ONLINE SURVEY
ON HEAVY RAIN RISK MANAGEMENT IN PILOT / PARTNER REGIONS

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Acknowledgements

This document contains the results of an online survey on heavy rain risk management in the RAINMAN partner regions. The outcome is a result of the effort of all RAINMAN partners to develop and distribute the online survey. We would like to thank all respondents of the survey for supporting the development of the RAINMAN project by participating in the online survey.

Contents

1. Context and goals of this study

1.1. Project context

Heavy rain events are a major environmental risk in Europe: they can hit any location with only very short warning time. Every year people die, thousands lose their homes, and environmental damages like water pollution occur.

The risks of heavy rain events are increasing all over Europe. In the project RAINMAN, partners from 6 countries have joined to develop and test innovative methods and tools for the integrated management of heavy rain risks by local, regional & national public authorities. These will be included in the RAINMAN-Toolbox, a set of five transferable tools and methods for municipalities and regional stakeholders.

Before developing the toolbox an online survey has jointly been developed by the project partners. With the survey, information regarding two important inputs for the conception of the toolbox is gathered. On the one hand experiences with heavy rain in different regions are evaluated, on the other hand the stakeholders indicate their wishes and demands to improve heavy rain risk management. The results serve as a basis for the concept of the RAINMAN-Toolbox and its comprising methods and tools.

1.2. Goals

The RAINMAN partnership conducted the online survey to tailor the toolbox to the needs of the stakeholders and end-users. In addition, with conducting the survey other important aims were supported. The four main goals of the survey can be summarized as follows:

1. to assess risk awareness,
2. to determine the status of heavy rain risk management,
3. to find out about the demands for heavy rain risk management tools and the needs for the toolbox,
4. to raise awareness for the project and the toolbox;

More detailed the four goals include the aspects described in the following:

Content wise the online survey was designed to gather information about the state of risk awareness and the status of heavy rain risk management in the four work packages. The four thematic work packages are

- WP1: Tools and methods for the assessment and mapping of heavy rain risk
- WP2: Risk reduction measures to reduce damages of heavy rain
- WP3: Pilot actions to test an improve the developed methods for risk assessment and prevention
- WP4: Risk reduction “RAINMAN-Toolbox”

The survey was an integrated part of the pilot activities in WP 3, so that regional knowledge is brought into the development of the toolbox, see activities on heavy rain risk management status and target group survey in Saxony (T3.1.2), South Bohemia (T3.2.2), Styria (T3.3.2), Jasz-Nagykun-Szolnok (T3.4.2), Zagreb / Istria (T3.5.2), Lower Silesia (T3.6.2) and Upper Austria (T3.7.2).

Moreover, the survey also helps to involve the target group in the development of the toolbox tools and to find out about the demands for heavy rain risk management tools and the needs for the toolbox. With doing the design and content of the toolbox tools can be tailored to the customers’ needs (see WP4). The questions of the survey are designed to gather knowledge especially regarding tools and methods for the assessment and mapping of heavy rain risk (RAINMAN tool 1, see WP1) and regarding the demands for the risk reduction tool to select and implement heavy rain risk mitigation measures (RAINMAN tool 2, see WP2).

In addition, the survey also targets to raise awareness for the project, the toolbox and the need to reduce heavy rain risks.

1.3. Approach and structure

This report summarizes and evaluates the findings of the RAINMAN online survey. Therefore the whole content builds on the results that were collected by conducting the online survey in 2018.

The results are presented as follows: In chapter 2 we present the basis of the further analysis: a description of the set-up and structure of the online survey. The report then focuses on the analysis of the overall results of the survey, see chapter 3. In this chapter key findings are summarized for each part of the survey. Important country specific findings were supplemented, especially such country specific findings that differ significantly from the total results. Chapter 4 then focuses on the conclusions that can be drawn for different activities within the project and for the further development of the RAINMAN-Toolbox. For each work package individual conclusions are presented. To conclude, chapter 5 summarizes the highlights of this report.

For this report we put a focus on the presentation and evaluation of the total results of the survey. Depending on the issue that users of the results would like to address, the additional information is very relevant and therefore attached to the report. First of all the answers to the open questions are listed in annex I. When evaluating the answer we had a closer look at these answers and considered these in the evaluation. Secondly, for each participating country the corresponding results have been summarized and presented as posters that are attached in annex II.

2. General description and structure of the online survey

In 2018, an online survey was jointly developed by the project partners before developing the toolbox (see activity T4.1.1, January 2018 – December 2018). With the survey, information regarding two important inputs for the conception of the toolbox is gathered. On the one hand experiences with heavy rain in different regions are evaluated, on the other hand the stakeholders indicate their wishes and demands to improve heavy rain risk management. The results serve as a basis for the concept of the RAINMAN-Toolbox and its comprising methods and tools.

The survey questions were jointly developed in English and coordinated by the Saxon State Ministry of the Interior. The local project partners translated the content into the local languages. The translated questions were then implemented in two online platforms. For the German survey the "Beteiligungsportal", a participation portal site in Saxony, was used to conduct the survey, for all other language versions the online survey tool LimeSurvey was used. The estimated duration for answering all questions is 15 to 20 minutes.

The survey was distributed between February 2018 and May 2018 by the project partners. They provided information about the survey to all stakeholders in the six countries of the consortium, to the associated partners in the seven pilot activities and any further institution that could deliver a valuable input.

With the survey the RAINMAN partnership involves the target group / end users in the tool development process for the RAINMAN-Toolbox regarding tools and methods for the assessment and mapping of heavy rain risk, which are mainly local public administration or local government and regional public administration. Further target groups are research institutes, universities, associations and private individuals.

The survey is structured in different thematic parts. The structure looks as follows.

- Personal information
- Part A: Experiences with heavy rain including questions regarding knowledge about heavy rain hazards and risks, e.g. databases (see chapter 3.2 for the evaluation of this part)
- Part B: Practical use of early warning systems (see chapter 3.3 for the evaluation of this part)
- Part C: Assessment of heavy rain hazards and risks (see chapter 3.4 for the evaluation of this part)
- Part D: Measures to mitigate heavy rain risks (see chapter 3.5 for the evaluation of this part)
- Part E: Demands and wishes (see chapter 3.6 for the evaluation of this part)

The survey closed with the option to provide contact information to stay in touch with the project and register for the RAINMAN newsletter.

3. Results and conclusions of the online survey

In 2018 the return of 367 questionnaires from six RAINMAN partner countries were evaluated. The main findings from the different parts of the online survey are presented in this chapter. The results will be analysed and considered against the background of the findings of different RAINMAN activities (for example available scoping studies).

3.1. Results and conclusions of part "personal information"

Key findings

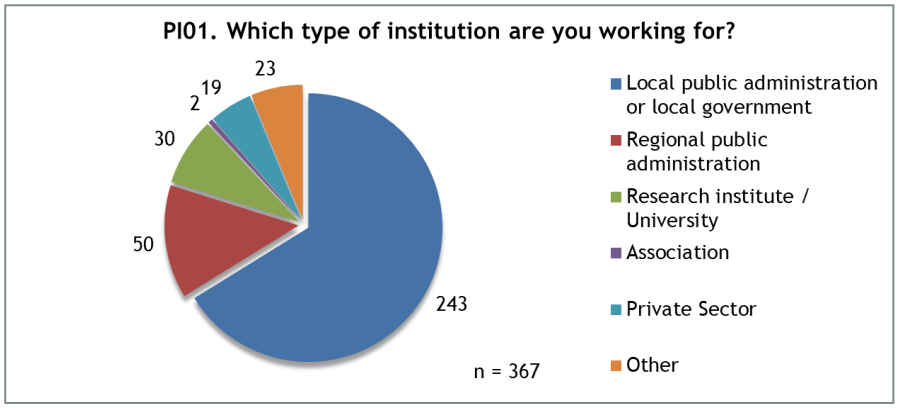
In total we received 367 completed questionnaires. The main target groups and target region were reached: We got 85 % of the answers from local public administration or local government and regional public administration and around 87 % of the answers came are from pilot regions.

The project partners used different approaches to contact possible participants. As a consequence, the participants differ with regard to the level of expertise from experts to municipalities without any experience in the topic so far. Also the number of respondents differs between countries.

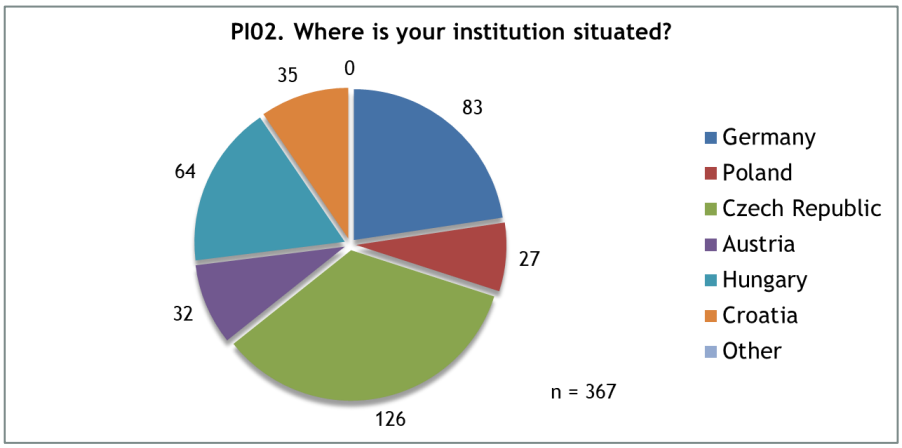
A high proportion of the respondents are experts from planning disciplines like spatial planning, urban planning, building permissions, environmental planning and nature preservation and respondents working in the field of water management / flood risk management. Only few participants are stakeholders in the field of meteorology / weather forecast and agriculture. These areas of activities are therefore underrepresented in the results and conclusions of the survey compared to their practical relevance with regard to heavy rain risks. The relatively small number of respondents from these disciplines reflects that both are not a focus of the RAINMAN project and its activities. Nevertheless, the practical relevance should not be underestimated.

Results

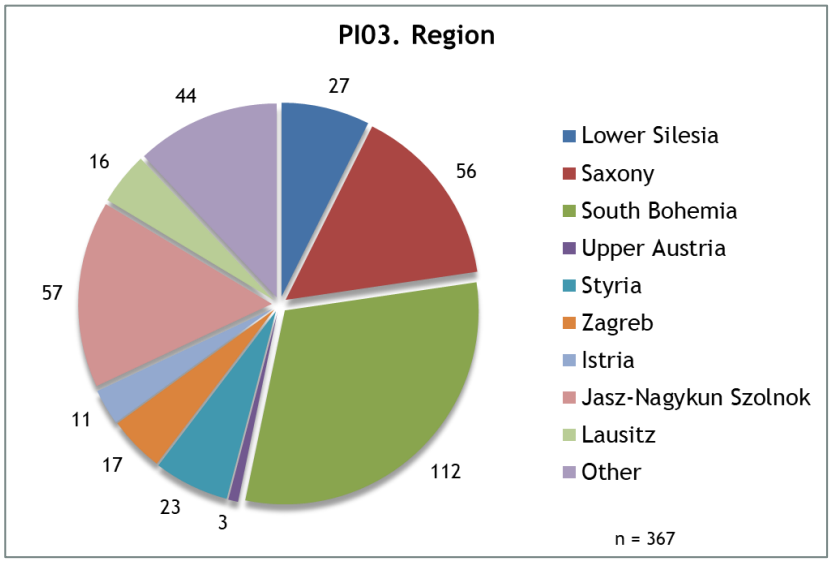
The following figures summarize the results of part "personal information" of the online survey. Comments and observations regarding the figure are added below the respective figure:



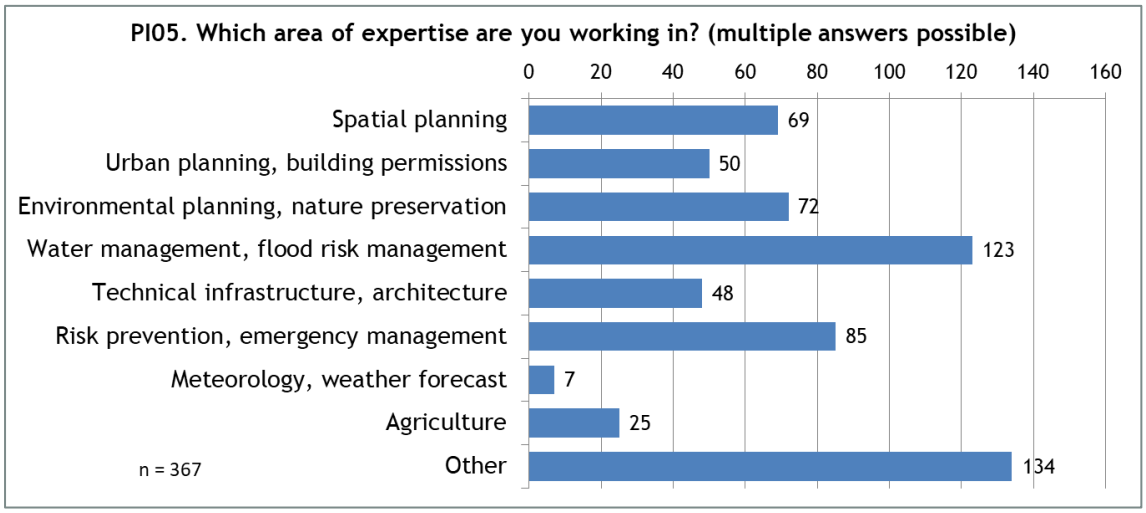
- In total we received 367 completed questionnaires.
- Main target groups were reached: around 85 % of the respondents are working in local public administration or local government and regional public administration.
- The share of the main target groups within the partner regions differs between 31 % and 97 % (see country specific results in the annex).
- In addition to the provided options, most of the respondents indicated to work for other public bodies (i.e. ministries), fire departments or civil protection institutions (see answers to the open questions in the annex).



- The sample size varies from one partner country to the next.
- The sample size as well as composition of the sample (type of institution) needs to be considered when drawing conclusions for the RAINMAN activities.



- Main target regions were reached: Around 87 % of the answers came are from pilot regions, especially from South Bohemia, Saxony (including Lausitz) and Jasz-Nagykun Szolnok (Hungary).
- The share of the respondents from pilot regions is even higher as 44 respondents chose the option “other” although some of the mentioned regions are part of the options above.



- A high proportion of the respondents are experts from planning disciplines like spatial planning, urban planning, building permissions, environmental planning and nature preservation (see first three options in the figure above).
- Another important share is respondents working in the field of water management / flood risk management.
- Noticeable 134 respondents chose the option “other”. A high number of these persons indicate to work as mayor, in a local council or in the field of public administration. From the remaining answers a high proportion could be assigned to the other provided options, especially to “technical infrastructure, architecture” and to the planning disciplines.

