scale of Application

On all scales, the application is only restricted by the availability and/or costs of data about social milieus

Degree of implementation

Project team

6.2.2.3 Example

In the following three figures the Sinus milieus for Austria, Germany and Italy are presented.

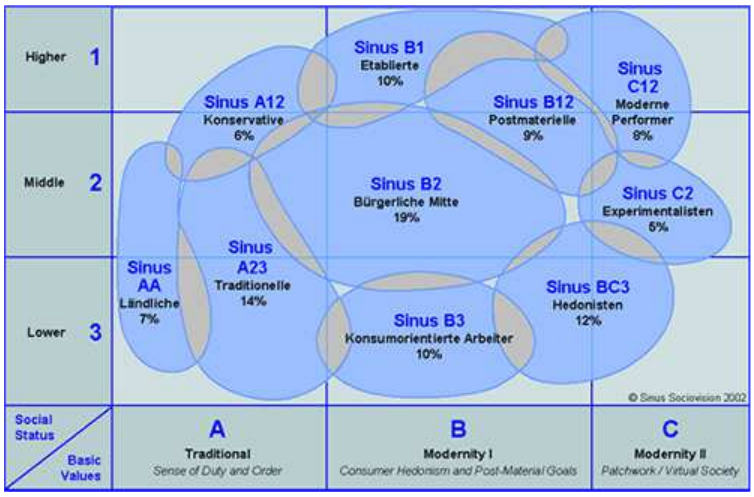


Fig. 8: Sinus Austria

Source: Integral, 2009

Translation Fig. 8: Sinus AA = Rural milieu, Sinus A12 = Conservative milieu, Sinus A23 = Traditional milieu, Sinus B3 = Consumption-orientated working milieu, Sinus B2 = Bourgeois middle class milieu, Sinus B1 = Established milieu, Sinus B12 = Post-material milieu, Sinus BC3 = Hedonist milieu, Sinus C2 = Experimentalists milieu, Sinus C12 = Modern performer milieu.

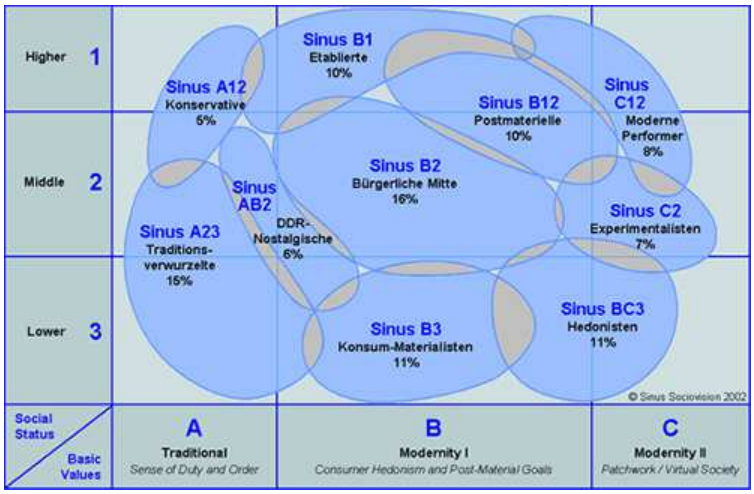


Fig. 9: Sinus Germany

Source: Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit (BMU), 2008, p.54

Translation Fig. 9: Sinus A23 = Traditional milieu, Sinus A12 = Conservative milieu, Sinus AB2 = Nostalgic milieu, Sinus B1 = Established milieu, Sinus B2 = Bourgeois middle class milieu, Sinus B3 = Precarious milieu, Sinus B12 = Post-material milieu, Sinus C12 = Modern performer milieu, Sinus C2 = Experimentalists milieu, Sinus BC3 = Hedonist milieu.

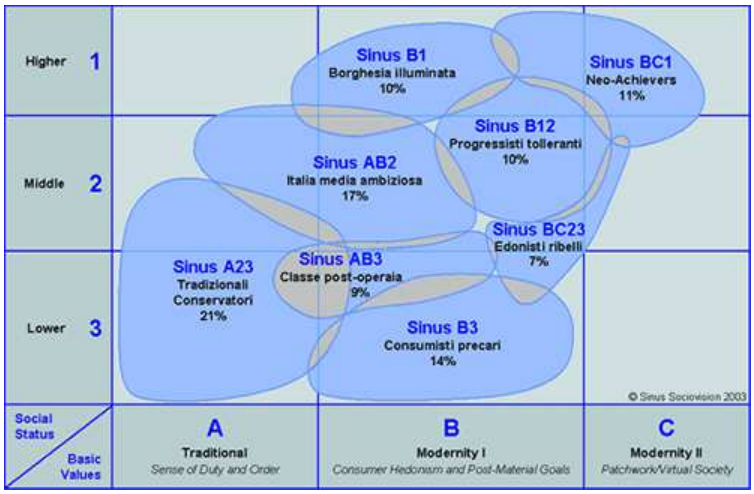


Fig. 10:Sinus Italy

Source: publisuisse 2009

Translation Fig. 10: Sinus A23 = Traditional-conservative milieu, Sinus B1 = Bourgeois enlightened milieu, Sinus AB2 = Status-oriented middle class milieu, Sinus AB3 = post-worker class milieu, Sinus B3 = Precarious milieu, Sinus B12 = Progressive-tolerant milieu, Sinus BC23 = Hedonist rebellious milieu, Sinus BC1 = Neo-Achievers milieu.

According to the social milieu approach different social groups need differently designed information material and various communication channels.

In the Austrian case study the project team hypothesised that most of the local population of the village Großkirchheim do belong to the rural and traditional milieus and the middle class. Additionally the results from the last elections were taken into account as well as statistical data about income, education and economic sectors, age and gender. These assumptions were discussed with the major and local stakeholders, which have additional knowledge about the professions and education of the local population.

According to that know-how low-threshold approaches with a strong focus on historic local events and oral history involving the local population are discussed. All Information material in German was tailored to the specific target groups.

6.2.3 Risk governance assessment tool

6.2.3.1 Context and Aim of Method

The risk governance assessment tool presented here supports decision makers to optimise the quality and performance of the planned and/or implemented risk governance process by evaluating it against a set of ideal risk governance indicators.

Field of Application

Risk communication, Participation, Risk governance
The method enables decision makers in the area of risk governance/communication to optimise the performance of their activities by assessing it along selected “ideal” risk governance indicators.

6.2.3.2 How to apply the method

Input and Resources

	first time the method is applied	further applications
Costs:	< 100 € (without external support); 1,000-2,000 € (with support from external communication expert)	< 100 €
Working days:	4 (reading and understanding self assessment tool; adaptation of indicators and agreement on indicator set; application of indicator set and discussion of results; dissemination of results; each 1 working day)	2 (application of indicator set and discussion of results; dissemination of results; each 1 working day)

Expected results

- Agreement on objectives concerning the authority's planned communication process
- Involvement of relevant staff members and creation of internal risk governance guiding principles
- Clear overview possible about the performance of the complex governance process
- Quick detection of priorities for further actions possible

Assessment of Results

The application of the method can be considered successful if the results of the 2nd or any other consecutive assessment rounds show an improvement in the risk governance performance. Further, similar internal and external assessment results can also be interpreted as a part of a successful application. However, also the implementation of the different steps can be seen as a success as objectives, priorities and responsibilities can be defined.
The results always have to be interpreted within the local or regional context. Due to the need to adapt the indicator set and its categories to the local or regional framework conditions the results can not in any case be used for benchmarking the risk governance process with other processes.

Scale of Application

The tool is very flexible and can be applied at national, regional and local level, even at the level of small decision units such as departments. However, it is mostly applied at the regional and local level where a multitude of stakeholders has to be involved, responsibilities have to be fixed and a broad set of addressees has to be informed.

Degree of implementation

This method shall primarily be applied by authorities that are in charge of carrying out a flood risk communication (management) process. It can further be applied by other relevant stakeholders in order to provide an external perspective.

6.2.3.3 Example

For the self assessment of the risk governance process the same indicators were used as described in the IMRA concept. However, some of the indicators were slightly adapted to the needs and circumstances of the local water authority.
The results show that the local water authority has already achieved some important steps (blue or green, see Table 7) in the following areas:

- access to information
- financial resources
- staff resources
- role

During a stakeholder workshop the risk governance and assessment approach was presented to the participants. The workshop participants represented stakeholders from communities, emergency management, flood risk management, land use planning, economic development, environmental planning etc. from the local as well as regional level.

Table 7: Feedback on self assessment of the local water authority

	Key Performance Indicators	Classification				
		Red Not started	Orange Beginning	Yellow Developing	Green Performing	Blue Improving
Basic / content	**Principles**		XX		X	
	Objectives		XXX			
	Trust		X	X		X
Process	**Accountability principle (internal)**		X	X		X
	Accountability principle (external)		XX	X		
	Justification		X	X	X	
Stakeholder	**Representation**		XX	X		
	Access to information	X	X	X		
	Tolerance process & outcome	X	X		X	
	Dialogue		XXX			
Resources	**Financial resources**	X	XX			
	Staff resources	X	X	X		
Expertise	**Role**		XXX			
Co-ordination and co-operation	**Co-ordination**	X	X	X		
	Co-operation		X	XX		

Source: own elaboration

The self assessment by the local water authority is marked with colours. The estimation results of the three stakeholders are marked with “X”.

The participants were asked to anonymously make their own estimation concerning the quality and performance of the risk governance process of the local water authority. Unfortunately only three

institutions followed this request. The result that is shown in Table 7 is of course not representative but gives an idea how the internal and external views of the local water authority's work converge or diverge, respectively, in this respect.
The feedback results show that in general the external and internal views are not that far away from each other. However, concerning some elements there are significant differences:

- access to information: estimated lower than by the local water authority itself;
- financial resources: significantly lower (red/orange external view compared to green);
- staff resources: significantly lower (red/orange/yellow external view compared to blue);
- role of expertise: here the external experts judge the work of the local water authority rather low (all orange) compared to the local water authority itself.

6.3 Informative approaches

6.3.1 Online communication

6.3.1.1 Context and Aim of Method

Information delivering, citizens' information usage and participation, knowledge sharing and stakeholders' decision-making, are allowed by the Web 2.0 technologies. The use of social network groups is described in the section "Virtual Social Networks" of this report according to their wide diffusion in the society and their proved relevance for managing risk situations.

Field of Application

Risk communication, Participation, Risk governance

6.3.1.2 How to apply the method

Input and Resources

	first time the method is applied	further applications
Costs:	5000 Euros for the first implementation	500 Euros
Working days:	60 days	7 days x month (for maintenance and management)

Expected results

Specific outcomes and main results of the methods are:
- Delivering information on Risk
- Implementing Knowledge sharing (both among stakeholders and citizens)
- Improving citizens' participatory attitudes and citizens' trust
- Improving public awareness of Risk
- Delivering results of decision-making
- Delivering results of specific projects

Assessment of Results

Measurements of successful application are:
- Usability of the on-line tools, accessibility

- Number of visits to the Website
- Page Rank, i.e. the relevance of a web page with its topics
- Users' satisfaction (this is a subjective parameter)

The interpretation of the results produce useful assessment results if a significant set of the identified users is involved for testing subjective parameters, such as user satisfaction.

Scale of Application

The scale on which the method can be applied is Regional and European.

Degree of implementation

On-line tools designer, information designer, e-service planner, citizens and stakeholders are all involved in the implementation.

6.3.1.3 Example

During the IMRA project, some dissemination activities and an on-line presence have been implemented aiming to support the project activities to assure a strong awareness of project objectives and results.
The strategy of dissemination and networking for the IMRA project has enabled the design and the implementation of a set of on-line resources including the dynamic Web site of the project, the definition of on-line groups of citizens and stakeholders using Facebook (Chiascio IMRA- IMRA Stakeholders) – as described in the section on Social Network groups – and an on-line resource service devoted to support specific activities, such as the administration of on-line questionnaires on flood risk.
The URL Website is: http://www.imra.cnr.it. It has been designed and developed both, 1) in order to provide and access contents and resources by the different partners of the project, supporting their communication and discussion, and 2) for the dissemination and promotion of the project contents and results in the stakeholder's communities and between citizens in all the case study areas and, more generally, in all the European States. For this reason it has been designed for supporting three different languages: English, German and Italian; this choice makes the website usable and allows the diffusion of best practice arising by the experiences of the three case studies project.
More services could be implemented, but they require a greatest time person and economic effort. It could be necessary to define a business plan involving stakeholders in order to allow to the defined on-line tools to be usable and useful beyond the project.

6.3.2 Public stand with small exhibition

6.3.2.1 Context and Aim of Method

Main aim of a public stand (e.g. in a pedestrian zone) is to inform the public about flood hazard and flood risk. Such an information stand should be combined with an attractive display of information, e.g. in a small exhibition.

Field of Application

Risk communication, Hazard/Risk Mapping, Risk governance

A public stand provides the opportunity to reach people unintended, just by chance and to open the communication process also to those who normally would not attend public meetings or other information channels.

6.3.2.2 How to apply the method

Input and Resources

	first time the method is applied	further applications
Costs:	1,000-5,000 € for buying first equipment (mobile pavilion, stand-up tables, poster hanging system, ...) 100-1,000 € for printing posters, designing games, brochures, giveaways	< 1,000 €; experience shows that the equipment will be permanently improved due to experiences made at every public stand
Working days:	5-10 working days, depending on time and effort that shall be dedicated to the public stand	1-2 working days, depending also on the number of involved people

Expected results

- Give flood risk management a “face”
- Reach broad variety of different people
- Get people informed about flood hazards and flood risks
- Get people informed about self-protection measures
- Provide information from different stakeholders in one place at the same time
- Visualisation (by stand, posters, staff) helps people to better remember the issues addressed

Assessment of Results

A direct assessment of the results is hardly possible. However, the degree of media coverage, following information requests addressed to the water authority or local authority, orders at handicraft enterprises can be indicators of a successful public stand

Scale of Application

Application scale is the local level.

