NeWater

- Deliverable D 3.3.2 -

WP 3.3 Elbe Basin

Stakeholder report defining needs for research, tools and capacity building in the Elbe basin

Elbe river in Meißen, Germany

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Contents

1. Analysis of Stakeholder and their respective roles in the basin including stakeholder feedback (issues)

International level

There exists the International Commission for the Protection of the Elbe (ICPE). ICPE goals:

- Reducing polluting discharges by communities, industries and diffuse sources;
- Ecological recovery of floodplains and improvement of biotope structures;
- Improvement of the Elbe water quality;
- Flood protection in the Elbe basin; and
- Implementation of the EU WFD in the Elbe basin.

Governmental level: Germany

Germany is a large country with a federal administrative system. The three primary levels of competence in German water management are the Federal Government, the Federal States (*Länder*) and the municipalities (Kommunen). There is no strict hierarchy between the levels, but each level has its own specific responsibilities.

The federal government is responsible for defining national tasks of water management. In line with Germany's constitution, the Federal Government has the framework responsibility for flood defence policy.

The Federal Ministry for the Environment, Nature Conservation and Nuclear Safety is responsible for water resources management as a part of environmental policy, and for the protection of water bodies.

The Federal Ministry for Transport, Building and Housing, which is responsible for the administration of federal waterways, navigation and sea pollution.

The Federal Ministry of Economics and Technology oversees water supply systems.

The Federal Ministry of Education and Research is in charge of developing new technologies.

The Federal Ministry for Health ensures the quality of drinking water.

The ministries have advisory authorities: the Federal Environmental Agency and the Federal Institute of Hydrology.

The state (Land) governments elaborate legislative details and formulate policy. They are responsible for the regulation of water supply and wastewater disposal in their states, within the framework of the federal laws. In general the states' environmental ministries are responsible for water management. They cooperate in the Elbe basins mainly in two instituitions: Arbeitsgemeinschaft für die Reinhaltung der Elbe (ARGE Elbe) and the Flussgebietsgemeinschaft Elbe (FGE Elbe)

The ARGE Elbe was established in 1977 by three German states (*Länder)* Hamburg, Niedersachsen and Schleswig-Holstein. It aims at cooperation in water management in general and ecological issues in particular. In 1993 the *Länder* Sachsen, Sachsen-Anhalt, Mecklenburg-Vorpommern and Brandenburg have joined the ARGE Elbe which is now including all states which are direct reparian states of the Elbe river. Since 1981 the basic principles for the work of the ARGE are determined at the irregularly organised Elbe Ministers Conferences. Currently, two working groups are active within the framework of the ARGE: one for (water quality) monitoring and one for flood protection. Integrating all state of

the basin to coordinate the river basin management as required by the WFD, the FGG Elbe was founded in 2004.. The ten Länder involved are Bayern, Berlin, Brandenburg, Hamburg, Mecklenburg-Vorpommern, Niedersachsen, Sachsen, Sachsen-Anhalt, Schleswig-Holstein and Thüringen. The aim of the FGG is to establish a systematic and mutually fine-tuned programme of activities and measures for the German part of the Elbe basin, which has been divided in five sub-basin areas (FGG ELBE 2005).. The FGG has no formal decision-making power, but mainly gives technical guidance for the cooperation between the German states (Borowski, 2004).

In accordance with state water laws, the organization and implementation of water supply and wastewater disposal belong to the duties of the municipalities. The municipalities use various forms of enterprises for implementation of water supply and waste water disposal, ranging from municipal agencies to private companies (Winnegge and Maurer 2002).

Water management associations, which find their legal basis in the federal Water Association Act, play a special role in the German institutional landscape on regional and local level. Water associations are self-governing institution, which can be formed for a wide variety of functions, ranging from small neighbourhood schemes to large territories on regional level. They are based on the principles of user participation and local autonomy and can consist of land owners, private enterprises and local public parties. The associations tackle the technical, economical and ecological aspects of water management.

Governmental level: Czech Republic

In the Czech Republic traditionally three levels of administration are responsible for water related decisions: central authorities (ministries), 14 regional offices and 76 district offices. At state level, the Ministry of Agriculture is responsible for the management of water bodies, artificial canals and irrigation systems, public water supplies and sewerage. The Ministry of the Environment is in charge of the protection of water resources and the related ecosystems. Both Ministries are jointly responsible for the development and implementation of water management policy (Puncochar 2005b).

Long-term flood management is organised via the River Basin Authorities and lead by the Ministry of Agriculture. The Ministry of Agriculture started the important ‘Program of Prevention against Floods’, focused on the increase of protection in the most endangered regions of the Czech Republic. The basin water boards and the Agricultural Water Management Authority are responsible for the realisation of the program, the first phase of which was scheduled for 2002 -2005.

The flood early warning is organized by the Ministry of Environment in cooperation with the Ministry of Agriculture. Flood warning systems are operated by the Czech Hydro-meteorological Institute, in cooperation with River Basin Authorities and regional and local administrations. Because the main problem is still a lack of general awareness, some principles of disaster reduction are taught at schools. To increase awareness to a desired level, however, more local and regional initiatives will be necessary (Obrusnik 2005).

At regional and district level, departments for the environment contain offices for water issues. Besides these three administrative layers, five *Povodi*’s (Water boards) were established in 1966. Since then they gradually evolved to ‘River Basin Authorities’, state enterprises responsible for control, monitoring and evaluation of water flow of the main river basins (among which the Labe, Vltava and Ohre, which are part of the Elbe basin) (Puncochar 2005b)

The water supply and sewerage sector has been privatised from 1993 to 1995. The new owners are municipalities, unions of municipalities or joint stock companies, whose main shareholders are municipalities(Puncochar 2005b).

Non-governmental organisations

Drinking water supply and wastewater treatment

In both Germany and the Czech Republic municipalities play a leading role in water supply. In the Czech Republic the drinking water sector consists of private enterprises, owned by municipalities, whereas in Germany the drinking water sector is only partly privatised.
The *Deutscher Vereinigung des Gas- und Wasserfaches (DVGW),* which supports technological development, and the *Bundesverband der Deutschen Gas- und Wasserwirtschaft (BGW)*, which represents 80% of the German water suppliers, are the German organizations representing water supply and wastewater treatment at the federal level.

In the Czech Republic the Association of Water Supply and Sewerage Services (SOVAK) was established as a voluntary, non-governmental and non-profit organisation that supports the sector (Puncochar 2005b).

Agriculture

In Germany the farmers are represented by the agricultural chambers, governmental authorities on state level with a lot of technical knowledge and a strong interest in agricultural issue, and by farmers associations, which cooperate on local, state and federal level.

The federal *Verband der Landwirtschaftskammern* (VLK) coordinates the technical collaboration between all federal chambers and the agricultural administrations in federal states without chambers and is one of the stakeholders that are informed about the annual meeting of the IKSE.

The farmers association are represented at the federal level by the German *Bauernverband* (DBV), which represents over 90 percent of the ca. 400,000 German agricultural enterprises. Both the public chambers and the private associations aim at sustaining agricultural land use. The chambers act trough the governmental structure, whereas the associations are more active in public (Borowski 2004).

In the Czech Republic, the Czech Agrarian Chamber, the Agricultural Association of the Czech Republic and the Association of private Farming represent the interests of the agricultural sector (COPA 2005).

Industry and power generation

In Germany the main part of water abstractions is used for cooling of power station. The second largest water user is the industrial sector. Large abstractions occur in the chemical, mining, iron and steel and pulp and paper industry (Winnegge and Maurer 2002). The IKSE identified the most significant industrial emissions in the Elbe basin in 1998 as originating from chemical, pharmacological, cellulose and paper, metallurgic, electrical, leather, fur, glass, ceramic and textile industries, as well as from mining.

The 81 German chambers for industry and trade operate according to legal requirements. The chambers joined forces in the *Deutsche Industrie- und Handelskanmertag* (DIHK), an umbrella organisation which represents over three million entrepreneurs. The German-Czech Industrial and Trade Chamber (GTIHK) mediates and facilitates interactions between Czech and German companies. The organisation was established in 1993 and is one of the stakeholders regularly invited by the ICPE (Borowski 2004).