3.2. Results and conclusions of Part A: Experiences with heavy rain

Key findings

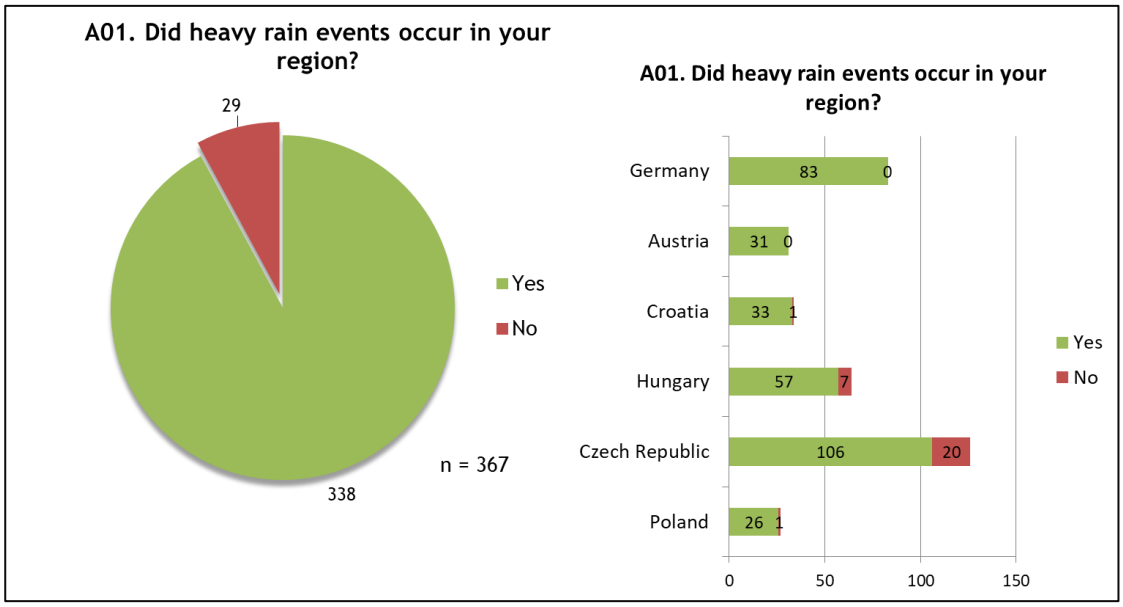
In general most respondents (>90 %) have experienced heavy rain events. More respondents state that they have experienced damages caused by flooding than damages caused by mass movements. However, there is no outstanding difference in the assessment of the type of damage that was caused: Respondents experienced especially damages on urban infrastructure, on private buildings and on cultivated land.

Most participants are concerned about consequences of climate change and think that heavy rain events will increase in the future. This underlines the need to provide guidance for heavy rain risk management.

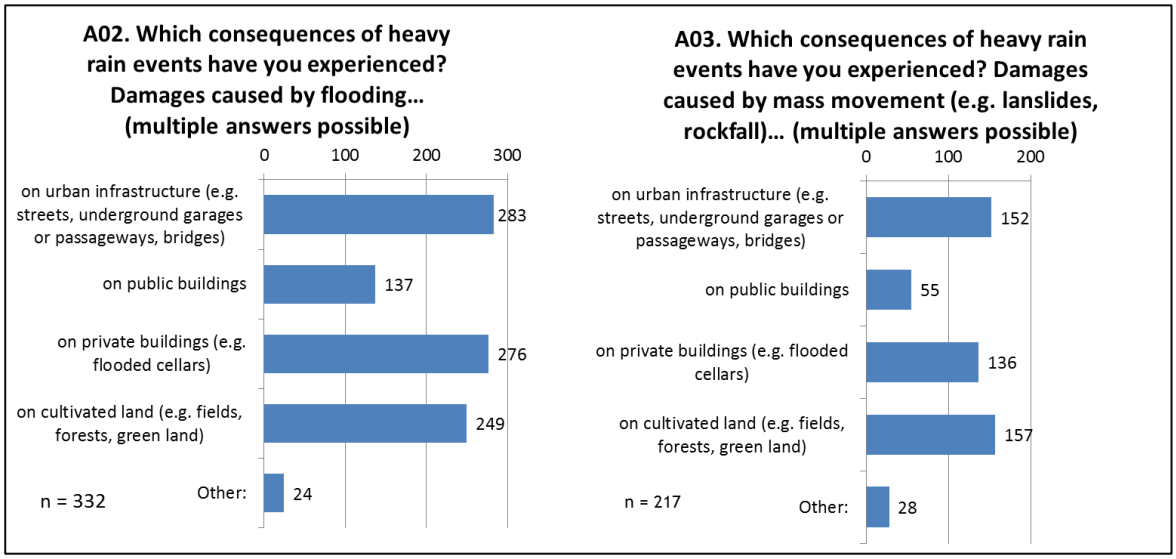
Regarding building precautions only one third of the respondents think that private house owners are mainly responsible for risk prevention. In Germany, Croatia, Hungary and Poland the share was even lower. In turn, most respondents agree that more activities by public authorities are needed for risk prevention. These findings confirm that the RAINMAN-Toolbox needs to target public authorities. At the same time, other entry points to the toolbox are useful, as for example for private persons.

Results

The following figures summarize the results of part “Experiences with heavy rain” of the online survey. Comments and observations regarding the figure are added below the respective figure:

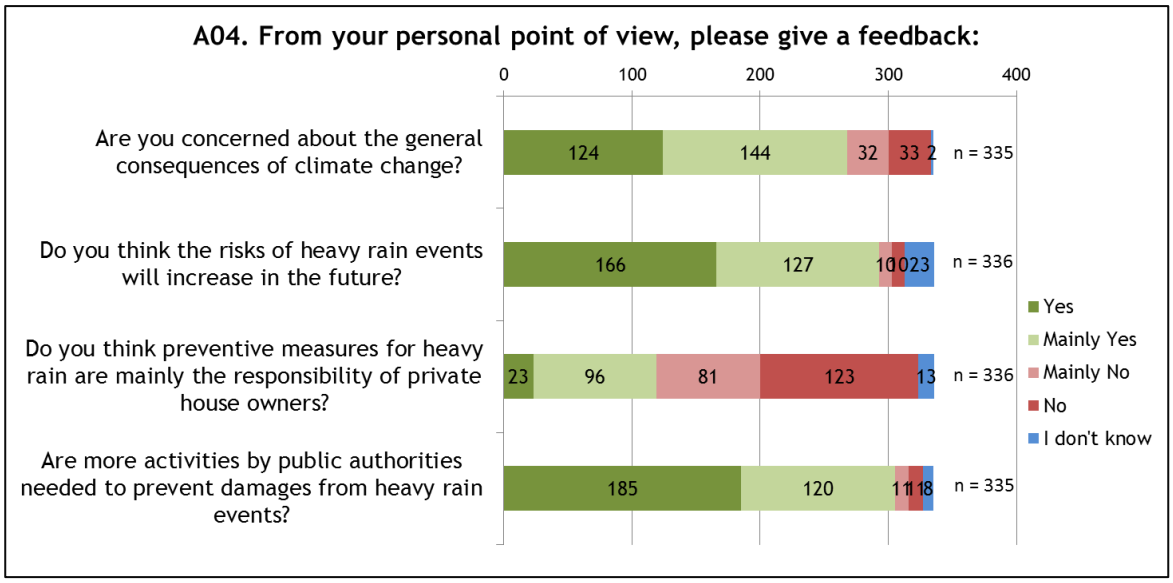


- In general most respondents (>90 %) have experienced heavy rain events. This result meets the expectations as most respondents come from the RAINMAN pilot regions which were selected due to the practical relevance of the topic "heavy rain" in the respective region.
- Compared to the other countries, more participants in the Czech Republic responded "no" - saying that they did not experience heavy rain events (nearly all answers from South Bohemia). This does probably not show that there were fewer heavy rain events in the Czech Republic but might be a result of the distribution approach (see above). In the Czech Republic the survey was sent to all municipalities in South Bohemia whereas in most other countries the online survey was distributed especially in the pilot regions which were selected due to their experiences with heavy rain events.



- Respondents have more often experienced damages caused by flooding than damages caused by mass movements. However, only the result for Austria is different from this observation: Out of 32 respondents 31 experienced damages by flooding and 28 experienced damages caused by mass movements.
- The kind of damages the respondents experienced by flooding or by mass movements is similar in all countries. Flooding and mass movements caused especially damages on urban infrastructure, on

private building and on cultivated land. Each of these three choices was selected by more than half of the respondents.



- As most respondents state to be concerned about the consequences of climate change and even more think that the risks of heavy rain events will increase in the future the importance of RAINMAN and the practical relevance of the project's outputs is emphasized.
- Only parts of the respondents think that private house owners are responsible for preventive measures.
- Activities by public authorities are needed, especially according to participants in Austria and the Czech Republic (see annex for country specific results).

3.3. Results and conclusions of Part B: Practical use of early warning systems

Key findings

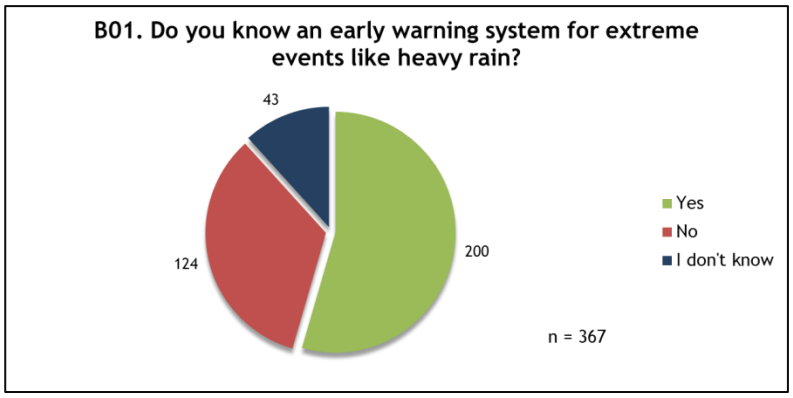
In the perceptions of the respondents from different countries and municipalities warning for heavy rain events are hardly predictable. The evaluation of the respondents reflect that heavy rain events have only a very short warning time (only 60 % of the participants state that warnings reach them in time) and are limited to a certain location (25 % state the warnings turn out to be correct). These results are not surprising but reflect the general problems regarding early warning systems for heavy rain events. Experiences seem to be similar in different countries and municipalities.

A comparison of the country specific results shows that the opinions regarding the needs for improvements of the early warning systems vary between the countries. Especially respondents from Germany and Austria see the need to improve early warning. At the same time these are the two of three countries that are focused at in the RAINMAN project with regard to early warning.

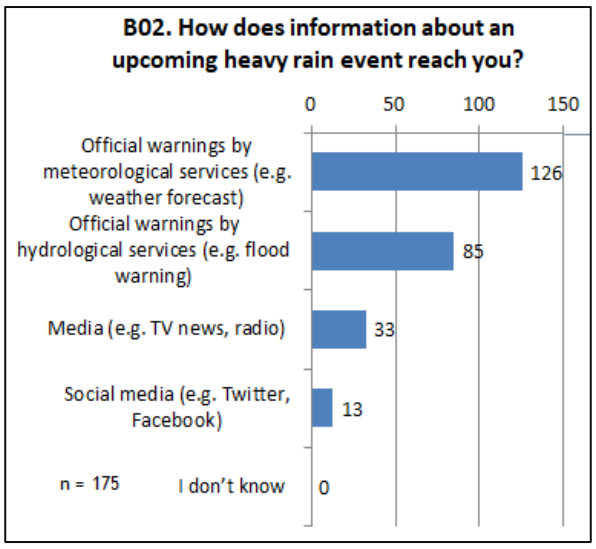
According to the respondents, improvements of early warning systems should especially include accuracy of meteorological forecasts and hydrological forecasts for small water bodies. Moreover, respondents also indicated the need of more and better information in this regard (see answers to the option "other").

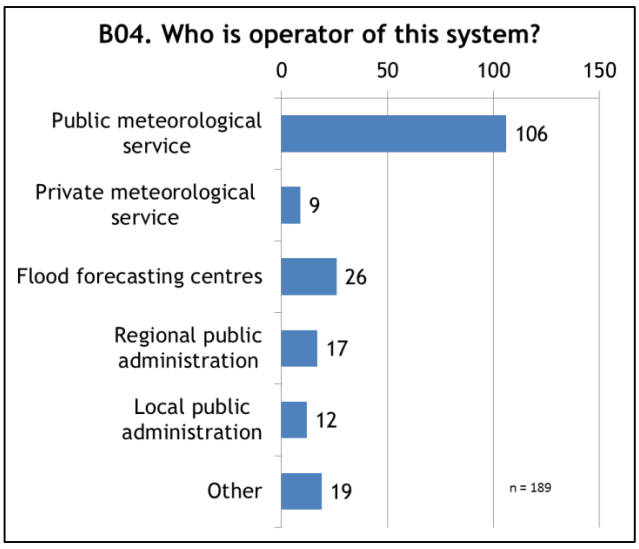
Results

The following figures summarize the results of part “Practical use of early warning systems” of the online survey. Comments and observations regarding the figure are added below the respective figure:



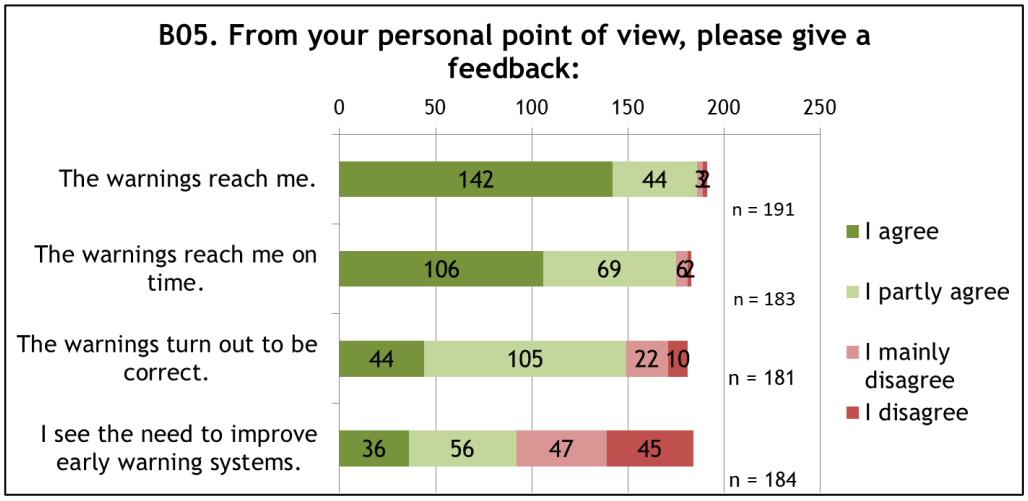
- Only about half of the respondents know an early warning system. This could be an indication that a high proportion of the participants is not working in the field of heavy rain management or is at least not dealing with early warning systems at all.
- The shares of participants knowing an early warning system for extreme events is even smaller in HU, DE, AT compared to the overall results.



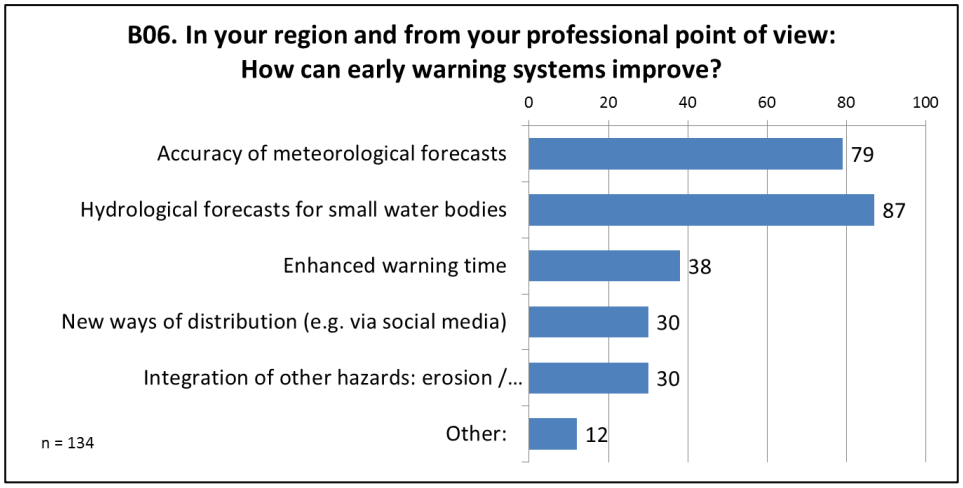


- Information about heavy rain events are mostly provided by public services. Depending on the country specific organisation this might be a meteorological or hydrological service.
- The indicated names of the early warning system differ in the respective countries. The most often named systems are:
  - Most Austrian participants named the “Central institute for meteorology and geodynamics”.
  - For Croatia most respondents state Croatian Meteorological and Hydrological Service DHMZ and Meteoalarm of The Network of European Meteorological Services EUMETNET
  - Czech participants named most often the system Czech Hydrometeorological Institute. Also local warning systems are mentioned by a lot of the participants.
  - For Germany participants mentioned federal systems of the German National Meteorological Service DWD and also regional systems like the flood early warning system of LfULG.