Degree of implementation

This method shall primarily be applied by authorities that are in charge of carrying out a flood risk communication (management) process. It can further be applied by other relevant stakeholders that can potentially play a role in flood risk management

6.3.2.3 Example

In the case study area of the river Wupper an information stand was set up for half a day on a Saturday morning and early afternoon to inform the public and to offer a dialogue. The following authorities were planned to participate in the information stand:

- Wupperverband (regional water association, responsible for flood risk assessment, implementation and maintenance of flood protection measures, risk communication)
- City of Leichlingen, planning department and waste water department (responsible for urban planning and local water management)
- Fire Brigade of the City of Leichlingen (responsible for flood emergency management); unfortunately had to withdraw its participation shortly before the event
- Handicraft enterprises in the area of flood protection installations for houses; unfortunately only one enterprise participated due to lack of time for preparation

The stand was combined with the “Crossing Wupper” installation: the level of a 100 year flood was visualised by a rope that spanned the river Wupper from one bank to the other.
Local TV and newspapers reported about the stand the following days.

During the four hours about 50 people visited the stand and informed their selves about the IMRA project, flood protection and information activities. It was used by the public to get in contact with representatives from different authorities.

Attracting children by a fishing game and involving adults and older children by a small competition was quite successful.

It took about 1.5 hrs to set up the stand (with 4 people involved) and 1 hr to take it down again. The stand was equipped with 8 people; however, it would have also worked with less.

Fig. 11:Public information stand and visualisation of 100 year flood level

Source: TU Dortmund

6.3.3 Public exhibition

6.3.3.1 Context and Aim of Method

Aim of the exhibition is to raise and stabilise the risk awareness of stakeholders and the broad public on a high level during a time where no flooding occurs.

Field of Application

Risk communication, Participation, Risk governance

6.3.3.2 How to apply the method

Input and Resources

	first time the method is applied	further applications
Costs:	10,000 – 50,000 €	2.500 €
Working days:	5-20 depending on effort for exhibition	5-15 Depending on additional effort for e.g. interviews, research

Expected results

- Exhibition designed for the social milieus that are the target groups
- Translation of technical/scientific know-how into easy-to-understood content
- Visualisation and emotionalisation of flood risk topics
- Achoring the communicative memory of flood witnesses,
- In combination with event at the opening ceremony or during the exhibition also possibility to enforce peer-to-peer communication
- -Makes it easier to gain attention of the media
- Planning with or getting support of stakeholders for the exhibition means working together on a practical task and giving them also the possibility to present themselves in public
- The exhibition can be used as core activity, as interface to additional activities e.g. public discussions, school competitions, invitations to artists to work on the theme, invitation to public to give a short impression on their experiences, celebration if exhibition is handed over to e.g. municipality...

Assessment of Results

- Interest of other communities/regions to get similar exhibition
- Interest of school to participate in such an exhibition
- Media coverage
- Number of visitors
- Do speak people/stakeholder about it (in discussions, interviews ...)

Scale of Application

On all levels, but mainly on the local and regional level

Degree of implementation

Project team together with stakeholders and e.g. in cooperation with flood witnesses, schools artists,...

6.3.3.3 Example

Exhibition "*45 Jahre Hochwasserereignisse 1965/1966*"

Venue: Nationalparkzentrum, Döllach 14, 9843 Großkirchheim, Austria, 6. May 2010 – 30 June 2010

The fact that the time span since the last flood took place in the Austrian subproject concerning the river Möll is more than 40 years, made the communication of the still existing risks a demanding task. Before this exhibition no systematically collection of the flood witness experiences and other information material concerning the flood events in the Großkirchheim has been done.

The idea of such an exhibition was not foreseen in the project plan but emerged during the discussions on how risk awareness could be established. Therefore the financial resources to produce a well designed and target group tailored exhibition used up most of the resources foreseen for communication activities within IMRA.

Additional man power, support of the printing and the loan of exhibition panels, was brought into the project by AKL and the international research society Interpraevent, which made a professional design possible. The project team decided for an exhibition with a low-threshold design that should be attractive and interesting for the defined social milieus.

The exhibition consisted of

- one major panel about the scientific backgrounds (meteorological data,
- hydrological information) of the floods
- 8 panels of information concerning the floods in Großkirchheim
- 3 panels featuring the media coverage 1956/66.

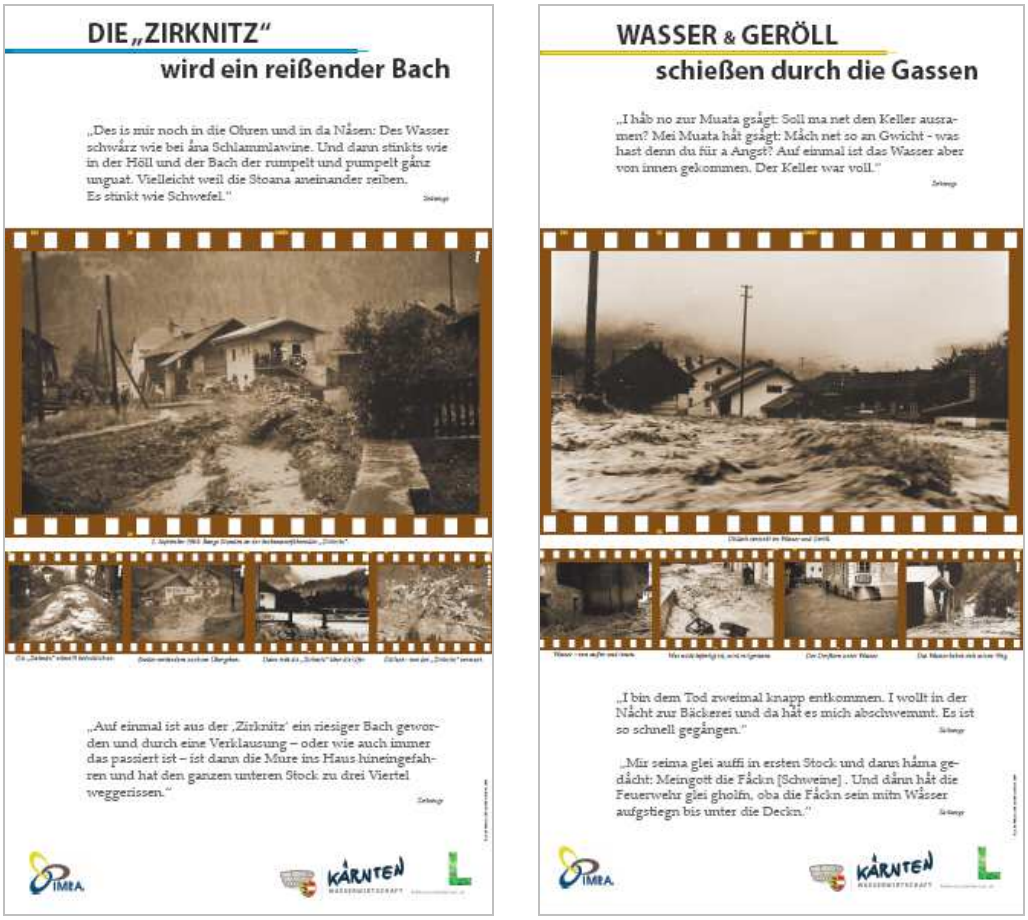


Fig. 12:Examples of exhibition panels (emotional text, regional dialect)

Photo: Susanne Korber, Revital

The exhibition space was shared with a more common and digital exhibition of the Austrian Service for Torrent and Avalanche Control (WLV) to include some additional information about other natural hazards.

The opening of the exhibition was planned as a mixture of an information activity and a social event. It was moderated by the mayor of Großkirchheim, with contributions of AKL, WLV and flood witnesses. The social framework was given by life musical entertainment of the music school and a buffet.
The exhibition was announced in the community newsletter and invitations sent out by AKL and WLV
The mayor estimated that 70-80 persons would attend the opening, but it was a positive surprise when 140 interested people arrived.

Within the opening the flood witness and former freelance journalist Oswald Zuegg donated his extensive collection of photos from the floods 1965/66 to the community of Großkirchheim. Some of his photos were also used for the exhibition

Fig. 13:Flood Witnesses talk about their experiences

Photo: Gernot Koboltschnig, AKL

Some people arrived very early (approximately 1 hour before the opening started) “to be able to take our time to look at the exhibition”. Half of the people stayed after the official part of the opening to socialise with each other, to look at the exhibition or to watch a slide show consisting of 150 single slides of the floods in Großkirchheim and a video about nature hazards. Both were shown in an infinite loop. The last persons left at midnight.

There was also some media coverage about the opening event (see annex). Some other communities of the Möll valley expressed their interest in the exhibition.

6.3.4 Media coverage

6.3.4.1 Context and Aim of Method

Aim of media coverage is to inform the public but also other stakeholders. It helps to keep people up to date about risk management activities. Further it is an important method to make people feel concerned.

Field of Application

Risk communication, Capacity building

Active press/media work in order to inform the public and other stakeholders about news, activities, information sources etc. Detailed information on flood hazards and risks are normally not an issue for the media but media helps to focus the interest of the people on further information sources.

6.3.4.2 How to apply the method

Input and Resources

	first time the method is applied	further applications
Costs:	< 100 € without professional external support	< 100 €
Working days:	> 10 for building up press contacts; this, however cannot be realised on short term; experience shows that it might take years until press/media contacts are established in a way that a press release "automatically" means a successful media coverage	1 for drafting a press release for a certain event or similar activity

Expected results

- Main result is to have a regular information flow from the authority side to the public and to other stakeholders.
- Further the provision of information might activate a public discussion process and increase risk awareness and maybe even concern.

Assessment of Results

- A successful application can be measured in the number of media appearances as well as in the quality of the media reports
- Further it can be measured in the number and intensity of the reactions to a media report (follow-up articles in newspapers, letters to the editor, online comments to web based reports)?

Scale of Application

National, regional, local, sub-local

Degree of implementation

Authority in charge of the flood risk management/communication process

6.3.4.3 Example

In the Leichlingen case study in the IMRA project the goal of the media activities was to promote and report on activities, inform about the project and to increase flood risk perception.
Overall more than 20 media appearances could have been counted within 12 months: 12 reports in newspapers, 9 online reports, 2 local/regional radio appearances and 2 local TV appearances.

Fig. 14:Examples of press reports and radio interview

Source: Rheinische Post, TU Dortmund; Kölner Stadt-Anzeiger

Real activities were important to raise interest for the media. People learned to know about the project, learned about flood risk management activities. In conclusion it was positive how good the media coverage was. It proved to be an important basis for any work.

6.3.5 Educational information

6.3.5.1 Context and Aim of Method

The overarching aim of providing educational information is to inform pupils/students and start a dialogue with the younger generation that normally does not feel addressed by risk communication activities. Further, pupils and especially teachers are important multipliers.

Field of Application

Risk communication, Risk governance, Capacity building

Different concepts possible, depending also on the age of the pupils.
Possible features:

- Interpret and understand existing hazard maps
- Design own flood risk maps and zoning plans
- Identify ideas about protection measures
- Discuss on preferred communication channels for younger generations

6.3.5.2 How to apply the method

Input and Resources

	first time the method is applied	further applications
Costs:	100-1,000 € for compiling teaching material; professional support by teachers is recommended	< 100 €
Working days:	10-15 for designing and testing the concept	1-5 per teaching unit, depending on the extent of the concept

Expected results

Expected result is a more informed group of younger people that also has an important function as multiplier, especially for other students but also for parents.

Assessment of Results

A successful measurement of the application is the number of pupils that could have been directly addressed. Above that it is difficult to measure success as pupils are not house or business owners, meaning that their decisions do not directly lead to improvement of self protection measures or support of flood risk management policies.

Scale of Application

Local scale

Degree of implementation

Stakeholders, authorities in charge of flood risk communication.

6.3.5.3 Example

In the IMRA project an 11th grade class was selected to participate in a “World Café” about local flood hazards, flood risks, protection measures and preferred information channels. Biggest challenge was to find and to contact a class and a teacher who was motivated and had dedicated some time to this approach. However, the feedback on the world café with the opportunity to exchange information about local flood risk management was approved by the pupils.

Another group of young people was taken on a field trip to the Diepental dam where flood protection measures were presented and the reasons for and character of flood events were explained. The field trip provided a vivid picture of the issue.

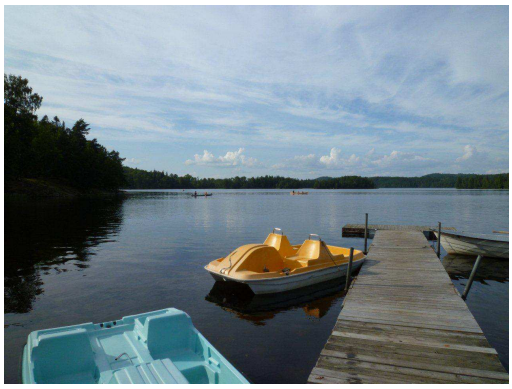



Fig. 15:World Café in local school and field trip to the Diepental dam

Source: TU Dortmund

6.3.6 School competition

6.3.6.1 Context and Aim of Method

The aim of a competition in schools is to build-up risk awareness in the younger generations and encourage a participatory approach to risk management.

Field of Application

Risk communication, Participation, capacity building

Building a participatory approach to risk management is a relevant goal of the method. Involving the education system is the first feature of the method. The second feature consists in defining a pro-active role of the identified parts of the education system, in order to improve their engagement level.

6.3.6.2 How to apply the method

Input and Resources

	first time the method is applied	**further applications**
Costs:	500 Euros per school (for preparing the exposition connected with the competition and the award for the schools)	500 Euros per school (for preparing the exposition connected with the competition and the award for the schools)
Working days:	6 days for preparation and follow-up, 1 day for training per school	6 days for preparation and follow-up, 1 day for training per school

Expected results

The specific outcomes and main results of the method are:

- Specific works produced by students for the competition
- Participation of students and teachers in the discussion on risk

Assessment of Results

A measurement of successful application is the percentage of teachers and students participating in the activities in respect to the identified one in the preparatory phase. Moreover, a subjective measure is also relevant, their level of engagement and satisfaction, directly connected with the participation level.

Scale of Application

The method is applied at local scale.

Degree of implementation

Stakeholders, authorities in charge of flood risk communication.

6.3.6.3 Example

A school competition was implemented, in the framework of the IMRA project, in the area of the Chiascio river basin in Italy. In a first step, both primary schools and secondary schools were invited to participate:

Primary schools:
- Istituto Comprensivo Assisi 2, Municipality of Assisi,
- Istituto Comprensivo La Meridiana, Municipality of Bettona,
- Istituto Comprensivo S. Benedetto, Municipality of Valfabbrica.