The independent German chemical industry association VCI represents the politico-economic interests of 1,600 German chemical companies and German subsidiaries of foreign enterprises in contacts with politicians, public authorities, other industries, the world of science and the media. VCI represents over 90% of the entire German chemical industry (VCI 2005).

In the Czech Republic the Association of Chemical Industry of the Czech Republic was founded in 1990 as a voluntary association of manufacturing, commercial, designing, research and advisory organisations with relations to chemical, pharmaceutical, petrochemical, and rubber and plastics industries. The Association embraces over hundred member companies, which represent over 60% employees working in this sector (Association of Chemical Industry of the Czech Republic 2005).

Navigation

There are several national and international non-governmental organisations that represent the interests of navigation. The *Verein zur Förderung des Elbstromgebietes* is an association aimed at the development of the waterways and ports in the Elbe basin, including the navigable tributaries and canals. The association focuses on the development of the Elbe downstream of Magdeburg to an important European shipping route. The activities include assessing, recommending and organizing meetings (Verein zur Förderung des Elbstromgebietes 2005). On sub-basin scale organisations like the *Verein zur Hebung der Saaleschifffahrt* are active.

In Germany, inland navigation is promoted by the *Bundesverband der deutschen Binnenschiffahrt* (BDB), which is a member of the European Barge Union (EBU). In 2004 the Czech union of ship owners AVP-CZ entered the EBU as first organisation of the new EU Member States.

The interests of navigation are also represented by governmental actors. The German Waters- & Shipping Administration (East) (WSD-OST) supervises the administration of most of the waterways in the Elbe basin. The main goal of the administration is to maintain and expand the traffic capacities of the federal waterways in order to promote economical growth. The administration is a strong stakeholder as it represents strong federal competences and shipping interests (Borowski 2004).

Fishing

There is no (or very limited) professional fishing on the Elbe. Recreational fishing, however, has a long tradition in the both countries. In Germany the *Verband Deutscher Sportfischer* (VDSF) represents 24 *Landesverbänden*, which include about 7000 associations and 700 000 individual fishers. The Czech Fishers' Union deals not only with sports fishing, but also with the protection of fish and their living environment, the education of members, and breeding and stocking of fish.

Nature protection

There are numerous environmental organisations active in the Elbe basin. In Germany, among others, the *Bund für Umwelt und Naturschutz Deutschland (BUND),* the WWF *(*incl. the *Auen institute)* and *The Naturschutzbund Deutschland* (NABU) are active. Most organisations are well connected through different inter-organisational working groups on water at federal and state level, through cooperation in the Deutscher Naturschutz Ring and through coordination by the Grüne Liga (Borowski 2004).

The Deutsche Umwelthilfe is an independent association for protection of nature and environment, which supports the River Network project 'Living Elbe'. The project aims for the Elbe basin to be acknowledged as cultural world heritage by UNESCO (Borowski 2004).

Citizens' organizations

The German *Bundesverband Bürgerinitiativen Umweltschutz* (BBU) is an umbrella organization of citizens' action committees that are committed to environmental protection. One of these action committee's is the *Arbeitskreis Wasser*, which has been trying to connect small and midsize Environmental Protection Organizations and Civil Engagement Groups in the realm of aquatic environmental protection since 1981. The Arbeitskreis provides these organizations and other interested people with an elaborate 'water archive' and a newsletter (AK Wasser 2005)

Citizens' organisations are acting in the Elbe basin in general on more local level. In Brandenburg, the high prices for wastewater led to considerable activities. Also, there different local environmental groups which act on local problems and are sometimes also linked to Local Agenda activities ((Kampa, Kranz et al. 2003).

2. Stakeholder feedback on major water-related problems and research needs in the basin

In order to define major research issues in the Elbe basin, the "Questionnaire on major water-related problems and research needs in the basin" was distributed to stakeholders both in German and Czech parts of the basin. All major groups of stakeholders were involved in the action: policymakers at the federal and state levels in Germany and at the ministry level in the Czech Republic; water managers; people working at the water supply and sewage water treatment enterprises; representatives of agriculture enterprises and farms, mining and water transport; people involved in spatial planning and nature protection, representatives of NGOs and scientists involved in water resources research.

Besides, the Questionnaire was distributed among 100 randomized private households of the village Glindenberg (ca. 1300 inhabitants) located very close to the Elbe River (about 1 km) in Saxony-Anhalt (Germany). The village was affected by the Elbe flood in August 2002 (precautionary completely evacuated, but without water damage).

Altogether, 376 Questionnaires were sent in Germany, 242 in the Czech Republic, and 100 were distributed in Glindenberg.

The Questionnaire included the following five major Questions, suggested answers and open questions:

1a. What are the major water resources related problems in the Elbe basin from your point of view?

- floods: more often,
- floods: more intensive,
- summer droughts,
- spring droughts,
- water quality: not sufficiently treated municipal sewage water,
- water quality: not sufficiently treated industrial sewage water,
- water quality: diffuse pollution from agriculture,
- climate change: dryer and warmer climate,
- climate change: wetter and warmer climate,
- climate change: colder climate,
- uncertain climate change,
- land use change: conversion of arable land to other land use forms,
- land use change: renaturation of wetlands,
- land use change: renaturation of mining areas,
- land use change: change of forest structure,
- transboundary Czech-German issues: which?
- Other problems: which?

1b. Water prices:

- are too high,
- are too low,
- should be calculated per m^3 used water,
- should be calculated per capita,
- should be calculated partly per m^3 used water and per capita.

2. What kind of research is needed to cope with the major water resources related problems in the Elbe basin from your point of view?

- assessment of flood risk,
- assessment of drought risk,
- assessment of water quality management,
- more reliable climate change scenarios,
- assessment of climate change impact on water availability,
- assessment of climate change impact on water quality,
- assessment of climate change impact on crop yields and natural vegetation,
- assessment of land use change impact on water availability,
- assessment of land use change impact on water quality,
- other?

3. Is the dialogue between stakeholders and scientists needed to better cope with the problems?

- is very important to properly define the research directions,
- is needed to better define possible management options.

4. How was your work until now affected by flood event 2002, expected climate change and Water Framework Directive?

- How did the floods in 2002 affect your work since?
- How does the predicted climate change in the Elbe basin affect your work?
- Do you see any progress concerning the integration of flood protection and the implementation of the European Water Framework Directive (especially concerning water quality management)?
- Do you see any barriers for a better integration of flood protection and the implementation of the European Water Framework Directive (especially concerning water quality management)?

Besides, free answers were also analyzed and summarized. Part II of the analysis, including overview of additional responses suggested by stakeholders is presented in a separate document on the NeWater homepage.

From 718 distributed Questionnaires, 240 filled Questionnaires were obtained back (approximately 33%): 127 of them from the German stakeholders (30 of them from Glindenberg), and 113 from the Czech stakeholders.

The obtained filled Questionnaires were evaluated separately for every of three groups (German major group, Glindenberg, Czech group), and further for every major stakeholder group. If the stakeholder (except inhabitants of Glindenberg) indicated several fields of activity (e.g. water management and policy), his/her ***responses*** were taken into account for all indicated groups. In total, 157 responses were evaluated from German major stakeholder group, 30 responses from inhabitants of Glindenberg, and 200 responses from Czech stakeholders (altogether 387 responses). The distribution of responses for two countries is shown in Fig. 2.1.