- Nearly all of the Hungarian respondents named “weather forecast”. A high proportion of the respondents does not enter any further details. Others specified the answer, i.e. www.met.hu, www.idokep.hu.
- For Poland no clear conclusion can be drawn as different systems are mentioned, i.e. the weather service of IMGW-PIB.



- Even though most respondents agree or party agree that the warnings are correct, on time, and reach the person, a closer look to the numbers reveals:
  - Depending on the country, participants assess warnings different.
  - Only 60 % of the participants state that warnings reach them in time, 25 % state the warnings turn out to be correct. This might reflect that warnings are often issued for large areas but that the heavy rain event only hits a small part of this area. The size of the selected warning area is often to large due to the uncertainty of the spatial location of the heavy rain event. In the perceptions of the respondents from different countries and municipalities warning for heavy rain events are hardly predictable.
- The opinions concerning the improvement of the systems vary. More than 80 percent of the respondents from Austria and Germany agree or partly agree that the early warning systems need to be improved whereas only around 15 % of the Hungarian and Croatian participants, around 30 % of the Polish participants and around 50 % of the Czech participants agree or partly agree to this statement. In contrast to the other countries considered, Austria and Germany have a publicly accessible hydrological (flash flood) early warning system.



- For improving early warning systems, the respondents set a focus on accuracy of themeterological forecast and hydrological forecasts for small water bodies.

3.4. Results and conclusions of Part C: Assessment and mapping of heavy rain risks

Key findings

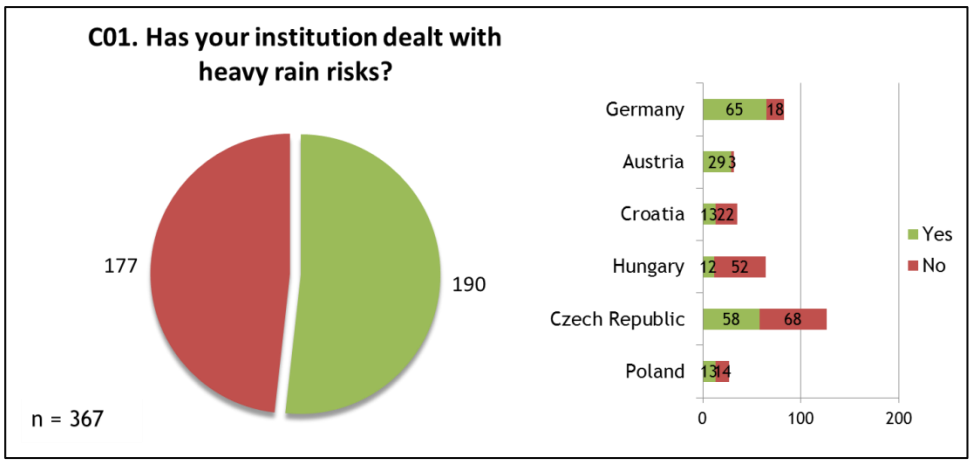
The three most common methods used are “analysis of the drainage system”, “systematic documentation of heavy rain events”, and “analysis of the topographic conditions”. More detailed, the key findings regarding different analysis applied to assess heavy rain risks are:

- **Systematic documentation of heavy rain events** is applied in most partner countries and seems to be the easiest way of assessing heavy rain risks.
- In all partner regions the most frequently named historic data for the **risk assessment based on historic** data are rain measurements, time series and event databases.
- The most common **analysis of topographic conditions** that the respondents / their institutions have done is by identification of surface flow path. The results regarding other options (identification of area depressions, identification of flood channels, and identification of inflow from neighbouring areas) do not give a consistent impression.
- The source for the **analysis of precipitation data** is in most cases station data. Around 28 % of the respondents use radar data and only few base their analysis on satellite data.
- The **analysis of the drainage system** is a conventional task for the design of urban drainage systems. The integration of the assessment of heavy rain risks seem to be useful. No clear trend is visible when it comes to the analysis of the drainage system (weak spots).
- The **analysis of the building structure and infrastructure** is rarely used to assess heavy rain risks compared to the other types of analysis. In most cases the availability of free spaces is the main focus of the analysis.
- Modelling: The **development of hazard and risks maps** in the institutions of the respondents is especially build on GIS analysis or 2D-modeling.

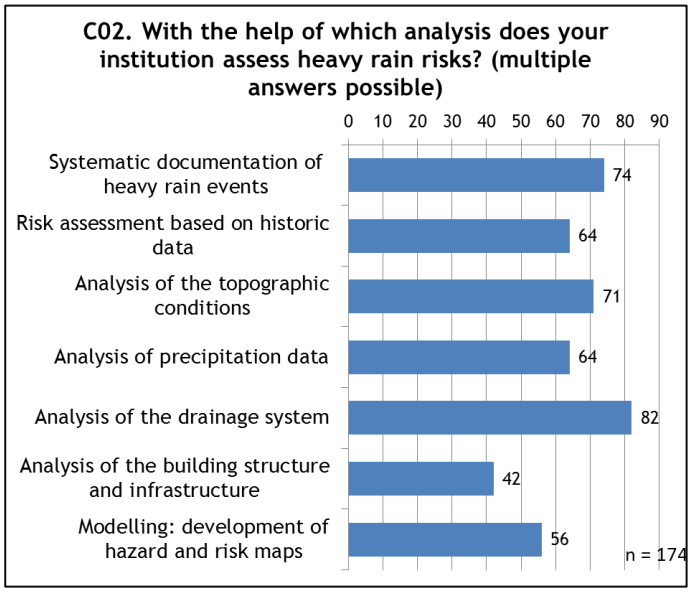
Although most participants are aware of heavy rain risks, nearly 50 % have not conducted any heavy rain risk assessment yet. According to the results of the online survey the provision of knowledge, data and financial resources would help to start mapping and assessing heavy rain risks.

Results

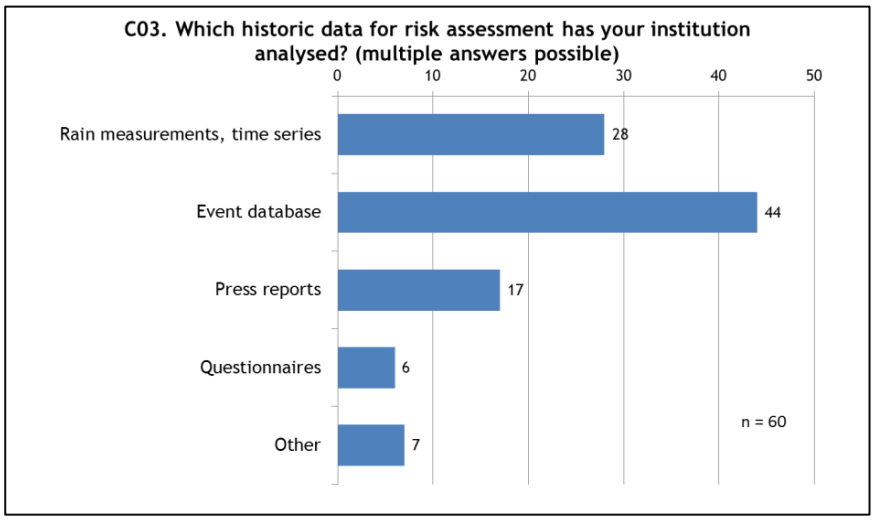
The following figures summarize the results of part “Assessment and mapping of heavy rain risks” of the online survey. Comments and observations regarding the figure are added below the respective figure:



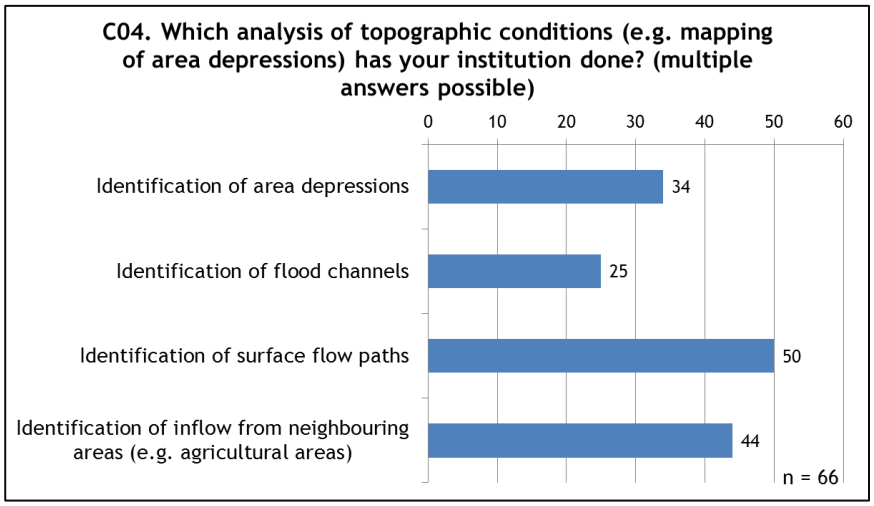
- Only about 50 % of the respondents have dealt with heavy rain risk. The result supports the presumption that a high proportion of the participants is not working in the field of heavy rain management (see also the analysis of question B01).
- The distribution of the results varies in the partner countries. As most respondents have experienced heavy rain events, differences in the field of expertise might be a reason for the variations (see question PI 05 in chapter 3.1).



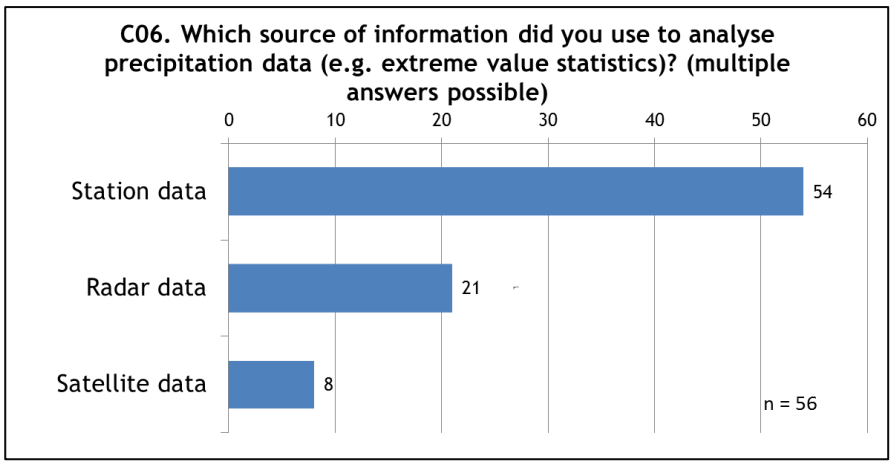
- A variety of methods to assess heavy rain risks is available. All proposed methods are used by a relatively high number of the participants.
- The two most named methods are “analysis of the drainage system” and “systematic documentation of heavy rain events”. At least one of these methods is one of the three most named options in the partner countries.



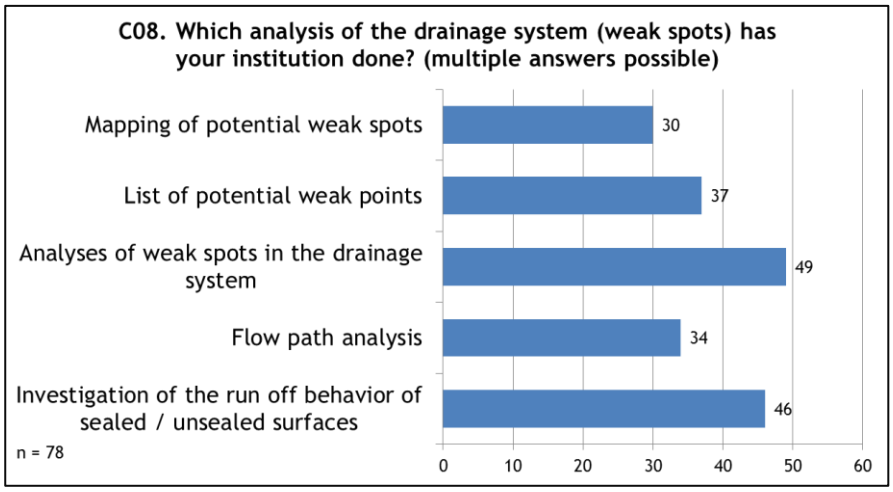
- In all partner regions the most frequently named historic data for the **risk assessment based on historic** data are rain measurements, time series and event databases. Participants added reports, interviews and journalism as further sources for the assessment (see option “other”).



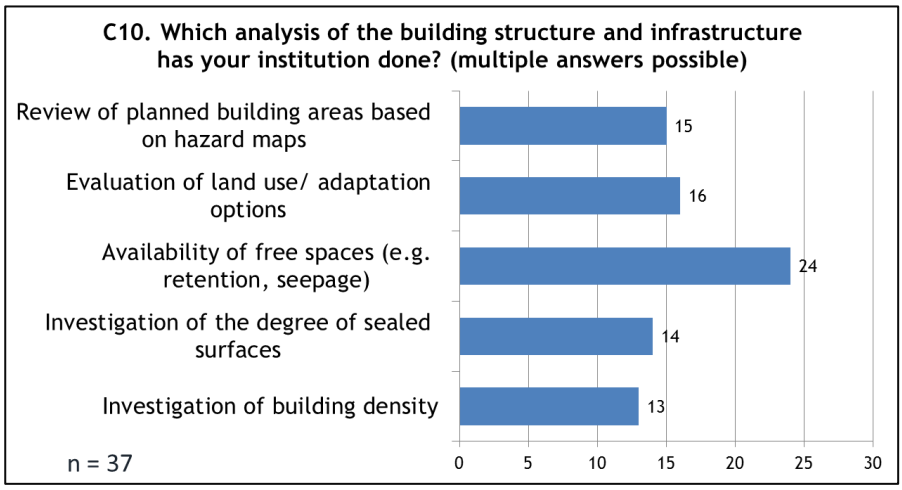
- Participants who indicate that they assess heavy rain risks with the help of topographic conditions are mainly from Germany and Austria. Thus, the overall results regarding the analysis method are reflected by the results of German and Austrian respondents. For additional information regarding the implementation in the respective country see annex I.
- All of the given options are chosen quite often so no clear favourite method could be identified.
- For additional information regarding the implementation in the respective country see annex I (question C5).