Secondary schools:
- Convitto Nazionale, Municipality of Assisi

In total 186 students were involved till the end. Only one of the initially involved classes did not participate at the competition. In addition the rules of the competition were defined: due to the different features of the involved schools, students were asked to produce a collective work, which required their discussion and conceptualisation of flood risk. As a second step the competition was launched in ten classes. One teacher for each class was identified as a contact point. All participants were informed that they had three months for producing their contribution. The results included paintings, brochures, power-point presentations and maps of the area of the Chiascio basin (see figures below).

Scheda campo

ANAGRAFICA STAZIONE

Istituto scolastico: San Benedetto Valfabbrica sez. Casacastalda
Classe: 2°C - 3°C
Data: 4/4/2011 Ora 9.00 Località: Schifanoia - Badia val di Rasina

DESCRITTIVA STAZIONE

Condizioni meteo: sereno
Corpo idrico: T. Rasina
Altezza s.l.m. (m): 330
Temperatura aria: (°C): 13°C - Temperatura acqua (°C): 10°
Distanza dalla sorgente (Km): 14
Zonazione ittica: Barbo
Profondità:15cm (dx) 46,5 cm (centro); 25,21 cm (sx)
Larghezza alveo bagnato (m): 7,30
Velocità della corrente: (m/sec): 0,5 m/sec
Portata: (morbida/magra): Morbida

PARAMETRI CHIMICI

Ossigeno (% sat): 4ppm -35%
pH: 8
Torbidità: 0

Fiume Chiascio

Carta d'identità

- Nazione: Italia
- Regione: Umbria
- Lunghezza: 82 Km
- Portata media: 20 m3/s
- Bacino idrografico: 1.974 Km2
- Altitudine sorgente: 850 m.s.l.m.
- Nasce:Monte Cucco, Umbria
- Sfocia:Tevere
- Territorio Bagnato: Bastia, Bettona, Torgiano, Assisi, Valfabbrica

Origini Inondazioni

Le inondazioni possono essere classificate a seconda dell'origine:

- Inondazioni per precipitazioni "in situ"
- Inondazioni per piene o straripamento di fiumi, laghi o maremme provocate o potenziate dalle precipitazioni, dal disgelo, dall'ostruzione dei letti dei fiumi o dall'azione di maree e venti.
- Inondazioni per la rottura o per operazione scorretta di opere di infrastruttura idraulica

Cause

Naturali: meteorologiche per pioggia

Non meteorologiche: per invasione del mare, disgelo

Non naturali (antropiche): rottura di argini

Cause miste: rottura di una infrastruttura idraulica, per cause meteorologiche

Rimedi contro le inondazioni

- Rispettare la natura non costruendo case sugli argini
- Non disboscare zone a rischio
- Tenere pulite le grate delle strade per raccogliere l'acqua piovana
- Effettuare un controllo periodico dello stato della casa in questo modo si eviteranno o saranno minori gli effetti di una eventuale inondazione
- Mantenere le aree attorno alla propria casa pulite e libere da fogliame, rami od oggetti che possono essere trascinati dall'acqua, per evitare l'accumulo di quest'ultima
- Realizzare costruzioni di difesa come terrapieni, contenimenti, bacini e chiuse per evitare che il fiume superi le rive.
- Realizzare dighe mobili

IL SEGUENTE LAVORO È STATO REALIZZATO IN COLLABORAZIONE CON IMRA
(Integrative flood risk governance approach)

Istituto Comprensivo Bettona

CLASSI IIA e IIB
Scuola Secondaria di I°

Rischio Idraulico nel bacino del CHIASCIO: conoscere per prevenire

a.s.2010/2011

Fig. 16:Examples from the works produced during the students competition (1)

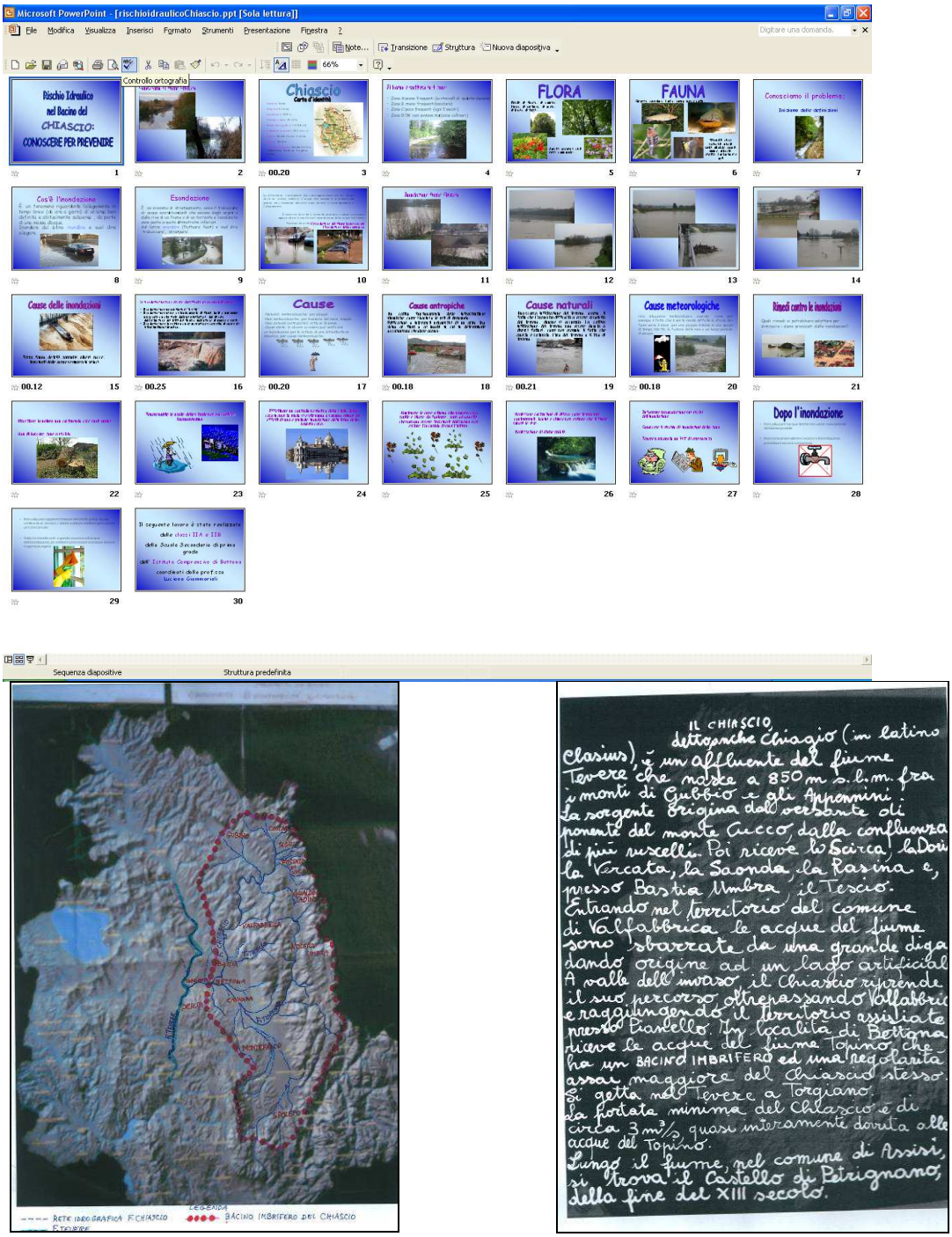


Fig. 17:Examples from the works produced during the students competition (2)

All contributions were presented in an exhibition during a public event on flood risk and each participating school received an award (in this case a financial contribution for educational materials) and a certificate.

In addition all contributions were included in a booklet on the Italian IMRA case study, which was distributed at the final event as well as on the IMRA project website.

Fig. 18: Certificate of participation at the schools competition, and students receiving certification

Fig. 19: Exposition of the students' works during the final event in Assisi

6.4 Consultative approaches

6.4.1 Online chat

6.4.1.1 Context and Aim of Method

Online chat with experts from science and flood risk management practice in order to offer the opportunity to answer questions around the issue of flood risk and flood protection.

Field of Application

Risk communication, Participation, Risk governance

For a pre-defined time span online users can log in the chat room and ask questions to the experts after the questions have been checked and answered, the answers are put online.

6.4.1.2 How to apply the method

Input and Resources

	first time the method is applied	further applications
Costs:	~ 1,000 € for first installation of online chat tool by external provider	~ 200 € once the tool is installed
Working days:	3 for preparation of contents and preparation of technical equipment	<1

Expected results

- Open questions can be answered, even if people wish to stay anonymous
- Answers can be read also by passive participants of the online chat
- Answers can be documented on the website and can be a starting point for a list of “FAQs”.

Assessment of Results

The easiest measurement of the results is the number of participants as well as the quality of the questions (to the point, objective) and the answers.
The number of hits of the documented answers in the following time can be another indicator.

Scale of Application

From regional to local level

Degree of implementation

Authority in charge of risk communication, scientists; but chat could also be offered in co-operation with other stakeholders, so that participants can address their questions to all relevant stakeholders.

6.4.1.3 Example

In February 2011, an online chat was offered to the people living in the Wupper case study area of Leichlingen. The objective of this online chat was to answer questions to flooding and flood prevention.
The online chat was announced on the website of the Wupperverband and the City of Leichlingen, in 4 newspapers and in the local TV. However, in the end it was a rather low participation with only 5 really relevant questions from 4 persons in 2 hrs. After the online chat the following conclusion was drawn:

- More intense internet announcement needed
- Connect chat with some current event
- 1 hour would be enough time

Fig. 20:Website announcement of online chat and answering of questions

6.4.2 Virtual social network

6.4.2.1 Context and Aim of Method

Considering risk communication we have to take into account that social media and social networking groups are gradually gaining an important role in the discussion, exchanging information and, encouraging participation of people in social life.
In fact, the interactive Social Media platforms such as Facebook, LinkedIn, Twitter, YouTube and others have radically changed the communication paradigm, stimulating new ideas, good and innovative practices and challenges. For this reason designing an online community is very important.

Field of Application

Risk communication, Participation, Risk governance

Social virtual networks on a specific topic can be set-up, using existing platforms such as Facebook, LinkedIn, Twitter, YouTube. Social virtual networks are used to create an on-line group of people who have a specific interest on a specific topic.

6.4.2.2 How to apply the method

Input and Resources

	first time the method is applied	**further applications**
Costs:	< 100 € (without external support); 1,000-2,000 € (with support from external communication expert); xx for external technical implementation	< 100 €
Working days:	8 (identification of platform; technical implementation; selection of topics and contents; launch; management of community)	2 (selection of new topics and contents; and management of community)

Expected results

- Definition of virtual social networks at regional and local level for citizens and stakeholders
- Definition of a virtual social network for delivering the IMRA results, connecting this social network with other existing virtual social networks.

Assessment of Results

- Number of community members; numbers of contributions, quality of contributions

Scale of Application

The method can be applied at regional and local level as it is devoted to reinforce the face-to-face existing communities delivering the project actions and events.
A virtual social network group could however also be created at national and European level to deliver specific information and stimulate discussion processes.

Degree of implementation

Regional administrations, water authorities and river basin authorities and districts with the flood risk management planning, scientists, institutional stakeholders, general public

6.4.2.3 Example

During Italian case study activities of the IMRA project, considering that the target communities were the stakeholders and citizens, two groups were created on Facebook, IMRA Stakeholders and IMRA Chiasio; they were also connected with some existing social network workgroups such as the Facebook group “Amici del Chiascio”. They were used only for the project activities.

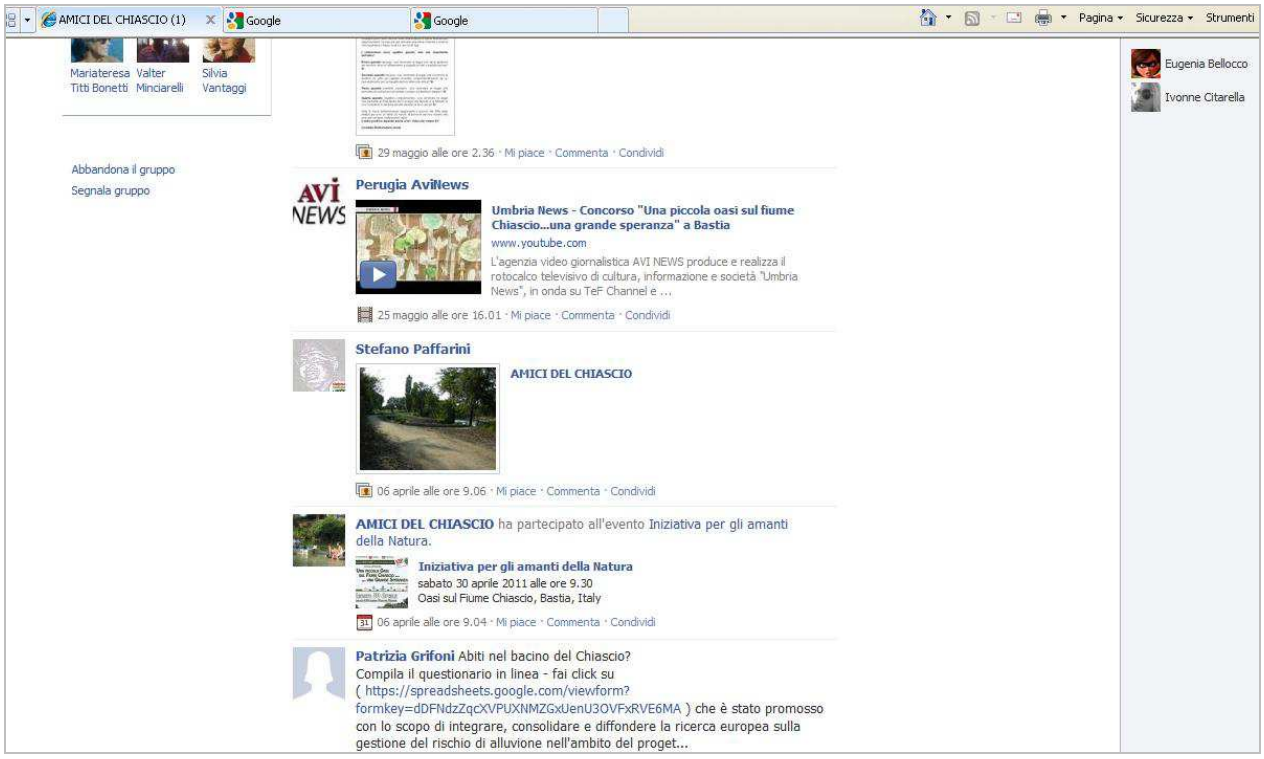


Fig. 21:Website Amici del Chiascio

Fig. 22:IMRA on Facebook

6.4.3 Survey/interviews

6.4.3.1 Context and Aim of Method

A questionnaire can be a qualitative or quantitative tool.