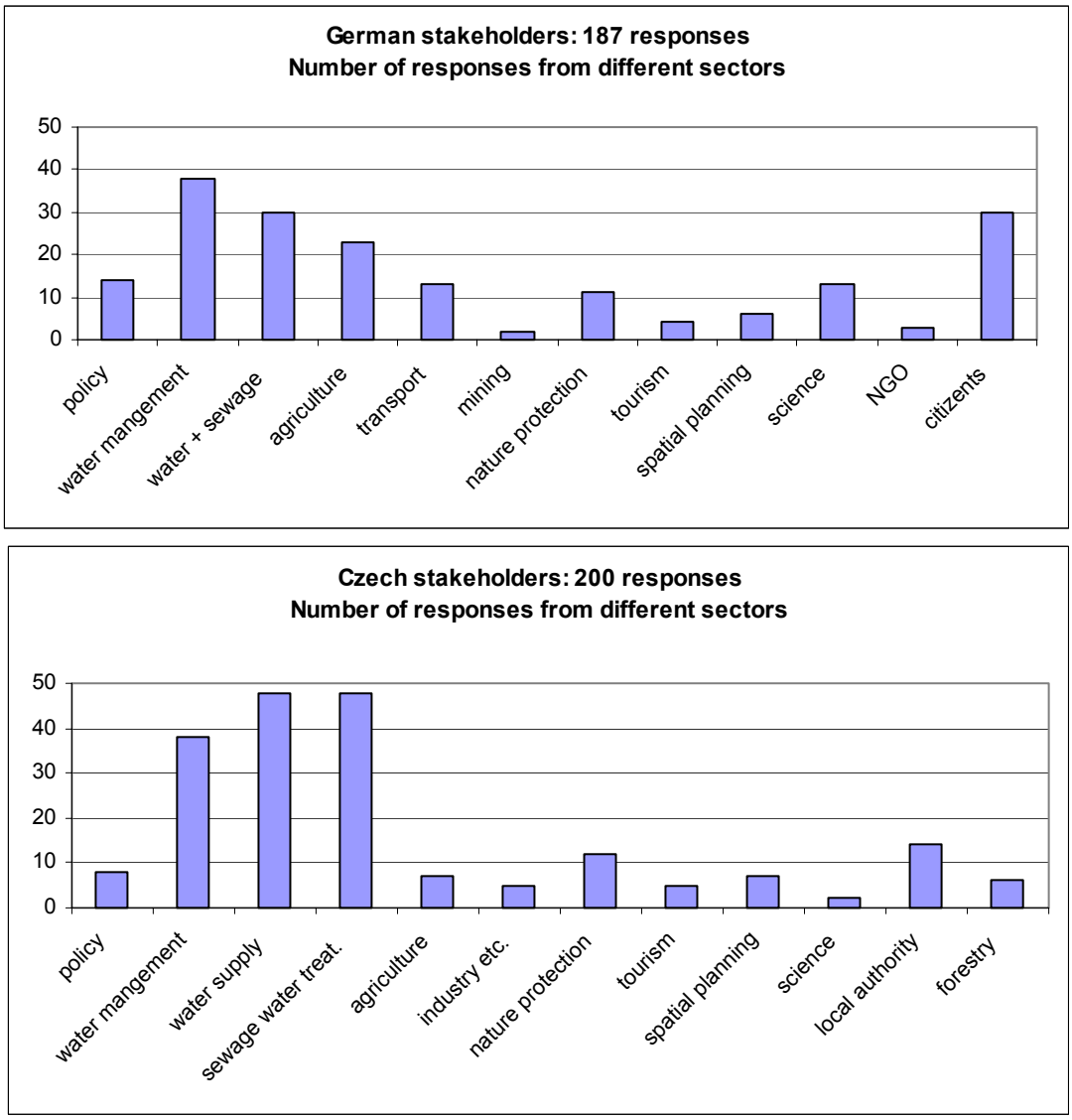


Fig. 2.1 Distribution of responses on the Questionnaire between two countries and major stakeholder groups

As one can see, most of the responses in the Czech Republic are from three groups: water management (19%), water supply (24%), water treatment (24%), but only 3.5% from farmers, while the responses of German stakeholders are more evenly distributed: 24% from water managers, 34% from water supply and sewage treatment, and 15% from farmers.

Here the main results of the Questionnaire action on major water-related problems and research needs in the basin are presented. The questions for Glindenberg were slightly different, and therefore were evaluated separately.

Fig. 2.2 presents accumulated responses on the question about major water-related problems. If the response was: 'very important', it was multiplied by 2, and if it was 'important', it was added. The Y axe on Fig. 2.2 presents the accumulated responses. The upper graph shows the accumulated responses of the German stakeholders (major group), the middle graph – the accumulated responses of the Czech stakeholders, and the lower graph – the accumulated responses of all stakeholders (except Glindenberg). Most of suggested problems were evaluated quite high by both groups, except 'warmer and wetter climate' and 'colder climate'. The level of positive responses of the German group (altogether

157 responses) was higher than that for the Czech group (200 responses): compare Y scales. The German stakeholders identified the following three priority issues:

- diffuse pollution,
- flood intensity, and
- summer droughts,

whereas for the Czech stakeholders the priority issues are:

- flood intensity,
- industrial pollution,
- municipal pollution.

The summary of all responses identifies the following three priority issues:

- flood intensity,
- diffuse pollution , and
- summer droughts.

Probably, the recent flood in August 2002 had a certain influence on the results. Different views of the Czech and German stakeholders on major sources of pollution reflect the current situation: the role of significant investments and efforts during the last 15 years in Eastern Germany in better sewage water treatment, and insufficient resources for that in the Czech Republic.

Fig. 2.3 presents accumulated views of stakeholders on research need in the Elbe basin. Here again, the level of positive responses among the Czech group is notably lower. The first priority issues identified by the German stakeholders are:

- climate impact on water availability,
- more reliable climate scenarios, and
- assessment of water quality,

whereas the Czech stakeholders identified

- flood risk,
- climate impact on water availability, and
- water quality

as most important. The accumulated view of all stakeholders suggests that the first priority research issues are:

- climate impact on water availability,
- flood risk, and
- water quality.

In general, the answers on question 2 agree with those on question 1, though the climate impact assessment gets higher priority in the research.

Fig. 2.4 presents the stakeholders' view on current water prices. Here 52% of the German and 37% of the Czech stakeholders agree that water price should be calculated per m^3 of used water. There is no clear view on whether the current prices are too high or too low.

Fig. 2.5 confirms the necessity of the stakeholder dialogue both for defining research directions and for better defining management options, though again the German stakeholders provided more positive answers (> 70%).

Responses on the last questions presented in Fig. 2.6 confirm that many stakeholders in Germany were strongly or averagely affected by the recent flood in 2002, and 46% of them feel already affected by the ongoing climate change. The level of positive responses here was lower for the Czech stakeholders.

The analysis and summary of the results for Glindenberg are presented in Fig. 2.7. The most important problems in the Elbe basin identified by the inhabitants of Glindenberg look different. Here, the urbanization seems to be the major problem, followed by flood intensity, uncertain climate change and diffuse pollution. It is quite natural that the research on floods and droughts was identified as most important, though other research topics were also evaluated quite high. Among the first priority measures against floods (a) the restriction of urbanization in areas vulnerable to floods, and (b) reduction of CO_2 emissions were defined.

Next two figures present results of the analysis for three selected groups of German stakeholders: policymakers, water managers and farmers. The Czech stakeholders were dominated by water managers and water supply and water treatment representatives: 67% of all responses, and farmer group was rather small (3.5%), therefore this part of the analysis was not selected for inclusion in the report.

Fig. 2.8 presents an overview of opinions of three stakeholder groups on major water-related problems. As one can see, diffuse pollution is the highest priority problem for the policymakers. This is reflected in the fact that International Commission for the Protection of the Elbe (IKSE) was created with the major objective to improve water quality in the Elbe. For the water managers diffuse pollution is also the first priority problem, followed by summer droughts and flood intensity. However, the farmers have another vision of major problems in the basin: climate change to more dry conditions, followed by current summer and spring droughts, which is quite natural. It is interesting that the farmers do not recognize the problem of diffuse pollution, which is known to be caused mainly by nutrient leaching from agriculture. However, this is quite understandable.

The next Fig. 2.8 reveals the main research issues selected by the same three stakeholder groups. The policymakers identified water quality, more reliable climate change scenarios and climate change impact on water availability as three equally important research issues. For the water managers climate impact on water availability and better climate scenarios are most important. For the farmers climate impact on water availability and crop yield, as well as climate scenarios are the first priority research issues.

The analysis was supplemented by creating several tables, which provide an overview of opinions by groups and as a total. The selected results are included in Tables 2.1 and 2.2. For the same reasons as above (more even distribution between groups), we included in this report only the tables illustrating opinions of the German stakeholders.

Table 2.1 summarizes opinions of the groups of German stakeholders on major water-related problems in the Elbe basin. The accumulated numbers of responses ([very important]*2+[important]) for issues per group were normalized by the number of responses, then only the values exceeding 1.0 were selected. This means that only positions that were on average evaluated as ‘important’ or higher, were selected. The indices are summarized in the last column. The table reveals also the most important problems:

- flood intensity,
- summer droughts,

- water quality: diffuse pollution, and
- warmer and dryer climate in future,

which are in agreement with a more simple evaluation on Fig. 2.2. Here the differences in the views of stakeholder groups are also evident (e.g. agriculture group). The table also reveals that policymakers and scientists recognize more problems as being important.