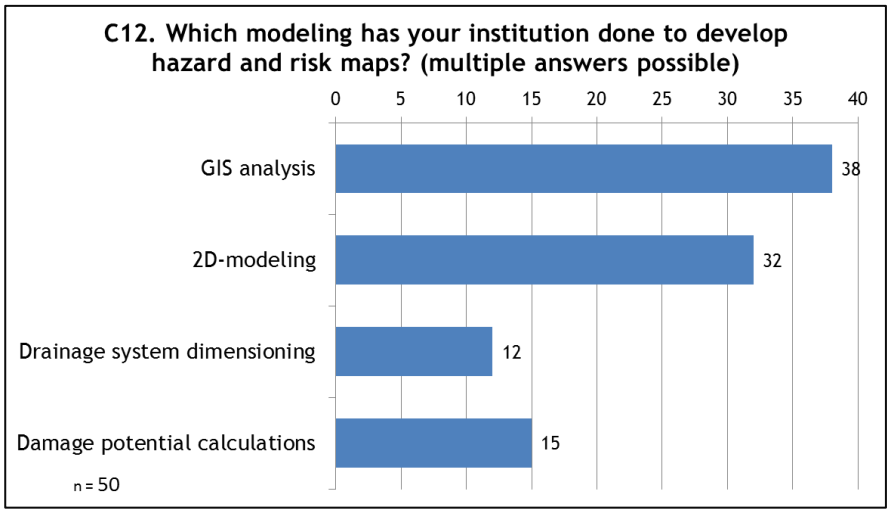
- The most common source for analysing precipitation data are station data, followed by radar data. Only few of the participants use satellite data.
- For additional information about data sets / models in the respective country see annex I (question C7). Mostly, statistical evaluations from national (hydro-) meteorological services build the basis for heavy rain analyses.



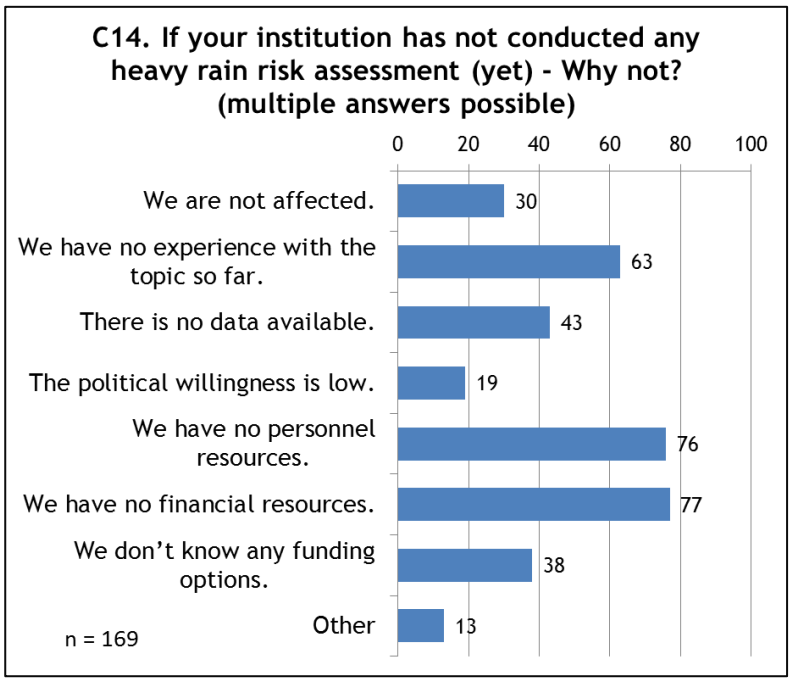
- Participants who assess heavy rain risks with the help of the drainage system apply different methods, mainly the analyses of weak spots or the investigation of the run off behaviour of sealed / unsealed surfaces.
- The analysis is hardy applied by the respondents from Croatia, Poland and Hungary.
- For additional information regarding the implementation of other analyses of the drainage system in the respective country see annex I (question C9).



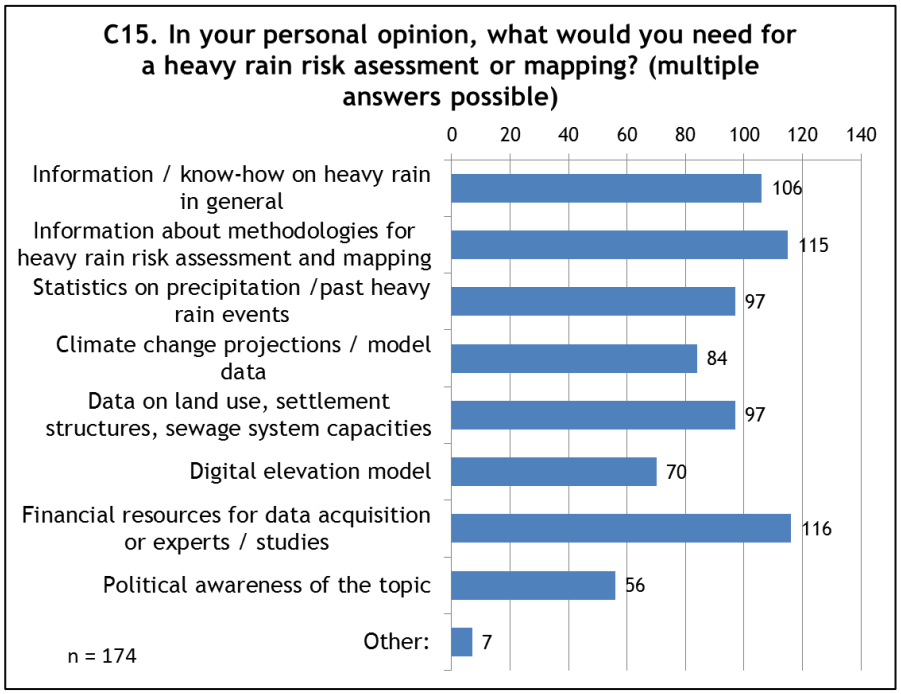
- According to the respondents, the assessment of heavy rain risks is rarely done by an analysis of the building structure compared to the other analyses.
- For additional information regarding other implemented analyses of the building structure and infrastructure in the respective country see annex I (question C11).



- The development of hazard and risks maps is especially implemented by Austrian and Czech participants.
- Most of the modelling to develop hazard and risks maps is done by GIS analysis or 2D-modeling.
- For additional information regarding other analyses to develop hazard and risks maps in the respective country see annex I (question C13).



- Participants that have not conducted any heavy rain risk assessment yet, identified a lack of personal and financial resources as well as missing experiences as the main reasons.



- For improving the situation and supporting the assessment or mapping of heavy rain risks, the respondents indicated the following needs:
  - know-how regarding heavy rain risks in general and methodologies
  - data, including statistics of precipitation , model data, data on land use, sewage system capacities and so on
  - financial resources for data acquisition or experts / studies

3.5. Results and conclusions of Part D: Measures to mitigate heavy rain risks

Key findings

A high share of the respondents' institutions have already planned or implemented mitigation measures. Nevertheless, an integrated risk management planning process is only implemented or planned by < 20 % of all respondents. Also the different proportion of experienced respondents regarding different fields of activity (see especially part B and C regarding assessment and mapping or early warning systems) indicate that a systematic planning process does not seem to be widely implemented. A variety of stakeholders is named as being involved in the risk management process. Not surprisingly the option "water management" is most often named.

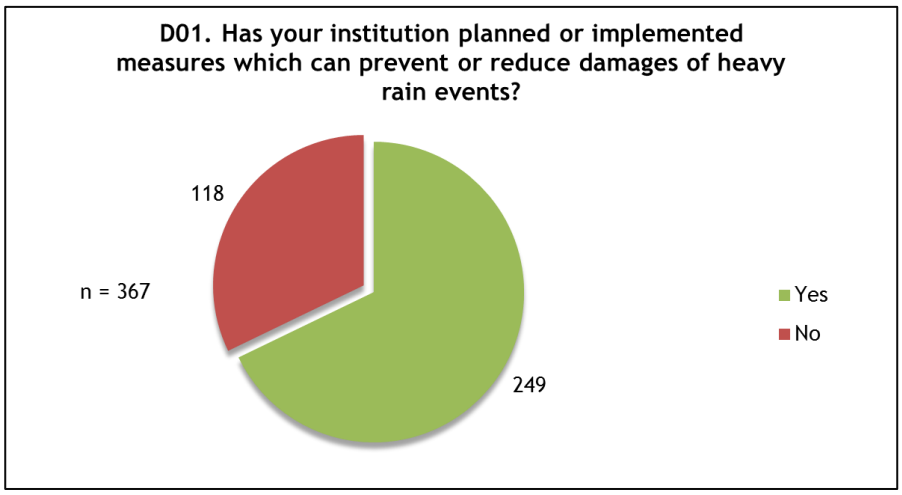
Different kinds of measures are valuable to reduce heavy rain risks. The distribution of the respondents' answers to the type of measures indicates a mix of different types of measures planned or implemented in the countries. A focus of the implemented or planned measures is on technical measures as well as on preventive measures in a built environment and outside of settlement structures. At the same time other measures which are an important part of risk management, are rarely applied (i.e. less than 25 % of the respondents selected aftercare measures to be planned or implemented, also soft measures like "information to stakeholders" are mentioned by comparatively few respondents). The measures that are planned or implemented by most of the participants' institutions are also consistent with the measures the participants assess to be most effective. These are preventive measures in a built environment / urban area, preventive measures outside of settlement structures and technical protection measures.

Reasons for not having implemented or planned any measures yet are similar to the reasons given for not having dealt with heavy rain risk assessment and mapping yet. Around 50 % of the respondents state that

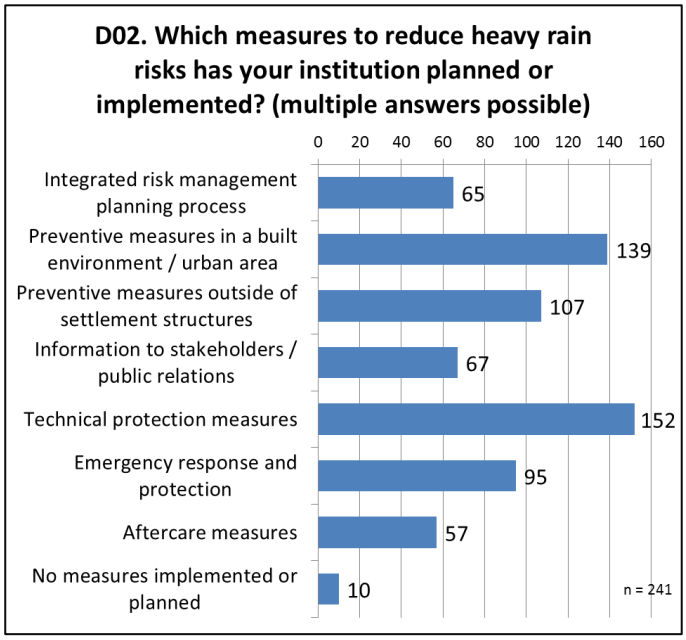
it is due to a lack of experience and financial resources. Conversely, financial resources / funding options and the availability of information / guidance on the selection of measures are the most frequently selected options that would support the implementation of heavy rain risks. But also the other available options (more political acceptance, more personal resources) are assessed as being helpful for the institution to implement further measures to reduce heavy rain risks.

Results

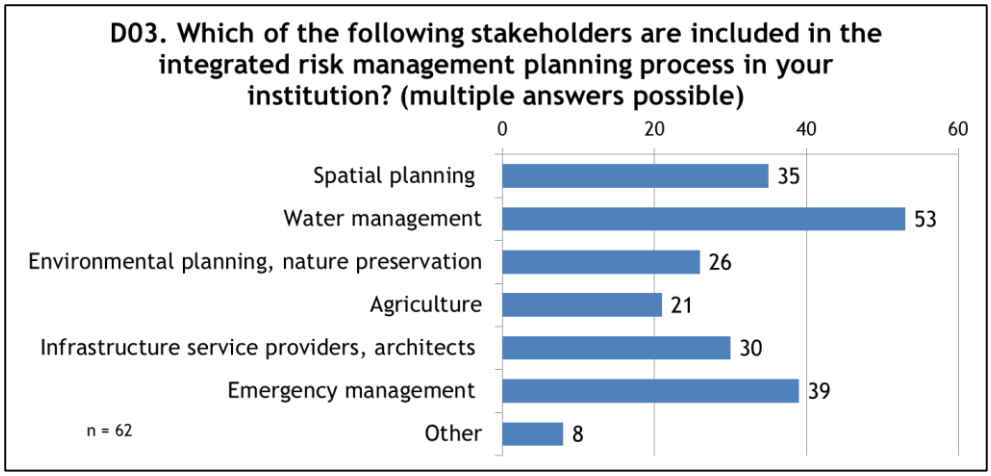
The following figures summarize the results of part "Measures to mitigate heavy rain risks" of the online survey. Comments and observations regarding the figure are added below the respective figure:



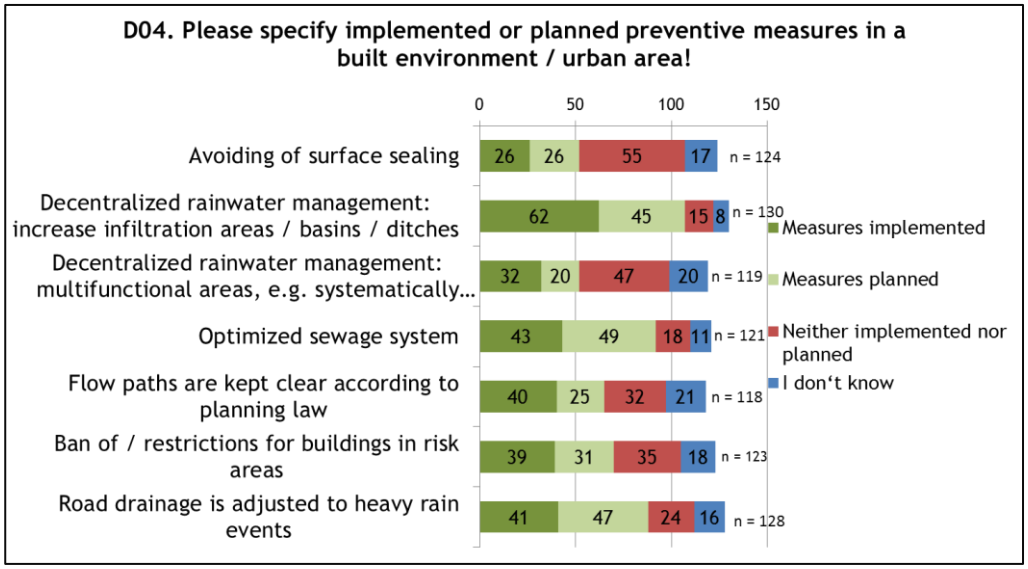
- Around 65 % of the respondents have planned or implemented measures to mitigate heavy rain risks. This share is higher than the share of respondents' that deals with assessment and mapping or that knows early warning systems.
- Thus, it can be assumed that a high proportion of the participants is not directly working in the field of modelling or assessing heavy rain risks but is involved in the management process. It could also mean that some participants do not properly assess heavy rain risks before implementing or planning mitigation measures. The implementation or planning of mitigation measures might rather be a reaction to past heavy rain events. However, a question that would answer exactly this connection was not part of the survey.