- Quantitative surveys can have different aims: mostly they are used to gain a picture about the status quo of knowledge and interests of the interviewees or to prove a hypothesis. By making a second round of questionnaire with the same interviewees changes of information level or opinions can be found out.
- Qualitative interviews can be used for exploring topics and gaining insight, description and understanding of proceedings, connections, conflicts.

Table 8: Comparison of qualitative and quantitative methods

	Quantitative	Qualitative
Philosophical foundation	Deductive, reductionalist	Inductive, holistic
Aim	To test pre-set hypothesis	To explore complex human issues
Study plan	Step-wise predetermined	Iterative, flexible
Position of researcher	Aims to be detached and objective	Integral part of research process
Assessing quality of outcomes	Direct tests of validity and reliability using statistics	Indirect quality assurance methods of trustworthiness
Measures of utility of results	Generalisability	Transferability

Source: Marshall, 1996

Field of Application

Risk communication, Risk governance, Capacity building

6.4.3.2 How to apply the method

Input and Resources

	first time the method is applied	further applications
Costs:	2,000 – 50,000	2,000 - 50,000
Working days:	20 - 30 (depends on distribution mode and depth of analysis)	15 - 25

- Time effort: depending on the number of interviewees, the method (written interview, telephone interview or personal interview) and the depth of the analysis (more time needed if additional data considered).
- Costs: depending if data for interviewees is bought from or brought in by a marketing specialist, if interviews are done by external experts and if support for statistical analysis is needed.

Expected results

- Results of the survey
- Material for press release

Assessment of Results

- The necessary quantity of questionnaires has be filled out (complete)
- Robustness of results of quantitative questionnaires: the validity of the results is depending on the structure/ the design of the questions of the standardised questionnaire, the number, the statistical representativeness and honesty of the interviewees as well as the statistical competence of the researchers.
- Robustness of results of qualitative questionnaires: individual inputs, not representative, but more insight into topics possible
- Feedback of interviewees: easy to understood and clear questions, are due to the interview now interest in topic etc.
- Useable results for discussion with stakeholders

Scale of Application

on local, regional and national scale

Degree of implementation

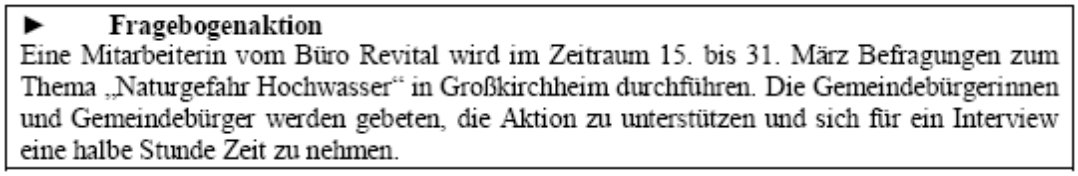
Scientists/ project team

6.4.3.3 Example

The quantitative questionnaire used in the Austrian CRUE-IMRA subproject was based on the draft provided by the project partners from the TU Dortmund. Some questions were adapted due to the regional conditions and the focus of the case study. The survey was in German and in electronic format, but filled out by an interviewer, not the interviewees themselves. The collected data was made available as an excel file.

Fig. 23: Survey Möll case study: Page 2 of the questionnaire

The survey was done in Großkirchheim by a student with a laptop within a week in March 2010 and in March 2011. That student went around in the village trying to find participants for the survey was announced in community newsletter in March 2010



► **Fragebogenaktion**

Eine Mitarbeiterin vom Büro Revital wird im Zeitraum 15. bis 31. März Befragungen zum Thema „Naturgefahr Hochwasser" in Großkirchheim durchführen. Die Gemeindebürgerinnen und Gemeindebürger werden gebeten, die Aktion zu unterstützen und sich für ein Interview eine halbe Stunde Zeit zu nehmen.

Fig. 24: Announcement of interviews via the community newsletter

It was planned to perform the survey by going from house-to-house, but people refused to open the doors or had no time. So most of the interviews were done in pubs and restaurants. The people asked to take part in the survey showed often a quite traditional behavior (e.g. "Please ask my husband…") – like to be expected after the analysis of the sinus groups of the village.

People are not used to questionnaires and after a while of giving straight answers "got warm" and many of them started storytelling. Sometimes the student had to filter the information from the storytelling, because the interviewees digressed. Sometimes the student had to transform the formal character of the questions into more informal formulations. Only a few interviewees preferred to read the questions on the laptop by themselves. Some of the questions were hard to understand – the feedback from the interviews was then used to optimise the second survey. The interviewees were reluctant and did not want to give their name, fearing that some things they tell would be made public. Thus a strong social control within the village could be recognised.

During the interviews the first contacts with flood witnesses could be established and first short interviews were documented with a voice recorder. We also received recommendations for other additional flood witnesses. The goal of an identical sample of interviewees of both rounds could not be reached, only half of the persons were the same.

The detailed results of the 69 interviews of the first and the second round of survey were analysed and are documented in detail in two short German reports. The results of the reports were used in the second workshop with stakeholders as well as for a report in the community newspaper.

6.4.4 School project

6.4.4.1 Context and Aim of Method

Lessons in schools have the goal of providing information on flood risk, stimulating a participatory behaviour and producing capacity building respect to the flood risk in the area where they live.

Field of Application

Risk communication, Participation, capacity building

6.4.4.2 How to apply the method

Input and Resources

	first time the method is applied	further applications
Costs:	1000 Euros for producing materials, such as video, games; 10 Euro per school for copies etc. + possible expenses for transfers	10 Euro per school for copies etc. + possible expenses for transfers
Working days:	50 days	5 days per school (including preparation, implementation and follow-up)

Expected results

Result should be represented by:

- An increased awareness on flood risk and flood risk management
- a more participatory approach of citizens in decision-making and planning activities related with flood risk.

Assessment of Results

Questionnaires and interviews can be used for measuring the awareness and the participatory attitude of students (and more in general of population) before and after the activities in the schools.

Scale of Application

The method can be applied at local level.

Degree of implementation

Stakeholders, authorities in charge of flood risk communication.

6.4.4.3 Example

A school project was implemented in the area of the Chiascio river basin in Italy.
In a first step, both primary schools and secondary schools were invited to participate:

Primary schools:

- Istituto Comprensivo Assisi 2, Municipality of Assisi,
- Istituto Comprensivo La Meridiana, Municipality of Bettona,
- Istituto Comprensivo S. Benedetto, Municipality of Valfabbrica.

Secondary schools:

- Convitto Nazionale, Municipality of Assisi

In total 186 students were involved. The Italian partners of the IMRA project defined the schedule for the 2 hours of planned work in each school. It was approved by the involved teachers. The two main tools used, were a video, introducing the problem of flood risk, and an interactive group game called MONOPAI (in reference to the abbreviation of the Italian name of the Hydrogeological Setting Plan, PAI).

Fig. 25: MONOPAI game

Italian partners of the IMRA project designed and produced the necessary material, in collaboration with an NGO specialised in geology and education (Geologie senza Frontiere onlus).

The main feature of the MONOPAI interactive group game was that a group of students had to allocate a defined number of various types of infrastructure (schools, houses, agricultural areas, train station, hospitals etc) on a stylised flood risk map. In addition the group had to write down the reasons for their choices and present them to the whole group. The Italian IMRA partners created the kit with all necessary material for the game (risk map, small pictures representing the various infrastructures, legends, description of game, paper, glue) as well as the video. The video was focused on the case study, also involving testimonies of people who lived the flood experience in the Chiascio area.

During the two-hour meetings in each school (always two classes were participating together in one lecture), a flood risk expert addressed a brief oral introduction on the topic. Then the video was shown to provide students with background information. After that followed the MONOPAI game, where students worked in groups up to 8 people. Each group presented their results to the whole group, explaining their decisions. A discussion concluded the meeting. As a follow-up each teacher received a CD with the results of the game of their class, photos, the material of the MONOPAI game and the video. They can be used beyond the project. All participating students were invited to a concluding final public event.

Fig. 26:Final Event

6.4.5 World café

6.4.5.1 Context and Aim of Method

The World Café method is quite well established and its main aim is that people get in contact with each other, discuss and develop new ideas by the power of networking with a multitude of people. It can be used for strategic dialogue, multi-stakeholder engagement, multi-generational collaboration and cooperative action (www.theworldcafe.com).

Field of Application

Risk communication, Participation, Risk governance

“The World Cafe is a creative process set in a cafe setting. The event either takes place in an actual cafe or else the room is set up to resemble one as much as possible: participants are seated around small tables with tablecloths and tea, coffee and other beverages. The cafe ambiance allows for a more relaxed and open conversation to take place. Often participants are provided with pens and are encouraged to draw and record their conversations on the paper tablecloths to capture free flowing ideas as they emerge” (People and Participation 2011).

6.4.5.2 How to apply the method

Input and Resources

	first time the method is applied	further applications
Costs:	~100 € if café is accessible and own organisation takes care of moderation etc. >1,000 € if a large number of people is involved, catering, external support and rent for a venue is necessary	100-2,000 €, depending on the framework conditions (see left)
Working days:	6 for understanding the method; preparing the equipment; testing with a sample group; inviting participants; carrying out the world café; documentation of the world café	2-3 for inviting participants; carrying out the world café; documentation of the world café

Expected results

"The World Cafe has been used in many different settings. It is good at generating ideas, sharing knowledge, stimulate innovative thinking, and exploring action in real life situations. The informal and deep conversations that the World Cafe encourages can lead to improved relationships between participants and between wider groups" (People and Participation, 2011).

For a flood risk communication process the specific results of the world café method most likely will be:

- Collect ideas for a cooperative flood risk management process
- Strengthen cooperation among stakeholders
- Create an atmosphere of trust between the public and the political-administrative authorities
- Detect local knowledge from the public/laymen on past flood events/flood hazard
- Detect desires from the public or other stakeholders
- A world café can be the beginning of a vital network among the public and/or relevant stakeholders.

Assessment of Results

The more vital the follow-up process of a world café is, the more successful it can be estimated. Follow-up activities can be a dialogue continuation in another format, building of a network. On the other hand the inclusion of the results into the decision-making process can be considered as the main success of the method.

Scale of Application

Regional or local

Degree of implementation

Stakeholders, scientists, authority in charge of risk communication process.

6.4.5.3 Example

In March 2011 the world café method was applied in the Wupper case study area of Leichlingen in the IMRA project. The objective was to inform about flood risks and learn from citizens' personal experience / information needs. An additional objective was to get in contact with people in order to create an atmosphere of trust between the Wupperverband and the public.

The world café was announced in 2 newspapers and some people received direct invitations by e-mail. It took place in a local café. Although the participation was quite low (15 participants) the results were quite promising as intensive discussions among participants and with stakeholders arose immediately and because the participants approved the method very much.

Concluding, the method succeeded, however, in the future better ways have to be found to attract more people.

Fig. 27:World Café in Leichlingen, Wupper case study area

Source: TU Dortmund

6.5 Decision-making approaches

6.5.1 Stakeholder workshop

6.5.1.1 Context and Aim of Method

Main aim of the method is to bring together all relevant stakeholders in the area of flood risk management and to identify responsibilities and competences in the different fields of flood risk management (information management, non-structural measures/planning, technical measures, disaster management etc.). Bringing together the different stakeholders as such and have an open discussion often is already a success.

Field of Application

Risk communication, Emergency planning, Risk reduction

Use the opportunity to have all relevant stakeholders at hand in order to get to know each other, exchange information, discuss etc., form a network; certain core questions can be discussed and agreements made; appropriate communication techniques may support this

6.5.1.2 How to apply the method

Input and Resources

	first time the method is applied	further applications
Costs:	100-1,000 € depending on the number of participants, catering, costs for room rent	100-1,000 € depending on the number of participants, catering, costs for room rent
Working days:	5 for identifying stakeholders, compiling list of contacts, sending invitations, conceptualising workshop, arranging venue, catering etc., carrying out workshop, documentation of workshop	3 for sending invitations, arranging venue, catering etc., carrying out workshop, documentation of workshop

Expected results

- Network of stakeholders
- Basis for trust between stakeholders
- Contacts are easier in the future
- Give stakeholders a “face”
- Define common views/perceptions

Assessment of Results

Prerequisites for success

- Identify the relevant stakeholders
- Present striking title for the workshop and suggest interestion and/or controversial questions/theses
- Give stakeholders the feeling that their participation will provide them added value
- Thoroughly conceptualise the workshop

Scale of Application

Any scale, for flood risk management especially regional and local scale

Degree of implementation

Stakeholders

6.5.1.3 Example

In the IMRA project in each case study area two rounds of stakeholder workshops were organised.

<u>First workshops</u>
Target group of the first workshops were those stakeholders that have a responsibility for the implementation of the flood risk management process. Preliminary project results were presented and discussed.

In case of the Wupper case study workshop 23 participants from regional and local government, fire brigades, Wupperverband, Chamber of Industry and Commerce etc. The workshop had the following objectives:

- feedback on planned survey
- identification of responsibilities
- presentation of self-assessment tool
- Further, general questions on public information and participation were discussed:
- How to involve the public effectively in the process of setting up flood risk management plans from the early beginning?
- To what extent has risk perception of individuals played a role for flood risk management of public authorities and how is it possible to make better use of it for future processes?
- How could proper risk awareness not only be achieved, but then kept for a long time?

Second workshops

The second round of workshops was used for presenting the final results together with all relevant stakeholders and served as a final validation of the project's work in the stakeholders' view. Moreover, external experts gave additional input on flood risk management related issues.

Fig. 28:During the stakeholder workshop: identification of responsibilities

Source: TU Dortmund

6.5.2 Public workshop

6.5.2.1 Context and Aim of Method

Main aim of the method is to bring together stakeholders and the public and to inform and discuss flood risk management related issues.