The last Table 2.2 summarizes opinions of the groups of German stakeholders on major research issues in the Elbe basin, in % of all responses. Only values higher than 50% were selected for this table. The indices in the last column reveal climate impact on water availability and better climate scenarios as being most important. Water quality assessment and flood risk also have high priorities. This is in full agreement with Fig. 2.3. This table also demonstrates high evaluation of research needs by scientists, which is quite understandable.

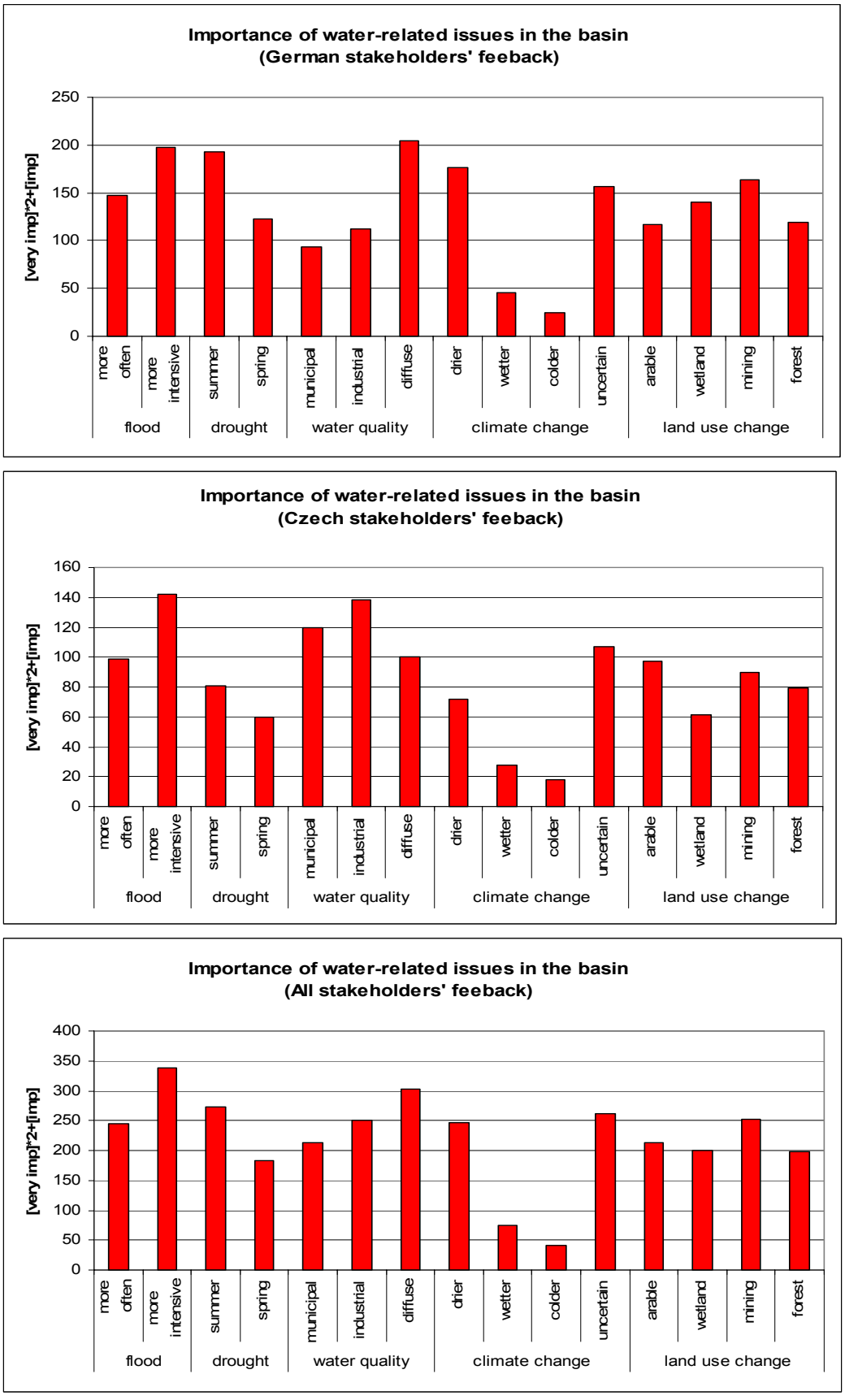
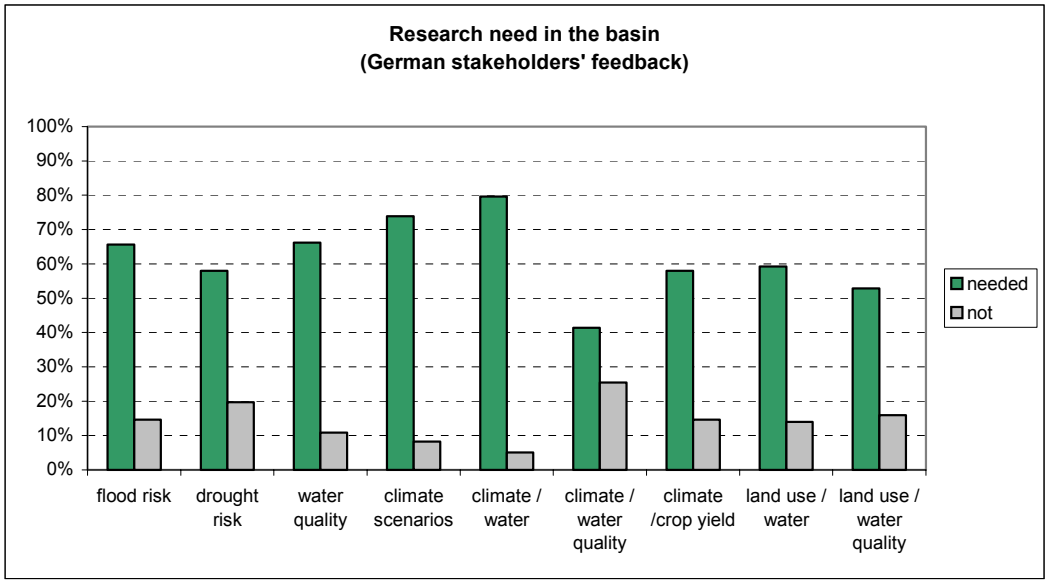
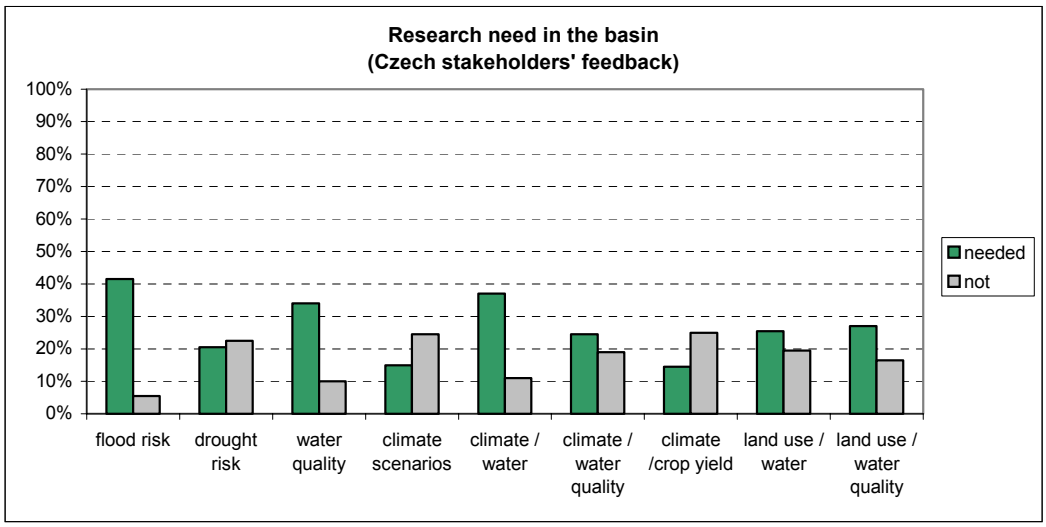


Fig. 2.2 Summary of stakeholders' view on major water-related issues.