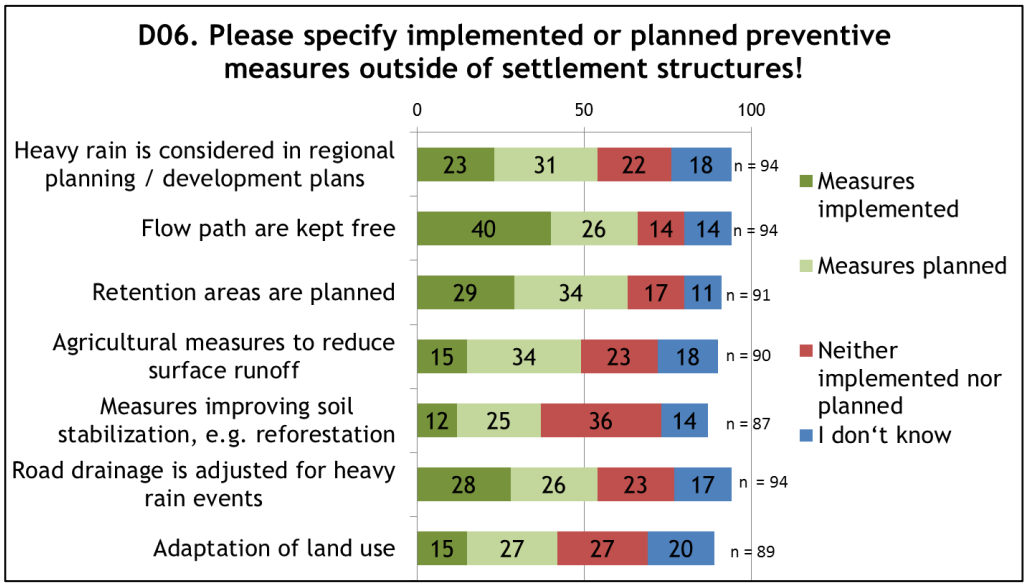
- A variety of measures was implemented or planned by the respective institutions – different kinds of activity are valuable to reduce heavy rain risks. The distribution of the respondents' answers also indicates a mix of heterogeneous measures leaving none of the options unselected.
- Soft measures (information to stakeholders) that can be easily implemented are selected comparatively rarely, guidance documents could support this.
- The focus of planned / implemented measures is on technical protection measures (152 out of 241) and preventive measures in a built environment / settlement structures.



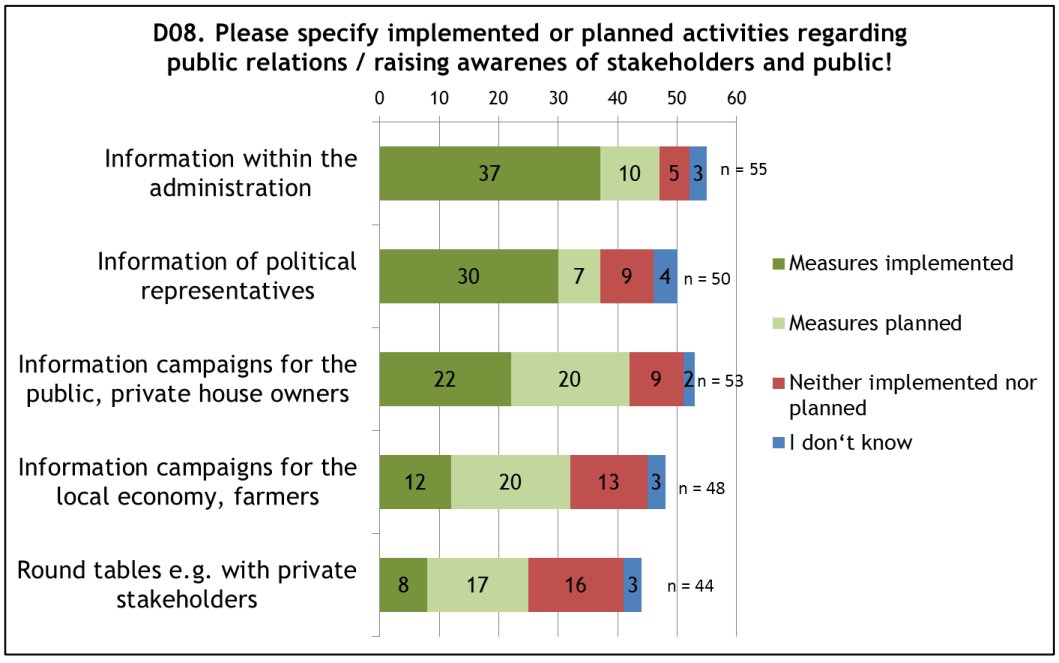
- A variety of stakeholders is included in the risk management process according to the participants.
- The distribution of the answers reflects the areas of expertise the respondents are working in (see question PI05).



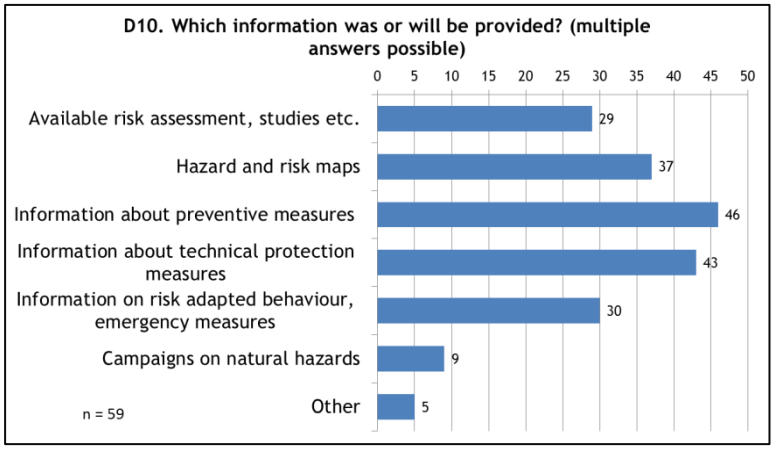
- Measures in a built environment that are implemented or planned by the highest share of respondents are connected to decentralized rainwater management, in specific to an increase of infiltration areas/basins/ditches.
- In contrast "avoiding of surface sealing" and "decentralized rainwater management by multifunctional areas" are the measures that are planned or implemented comparatively less frequently.
- For additional information regarding measures that are planned or implemented by the respondents' institutions see annex I (question D05).

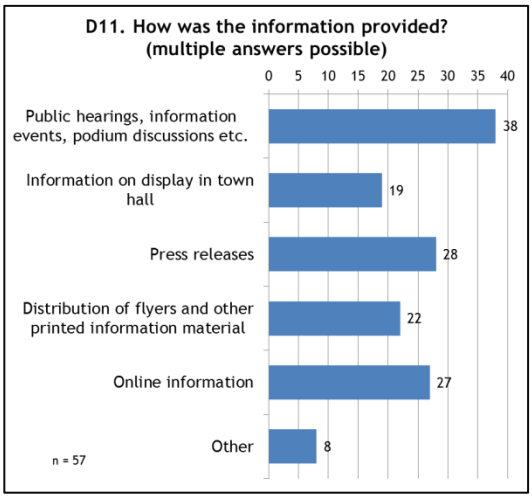


- Measures outside of settlement structures are rarely implemented or planned than in a build environment. The top two answers of the participants consider flow path that are kept free as well as retention areas that are planned.
- For additional information regarding measures that are planned or implemented by the respondents' institutions see annex I (question D07).

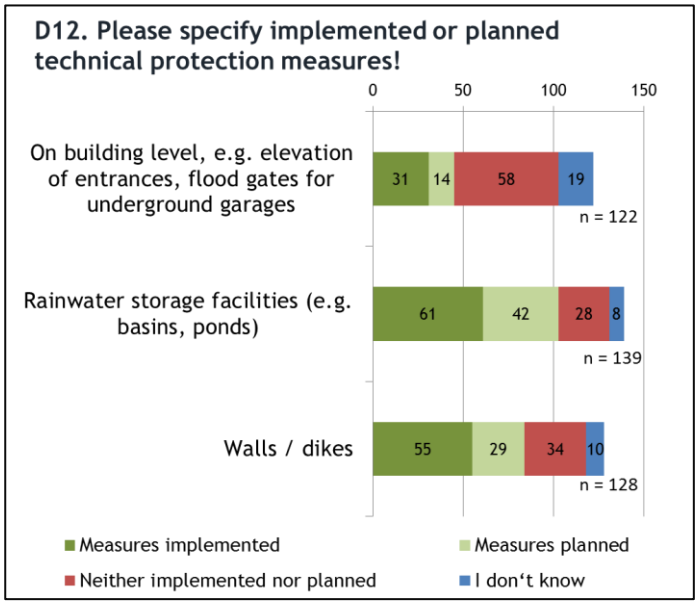


- Only 67 out of the 367 participants of the online survey have planned or implemented measures regarding public relations or raising awareness (see question D02).
- The most common approach to raise awareness seems to be the information within the administration and of political representatives as well as the implementation of information campaigns for house owners.
- For additional information regarding measures that are planned or implemented by the respondents' institutions see annex I (question D09).

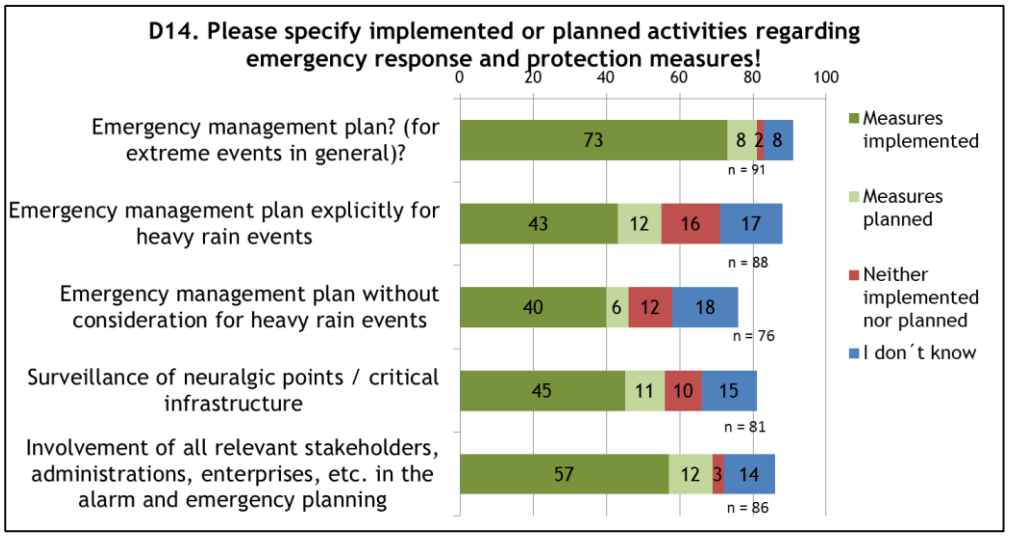




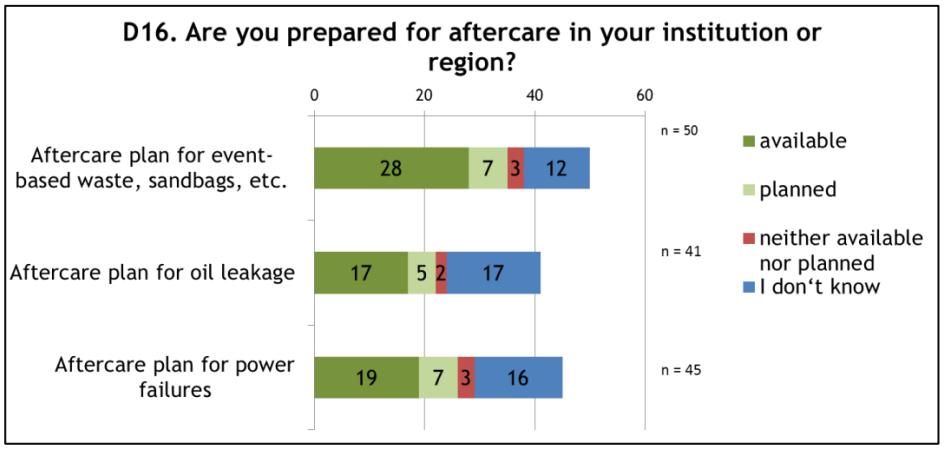
- The information provided describes especially different types of measures (technical as well as preventive measures but also information on emergency measures). Also information about risk analyses is often distributed.
- In all participating countries the respondents state that the information is provided via events like public hearings, podium discussions, etc. The results regarding the other communication ways vary significantly between the partner countries (see country specific results in annex II).



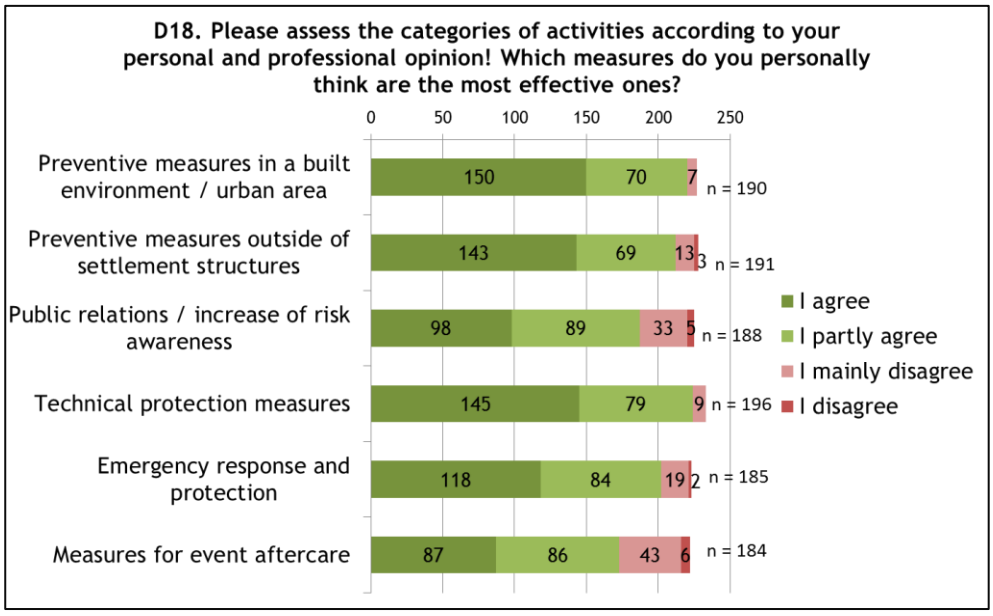
- According to the respondents, rainwater storage facilities but also walls and dikes are the most often technical protection measures planned and implemented.
- For additional information regarding measures that are planned or implemented by the respondents' institutions see annex I (question D13).



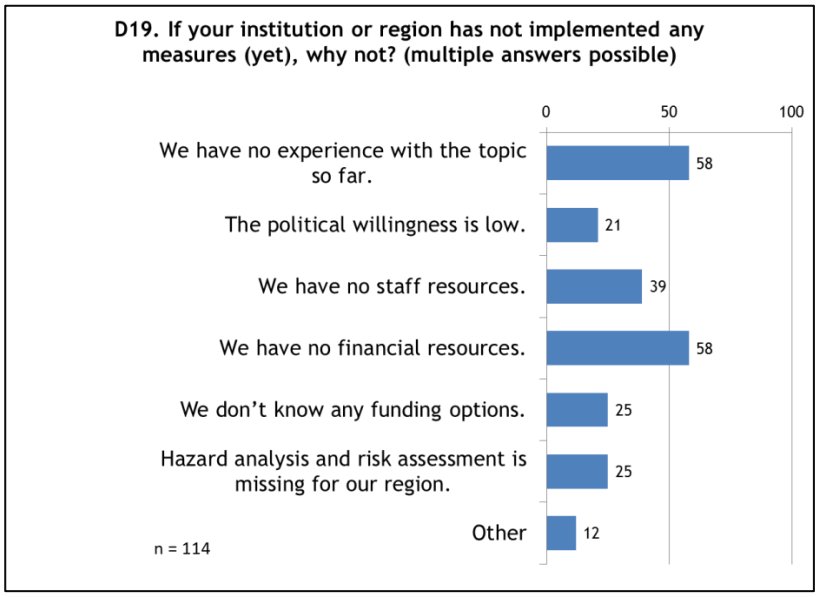
- According to the respondents various protection measures are planned and implemented. Most participants of the online survey state that their institution planned / implemented emergency management plans.
- For additional information regarding measures that are planned or implemented by the respondents' institutions see annex I (question D15).