Field of Application

Risk communication, Risk Governance, Risk reduction

Use the opportunity to have a group of people from public at hand in order to inform, exchange information, discuss etc.; certain core questions can be discussed; appropriate communication techniques may support this

6.5.2.2 How to apply the method

Input and Resources

	first time the method is applied	further applications
Costs:	100-1,000 € depending on the number of participants, catering, costs for room rent	100-1,000 € depending on the number of participants, catering, costs for room rent
Working days:	5 for preparing and sending invitations, conceptualising workshop, arranging venue, catering etc., carrying out workshop, documentation of workshop	3 for preparing and sending invitations, arranging venue, catering etc., carrying out workshop, documentation of workshop

Expected results

- Basis for trust between stakeholders and the public
- Give the public the opportunity to present their own view
- Give stakeholders a “face”
- Define common views/perceptions

Assessment of Results

Prerequisites for success

- Identify the relevant group from the public that shall be invited
- Present striking title for the workshop and suggest interestion and/or controversial questions/theses
- Give the public the feeling that their participation will provide them added value
- Thoroughly conceptualise the workshop

Scale of Application

Any scale, for flood risk management especially local scale

Degree of implementation

Stakeholders, the public

6.5.2.3 Example

In the IMRA project an information workshop was organised to present and to discuss the planned survey. The results and suggestions were finally integrated into the final version of the questionnaire.

Unerwartete Gefahr: Wupperhochwasser

LEICHLINGEN (LH) Das letzte Hochwasser in Leichlingen ist knapp 100 Jahre her, die Erinnerung daran verblasst. Dass in der Blütenstadt das Risiko von Hochwasser und den damit verbundenen Gefahren besteht – darüber will eine Infoveranstaltung die Leichlinger am 1. Juli im Ratssaal aufklären. Die Stadt lädt gemeinsam mit Wupperverband und der technischen Universität Dortmund zu dem Abend ein. Auf der Agenda: ein vom Wupperverband unterstütztes Forschungsprojekt der Dortmunder Hochschule, das sich mit der Wahrnehmung von Hochwasserrisiken in der Öffentlichkeit beschäftigt. Das Bewusstsein dafür und die Eigenverantwortung der Bürger sollen geweckt werden. Unter anderem durch eine Umfrage, die Anfang Juli an ausgewählte Haushalte auch in Leichlingen verschickt wird. Wichtiges Thema auf den Fragebögen: Wie können Bürger über Hochwassergefahren am besten informiert werden. Auf der Veranstaltung sollen Ansätze zur Kommunikation von Hochwasserrisiken und die Umfrage vorgestellt werden. Angesprochen, so teilt der Wupperverband mit, seien vor allem Bürger, die in der Nähe zur Wupper wohnen.

Infoveranstaltung zu Hochwasserrisiken der Wupper am Donnerstag 1. Juli, 17.30 Uhr, Ratssaal im Rathaus, Büscherhof.

Fig. 29: Information meeting with the public and invitation note in local newspaper

Source: TU Dortmund

6.6 Transferability of methods and approaches

Any kind of guidance or handbook has to deal with the following questions: Which of the recommendations compiled from literature or case study experiences can be transferred to other cases? Are the applied and tested methods and approaches flexible enough? Which elements are generally transferable and which are context related and have to be adapted to other circumstances?

The following section points at some circumstances that determine the transferability of the suggested methods and approaches.

6.6.1 Role of specific contexts

The 12-step approach presented here is a general frame for involving and informing stakeholders and the public in flood risk management. It can be generally applied to other cases. The specifications within each step and the design of approaches and methods, however, need to take a look at specific contexts because every case has its own context and specificities which depend on the characteristics of the risk setting itself (e.g. existing level of acceptance with respect to risk governance), political (e.g. legal system), economic, social (e.g. risk culture), institutional and other aspects. These characteristics have a large influence on the implementation of any concept for participatory flood risk management. Therefore aspects/questions, which should be stressed in this context, are:

- What kind of risk type does exist?
- What kind of administrative/institutional type characterises the case study?
- Which parts of the concept have to be modified?
- How are the structure and type of the affected stakeholders?
- How to deal with stakeholders that do not speak English?
- What does the access to local stakeholders/decision makers look like?

Context of scale
One major issue is the question of how large the flood risk management area is. Is the catchment area or the area of intervention local or regional? How large is the population that is potentially affected by flood hazards? And which stakeholders have to be informed? What is the share of the potentially affected population?

The extent of the area of intervention determines to a large degree which approach or method can be applied. In very general terms the approaches can be characterised as follows:

- Large areas/regional scale: In this case not everyone may be reached by the information or participation campaign. Further, the level and character of the analysis has to be adapted to the large number of people or extent of the area, respectively. Decision-makers have to make use of methods and instruments where they are able to reach a large number of people taking into account their often limited resources. These methods can be e.g. the use of mass media (newspapers, TV spots, radio), written or online surveys that can be sent to households or companies and more or less automatically analysed, exhibitions at strongly frequented venues, work with multipliers etc.
- Small areas/local scale: If only a small area and a limited number of people are concerned, information can address people directly by oral interviews (for the analysis), direct involvement in public events like workshops or others. Internet based approaches might be less useful than direct contacts between decision-makers and the public.

Context of responsibility
Another aspect is how the responsibilities for flood risk management are distributed among different authorities. Who are the responsible stakeholders? Who is responsible for flood hazard and flood risk assessment? Who is responsible for informing the public? Who is responsible for deciding on flood protection measures? Who is responsible for implementing flood protection measures?

The analysis of the scientific literature concerning different projects handling risk governance has shown that research on risk as well as risk management practice is fragmented by subject and according to the budget-holding organisations involved. This might be evaluated as a problem according to the responsibilities which may lead to failure of the risk governance process in times of e.g. immediate

danger. The complexity of the flood risk management regime has to be taken into consideration before designing a flood risk management approach:

- Large set of stakeholders with complex structure of responsibilities: First it is necessary to identify who the relevant stakeholders are at all. The more stakeholders are involved, the more there is the need to start a dialogue and information exchange process between the stakeholders such as water authorities, land-use planning, landscape planning, "experts" (e.g. engineers and researchers), local authorities, regional authorities, emergency management, etc. This is a basis for the coordination of activities and for a cooperative flood risk management process which needs a large quantity of trust and openness among stakeholders.
- Limited number of stakeholders with clear responsibilities: Also in this case cooperative approaches in a coordinated flood risk management approach are needed, however, the process can start quicker, as the step of stakeholder identification and the identification of responsibilities can be done with less effort.

Other contexts

Another problem is the understanding of "risk" (see also before). Risk can be understood in a broad sense as a combination of the probability of occurrence and the extent of the consequences of the impacts understood as adverse effects. However, there are significant differences between "true" and "perceived" risk (different interpretation according to individual and social contexts). Subsequently there should also be a distinction between the factual and the "socio-cultural" dimension of risk. It should be underlined that a public decision-making, which is only based on the factual dimension of risk, leads to distrust and makes vulnerable both institutional settings and affected individuals. As a consequence, more public participation in risk assessments and decision-making is needed in order to make the process more democratic, improve the relevance/quality of technical analysis and increase the legitimacy and acceptance of public decision-making.

Further, there is a distinction of the problems related on the one hand to the context and on the other hand to organisational aspects. It is obvious that some of the mentioned hindrances or problems could fit in both categories:

- Context related problems/hindrances: problem of politicians (oppositions) that do not want to be involved because they need the opponents' failures to strengthen their own politics; different cultural habits/ways of dealing with risks but also distrust in authorities; no/low access to real decision-making; Problems of understanding (missing common languages, different knowledge base); non-transparency of the process/problem.
- Problems/hindrances related to organisational aspects: no proper representation of all stakeholder groups in the participation process; problems of understanding (missing common languages, different knowledge base); lack of time and financial resources for intensive participation; lack of engagement/interest of potentially affected stakeholders; lack of acceptance (valid for all involved actors), e.g. caused by poor integration.

A key element to deal with the mentioned problems is to involve people and stakeholders from the very beginning. Some of the problems such as distrust in authorities, access to decision-making, difficulties in understanding, non-transparency, missing stakeholders and acceptance can be minimised with governance related approaches. An important partner in this respect is the media, which helps to inform the public about planned activities.

More generally, all those approaches that relate very much on specific instruments or tools such as zoning ordinances, formalised participation processes etc. will often fail to be transferred because of the specific local situation. Much more promising is the optimisation of outcomes by a rationalisation of the process itself. The 12-step IMRA approach aims at such a process optimisation. This is clearly in line with EU

legislation where some Directives already prescribe process steps that have to be implemented in the member states according to their frameworks. This also supports the subsidiarity principle.

6.6.2 Role of legal and administrative background of planning systems

Importantly, it is the definition of risk that affects the risk policy. Moreover, defining a risk is an exercise in power in view of existing ambiguity. In European member States, governed according to law, the existing legal framework serves as normative basis for any risk assessment and risk management, to be taken by public as well as private bodies. This frame differs considerably among European countries and can be grouped into different administrative families, as shown by the following figure.

Apart from legal factors, individual risk perception is also shaped by how the community or a certain socio-cultural milieu generally deals with a special type of risk or risky situations. What applies to individuals can also be observed between different societies, which each share a common legislative and cultural basis. An important and interesting aspect of risk perception is thus the variation in different cultural (regional, national) contexts, a perspective studied within the cultural risk paradigm. Risk perception enters the risk management equation through differing estimations on, for example, how probable an event may be, and how much money is to be spent on preparedness.

The given differentiation in legal and administrative families influences particularly the way in which decisions are taken and prevention actions are planned, though the EU Flood Risk Management Directive sets a common ground. In some of the EU Member States (particularly in the Germanic family), a new development is legally allowed when it is conforming to the land use as laid down in legally binding plans. This so called regulatory function of planning is known under the term “conforming planning” in the international discourse on planning theory (Rivolin 2009, Larsson 2006). In other EU Member States (i.e. the Napoleonic family), the so called development function dominates, which is discussed under the term “performing planning”. This planning type is characterised by legally non-binding programmatic and/or strategic statements. Potential projects are then evaluated against the question whether they support the implementation of the programme or strategy. Furthermore, there are – if at all – only partially binding effects for the subordinated local level. In Eastern Europe, however, management policies are characterised by a deep distrust in any long-term strategic planning approach – due to the experiences these cultures made with planning during the communistic epoch.

However, the legal framework determines how strategies and measures for risk management are designed and by which institutions they are implemented. As an example, the setting of legally binding and spatially specific objectives (e.g. to keep an area free of further settlement development) presumes that there are laws enabling the enactment and enforcement of such spatial objectives. Thus, the differences in the planning systems shall be taken into consideration for deriving management options.

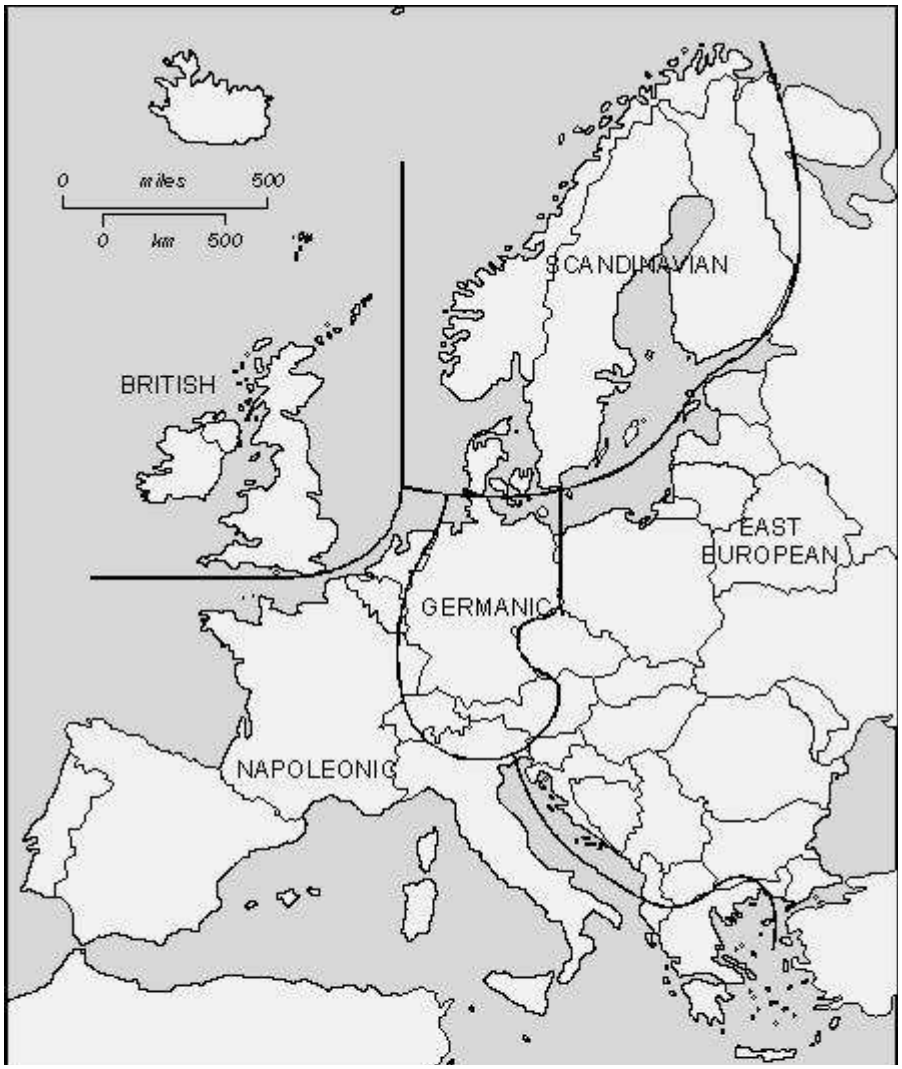


Fig. 30:The legal and administrative 'families' of Europe

Source: Newman & Thornley 1996, p.29

6.7 Applicability and suitability of methods

This section provides overviews of the methods and approaches presented in the following chapters with relevance to the spatial scale, resource input and the cultural/planning related background. The tables will help to identify the right measure for the specific purpose and setting.

6.7.1 Scale oriented applicability of methods and measures

This part contains messages about the dedication of measures in relevance to the spatial scale. The level of implementation of measures and application of methods chosen in this report is the local scale, taking into account that the term „local" stretches from a quarter or a small alpine village, e.g. up to large district-free cities. The stakeholders responsible for carrying out the information and communication process,

however, could also be regional authorities. As the IMRA project as such but also the outputs (final report, handbook) are focused on the work in local surroundings and are based on local case study experiences the applicability of the results is focused on local approaches.