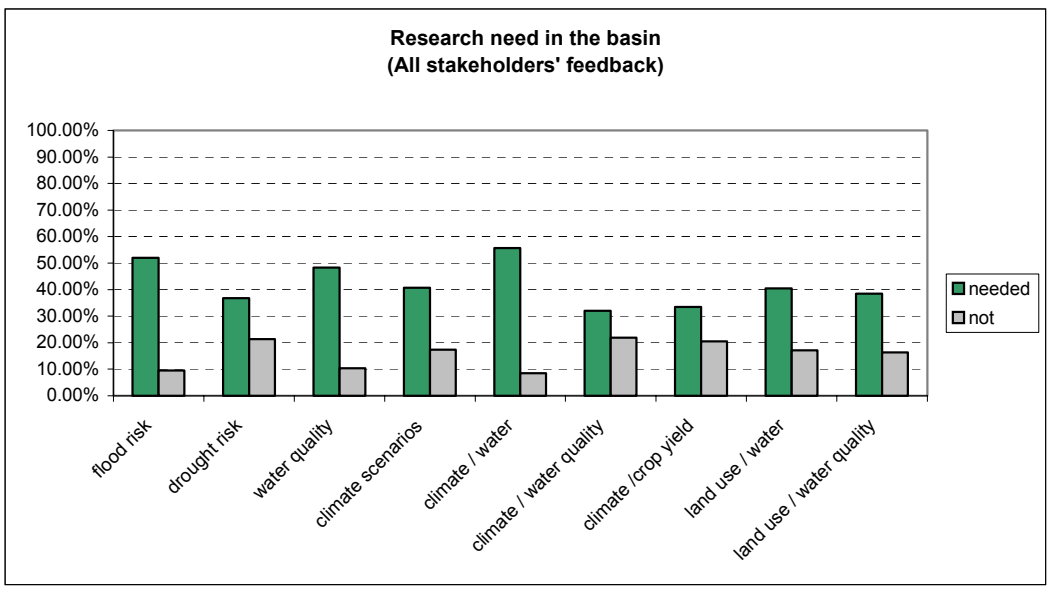


Fig. 2.3 Summary of stakeholders' view on research needs.

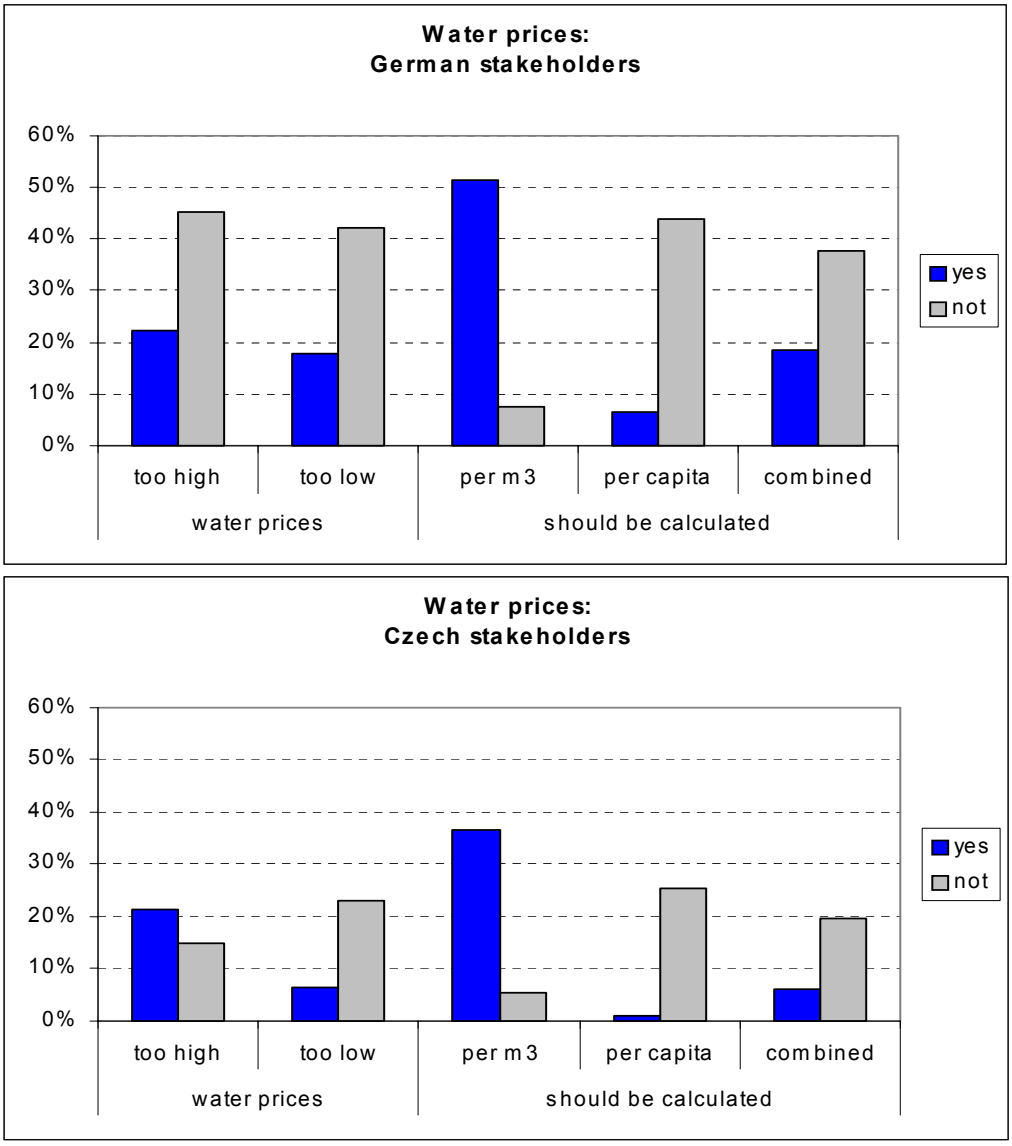


Fig. 2.4 Stakeholders' view on current water prices

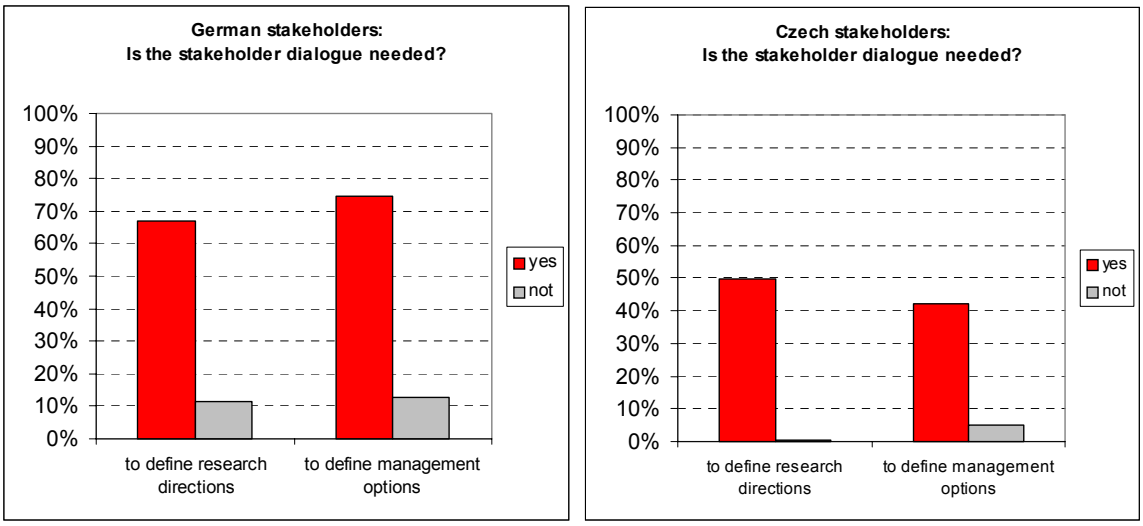


Fig. 2.5 Stakeholders' view on the need of the dialogue between researchers and stakeholders