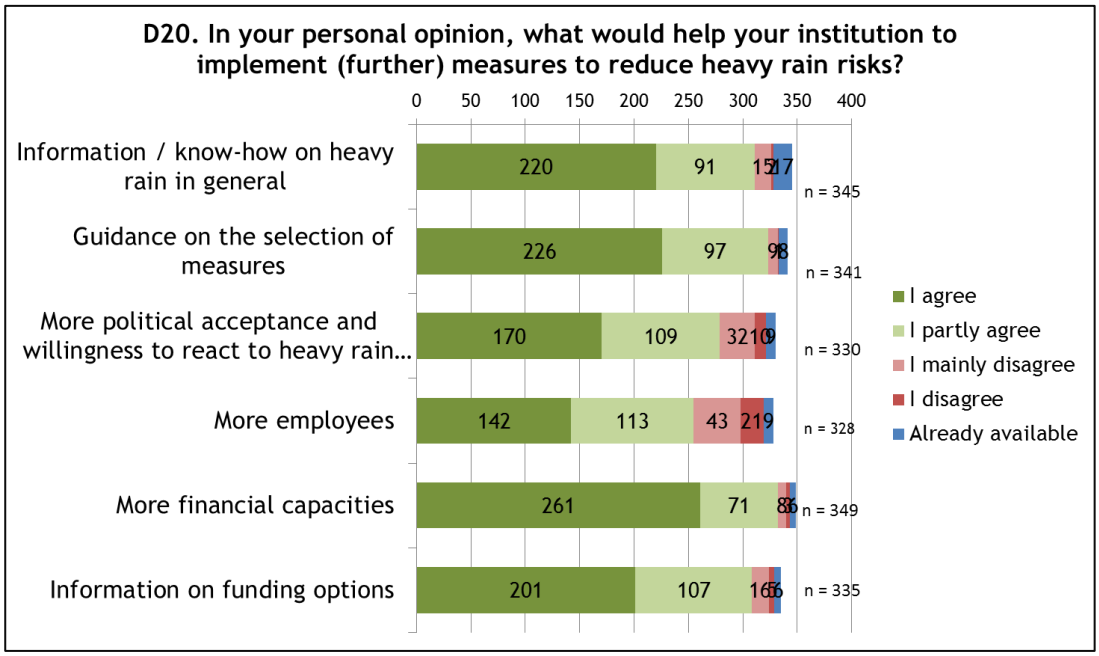
- Only 57 participants stated that their institution planned or implemented aftercare measures (see question D02). These measures are often connected to plans for event-based waste things, like waste, sandbags, etc. Less than 30 of the participants state that they have a plan for power failures or oil leakage.
- For additional information regarding measures that are planned or implemented by the respondents' institutions see annex I (question D17).



- The online survey did not only reveal which of the measures have been planned or implemented but also asked which of the measures the participants assess to be effective. It turned out that the respondents of the survey agreed / partly agreed for all of the types of measures to be effective.
- Most participants agreed that preventive measures in a built environment / urban area, preventive measures outside of settlement structures and technical protection measures are most effective.
- It should also be noted that soft measures and measures in the field of aftercare are not only least planned or implemented by the respondents (see question D02) but also assessed to be least effective compared to the other options.



- Reasons for not having implemented or planned any measures yet are especially a lack experience and financial resources.



- Financial resources / funding options and the availability of information / guidance on the selection of measures would support the implementation of heavy rain risks.
- Nearly all of the available options are assessed as being helpful for the institution to implement further measures to reduce heavy rain risks.

3.6. Results and conclusions of Part E: Demands, wishes

Key findings:

The participants of the online survey confirm that the proposed information and materials would support the management of heavy rain risks.

A high proportion of the participants would personally need online information / material (more participants than those who ask for printed information) - the online toolbox of the RAINMAN project will definitively satisfy this need of the respondents.

Content-wise the toolbox will cover different topics that have been assessed as being relevant by the respondents. In detail:

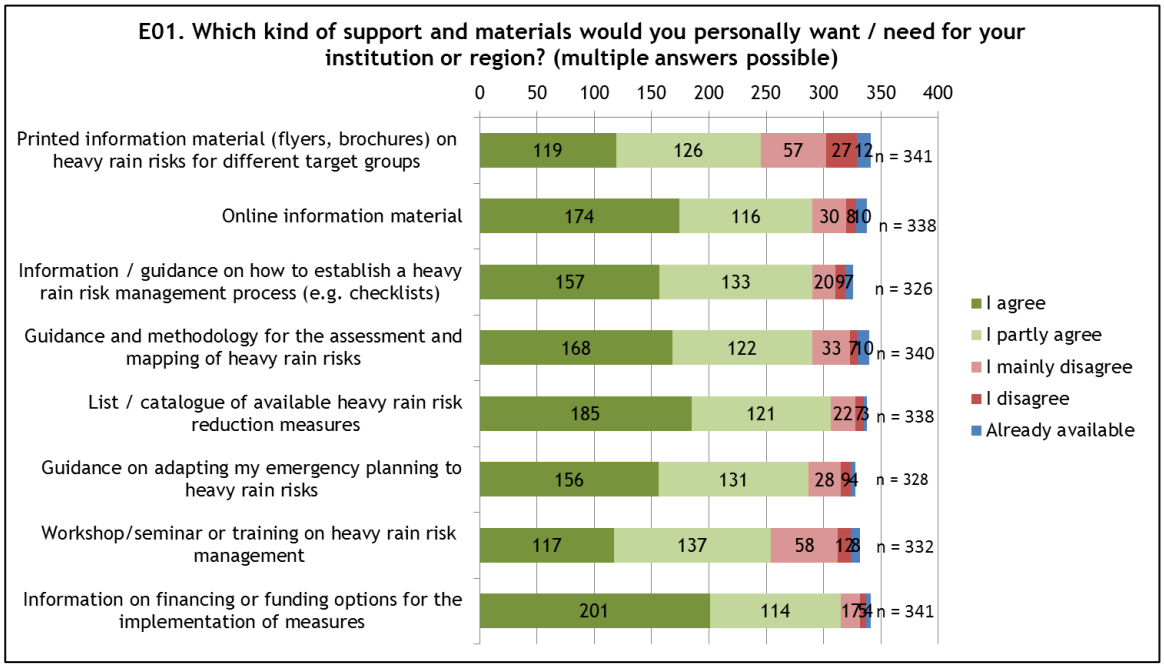
- The respondents ask for guidance on how to establish a heavy rain risk management process. The RAINMAN project covers this issue by pilot actions.
- Respondents state that they would need guidance for the assessment and mapping of heavy rain risks. The RAINMAN-Toolbox covers this in tool 1.
- The respondents ask for a list / catalogue of available heavy rain risk reduction measures. The RAINMAN-Toolbox covers this in tool 2.
- Guidance on adapting emergency planning to heavy rain risks would support the management of heavy rain risks of the respondents. This issue will be looked at in a subtool covering the topic “emergency response”.

Other demands / wishes cannot be covered by an online toolbox, as for example workshops / seminars or training. Nevertheless, the RAINMAN project covers these needs in additional activities.

Summing together the toolbox includes a large part of the demands and wishes so far. Furthermore, the section “demands and wishes” also reveals a blind spot of the RAINMAN-Toolbox: information on financing or funding options for the implementation of measures are not included in the toolbox.

Results

The following figures summarize the results of part “Demands, wishes” of the online survey. Comments and observations regarding the figure are added below the respective figure:



- For nearly all of the given options a high share of the Participants stated that the respective kind of information / material would support the management of heavy rain risks (answers “I agree” and “I partly agree”).
- In addition to the provided options, respondents indicated for example
  - the need for information / material that make the topic clear for the general public and that raise awareness (i.e. film material, measures for private persons to protect their buildings, interactive and attractive materials, material for social media during an event),
  - the need for providing free data and models (see answers to the open questions in the annex),
  - and the need for education and training.

4. Conclusions for the RAINMAN project and the RAINMAN-Toolbox

The results of the online survey and the conclusions for different activities were discussed within the RAINMAN partnership.

Selection of participants that answered the survey

Most respondents have experienced heavy rain events so the survey was distributed to appropriate stakeholders that are aware of heavy rain risks and have experienced events before. Respondents experienced especially damages on urban infrastructure, on private buildings and on cultivated land – no matter if the damage is caused by flooding or by mass movements.

Confirmation of the target group

Moreover the online survey could confirm the determination of the toolbox' target groups which are especially public authorities. At the same time, other entry points to the toolbox are useful, as for example for private persons to inform about preventive measures to protect private properties and buildings.

Differences between the participating countries

In general the analyses of some questions indicated of course some differences between the participating countries. The more specific the question is the more heterogeneous are the results. At the same time only few participants gave answers to very specific questions so that generalizations are not in every case possible. Especially when it comes to the more content specific questions (for example in part "assessment and mapping") the results do represent a reliable statement but can help to guide the way to a user friendly and valuable toolbox. Nevertheless, the online survey reveals no substantial differences in the different partner countries, for example regarding the experiences with heavy rain risks, so that the evaluation of the survey confirms the development of one toolbox for all participating countries supplemented with country-specific contents. A country specific differentiation of the toolbox contents was neither planned nor does it seem to improve the value of the toolbox in specific countries which might be due to a very different knowledge base or very different experiences with the topic so far.

Conclusions from the online survey for WP1 – Tools and methods for the assessment and mapping of heavy rain risks

The evaluation of the survey results (part C) showed that a variety of methods is available and applied for the assessment of heavy rain risks. A clear distinction between important / non-important methods is not possible. The results of part C of the online survey were considered against the background of the scoping study on available methods and approaches as well as demands (D.T1.1.1) and support the results of the scoping study. In conclusion the toolbox needs to give guidance regarding different kinds of assessment methods but should not aim to harmonize. Users of the toolbox need to select a method / an approach according to their special circumstances.

Conclusions from the online survey for WP2 – risk reduction tool to select and implement heavy rain risk mitigation measures

The analysis of part D of the survey indicated that a high share of the respondents' institutions have already planned or implemented mitigation measures. It can be noted that stakeholders put a focus on planning or implementing structural measures, like technical measures. Other non-structural measures, like "information to stakeholders" are comparatively rarely applied. Also structural measures have been assessed as being more effective. Considering these results against the background of the scoping study on "Collection and development of risk reduction measures" (D.T2.1.1), it can be concluded that on the one hand more information on the variety and effectiveness of different kinds of measures is needed. According to the scoping study different catalogues of measures exist in the RAINMAN partner regions but

with limited scope. When developing a catalogue of measures for the RAINMAN-Toolbox not only the results of the scoping study should be taken into account but also the answers to the online survey should be checked again. On the other hand not only a catalogue of measures would support stakeholders in Central Europe but also guidance on how to select these measures would be needed. It can be assumed that an integrated risk management planning process has not widely been implemented or planned until now (only by less than 20 % of the respondents).

Conclusions from the online survey for WP3 – Pilot actions

The online survey was distributed to stakeholders in the RAINMAN Pilot Actions to ensure that the joint results are tailored to the needs of local and regional target groups. However, additional feedback from the pilot actions during the further development will support the toolbox development.

The aim of conducting the online survey, was to deliver expectations and requirements on the methods and tools from the potential users. As the online survey indicated, stakeholders need more information and guidance with regard to the management of heavy rain risks. At the same time the selection and application of a specific method and approach depend on regional and local conditions and specific needs.

Pilot activities in all participating partner regions are implemented to test the developed joint methods and tools and to prove their feasibility and applicability. Outputs are 7 pilot actions, with different characteristics to give a wide range of application conditions. The pilot actions will represent specific sets of environment and serve as best practise examples for different results in the toolbox.

Conclusions from the online survey for WP4 – Development of the RAINMAN-Toolbox

According to the results of the online survey the main reasons for not having conducted any heavy rain risk management yet or for not having implemented or planned risk reduction measures yet are in particular a lack of experiences and a lack of financial or personnel resources. Reversely, this means (and is also confirmed by the results) that the provision of knowledge, information, guidance and data in an online toolbox would support the stakeholders.

The results of the online survey will be considered in the “Conception and realisation of the RAINMAN-Toolbox for heavy rain risk reduction” (Output O.T4.1). This means the toolbox concept and structure will be adjusted to the survey results and outcome of consultations with external experts and stakeholders.

Furthermore, the survey is one part to ensure the participation of the stakeholders and toolbox users for assuring transferability of RAINMAN-Toolbox to other regions in Central Europe. The revealed heterogeneous experience of participants will be considered by including different levels of detail of the content. In addition to regional and local public administration the RAINMAN-Toolbox will also contain some information for private persons as private mitigation measures could have a significant impact on heavy rain risk reduction.

Blind spots of the toolbox

The toolbox includes a large part of these demands and wishes so far. But the section “demands and wishes” also reveals a blind spots of the RAINMAN-Toolbox: information on financing or funding options for the implementation of measures are not included in the toolbox. The RAINMAN partnership will consider the additional content for the further development of the toolbox. A first discussion showed that the information are very specific in the respective countries (also regional and local funding options exist) and must be checked at regular intervals. Both requirements cannot be fulfilled by the RAINMAN-Toolbox so the additions will be carefully checked.

5. Summary and outlook

5.1. Summary

The main results of the survey have been outlined in the thematic chapters for each part of the survey (see chapter 3). Conclusions for the project have been drawn in chapter 4.

The aim of the online survey was to gather information regarding experiences with heavy rain in general and heavy rain risk management in different regions as well as regarding wishes and demands to improve heavy rain risk management.

With the analysis of the survey results the approach of the RAINMAN project and the toolbox has been confirmed again. Stakeholders dealing with heavy rain risks do not only need information on details (for example on a single method, a single measure etc.) or information about specific fields (for example the individual tools, the catalogue of measures etc.) but guidance in the different activities (for example guidance on how to select measures) and the overall integrated management process. The results of the online survey confirm that the approach of the RAINMAN-Toolbox should be promoted further. With the RAINMAN-Toolbox the consortium aims to develop an easy accessible online tool that gives guidance for the integrated management of heavy rain risks and that comprises the whole process: from assessment and mapping of heavy rain risks (tool 1) though the selection of risk reduction measures (tool 2) and risk communication (tool 3) to governance (tool 4).

The results of the online survey have already been implemented in the concept of the RAINMAN-Toolbox and its comprising methods and tools.

5.2. Outlook

The results of the online survey will help to structure and design the RAINMAN-Toolbox according to the needs and demands of local and regional stakeholders. Also the activities in the different thematic work packages will consider the analysis of the experiences, status-quo, demands and wishes in their future work.

The RAINMAN partnership will continue to involve the participating cities and regions in the development process of the toolbox. For doing so they will be asked for evaluation and feedback of the results of the toolbox. They will also be trained on the tools.

Another online survey will be designed as an ex-post survey (see. T4.4.1). The ex-post survey will be conducted as soon as a first draft of the toolbox is ready so that adjustments of the toolbox can be done for the final toolbox version.

6. Annex I

The following table summarizes the answers of the participants to the open questions of the survey. Answers were given in national language and translated to English by the RAINMAN consortium. The overview differentiates the answers from the respective countries so that further conclusions for the RAINMAN partners are possible. The general assessment of the answers is included in the analysis of the online survey (see main part of this deliverable). If the exact answer was given by several participants the respective number is given in brackets.