Table 9: Scale oriented applicability of methods and measures

Method	Local level (cities, towns)	Sub-local level (villages, quarters)
General		
Stakeholder analysis tool	highly recommended as stakeholders often have overlapping responsibilities and on the other side responsibilities might not be covered by authorities; potential for conflicts	recommended in order to identify responsibilities; however, at the sub-local level responsibilities might be clearer due to contacts of stakeholders on personal, more informal levels
Social milieu approach	recommended; although no homogenous social milieu for the entire area can be expected; but knowing about the share of each milieu helps to tailor the communication strategy	recommended; at the sub-local level certain quarters or villages may even be represented by just one or two social milieus
Risk governance assessment tool	recommended; internal and external evaluation of risk governance performance of the responsible regional or local authorities	recommended; even small authorities at the local/sub-local level can assess the quality of their governance approach with the tool
Information		
Online communication	recommended in case a certain minimum number of participants has to be reached	partly recommended as personal involvement might be appreciated more by the public; some people do not have any internet access (e.g. elderly people)
Public stand with small exhibition	recommended, especially whenever areas with high pedestrian frequency can be used	partly recommended as pedestrian frequency might be too low at the sub-local level
Public exhibition	partly recommended; exhibition must be able to reach a broad range of (different) people, difficult to attract a large number of people to a topic where only a part of the citizens might be affected	highly recommended, especially if citizens played an active role in the preparation of the exhibition; eye witnesses and/or locally well-known people shall be involved
Media coverage	highly recommended because a potentially large number of people can be reached with moderate effort; reporting in media shall be coupled with recent activities	recommended; in small villages, however, citizens already know about certain activities (by personal contacts) before they are reported in the media; media reports help to inform people from neighbouring towns about local activities
Educational information	partly recommended; either large effort to go into several schools and classes (in order to create an effect at the city scale) or rather low effect if only a few classes are involved	highly recommended as it might be often possible to reach almost all pupils by carrying out activities in a few classes

Method	Local level (cities, towns)	Sub-local level (villages, quarters)
School competition	highly recommended as competitions with pupils from several schools, especially in combination with an exhibition, attracts students, teachers and parents as well as people passing by	highly recommended as competitions with pupils from several schools, especially in combination with an exhibition, attracts students, teachers
Consultation		
Online chat	recommended if carried out with a recent event (e.g. flood event) and if potential users can be reached online/by e-mail	not recommended as people might not approve anonymous way of information exchange/consultation
Virtual social network	recommended if moderation/maintenance of social network group can be guaranteed; opportunity to involve people in larger communities	not recommended as people at the sub-local level might not approve anonymous way of information exchange/consultation; further it might be in conflict with data privacy
Survey: interviews or questionnaires	recommended in order to receive feedback from a large number of people, especially by online questionnaires or in combination with written questionnaires; can be complemented by interviews to gain more detailed information by key stakeholders or flood witnesses	interviews highly recommended as it helps to detect local knowledge and provides deep insight into how people think about flood risk management activities; able to reach people at sub-local scale quite well
		questionnaires not recommended as sample group can be too small at sub-regional level, not easy to gain representativeness
School project	partly recommended; either large effort to go into several schools and classes (in order to create an effect at the city scale) or rather low effect if only a few classes are involved	highly recommended as it might be often possible to reach almost all pupils by carrying out activities in a few classes
World café	highly recommended whenever a large number of people shall be brought together and new ideas shall be generated and exchanged	recommended whenever a large number of people shall be brought together and new ideas shall be generated and exchanged; depends on total number of participants to be expected as minimum number is required
Common decision-making		
Stakeholder workshop	highly recommended as this is a necessary prerequisite to discuss on options for co-operation and co-ordination of activities; establishment of personal contacts as additional aspect	highly recommended as this is a necessary prerequisite to discuss on options for co-operation and co-ordination of activities; establishment of personal contacts as additional aspect, also between stakeholders/the public
Public workshop	highly recommended as this is a necessary prerequisite to build trust between authorities, the media and the public; establishment of personal contacts as additional aspect; media to report on workshop	highly recommended as this is a necessary prerequisite to build trust between authorities, the media and the public; establishment of personal contacts as additional aspect; media to report on workshop

Source: own elaboration

6.7.2 Required input of resources for the application of methods and measures

This section provides a quick overview of resources needed to apply a certain method or approach. The information is based on real costs/efforts needed in the case study work of the IMRA project and was supported by long experience of the involved flood risk management authorities.

Table 10: Required input of resources for the application of methods and measures

Method	Financial resources		Personnel resources	
	First application	Further applications	First application	Further applications
General				
Stakeholder analysis tool	0 €	Normally done only once in the beginning of a project	2 working days (draft of tool adapted for topic, preparation of meeting with core stakeholder, discussion /meeting, summary of results)	Normally done only once in the beginning of a project
Social milieu approach	0 € for an analysis on social milieus based on available Data Up to 50,000 € for a detailed analysis done by a market research institute	Normally done only once at the beginning of a project	1 working day minimum for data research on the web (depending on available data) 5-10 working days (analysis of needs, contract with market research companies, selection of offers, discussion of results and consequences for communication strategy)	Normally done only once at the beginning of a project
Risk governance assessment tool	< 100 € (without external support); 1,000-2,000 € (with support from external communication expert)	< 100 €	4 working days (reading and understanding self assessment tool; adaptation of indicators and agreement on indicator set; application of indicator set and discussion of results; dissemination of results; each 1 working day)	2 working days (application of indicator set and discussion of results; dissemination of results; each 1 working day)

Method	Financial resources		Personnel resources	
	First application	Further applications	First application	Further applications
Information				
Online communication	5,000 Euros for the first implementation	500 Euros	60 working days	7 working days x month (for maintenance and management)
Public stand with small exhibition	1,000-5,000 € for buying first equipment (mobile pavilion, stand-up tables, poster hanging system, ...); 100-1,000 € for printing posters, designing games, brochures, giveaways	< 1,000 €; experience shows that the equipment will be permanently improved due to experiences made at every public stand	5-10 working days, depending on time and effort that shall be dedicated to the public stand	1-2 working days, depending also on the number of involved people
Public exhibition	> 10,000 up to 50,000 for buying first equipment, printing costs if not possible to print in-house, professional layout of posters, buffet, external support for recherché etc.	> 2,500 €	5-20 working days, depending on the effort for exhibition (research, layout, invitations, framework programme, press releases, moderation). If interviews with flood risk witnesses needed add more time	5-15 working days depending, if new researches are necessary
Media coverage	< 100 € without professional external support	< 100 €	> 10 working days for building up press contacts; this, however cannot be realised on short term; experience shows that it might take years until press/media contacts are established	1 working day for drafting a press release for a certain event or similar activity
Educational information	100-1,000 € for compiling teaching material; professional support by teachers is recommended	< 100 €	10-15 working days for designing and testing the concept	1-5 working days per teaching unit, depending on the extent of the concept
School competition	500 Euros per school (for preparing the exposition connected with the competition and the award for the schools)	500 Euros per school (for preparing the exposition connected with the competition and the award for the schools)	6 working days for preparation and follow-up, 1 day for training per school	6 working days for preparation and follow-up, 1 day for training per school

Method	Financial resources		Personnel resources	
	First application	Further applications	First application	Further applications
Consultation				
Online chat	~ 1,000 € for first installation of online chat tool by external provider	~ 200 € once the tool is installed	3 working days for preparation of contents and preparation of technical equipment	<1 working day
Virtual social network	< 100 € (without external support); 1,000-2,000 € (with support from external communication expert); xx for external technical implementation	< 100 €	8 working days (identification of platform; technical implementation; selection of topics and contents; launch; management of community)	2 working days (selection of new topics and contents; and management of community)
Survey: interviews or questionnaires	Depends on distribution mode and depth of analysis 0 € if done by yourself Up to 50,000 with support of an expert for surveys (if representativenes needed, external expert for interviews or statistical analysis)	>25,000 with support of an expert for surveys (if representativeness needed and done with interviews)	Depending on the length of questionnaire, the method (internet, paper, telephone, face-to-face-interview) and the number of persons. Steps include the design of the questionnaire, contact/distribution to interviewees, collection, interpretation of results 20 -30 working days	15 -25 working days
School project	1,000 Euros for producing materials, such as video, games; 10 Euro per school for copies etc. + possible expenses for transfers	10 Euro per school for copies etc. + possible expenses for transfers	50 working days	5 working days per school (including preparation, implementation and follow-up)
World café	~100 € if café is accessible and own organisation takes care of moderation etc. >1,000 € if a large number of people is involved, catering, external support and rent for a venue is necessary	100-2,000 €, depending on the framework conditions (see left)	6 working for understanding the method; preparing the equipment; testing with a sample group; inviting participants; carrying out the world café; documentation of the world café	2-3 working for inviting participants; carrying out the world café; documentation of the world café

Method	Financial resources		Personnel resources	
	First application	Further applications	First application	Further applications
Common decision-making				
Stakeholder workshop	100-1,000 € depending on the number of participants, catering, costs for room rent	100-1,000 € depending on the number of participants, catering, costs for room rent	5 working days for identifying stakeholders, compiling list of contacts, sending invitations, conceptualising workshop, arranging venue, catering etc., carrying out workshop, documentation of workshop	3 working days for sending invitations, arranging venue, catering etc., carrying out workshop, documentation of workshop
Public workshop	100-1,000 € depending on the number of participants, catering, costs for room rent	100-1,000 € depending on the number of participants, catering, costs for room rent	5 working days for preparing and sending invitations, conceptualising workshop, arranging venue, catering etc., carrying out workshop, documentation of workshop	3 working days for preparing and sending invitations, arranging venue, catering etc., carrying out workshop, documentation of workshop

Source: own elaboration

6.7.3 Planning families related suitability of methods and approaches

As described before the legal framework determines how strategies and measures for risk management are designed and by which institutions they are implemented depending on the underlying planning culture. Planning systems are characterised by different administrative cultures, preferences in planning approaches (conforming vs. performing planning etc.) such as Napoleonic, British, Scandinavian, Eastern European and Germanic.

Thus, the differences in the planning systems shall be taken into consideration for deriving management options. The following table gives an overview, which methods and approaches might appear most suitable against the background of the different European planning families.

Table 11: Planning families related suitability of methods and approaches

Method	Napoleonic	British	Scandinavian	Germanic	East European
+ = highly recommended o = recommended - = recommended under certain circumstances	Development function dominates; legally non-binding programmatic and/or strategic statements	Characterised by national level planning; only strategic planning at the regional level	Local self-government is seen as one of the cornerstones; the role of the local land use planning level is the most influential	New development legally allowed when it is conforming to the land use as laid down in legally binding plans	Management policies are characterised by a deep distrust in any long-term strategic planning approach
General	**Strategic planning approach needs evaluative elements**	**Strategic planning approach needs evaluative elements**	**Need to tailor communication strategy towards local implementation level**	**Need to tailor communication strategy towards local implementation level**	**Need to tailor communication strategy in order to increase trust in decision-making**
Stakeholder analysis tool	+	+	+	+	+
Social milieu approach	o	o	+	+	+
Risk governance assessment tool	+	+	o	o	+
Information	**Information important but has to be supported by elements of consultation in order to design and agree on strategic approaches**	**Information important but has to be supported by elements of consultation in order to design and agree on strategic approaches**	**Provision of information necessary in order to keep people informed about different implementation steps within the planning process**	**Provision of information necessary in order to keep people informed about different implementation steps within the planning process**	**Provision of information necessary in order to keep people informed about different implementation steps, educational information as important basis**
Online communication	o	o	o	o	-
Public stand with small exhibition; Public exhibition	o	o	+	+	o
Media coverage	+	+	+	+	+
Educational information; School competition	o	o	+	+	+

Method	Napoleonic	British	Scandinavian	Germanic	East European
+ = highly recommended o = recommended - = recommended under certain circumstances	Development function dominates; legally non-binding programmatic and/or strategic statements	Characterised by national level planning; only strategic planning at the regional level	Local self-government is seen as one of the cornerstones; the role of the local land use planning level is the most influential	New development legally allowed when it is conforming to the land use as laid down in legally binding plans	Management policies are characterised by a deep distrust in any long-term strategic planning approach
Consultation	**Important in order to design and agree on strategic approaches well in advance**	**Important in order to design and agree on strategic approaches well in advance**	**Consultation at local level needed and possible due to strong role of local level**	**Consultation at local level needed and possible due to strong role of local level**	**Important for increasing quality and acceptance; participation however often not approved, approaches to motivate people needed**
Online chat	+	+	+	+	-
Virtual social network	+	+	-	-	-
Survey/interviews	o	o	o	o	+
Survey/questionnaire	o	o	+	+	-
School project session	-	-	-	-	-
World café	+	+	o	o	+
Common decision-making	**Workshops as important method to involve stakeholders and the public**	**Workshops as important method to involve stakeholders and the public**	**Workshops as important method to involve stakeholders and the public**	**Workshops as important method to involve stakeholders and the public**	**Workshops as important method to involve stakeholders and the public**
Stakeholder workshop	+	+	+	+	+
Public workshop	+	+	+	+	+

Source: own elaboration

6.8 References allocated to methods

Stakeholder analysis tool

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Risk governance assessment tool

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Michelsen, G., Godemann, J. (Hrsg.) (2005) „Handbuch Nachhaltigkeitskommunikation. Grundlagen und Praxis“. OEKOM-Verlag: München.

Public exhibition

Media coverage

Local Government - Improvement and Development (2011) “Media relations”. Online: http://www.idea.gov.uk/idk/core/page.do?pageId=7816298.

wikiHow (2011) “How to Write a Press Release”. Online: http://www.wikihow.com/Write-a-Press-Release

Educational information

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School competition

Online chat

Virtual social network

Survey/interviews

Marshall, M.N., (1996) “Sampling for qualitative research”, Oxford University Press, Vol. 13, No. 6.

School project session

World café

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Public workshop

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7 Contribution of the project to the overarching topics of the call

7.1 Connection to the Flood Risk Management Directive

The IMRA Project contributes to the realisation of the requirements of the Flood Directive 2007/60/EC mainly by improving the acceptance basis for not only the assessment with its key elements of hazard and risk maps, but also the management plans. Generally, it should be mentioned that the public is a key actor in dealing with (flood) risks. The experience and the perception of the public influence the concepts in dealing with risks (in a positive but also in a negative way). Therefore, it is necessary to involve the public from early beginning in the process as principally underlined by Article 10 of the Flood Risk Management Directive:

> *"1. In accordance with applicable Community legislation, Member States shall make available to the public the preliminary flood risk assessment, the flood hazard maps, the flood risk maps and the flood risk management plans. 2. Member States shall encourage active involvement of interested parties in the production, review and updating of the flood risk management plans referred to in Chapter IV."*

However, the Directive does not give specific advice how preliminary results shall be made available in a tailor-made way to different social groups which form the public. Moreover, nothing is said about how to encourage active involvement.