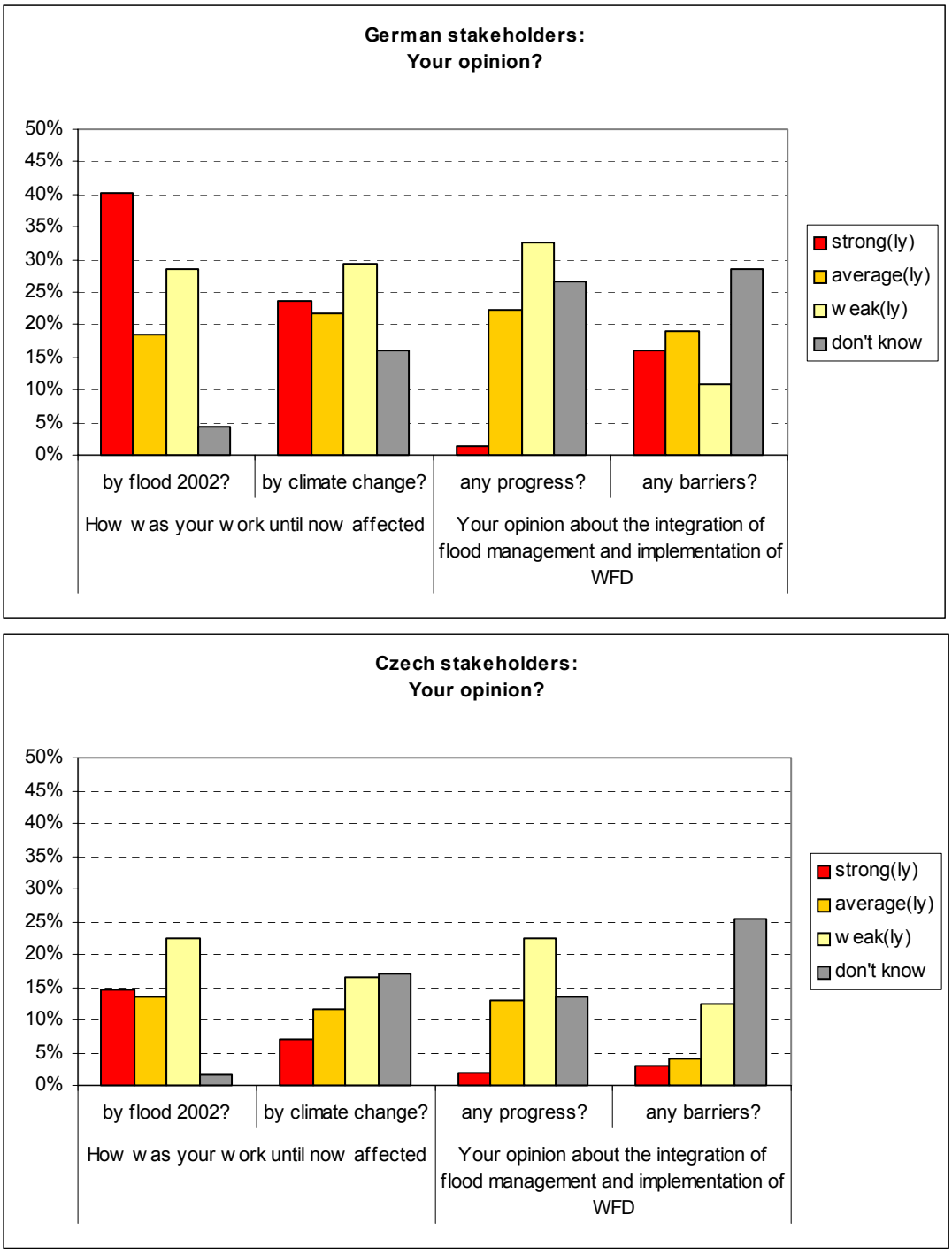
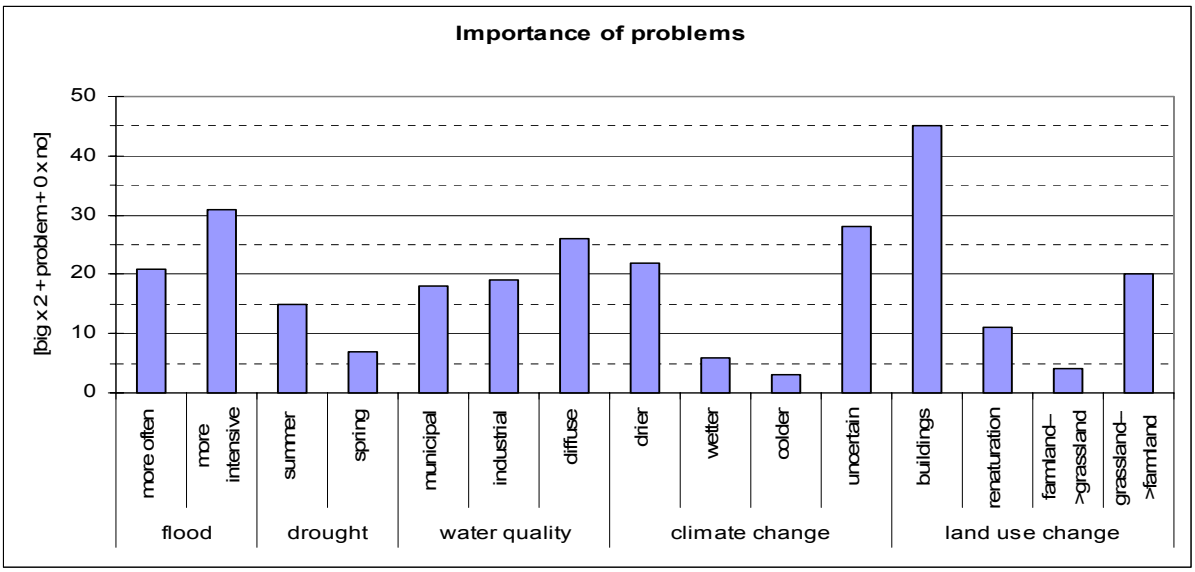
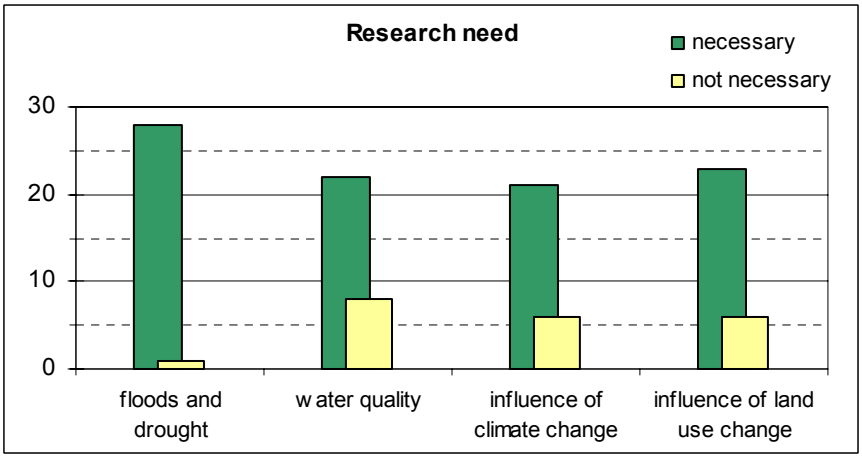


Fig. 2.6 Stakeholders opinion on the current ongoing changes and events (flood 2002, climate change, implementation of WFD)



(a)