Country	Entry
PI|01. Which type of institution are you working for?	
AT	▪ Climate change adaptation model region (Förderprogramm Anpassungsmaßnahmen Österreich) ▪ Fire department
CR	▪ Water supply company (2) ▪ Government enterprise ▪ Public enterprise ▪ Water management ▪ State administration ▪ Croatian Waters is a legal entity for water management founded by the Republic of Croatia.
CZ	▪ state administration (government) (2) ▪ Ministry ▪ Ministry of Environment ▪ national (state) organization
DE	▪ Aid organisation/civil protection ▪ Head of fire department ▪ Technisches Hilfswerk ▪ Fire department
HU	▪ public body
PL	▪ municipal company ▪ private person
PI|03. Region	
AT	▪ Tirol ▪ Graz ▪ Ennstal
CR	▪ Primorje-Gorski Kotar County (2) ▪ Zagreb County ▪ Osijek-Baranja County ▪ Slavonia
CZ	▪ Prague (2)

	▪ The South Moravian Region (3) ▪ The South Bohemia Region ▪ Czech Republic
DE	▪ North Saxony (2) ▪ Colditz ▪ District Görlitz ▪ Bavaria ▪ Vogtlandkreis ▪ Upper Lusatia-Lower Silesia ▪ Lower Silesia ▪ Central Saxony ▪ Erzgebirgskreis
HU	▪ Heves (2) ▪ Heves county (2) ▪ Bács-Kiskun county ▪ Pest county ▪ Békés county
PL	*No answers*
PI|05. Which area of expertise are you working in?	
AT	▪ Geology (2) ▪ Creating awareness, communication, project management ▪ Local politics ▪ Municipality ▪ Civil protection
CR	▪ Environmental and nature protection ▪ Protection of water resources ▪ Designing hydraulic structures; water contribution; GIS cadastre of hydraulic structures; preparation of Terms of Reference, etc. ▪ Higher education ▪ Water supply ▪ Numerical modelling of flood waves ▪ Hydrological forecasting ▪ Pressure drainage of rooftop rainwater ▪ Programming and use of EU funds
CZ	▪ Village mayor (15) ▪ Self-government (5) ▪ Municipal office (7) ▪ Local Self-government (4)

	▪ 1*state forest administration;2*air environment; 3* the authority to control the removal (taking out) of agricultural land from the agricultural land fund ▪ state administration (government) ▪ 1*waste management, 2*air management, 3*animal protection ▪ City Council (government) ▪ Vice-mayor ▪ Retired person (pensioner) ▪ industry ▪ Public authority ▪ Road administration ▪ Transport (road administration) ▪ Municipality ▪ Food industry ▪ logistics ▪ Construction ▪ Official, clerk, office worker ▪ Department of Economic Governance and Investment ▪ Management of the municipal office (local assembly) ▪ All (:-)) ▪ Public administration ▪ hydrology ▪ Land consolidation ▪ climatology ▪ State administration ▪ Education and research ▪ Municipal office Hlavatce
DE	▪ Mayor (3) ▪ Fire department (2) ▪ Local government (4) ▪ Building authority (4) ▪ Operational planning/Head of operations/ Expert advice ▪ Fire and civil protection ▪ Defensive fire and civil protection ▪ Municipality ▪ Public order office ▪ Administration civil engineering, water ▪ Central office ▪ Administration/Mayor

	▪ Public order office/Fire department ▪ Water protection ▪ Water supply/Sewage disposal ▪ Fire protection, emergency service, civil protection ▪ Civil engineering ▪ Local building authority ▪ Administration
HU	▪ mayor ▪ public administration ▪ urban management & development ▪ Project tendering, Project management ▪ urban management ▪ local council ▪ county-level protection ▪ urban management, investment ▪ polity ▪ Technical ▪ authority
PL	▪ giving opinions on local planning documents ▪ Volunteer Fire Service ▪ career counseling ▪ inhabitant
▪ A|02. Which consequences of heavy rain events have you experienced? Damages caused by flooding…	
AT	▪ Location of emergency forces (e.g. fire department) ▪ Streets outside of settlement areas ▪ On rural infrastructure (national roads, municipal roads, forest roads,…)
CR	▪ High water levels in the existing watercourses, flooding of the urban parts of settlements, accumulation of considerable quantities of sediment in the existing retention basins ▪ Waste disposal sites ▪ Buildings, plants, pumping station ▪ Industry, watercourses ▪ Rising water levels and overflowing in lower elevations ▪ Wells and sources
CZ	▪ movable assets/property, movables ▪ Pond, dams ▪ ponds
DE	▪ On transport infrastructure ▪ Water 2nd order, Public swimming pool

	▪ Sport vacilities ▪ Industry, trade ▪ Sports field ▪ Streams ▪ Water
HU	▪ human life, animals loss
PL	▪ technical infrastructure
A|03. Which consequences of heavy rain events have you experienced? Damages caused by mass movement (e.g. landslides, rockfall)…	
AT	▪ Sewer section ▪ On rural infrastructure (national roads, municipal roads, forest roads,…) ▪ Rural infrastructure, energy supply companies
CR	▪ Strong erosion processes, sedimentation at the mouth of the Raša River, i.e. in the Bršica port basin ▪ Industrial facilities, beaches, watercourses ▪ The cellars of family houses flooded along the very edge and beyond the borders of the protected area ▪ Regular water supply rendered more difficult
CZ	▪ none ▪ Flooded objects ▪ None information ▪ ponds
DE	▪ Water (2) ▪ On transport infrastructure ▪ On streams ▪ Water 2nd order, Public swimming pool ▪ Sport vacilities ▪ Other ▪ Streams
HU	▪ I don’t have similar experience in “Mezőtúr” town ▪ No ▪ Not typical ▪ Didn’t happen similar
PL	▪ lack ▪ damage of the weir on the river ▪ trees breaking
B|03. What is the name of the early warning system?	
AT	▪ Central institute for meteorology and geodynamics ▪ Analysis- and Nowcasting system INCA of the central institute for meteorology and geodynamics ▪ Weather warnings central institute for meteorology and geodynamics, Morecast Ubimet (weather app)

	▪ Service of insurance via SMS ▪ Central institute for meteorology and geodynamics, hydrography Styria ▪ Central institute for meteorology and geodynamics and national warning centre Styria
CR	▪ Meteoalarm (2) ▪ It has no special name, but if there are forecasting conditions for short-lasting heavy rain events, DHMZ website, from which news is taken over by the media, announces potential flash flood events ▪ Flood Defence Master and Implementation Plans ▪ DHMZ forecasts by means of e-mail notices from the competent services of Croatian Waters ▪ DHMZ ▪ EWS ▪ There is a meterological radar for rainfall detection installed at the Faculty of Civil Engineering in Rijeka, as well as several weather stations in the wider Rijeka area. ▪ Meteoalarm and hydro alarm, Flash Flood guidance System, EFAS (European Flood Awareness System)
CZ	▪ Flood Information System (3) ▪ Czech Hydrometeorological Institute Warnings (4) ▪ I don't know (4) ▪ Flood Forecasting Service (Czech Hydrometeorological Institute) (4) ▪ Integrated alert system (3) ▪ Operations and Information Centre of the Fire brigade (4) ▪ Fire Rescue Service of the South Bohemia Region (2) ▪ Hydro meteorological monitoring of the Vltava river basin ▪ Email and mobil phone ▪ The Czech Hydrometeorological Institute ▪ Integrated rescue system ▪ Info channel of Czech Hydro meteorological Institute ▪ National information system of Integrated Rescue System Service ▪ Crisis management authorities ORP (=municipality with extended competences) Strakonice - early warning system ▪ National television channel ▪ Czech Hydrometeorological Institute ▪ Information channel for the municipality Český Krumlov of Czech Hydro meteorological Institute ▪ Integrated Rescue System Service ▪ Warning system on Czech Hydro meteorological Institute website ▪ 1*Rain gauge (pluviometer), 2*level meter on the flow (flowmeter) ▪ Sirens, mobile broadcasting (radio) ▪ District crisis team (management) ▪ Warning of possible heavy rain events ▪ Local warning system ▪ Flash Flood Guidance

	▪ Local broadcasting warning system, municipal warning system ▪ Integrated alert system (cooperation with CHMU) ▪ 2*Operations and Information Centre of the Fire brigade - getting sms on our mobil phone, 3*ALADIN = numeric model for weather forecasting
DE	▪ Weather app “WarnWetter” of the German national meteorological service (DWD) (3) ▪ BIWAPP disaster warning and information app (3) ▪ Flood information system (Saxon flood centre) (2) ▪ German national meteorological service (DWD) (3) ▪ Flood early warning (2) ▪ Flood warning of flood centres ▪ Flood information system ▪ Flood early warning system LfULG ▪ Flood news service Saxony ▪ Flood early warning system (Saxon State Ministry of Environment and Agriculture) ▪ Flood early warning system Saxony ▪ Storm forecasting of the German national meteorological service (DWD) ▪ NINA Federal emergency information and news app (Federal Office of Civil Protection and Disaster Assistance) , HWIMS flood information system (Saxon flood centre) ▪ Weather warning ▪ Fire department-weather information system (DWD) ▪ Storm warning of the german national meteorological service (DWD), Flood news service Bavaria ▪ Alerting system ▪ Warn and information system (App) ▪ BIWAPP disaster warning and information app, NINA federal emergency information and news app (Federal Office of Civil Protection and Disaster Assistance) ▪ Saxon flood centre ▪ Emergency service for flood ▪ Federal emergency information and news app (Federal Office of Civil Protection and Disaster Assistance)
HU	▪ weather forecast, radar ▪ weather forecast www.idokep.hu (2) ▪ weather forecast ▪ weather forecast, hazard forecast ▪ https://www.met.hu/idojaras/veszelyjelzes/index.php?c=a ▪ Országos Meterológiai Szolgálat, weather forecast www.met.hu (3) ▪ weather forecast www.eumet.hu, www.metnet.hu ▪ News ▪ weather forecast ▪ VÉSZ - a mobil application which give information about accidents and meteorological emergency ▪ disaster management directorate, local deffense committee, weather forecast www.met.hu

PL	▪ Regional Warning System (RSO) ▪ early warning system ▪ Weather service IMGW-PIB ▪ National Warning System ▪ Institute of Meteorology and Water Management ▪ Antistorm.eu
B|04. Who is operator of this system?	
AT	▪ Insurance ▪ Fire deparment, Uniqa insurance
CR	▪ Croatian Waters – Section for Protection from Adverse Effects of Water ▪ Faculty of Civil Engineering in Rijeka ▪ MeteDHMZ, Meteorological and Hydrological Service
CZ	▪ The Czech Hydrometeorological Institute (2) ▪ Fire Rescue Service of the Czech Republic ▪ National information system of Integrated Rescue System Service ▪ I don't know ▪ Depends on the extent of the territory and monitoring level
DE	▪ Federal state Saxony (2) ▪ Public meteorological service, hydrological service/flood forecasting centres ▪ Federal office for civil protection and disaster assistance ▪ Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V.
HU	▪ ministry of the interior
PL	*No answers*
B|06. In your region and from your professional point of view: How can early warning systems improve?	
AT	▪ Insurance ▪ Fire deparment, Uniqa insurance
CR	▪ All of the above, more or less automated gauging stations
CZ	▪ Not to issue alibistic warnings ▪ No need of improvement ▪ I don't know ▪ Raise awareness of the hazards of dangerous outflows from torrential rainfall (heavy rain)
DE	▪ Don't switch off VHF radio for economic reasons – this warning option works without access to mobile communications and internet, such as radio in case of power failure – DAB or internet radio don't do that. ▪ Increase the density of monitoring network/measuring stations ▪ Ensure the drainage ▪ Well organised, secure information channels ▪ Warning of heavy rain events ▪ Better information about existing early warning systems

HU	▪ according to my opinion not necessary
PL	*No answers*
C|03. Which historic data for risk assessment has your institution analysed?	
AT	*No answers*
CR	*No answers*
CZ	▪ Archival sources, journalism
DE	▪ Interviews on site ▪ Eyewitness reports ▪ Flood maps ▪ Flood events referred to districts ▪ Already occurred mixed water leakage from sewer system
HU	▪ a separate company does this
PL	*No answers*
C|05. Please name other analyses of topographic conditions implemented by your institution.	
AT	▪ Sediment & debris potential ▪ Flood control reservoir by the municipality ▪ Nationwide GIS preparation of flow paths with correction of DGM ▪ Slope water maps
CR	▪ Additional detailed surveying of terrain
CZ	*No answers*
DE	▪ On-site visit within the training of civil protection volunteers ▪ Sighting of existing digital maps on slopes which are vulnerable to erosion (e.g. regional plan: category “area with potentially high risk of erosion by water” ▪ Deform of water profile because of e.g. buildings like retaining walls, bridges, development ▪ Scan flights and evaluation after attachment ▪ Measurement ▪ nWAP
HU	*No answers*
PL	*No answers*
C|07. Which data sets / model did you use?	
AT	▪ Analysis- and Nowcasting system INCA, station data ▪ Heavy rain analysis, eHYd hydropraphic information AT ▪ WegenerNet data portal (project of university Graz) ▪ Civil engineering office ▪ Hydrographic yearbook, analysis of hydrography Styria
CR	▪ Statistical analysis of time series of rain data from stations, period of 30 years and more ▪ Hydrological data analysed within different divisions of Croatian Waters, existing (old) design documents, old studies

	▪ DHMZ database ▪ ALADIN, HEC-HMS ▪ NWP, re-analyses, global and regional climate models.
CZ	▪ n-year flows based on CN curves ▪ simple rainfall runoff model ▪ Publicly available data sets (CHMI) ▪ DesQ-MaxQ, HEC-HMS
DE	▪ DGM2 digital terrain model, Hydro AS simulation of watercourses and surface run off
HU	▪ precipitation gauges, radar
PL	*No answers*
C|09. Please name other analyses of the drainage system implemented by your institution	
AT	▪ Systematic analysis of personal information and perceptions of affected persons and observers ▪ Tabulation, numerical analysis ▪ Flood documentary after disaster events
CR	▪ Coincidences of events
CZ	▪ Building a polder
DE	▪ Analyses of care measures with adjustments to prevailing conditions ▪ Hydraulical calculation sewer system ▪ Hydrodynamic calculations ▪ Monitoring of conditions of water bodies (“Gewässerschauen”)
HU	▪ investigation of drainage system ▪ systematic check of drainage system of maintained ▪ troubleshooting of congestion of drainage system, exchange of narrow diameter drains
PL	*No answers*
C|11. Please name other analyse of the building structure and infrastructure implemented by your institution	
AT	▪ Laser scan analysis of buildings
CR	▪ Functionality and age/condition of built infrastructure
CZ	▪ No answers
DE	▪ Adjustment land-use planning, inspect building plans for adjustment requirements
HU	*No answers*
PL	*No answers*
C|13. Please name other analyses to develop hazard and risk maps implemented by your institution	
AT	▪ 1D modeling
CR	▪ Land use, impact on spatial planning ▪ I have (theoretically) dealt with maps of hazards and risks of geohazards and flood flows.
CZ	*No answers*
DE	▪ Use of existing data of LfULG for spatial planning determinations