Both is addressed by the IMRA project and it can be seen as one of the main topics of the project as the improvement of procedural efficiency is the key approach in the project (see Section 2.2). This procedure will contribute to the increase of risk-awareness because only those who are informed and involved in the process are willing to accept the process as well as the outcome (here: Flood Risk Management Plans) and support it with appropriate measures (especially for cases where the intervention of the government is limited, valid for e.g. property rights).

Fortunately, the stage of the implementation of the Flood Risk Management Directive differs between the three test cases of IMRA. Therefore, the proposed methods and procedures were tested for their applicability in different ways: during the first preparation of maps and their communication to the public (Germany), but also afterwards for setting up the management plans and their update (Austria, Italy). From this case study perspective the overarching questions concerning the Flood Risk Management Directive have to be answered as follows:

- **Contribution to the implementation of preliminary flood risk assessment:** The German partners see no direct contribution; flood risk assessment was not a project objective; the project was about communicating the results of flood risk assessment to stakeholders and the public. In Italy flood risk assessment exists due to the Hydrogeological setting plan. In Austria there was no direct contribution as a hazard map for the case study area has already been available before.
- **Contribution to the implementation of flood hazard maps and flood risk maps:** For the German partners it is an accompanying contribution: As communication is an important element in the implementation of plans this is an important "soft" contribution. In Italy flood hazard and risk

maps exist also due to the Hydrogeological setting plan. However, IMRA outcomes will be useful for the updating of the flood risk management plan foreseen by the Flood Risk Management Directive for what concerns the public participation in the information and consultation phases. In Austria the results of the workshop with lay persons concerning the comprehensibility of information material and maps were presented to persons responsible for the national flood hazard maps. On the provincial level the workshop had an immediate impact on the design of maps and information material of AKL.

- **Contribution to the implementation of flood risk management plans:** Like in the paragraph before the German partners see it as an accompanying contribution: As communication is an important element in the implementation of plans this is an important "soft" contribution. In Italy a flood risk management plan exists: Hydrogeological setting plan. In Austria the discussions within the two stakeholder workshops have shown how stakeholders should and could be included into the assessment of flood risk management plans.

7.2 Participation

The different steps of the IMRA concept have different target groups and aims. The surveys concentrate on the risk perception of the public, whereas the self assessment tool aims at the performance and perceived image of the responsible authority in dealing with risks. Through the self assessment tool the responsible authorities are able to measure their own risk governance process and adapt it according to the needs as well as the results. This kind of tool is not complicated and – once it is thoroughly introduced – it is easy to work with. Therefore it could be seen as a kind of support for the responsible and appropriate authorities.

The realised surveys highlight the needs and expectations of the public. This concerns not only the needed information (i.e. the kind of information the public is expects) but also who should provide this information. Through this procedure the appropriate stakeholders (e.g. the local government or the responsible water authority) receive the information on what kind of perception (concerning e.g. the responsibilities) the public is characterised by. On the other hand the surveys can be seen as “education”, i.e. they provoke the public to get further information about the topic. This is also aimed by the responsible authorities because this will support the risk awareness of the public and avoid e.g. conflicting activities (unadapted way of building in flood prone areas).

It is obvious that such a detailed procedure is not always able to be implemented in each case study (especially because the problem concerns not only the local but also the regional level). Nevertheless, the concept focuses on a communication strategy that highlights the public in the whole process of dealing with risks. We should be aware of the fact that we are not planning for the public but planning with the public (“collaborative science”). Otherwise the results will not be accepted and adapted by the public. And this is aimed by the IMRA project where it is in line with good governance principles.

The case study perspective revealed the following:

- **Need for local tailor-made solutions:** In Austria and Germany the social milieu approach was used as an example for a target group oriented successful risk communication campaign. In Italy the case study contributed with experiences for the involvement and information of stakeholders and the public, testing the IMRA concept with the several steps. It becomes clear that local adaptations of the concept are needed (e.g. using the social milieu), but also to the current financial situation of public authorities in general.

7.3 Harmonisation

The main aim of the case studies is a validation of the applicability of IMRA's conceptual frame to different environments. Consequently, the case study work focused rather on deriving tailor-made solutions than co-ordinating the different contributions coming from different sub-basins.

It became evident during the common research that there are considerable differences in the legal framework on national level regarding flood risk management. Therefore harmonisation seems to be a difficult task to be reached. The position of the IMRA project (and also its starting point) is that a common procedural approach is necessary, which can be adapted to local circumstances either by adapting the implementation details and/or selecting the appropriate methods from the "toolbox". However, a particular indicator is about the coordination efforts of the responsible management authorities. In doing so, the concept touches also the need for a horizontal co-ordination.

The IMRA concept is one attempt and solution for its wide application and could lead to more harmonised results, which allows monitoring and benchmarking. The case study perspective on the aspects of harmonisation is as follows:

- **Consistent, (trans-) national flood risk management strategies:** In all case studies the methods and approaches used in the partner regions were discussed among the other IMRA case study partners and conditions and options for their transferability were be formulated (see Section 6.6). Further the project contributed to the ERA-Net CRUE handbook as well as the IMRA Handbooks. The Italian partners further pointed out that flood risk management strategies are defined by national law in Italy. The IMRA concept is an additional step to strengthen the aspect of involvement of stakeholders.

7.4 Restrictions

The IMRA concept is explicitly designed to be applied in different countries with various social, socio-cultural, historical, legal-institutional, political and economic characteristics (this was proved by the selection and application in the three case studies). It is flexible enough to be adapted to the given needs and circumstances but it also serves as a kind of "framework" for dealing with risks.

A potential restriction – which is of course applicable for all publicly funded projects – is how institutions later on carry out such an elaborated approach after funding by projects and scientific support has ended. There might be a need to streamline the methodological approach in order to make it applicable in the daily routines of regional and local institutions with their restricted financial and personnel resources. This requirement will be accommodated by the IMRA Handbook on steps and methods of a communication and participation process (published in parallel to the final report), which enables stakeholders to chose the appropriate communication method – also in relevance to the available budget. Further, as the Flood Risk Management Directive requires an involvement of stakeholders, the IMRA Handbook will provide a guidance for administrations in charge.

Concerning the existing restrictions the case study results confirmed the need for local/regional adaptations under an overarching procedural concept:

- **Social/socio-cultural-historical/legal-institutional/political/economic characteristics:** In the Austrian case study the willingness and strong support by the mayor of Großkirchheim concerning all risk communication activities (except the internet page) is not given in other communities in the Möll valley. In Germany in Leichlingen the support by local politicians was rather low at first; however, the city administration and other local stakeholders, especially the public and the media

approved the increase in communication and information about flood risk management. The approach with the different elements (media coverage, workshops, public meetings, online chat etc.) can be transferred to other case studies and be generalised; the success however strongly depends on local circumstances. Transferability can only be regarded to be successful for those elements that can be implemented without any additional public funding in the future – or alternative sources for funding have to be found. In Italy local and also regional institutional stakeholders are only interested to be involved if they feel that their concerns are integrated in the decisions. Regarding information of the population their interest depends on personal motivation.

- **Flood type and degree of awareness:** For the Austrian case study a generalisation for small Austrian alpine regions with adaptation to maybe other social milieus is possible. In the German case study the City of Leichlingen was chosen because it was anticipated that the people had a low risk perception. Thus, the approach is mainly designed for medium sized (10,000-50,000 inhabitants) towns where no public "flood risk culture" has emerged yet. For the Italian case study it can be said that the flood risk in the Chiascio is not extremely high and people feel safe due to the dam, which has been constructed and the fact that there was no important flood event recently.
- **Uncertainties and the way they are dealt with:** In the German test case uncertainties have been addressed in public meetings in an open way. It is a "tightrope walk" to express that uncertainties exist and people have to prepare for a possible extreme event on the one hand and to assure that authorities do their very best to permanently maintain and improve flood protection infrastructure on the other hand.

7.5 Enhancement of Resilience

As stated in Chapter 2 risk governance is strongly related to the institutional and procedural dimension of resilience, which is “determined by the degree to which the social system is capable of organising itself and the ability to increase its capacity for learning and adaptation, including the capacity to recover from a disaster” (ISDR 2002).

The IMRA risk governance approach aims at enhancing the disaster resilience of a society (or a region) and includes “the totality of actors, rules, conventions, processes, and mechanisms concerned with how relevant risk information is collected, analysed and communicated and management decisions are taken” (IRGC, 2005, p. 22).

Deficits in risk governance practices can reduce the capacity of communities for resilience and adaptation. There are two main dimensions that have to be considered:

- Misfits in interplay between different institutions, involved in risk assessment, communication and management (“problem of interplay”, Young 2002 also regarded as important by the recent EC Communication “A Community approach on the prevention of natural and man-made disasters (2009)”);
- Misfits between institutions and stakeholders (Löftstedt 2005).

The first dimension is addressed by the IMRA self assessment too, the second by IMRA’s communication and stakeholder involvement concept.

The European Commission sets the frame for procedural requirements (e.g. Strategic Environmental Assessment Directive 2001/42/EC) and Member States have to apply their tools and techniques as well as legislation in order to be able to act along the prescribed common objectives, definitions and certain procedural steps. This also supports the subsidiarity principle. In the end, procedural efficiency leads to improved material standards for risk management and governance and thus fosters resilience.

The 12-step IMRA approach aims at such an optimisation of process efficiency. In combination with the methods that were applied and tested within the IMRA research phase, IMRA provides a toolbox for selecting the right method for the right purpose in order to design a flood risk communication and participation process along the 12-step approach.

In doing so, the possibility to implement different measures, defined in flood risk management plans, can be considerably improved. IMRA wants to make sure that communication and governance strategies are in the centre of any overall flood risk management.

8 Implications for stakeholders

8.1 How to improve the performance of management systems?

Two basic recommendations are to make sure to focus the right problem in the right order and to involve actors throughout the whole governance process from assessment to management (e.g. Berkes and Folke 2002). In this context Pahl-Wostl (2009: 355) points out that "more emphasis has to be given to network governance and processes of social and societal learning (Armitage et al. 2008, Folke et al. 2005, Pahl-Wostl et al. 2007 a, b)". The performance of the management system will be improved by participating interested persons and parties. This results from the reduction of uncertainties within the political implementation process, which derive from unexpected (public) resistance (Newing et al. in Pahl-Wostl 2009: 357). The inclusion of actors, stakeholders and the public throughout the complete governance process may gain more knowledge in the phase of assessment and later in the management process, as well as innovative solutions (Berkes and Folke 2002 in Pahl-Wostl 2009: 357). For instance, one result from the INNIG project (funded 2005-2006 by the German Federal Ministry of Education and Research under the initiative "Risk management of extreme flood events") is that the interviewed group of farmers sees a benefit in the opportunity of positioning local experience, which normally finds no response in addition to the leading academic (technical) knowledge (Heinrichs and Grunenberg 2007: 102).

In addition it is necessary to take care of improving the skills of involved and responsible individuals. In this context of individuals being responsible for the management it should be pointed out that there are different types of decision makers. The CARPE DIEM project (funded under the 5th Research Framework Program, 2002: 129) differentiates between: elected, local volunteer and professional. The background of the decision maker has an effect on how decisions are made and what information is needed. In countries where this way of working is not common (e.g. in Southern Europe; cf. "Napoleonic" planning culture, Section 6.6) one should integrate performance management in the work of a public administration, e.g. by training of management and staff.

Last but not least, certain resources (time, money, manpower, etc.) have to be provided to support the management process (see the methods chapter for more details). Or the other way round: one should be aware of the fact that manpower and money are limited resources, thus the effectivity of measures is important.

8.2 How to take care of better public involvement and risk communication?

In the beginning of a flood risk management process it is essential to carry out a thorough stakeholder analysis and an analysis of the affected population. When identified, people have to be addressed with understandable language. Decision makers and other stakeholders shall beware of the myth that a boost in information will automatically lead to increased risk awareness (Sims and Baumann 1983 in Hagemeier-Klose and Wagner 2009b: 42). Especially those information is noticed, which is linked to the recipients'

state of knowledge (Deutsch 1973: 215, Merten 1994: 297 ff., Wagner: 2005). Because of the non-significant position of natural hazards in everyday life (Geipel et al. 1997: 28, Sims and Baumann 1983: 183 in Wagner 2004: 54) it is expected that other attitudes affect people's perception on river flooding in this case. According to Weichselgartner (2001) one can say, people are looking through specific "eyeglasses" on a topic (cf. Wagner 2004: 54).

In all cases the media/press should be involved. This sounds simple at first sight but it can be quite a challenge to position your information. Therefore, among the assembled stakeholders those should be identified, who– ideally – hold an own press office. Media/press will be more open for information transferred by persons they have been working together with for quite a long time (seriousness of the information given, trust). Aside one should consider the education of local media or single journalists on the context of river flooding, especially the used modelling methods and the correct meaning of the often used terms (e.g. CARPE DIEM: 130).

Furthermore, alternative ways of information and communication (e.g. exhibitions, interactive participation methods etc.) should be taken. Within the IMRA project very good experience with the method "world café" was collected – even with groups/persons of different ages and backgrounds.

One should also consider addressing multipliers like teachers, (local) prominent persons (the ERA-Net CRUE project DIANE-CM highlighted the function of so-called "local heroes"). In this context pupils can be involved directly. The pupils work in this case also as multipliers when they report about their classes at home. The experiences in the case study in Leichlingen (but also in the school related activities in Austria and Italy) showed that pupils are easy to motivate to work on the context of river flooding and hold quite a variety of knowledge. However, the education of pupils in the area of river flooding does not have to be just a special event besides the normal curriculum. Surveys in other empiric research (Heinrichs and Grunenberg 2007: 107) document that the group of the pupils wish for an integration of this specific topic, because it should be in their own interest for safety. The value of providing some striking/prominent examples/people, the public knows and can talk about shall not be underestimated.

In all cases it is important to choose a tailor-made strategy to address the different groups with the appropriate communication methods (e.g. based on an analysis of Sinus groups).

8.3 Quality and fairness of processes

First of all common risk governance principles should be taken into account. It is required to take care of an open and transparent process (e.g. Figueiredo et al. 2009: 586f.). Therefore it always has to be sure that information is provided and made accessible for everyone. That includes the usage of the language of the people that are concerned.