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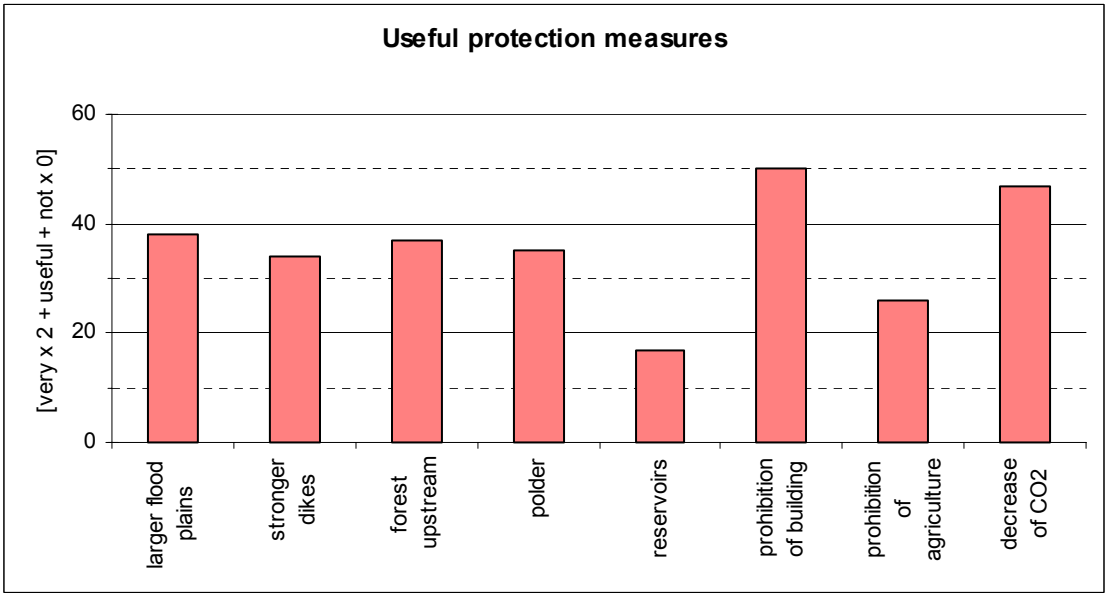

(c)

Fig. 2.7 Cumulative opinion of the inhabitants of the village Glindenberg on major water-related problems (a), research needs (b), and useful protection measures against floods (c)

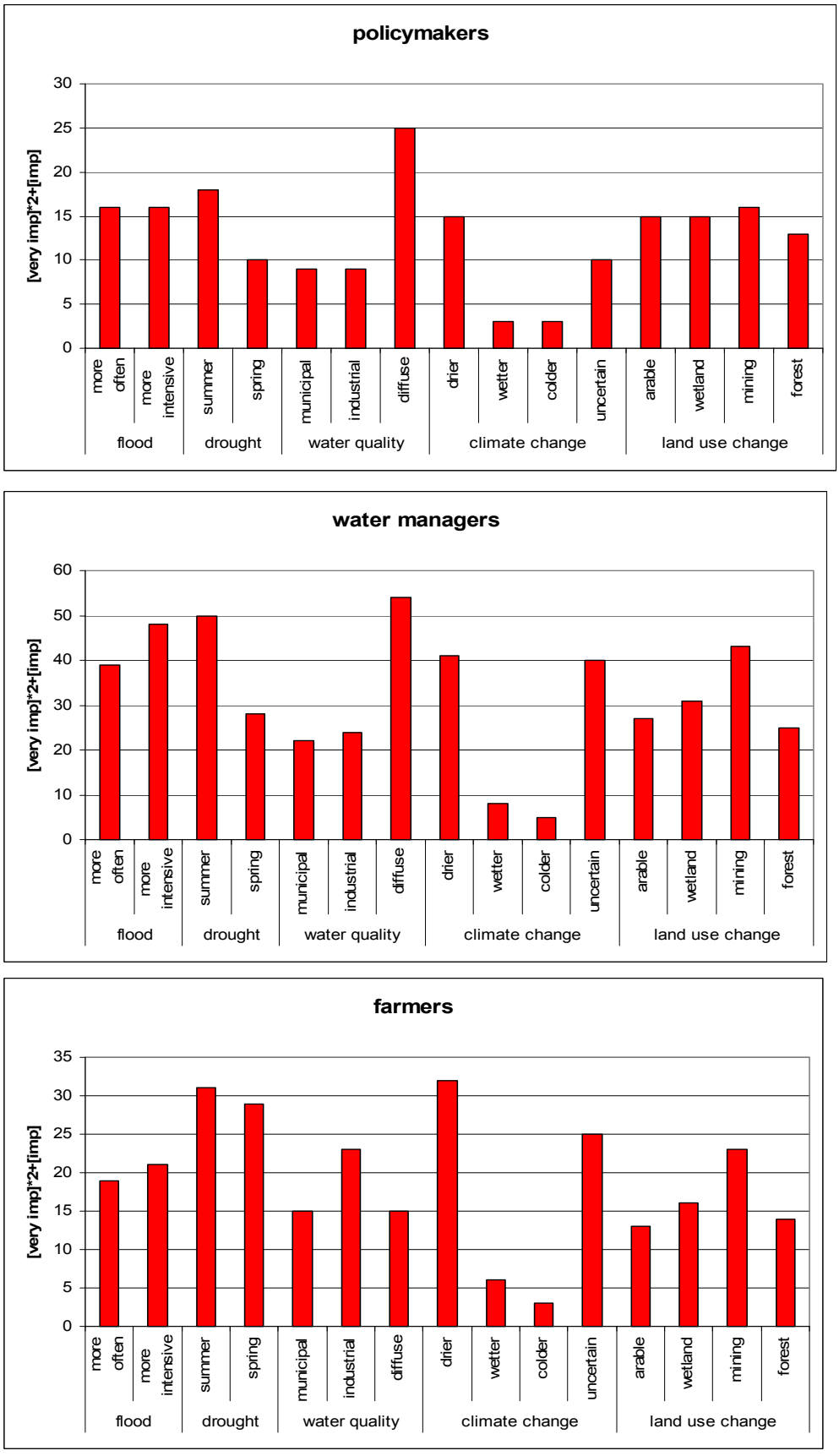

Fig. 2.8 Summary of three groups of German stakeholders' view on major water-related problems in the Elbe basin: policymakers (top), water managers (middle), and farmers (bottom)

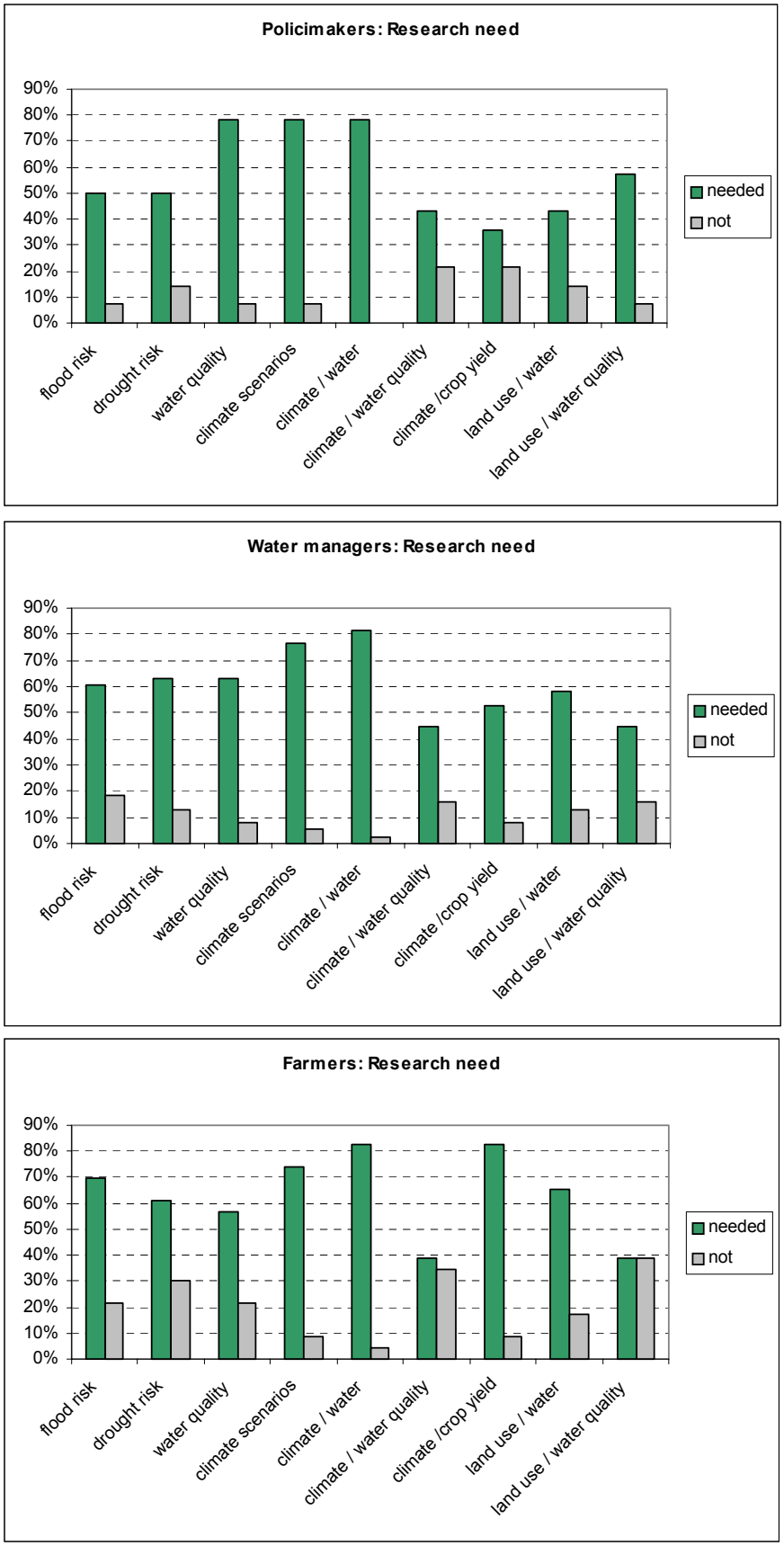

Fig. 2.9 Summary of three groups of German stakeholders' view on research needs in the Elbe basin: policymakers (top), water managers (middle), and farmers (bottom)