Another point is to be open to (self-) assess the quality of the governance process. In doing so it can be helpful to work closely with people and key persons (multipliers): interested people shall be involved into the process and develop strategy in close cooperation with stakeholders and the public. The people's opinion about the stakeholders and their reputation has to be recognised. If the people's confidence cannot be reached the complete management process will be threatened.

Further, one shall be aware of the social dimension of the project. Some of the information provided will inform people that their houses, real assets or even their lives are in danger.

8.4 Long lasting and/or institutionalised participation

The proposed school programmes should be repeated regularly. Better would be an embedding in the curriculum. People shall be reminded of past events (e.g. press release 10 years, 20 years after the last disaster). Therefore pictures of local historic flooding events can be used to establish a real reference and promote the risk awareness because pictures are able to touch the viewers' emotional spot (Lopes 1992 in Hagemeier-Klose and Wagner 2009b: 47). It is important to involve people emotionally (positively!), e.g. by involving witnesses, but: people should not be made afraid but rather their awareness raised. This may result in an enhancement of the people's willingness to pay or rethinking about self protection measures. So people have to be made to feel concerned: they must understand that flood risk is something that really is relevant for them and not just an administrative exercise.

"Welcome packages" on flood risk management provided for new residents can also be an important tool. New citizens are unaware of flood risks (especially when events appeared a long time ago) and are therefore insensible for this matter. Additionally an own category of flood risk management on the community's website (parallel to other local issues) shall be installed.

The co-ordination of the information and communication process should be allocated to an established and commonly accepted local group or actor (Local Agenda group, environmental group, citizens' initiative). It should be taken into consideration that people have different perceptions before and after a disastrous event, hence measures have to be tailored respectively. Another fruitful way is to provide emergency training and education for emergency managers. In the Italian region of Lombardy a standard for emergency preparedness trainings is established. Particularly interesting is the fact that special courses for municipal mayors are offered with instructions about their responsibilities and duties (cf. Alexander et al. 2009).

Communication material and public participation tolls shall be regularly evaluated and it shall be questioned, which material really improves risk perception. By using such an ongoing evaluation concept authorities in charge of the flood risk management process are able to take corrective action when regarding weakening performance (controlling). It will also strengthen the faith in the broad public.

9 Policy recommendations and further research needs

The IMRA project focused very much on communication and participation methods and their applicability within the developed flood risk governance concept. Thus, the following policy recommendations and further research needs are primarily related to these issues.

Policy recommendations

For the **European level** it is recommended that flood risk management policy should be stronger linked to regional policy and shall not only involve infrastructure investments but also capacity building for local decision-makers and administrative staff. This could be an issue e.g. in the INTERREG programme (e.g. INTERREG IVC strand). Further, capacity building tools, networks and programmes should be developed to provide stakeholders to carry out an effective flood risk communication and participation process. Scientifically it became obvious that there is a need for developing benchmarking tools for measuring the efficiency of a flood risk management process.

For the **national level** a recommendation concerning data related issues should be made: The IMRA project but also other ERA-Net CRUE projects confirmed the need to develop data provision and maps that can easily be understood by the public (setting of common frame with support from media experts). Concerning policy maker issues, a common framework for flood risk management shall be provided, especially with adequate communication and participation methods (which already exists in many Member States). Further, good practice examples (exhibitions, posters, leaflets but also films) shall be provided on how regions or municipalities positively benefited from an active involvement of stakeholders and the public (positive image, openness, pro-active risk management).

Finally, some recommendations shall be made that aim rather at the **regional level**: Although the IMRA project has produced deployment planning guidelines and toolkits, detailed discussions with regions and water authorities during conferences and dissemination events have indicated the need for (a) additional, more practical guidelines, which include the experience of various projects in one handbook and (b) improvement of regional policies for an effective implementation of the Flood Risk Management Directive. For those reasons, there is the need to make the new findings of the mentioned research projects available to a large range of regional actors by creating an on-line experience exchange and training tool, including additional approaches and experience.

Further research needs

Further research needs are seen in the research on transferability of good practice examples of the Flood Risk Management Directive implementation tools. Further it should be investigated how to take care of a continuous communication and participation process without funding from research projects. Finally, indicators shall be developed together with stakeholders that speak in their own language and that are meaningful to them.

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Appendix

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Terms and Definitions

Term	Definition
Community	**Community** can be defined in a narrower or wider way. A narrow definition would restrict members of a community to those people who live inside certain administrative borders (e.g. a town or district). A wider definition in the context of flood risk would encompass all those that are directly or indirectly potentially affected by flood risk. Within this document we will use the broader definition of this term.
Flood	**Flood** means the temporary covering by water of land not normally covered by water. This shall include floods from rivers, mountain torrents, Mediterranean ephemeral water courses, and floods from the sea in coastal areas, and may exclude floods from sewerage systems. (cf. Flood Risk Management Directive 2007/60/EC (Article 2))
Flood risk	**Flood risk** means the combination of the probability of a flood event and of the potential adverse consequences for human health, the environment, cultural heritage and economic activity associated with a flood event. (cf. Flood Risk Management Directive 2007/60/EC (Article 2))
Hazard	**Hazard** is a potentially damaging event, phenomenon or human activity that may have a negative impact on cultural, economic, environmental, institutional, physical or social assets. Hazards may include latent conditions that represent future threats and can have different natural or human-induced origins. Hazards can be single, sequential or multiple in their origins and effects, which can be biological, geological, hydrological, atmospheric, social, psychological or technological. A hazard is characterised by its location, magnitude, frequency and probability (MOVE Project, 2009).
Public	The **public** means “everybody”: an open and more or less unlimited group of persons that are affected by or interested in a topic or a project/a process. A good example of such an unlimited circle is the term “water users” – no one can be excluded from that description.
Resilience	**Resilience** can be very broadly defined as the ability of a system “to maintain its functions under duress than as its direct resistence to stresses or shocks” (according to Holling 1973, Disaster Recovery Journal 2005, Van der Perk et al. 2000). In the context of the IMRA project resilience can be understood as the capacity of a society or region to absorb stresses and shocks such as natural hazard impacts.
Risk	**Risk** = Hazard potential (Probability x Magnitude) x Damage potential / Coping Capacity.
Stakeholder	In scientific projects the term **stakeholders** is often used for representatives of the institutionalised public and of (non-institutionalised) organised interest groups. In contrast, other institutions have a broader understanding of the term stakeholder: it is everybody that is affected or interested by a project/activity. Within the project CRUE-IMRA we distinguish between two groups of stakeholders: the public and institutional stakeholders. For a detailed definition see chapter 1.2

Glossary of Acronyms and Abbreviations

a.s.l.	◄	Above sea level
AB Tevere	◄	Autorità di Bacino del Fiume Tevere (Tiber River Basin Authority), Rome
AKL	◄	Amt der Kärntner Landesregierung, Klagenfurt
BMLFUW	◄	Bundesministeriums für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft (Federal Ministry of Agriculture, Forestry, Environment and Water Management), Vienna
BSE	◄	Bovine spongiform encephalopathy (mad cow disease)
cf.	◄	Compare
CRUE	◄	Coordination of the research financed in the European Union on flood management
e.g.	◄	For example
FRM	◄	Flood risk management
IMRA	◄	Integrative flood risk governance approach for improvement of risk awareness and increased public participation
IRPPS	◄	Institute for Research on Population and Social Policies, Rome
IRPUD	◄	Institute of Spatial Planning, TU Dortmund University
ISPRA	◄	Istituto Superiore per la Protezione e la Ricerca Ambientale, Rome
LA 21	◄	Local Agenda 21
MIDIR	◄	Multidimensional Integrated Risk Governance
SWOT	◄	Strengths – Weaknesses – Opportunities – Threats
T6	◄	T6 consultancy, Rome
TUDO	◄	TU Dortmund University
UBA	◄	Umweltbundesamt GmbH (Environment Agency), Vienna
WLV	◄	Wildbach- und Lawinenverbauung (Torrent and avalanche timbering)

Table of project information

Joint project title	◄	**IMRA – Integrative flood risk governance approach for improvement of risk awareness and increased public participation**
CRUE Project No.:	◄	ERAC-CT-2004-515742
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Objectives	◄	The overarching goal of the IMRA project was to influence and change risk perception and real decision-making by actively involving stakeholders and the public in three case study areas of three different river basin districts in Europe. The whole process of assessing and managing flood risks has been reorganised following the risk governance concept for participatory flood risk management, developed during the IMRA project.

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Background ◄	The IMRA risk governance concept is based on a theoretical background on participation, risk communication and stakeholder analysis, using the concept of social milieus for the definition of the target groups, as well as on monitoring indicators and measuring values. As the call on "Flood resilient communities – managing the consequences of flooding" (2nd ERA-Net CRUE Funding Initiative) stresses, "*a particular challenge for governmental institutions and water authorities is to strengthen public participation in the establishment of future approaches to flood risk management [cf. Article 10 of the Flood Risk Management Directive].*" This becomes necessary in particular in context of setting up flood risk management plans in accordance to Article 7 of the Flood Risk Management Directive. This public participation does not end in itself and is much more than just an information campaign with regard to final results. This becomes clear when looking at § 2 of Article 10: "*Member states shall encourage the active involvement of all interested parties into the production, review and updating of the flood risk management plans.*" Decisions in the area of so called "traditional" risks like flooding are normally based on probabilities because they are past-oriented and informed by statistics. Climate change related effects on temperature and precipitation, however, will certainly leads to new uncertainties, because past events might be not representative anymore. Here, the perspective changes from probabilities to just possibilities. With public decision-making not having any precise information at hand restrictions for private property rights are probably not anymore legally justifiable. Hereby, consensus about thresholds and response actions becomes more important. Moreover, measures, based on mandatory decisions of public administration as well as measures, which are in the responsibility of private stakeholders need to be accepted widely for their implementation. This is clearly visible when looking at evacuation orders, building protection measures to be taken by private households, risk awareness etc. Having these facts in mind, the "active involvement", propagated by the Flood Risk Management Directive, has to be seen as crucial for the success of the Directive's main objective, the reduction of flood risks. Better involvement and more openness as well as better policies, regulation and delivery have been identified as key objectives by the White Paper on European Governance, launched by the EC in 2001. Risk governance principles like stakeholder involvement have been integrated in the ISDR, as endorsed in January 2005 in the Hyogo Framework for Action. The risk governance approach has recently been regarded as important by the new Territorial Agenda of the EC, launched in 2007 in Leipzig, Germany by the Member States Ministers for Spatial Planning as part of the priority 5 "Promoting Trans-European Risk Management."
Research ◄	The whole process of assessing and managing flood risks was reorganised by following the IMRA risk governance concept for participatory flood risk management aiming at the improvement of risk awareness and increased public participation developed at the beginning of the project (WP1). Risk governance and its core element risk communication are relevant for

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		different risk settings in general and for different river basin districts in particular. In order to prove this conceptual framework, three different river basin districts were integrated into the project as case studies (WP2), representing: ▪ a mid-Europe hilly land river basin district, densely built-up, mainly prone to winter floods and flash floods: river Wupper (Germany); ▪ an alpine river basin, prone to flash floods and debris flows: river Möll (Austria); ▪ a Mediterranean river basin, prone to torrential floods: river Chiascio (Italy). The results of the case studies were used for validating and adjusting the IMRA governance concept (WP3). Two scientific workshops served as linkage to the scientific community. Dissemination activities on various levels completed the activities (WP4). Project coordination, management, monitoring and evaluation accompanied all other activities.
Findings	◄	By applying the IMRA risk governance concept in the three case studies, existing ambiguities (differences between true flood risk and perceived risk) were reduced and some best practice examples were derived from the case studies serving as references for other authorities dealing with flood risk management plans in Europe.
Implications (Outcome)	◄	The IMRA concept was developed in order to be easily transferable to other administration dealing with flood risk management in all parts of Europe. Therefore, a practical handbook “Planning and implementing a communication and public participation processes in flood risk management –Procedural guidelines and toolbox of methods” was realised in English, German and Italian.

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Publications related to the project ◄	*Articles* ▪ Fleischhauer, M., S. Greiving, M. Scheibel, T. Stickler, N. Sereinig, G. Koboltschnig, P. Malvati, P. Grifoni, K. Firus (2011): Improving the Active Involvement of Stakeholders and the Public in Flood Risk Management. New tools and case study results from Austria, Germany and Italy. Abstract accepted for NHESS special issue "Flood resilient communities - Managing the consequences of flooding" (in preparation) ▪ O'Sullivan, J., I. van der Craats, S. Greiving (2011): The role of flood awareness and risk perception in flood management across Europe. Abstract accepted for NHESS special issue "Flood resilient communities - Managing the consequences of flooding" (in preparation) ▪ Bonaiuto, M., Jaroslav Mysiak, K. Firus, P. Grifoni, G. Carrus, P.Malvati, C. Ferranti, V. Vitale (2011): Flood risk management in Italy: challenges and opportunities for the implementation of the EU Flood Risk Management Directive. NHESS special issue "Flood resilient communities - Managing the consequences of flooding" (in preparation) *Conference Papers* ▪ Stickler, T., M. Fleischhauer, S. Greiving, N. Sereinig, G. Koboltschnig, P. Malvati, P. Grifoni, K. Firus (2011): Planning and Evaluating with New Participatory Flood Risk Management Tools - Findings from case studies in Austria, Germany and Italy. Paper accepted for UFRIM Conference, Graz, September 2011. ▪ Greiving, S., Lindner, C, (2011): Assessment of flash flood risk in a continuous urban fabric by the example of the City of Dortmund. Paper accepted for UFRIM Conference, Graz, September 2011. ▪ Greiving, S.; Lindner, C.; Wanczura, S. (2011): Linking actors and policies throughout the flood risk management cycle. Paper accepted for UFRIM Conference, Graz, September 2011. ▪ Stickler, T., Sereinig, N., Greiving, S. & Fleischhauer, M. (2011): New Tools to Plan and Evaluate Participatory Flood Risk Management - Concept and empirical findings. Paper accepted for 12th Congress INTERPRAEVENT, Grenoble, April 2012. ▪ Koboltschnig, G., Korber, S., Sereinig, N., Stickler, T. (2011): Risk dialogue as an essential part of the integral flood risk management: experiences from an Austrian case study. Paper accepted for 12th Congress INTERPRAEVENT, Grenoble, April 2012. *Other publications* ▪ IMRA project (2011): Handbook for flood risk management. (in preparation) ▪ IMRA project (2011) Handbuch Hochwasserrisikomanagement (in preparation) ▪ IMRA project (2011): Manuale per gestione del rischio alluvione (in preparation)