Table 2.1. Summary of opinions of the groups of German stakeholders on major water-related problems in the Elbe basin. The accumulated numbers of responses ([very important]*2+[important]) for issues per group were normalized by the number of responses, then only the values exceeding 1.0 were selected.

	all stakeholders	policymakers	wat. management	water + sewage	agriculture	transport	nature prot. +	science	TOTAL
flood frequency		1.14	1.03					1.08	3.25
flood intencity	**1.25**	1.14	**1.26**	1.17		**1.46**	**1.42**	**1.54**	**7.99**
summer drought	1.23	**1.29**	**1.32**		**1.35**	1.15	**1.33**	**1.38**	**7.82**
spring drought					**1.26**				1.26
water quality: municipal sources									
water quality: industrial sources									
water quality: diffuse sources	**1.31**	**1.79**	**1.42**	**1.33**			**1.79**	1.15	**7.49**
warmer and drier climate	1.12	1.07	1.08		**1.39**		**1.25**	**1.38**	**6.18**
warmer and wetter climate									
colder climate									
uncertain climate change			1.05		1.09		1.08	**1.38**	4.61
land use: conversion of arable land		1.07							1.07
land use: renaturation of wetlands		1.07					1.04	1.08	3.19
land use: renaturation of mining areas	1.04	1.14	1.13	1.07				1.08	4.42
land use: conversion of forest									

Table 2.2. Summary of opinions of the groups of German stakeholders on research needs in the Elbe basin, in % of all responses. Only values higher than 50% were selected.

	all stakeholders	policy-making	wat. management	water + sewage	agriculture	transport	nature prot. +	science	**TOTAL**
flood risk	65%		61%	67%	**70%**	62%	67%	**85%**	**4.10**
drought risk	58%		63%		61%		54%	**92%**	2.71
water quality	67%	**79%**	63%	**77%**	57%		**71%**	69%	**4.15**
climate scenarios	**74%**	**79%**	**76%**	**70%**	**74%**	**77%**	**71%**	**77%**	**5.23**
climate / water	**79%**	**79%**	**82%**	**73%**	**83%**	69%	**75%**	**100%**	**5.40**
climate / water quality								54%	0.54
climate /crop yield	58%		53%	57%	**83%**	54%	54%	69%	**3.69**
land use / water	60%		58%	67%	65%	62%		**77%**	3.28
land use / water quality	53%	57%		67%			63%	54%	2.40

3. First concept of a participative definition of the research issues in the Elbe basin

The participative definition of the first priority research issues in the Elbe basin was performed using results of the Questionnaire distributed among all major groups of stakeholders in Germany and the Czech Republic as described in Chapter 1.5.

The following groups of stakeholders were involved in the action: policymakers at the federal and state levels in Germany and at the ministry level in the Czech Republic; water managers; people working at the water supply and sewage water treatment enterprises; representatives of agriculture enterprises and farms, mining and water transport; people involved in spatial planning and nature protection, representatives of NGOs and scientists involved in water resources research. In addition, the Questionnaire was distributed among 100 randomized private households of the village Glindenberg (ca. 1300 inhabitants) located very close to the Elbe River (about 1 km) in Saxony-Anhalt (Germany). Altogether, 376 Questionnaires were sent in Germany, 242 in the Czech Republic, and 100 were distributed in Glindenberg.

From 718 distributed Questionnaires, 240 filled Questionnaires were obtained back (approximately 33%): 127 of them from the German stakeholders and inhabitants of Glindenberg, and 113 from the Czech stakeholders. The obtained filled Questionnaires were evaluated separately for three groups (German major group, Glindenberg, Czech group), and further for every major stakeholder group. If the stakeholder (except inhabitants of Glindenberg) indicated several fields of activity (e.g. water management and policy), his/her responses were taken into account for all indicated groups. In total, 157 responses were evaluated from German major stakeholder group, 30 responses from inhabitants of Glindenberg, and 200 responses from Czech stakeholders (altogether 387 responses).

The stakeholders from Germany and Czech Republic identified the following first-priority water-related problems (see Chapter 1.5):

- flood intensity,
- water quality: diffuse pollution , and
- summer droughts,

and the following first-priority research needs:

- climate impact on water availability,
- flood risk, and
- water quality.

The identified in the participative process major problems and research needs are, generally, in a good agreement.

Keeping in mind major objectives in NeWater project related to Integrated Water Resources Management and Adaptive Management, the following two major research issues can be formulated for the Elbe Case Study in the NeWater project:

- ***Incorporating climate variability and climate change into IWRM with emphasis on floods and droughts, and***
- ***How the ongoing changes in land use and climate, in land and water management influence water quality, and what are the implications for integrating water quality and water quantity issues in IWRM.***

Of course, these two research issues are very wide and ambitious, and the Elbe CS team even with the support of other WPs of NeWater and stakeholders does not pretend on

fulfilling these research objectives fully in time of the project duration. This is rather the direction where to go.

For implementation of the Case Study objectives, the work during the NeWater project is divided into three phases and different tasks and steps (our current view, could be modified in future):

Phase I (preparatory)

1. assessment of the current water management regime in the basin using literature and stakeholder interviews;
2. stakeholder activities for participative definition of major research issues in the basin: a questionnaire action, interviews and a workshop;
3. data collection for

   (a) vulnerability assessment,

   (b) hydrological and water quality modelling, and

   (c) climate and land use change impact studies in the basin (with support of stakeholders);
4. acquisition of scenarios of climate and land use change in the basin (from WP 2.2, WP 2.6);

Phase II

5. vulnerability assessment using data and innovative tools (obtained from WP 2.1) for impact estimation;
6. stakeholder activities (interviews, workshops) for identifying information needed from research by water managers and policymakers for

   (a) incorporation of climate change and climate variability into IWRM, and

   (b) integration of water quality and water quantity issues in IWRM

   (with support of WP 3.1, WP 2.2, WP 2.3, and WB 1);
7. model SWIM adjustment for

   (a) water quality modelling in the selected subbasins, and

   (b) climate impact study in the whole Elbe basin;
8. ecohydrological modelling of water availability and quality in the selected subbasins of the Elbe: e.g. Stepenitz, Jizera, Malse, and Saale (together with the LABE-project);
9. assessment of land use / land management / water management impacts on water quality in the same selected subbasins as in step 8. (together with the LABE-project and WP 2.6);
10. climate impact assessment on water availability for the whole Elbe basin using different climate change scenarios (together with the GLOWA-Elbe project and WP 2.2);

11. assessment of flood and drought trends in future by analysing available climate scenarios (step 4) and results of climate impact assessment (step 10) (inclusion of this task is precautionary: its fulfilment depends on available resources and time constraints);

Phase III

12. assessment of the possible ways and strategies for incorporation of climate change and climate variability into IWRM and AM (together with WP 2.2, WB 1 and stakeholders);
13. assessment of the possible ways and strategies of integration water quality and water quantity issues in IWRM and AM (together with WP 2.3, WB 1 and stakeholders);
14. development of strategies for adaptive water resources management and transition to adaptive management regime in the basin (leaded by WB1 and with the support of stakeholders);
15. definition of the future research needs (together with WB 1, WB 2 and stakeholders).