	▪ Modellings in collaboration with engineering offices ▪ A research project is currently in progress (HiOS). One of the objectives is the development, testing and optimization of procedures for determination of hazards by surface run offs as a result of heavy rain. Different levels of detail are examined. From a bavarian reference map (GIS based) to detailed coupled hydrological-hydrodynamic simulations with different models. ▪ 1D-modelling, according to Lutz (1984)
HU	▪ Flood risk management ▪ pluvial flood risk assessment map
PL	*No answers*
C|14. If your institution has not conducted any heavy rain risk assessment (yet) - Why not? (multiple answers possible)	
AT	*No answers*
CR	▪ We are not directly in charge of such type of activity ▪ I don't know ▪ I am not familiar with that
CZ	▪ is not our competence (3) ▪ this is (heavy rain) an exceptional situation - addressed in the framework of flood protection ▪ low frequency, minimal damage ▪ the degree of danger is low, we can respond in time ▪ the question is not relevant to my institution (employer - university)
DE	▪ Question of competence
HU	*No answers*
PL	▪ risk assessment is beyond our competence, such data is necessary for proper creation of spatial development, especially in the context of rainwater management ▪ This is not in our competence
C|15. In your personal opinion, what would you need for a heavy rain risk assessment or mapping?	
AT	*No answers*
CR	▪ More detailed monitoring of rainfall using radars and a number of new automatic rain gauging stations in the greater Zagreb area. Only 3 automatic rain gauges aren't enough for the City of Zagreb. ▪ A little bit from everything mentioned above
CZ	▪ terrain survey + evaluation of narrow points ▪ prevention
DE	▪ basis/order
HU	▪ money, money… for building drainage systems in rural and urban areas ▪ not relevant
PL	*No answers*
D|03. Which of the following stakeholders are included in the integrated risk management planning process in your institution?	
AT	▪ Municipalities ▪ National geology
CR	*No answers*

CZ	▪ Crisis management (2) ▪ Research institution, state institution ▪ a unit of volunteer firefighters (local organisation in the village Roudné) ▪ The Vltava river basin
DE	▪ The state of Bavaria is currently promoting the development of integral concepts for municipal flood risk management as part of a special support programme. Recipients of the subsidies are Bavarian municipalities, which should also initiate dialogues with stakeholders in the risk management process as part of the concept development process.
HU	*No answers*
PL	*No answers*
D|05. Which other preventive measures in a built environment / urban area has your institution planned or implemented?	
AT	▪ Planned/partly implemented: creating awareness, information of all stakeholders and population, preparation of information sheets for emergency and disaster events, communication training for relevant stakeholder, educational offer for all ages (from kindergarten to adult education) ▪ Information and provisions for flood free +/- 0,0 levels on buildings ▪ Decentralised rainwater usage ▪ Retention basin
CR	▪ Construction of retention basins to regulate peak rain discharges. Stimulating rainwater infiltration as close to the place of their formation as possible. ▪ Construction of larger retention basins to receive major water waves. Informing the public about the consequences of floods if such retention basins are not built, because the local population in the vicinity of which such retention basins, reservoirs, barriers, etc. are planned to be built are always against their construction. If a flood occurs, everything is forgotten by the summer. ▪ Water sensitive urban design tools
CZ	▪ anti-flood wall (dam) in the northern part of the village ▪ There is a need of mapping (survey) of the taken measures; I sent an email to the competent department: ▪ Colleagues and colleagues, I am sending you a cover letter. You do not have to read it all but you can, just the first two paragraphs. Since you also have this issue in your grievances, especially the OŽP (Department of the Environment), I ask you to send the documents and your observations as follows: ▪ Where in our town and associated municipalities do we have areas where torrential rains and flash floods occur (to confirm or supplement)? I am attacking at random - (from the top of the Dusík river with the brook to the river) - Děkanský Creek from the forest to the river - Ráma Street via Vinařické square (although there are probably no such problems after the adaptations) - Away down - Tyršova street from above via Namesti Miru - Mostecká Street - part of Na Brodech street before slaughter - in Nuzice, Netěchovice, Predčice, Koloděje, Vesce - do you have some more details? ▪ What measures would be best in these areas to mitigate damage and increase protection for citizens and property? Then I will fill out the questionnaire. ▪ Answer of Head of the Department of the Environment: Hello, your list of areas with heavy rain threats is almost complete for the city. I would probably add to Ke Hradu Street, Jiráskova Street "Peklo" - there is a problem with a clogged drainage grid, Račina brook (cottages and lower residential buildings) on Hlinka - Hlinecká Street in the section behind the cultural center, where water flows to Peklo and the sloping section of Komenský Street under Blanice. On the Bohunická Street, especially the section from the collection of raw materials and Svazarm, both branches of Husova Street and Havlíčkova Street with insufficient sewerage capacity. From the associated villages Nuzice - the insufficient capacity of the passage under the Týn - Bechyně road is connected with flooding of the village square, Předčice - the water from the fields above the village threatens a new development on the road to Týn and on the way from the top of the Veselská Road to

	the trailer and home under the way. Koloděje u mostu - danger from Hostecký brook. Koloděje Vesce threat from the fields above the chapel - partially solved by a low spike along the field path. The recreational area near Lužnice is also threatened by the Bílinský brook. Hněvkovice - the possibility of a flood from the fields on the way to the village. Netěchovice + Jarošovice have not yet reported any major problems. Measures can be taken quite hard, in some cases (Nuzice - dry polder above the village of 6-8 milion CZK) unsolvable due to ownership relations to suitable plots (estate). Here is the problem also in the intervention of the property of the region (the passage under their roads) and in addition the construction of about 100m of the capacitive pipeline under the Nuzice village square. The Hostecký brook valley in Koloděje - can only be solved by limiting (enhancing) the flow profile under the communication between the individual objects. Předčice - it is possible to try to divert the water from the fields of the original (now ravaged) field paths back to Račina, but this will increase the flow in Račanský Creek, which is not very desirable (again according to the current capacities of Račina river bed). Generally throughout the city and associated municipalities, this issue would require assessment and calculation by a hydrologist, including an estimate of implementation costs. ▪ Best regards Ivan Palma
DE	▪ Optimisation of operational emergency response and aftercare ▪ Flood prevention concept ▪ Distress waterway ▪ Clearing of draining streams ▪ Adaptation of street drainage ▪ Demolition of sea walls/Application of slopes ▪ Preparation flood map for the district Krebs ▪ Opening of channels to ditches, rainwater retention basin built ▪ Infiltration of rainwater from private land and new development areas at the place of accumulation ▪ Preparation of storage trenches
HU	▪ Modification and full restoration of all pumping station to the maximum discharges. Total restoration of main canals. Total restoration of surface drains (one sides of streets) on 2/3 part of settlement. ▪ systematic cleaning of closed drains ▪ maintenance of ditches and culverts ▪ annual maintenance of drainage systems ▪ maintenance of ditches ▪ modification of total drainage system of part of the settlement, renewal according to projects
PL	▪ In the spatial development plan of the Lower Silesian Region, as well as in the spatial development plan of the Wrocław city we provide (describing briefly because of the survey limitations) activities increasing the retention capacity of the Odra basin, and the maximum retention of rainwater in places where they fall, and we postulate for the designation of areas exposed to the risk of rainfall, especially in the urban areas of the Lower Silesia Region (Voivodship).
D|07. Which other preventive measures outside of settlement structures has your institution planned or implemented?	
AT	▪ Planned or partly implemented: awareness raising, information of all stakeholders and public, creation of information sheets for emergency / catastrophe events, communication education for relevant stakeholders, education offers for all ages (nursery to education of adults)
CR	▪ Construction of multi-purpose systems to receive rainwater and their use in agriculture; higher rate of rainwater infiltration as close to the place of their formation as possible. ▪ Better engagement on the regulation of torrents, watercourses, erosion protection (preparation of erosion and landslide maps); analysis of the overall catchment area and identifying the needs and priorities in that area; perform works in larger section; define in a regulation return periods for the dimensioning of watercourses

CZ	▪ Only proposals, no planning (it is meant that no plan -project, has yet been elaborated, I guess)
DE	▪ Coordination processes with higher authorities (without success so far)
HU	▪ appropriate ground condition, maintenance of drains, canals, water structures ▪ continuous reaping of out of town ditches ▪ maintenance of dirt roads ▪ increasing storage capacity of the ground ▪ maintenance of ditches of councils
PL	*No answers*
D|09. Other activities regarding publicity, raising awareness of stakeholders and public:	
AT	▪ Information at mayor conferences ▪ Town meeting, local journal ▪ Press release in local media, interviews, facebookpages with appropriate information on model regions, workshops with relevant participants and experts (disaster protection and infrastructure, land, forestry and water economy)
CR	▪ Inform the public through the media, presentations and round tables about the performed flood defense works in this catchment area and about the planned future flood defense activities.
CZ	*No answers*
DE	▪ Introduction water weir ▪ Participation in the administrative procedure ▪ Event-related letters to citizens ▪ Consultation by employees of the building authority, in particular for preventive flood protection; Information events (in particular for riparian landowners) by independent associations, ongoing trainings of employees of building authorities/building yards
HU	*No answers*
PL	▪ appointing committees and estimating damages caused by heavy rain at farms (agricultural areas).
D|10. Which information war or will be provided?	
AT	*No answers*
CR	▪ Explanation of design documents, studies, spatial plans, etc.
CZ	*No answers*
DE	▪ Information about water maintenance
HU	*No answers*
PL	▪ as part of the developed regional planning documents ▪ public aid
D|11. How was the information provided?	
AT	*No answers*
CR	▪ Informing the representative/s of local self-government units about the planned works in their region and about the flood risks if such works are not performed
CZ	▪ Only within the city administration
DE	▪ Consultation of individuals and public representatives

	▪ Conversations ▪ Reports to local decision-makers ▪ As part of the procedure presented
HU	▪ provide verbal information for residents
PL	▪ have not been disseminated yet, it will follow after the adoption of both documents by the Board of the Lower Silesian Voivodship
D|13. Which other technical protection measures has your institution planned or implemented?	
AT	▪ Concepts on drainage to be implemented in accordance with dedications ▪ Retention tanks, building development for wild streams etc. ▪ Flood control reservoirs and linear measures at streams in preparation, blocking debrisand linear measures at wild streams in preparation ▪ Storage canal ▪ Flood proof gates at access roads and entrances, additional wells and wellsumps in buildings, drainage from the lowest point with alarm systems
CR	▪ Civil Protection Headquarters, decision-making and adoption of measures ▪ Retention area, lateral channels ▪ We address the impact on buildings, in particular large roof surfaces ▪ Construction of retention basins, reservoirs, flood relief channels, regulation works
CZ	▪ Removing possible problem structures (buildings) to release the flow of fresh water ▪ “window” type of overflow - passes a controlled amount of clean water (without branches, etc.) ▪ Drainage gutter for municipalities Debrník, Hlavatce
DE	▪ Recovery of natural flooding areas ▪ Recovery of retention ditches ▪ Adjustment of infrastructure (e.g. floodable streets) ▪ Equipment of the water weir ▪ Demolition of buildings near the shore ▪ Technical measures at the construction level on buildings and infrastructure ▪ Renaturation of streams ▪ Optimization of the sewerage network ▪ Enlargement of canals, culverts, streams and ditches as well as the construction of storage trenches
HU	▪ ready plan: complex development of drainage system in Kenderes (I part) ▪ Planning closed drains and development of drains in the future ▪ maintenance of ditches (2) ▪ infiltration trench, insurance of runoff ▪ build new ditches, settlement planning plan should regulate criterion of building in pluvial flood areas.
PL	*No answers*
D|15. Which other activities regarding emergency response and protection measures has your institution planned or implemented?	
AT	*No answers*

CR	▪ Civil Protection Headquarters, decision-making and adoption of measures
CZ	▪ In the city there is an early warning flood warning system - rain gauge (pluviometer) and "local radio"
DE	▪ Obtaining weather information, possibly early warning ▪ Provision of remedies in the occurance of damage ▪ Flood action plan of the voluntary fire brigade Niederau and its districts
HU	*No answers*
PL	*No answers*
D|17. Which other aftercare measures has your institution or your region planned or implemented?	
AT	▪ Damage repair at water building infrastructure
CR	▪ Readiness to receive a significant share of pollution load in rainwater
CZ	*No answers*
DE	▪ Optimization of the clean-up operations (e.g. Pumping out basements of affected persons on their own initiative)
HU	▪ incorrect notation „I don't know" removal mud from the road, removal fallen trees
PL	*No answers*
D|19. If your institution or region has not implemented any measures (yet), why not?	
AT	*No answers*
CR	▪ We do not deal with the implementation of measures. ▪ I don't know an exact answer to this question. ▪ I have no knowledge of that. ▪ I am not familiar with that.
CZ	▪ there was no problem with the pluvial flood yet ▪ No flood ▪ There is no need for any measures ▪ Absence of legislative support ▪ No relevant question
DE	▪ No authority to implement measures
HU	▪ Not relevant "your institution"
PL	*No answers*
D|21. What else would help you to implement (further) measures to reduce heavy rain risks?	
AT	▪ Competences of spatial planning experts ▪ Increased education of building authorities and building surveyors to make aware of heavy rain risks during construction works in town ▪ Improvement of the relations between participants (neighbors, planners, authorities…) ▪ Overall risk assessment – discrepancies between risk zone plan and drainage survey are problematic for municipalities (different parameters and effects on spatial planning), different concepts make it hard to explain for citizens and local politicians ▪ Bigger awareness of all citizens regarding clima protection issues!
CR	▪ Publicly available data (rainfall, water levels) presented in a way that the majority of the population finds

	interesting ▪ In our case, occurrence of storms with rain, with consequences in the form of wind-toppled trees, landslides, sometimes flooding ▪ Connection with the national institutions dealing with the said issue ▪ We have to buy data from the DHMZ????? In Europe data is available free of charge!!
CZ	▪ Include measures in flood plans ▪ Legislation is missing
DE	▪ It's not just about reacting, but much more about the preventive adjustment ▪ Legal means for land availabililty ▪ Create more incentives for voluntary commitment ▪ Nationwide registration and expulsion of flooding areas even of waterbodies of 2. Order ▪ Softening of nature protective guidelines to implement flood protection measures ▪ Consideration of the polluter pays principle regarding land use and agriculture forms, which encourage wildly flowing off surface discharge ▪ Understanding of land owners / users or especially agricultural users ▪ Responsibility of politics, better agreement at funding programs ▪ Hazard maps based on topography and soil properties ▪ Equal definition of terms, closing of law gaps (e.g. Usage of traffic areas for discharge); more acceptance and consideration of heavy rain and flooding events at planers, architects, private builders and in administration (municipal, bearers of infrastructure e.g. road construction); over all improved awareness for nature hazards and rationality in nature handling regarding current hazards; acceptance and willingness to assume individual responsibility ▪ Cooperation between authorities ▪ Focus on soil errosion, here technical measures can be given up, if an agricultural change in usage (green discharge paths) would be supported politically (agricultural) ▪ Acceptance between bearers of building of waterbodies of 1. and 2. order ▪ Adaption of the handling of subsidies at given circumstances and over all funds of preventive flood protection for municipalities and the general public ▪ Faster edit of requests (water right authorization, deficit of planning permission etc.), processing of funding requests (12 to 24 months) ▪ Funding programs for the construction of preventive protection in case of heavy rain ▪ Educational material for the general public with presentation for personal provision
HU	▪ cooperation of settlements ▪ Drainage systems will be planned not only from the office. More information need from the territory for the planning.
PL	▪ acceptance of changes in the environment and an attempt to adapt to new conditions ▪ appropriate competences to carry out tasks
E|02. Other support and additional materials you personally want or need:	
AT	▪ Film material of not spectacular events to improve the identification of affected and responsible persons with problems. Film material which could concern anybody ▪ Targeted disaster practices in accordance with this topic ▪ Make the topic clear to the general public – prohibition of ploughing up of grassland in hillslide locations and

	less sealing of traffic and parking areas
CR	▪ Available information about rainfall, soil, water levels and discharges, topography, climate, without additional payment ▪ Education and training, specialization (no “bits and pieces”), keeping track of global trends and news in this field and considering the possibility of their application in our conditions ▪ Raise the issues to the national level, into strategic documents of different sectors
CZ	▪ In our case, it is necessary to demand from the owners of adjacent plots of land the timely removal of flow-preventing trees and the river basin administrators to give such amount of funds to regularly clean the streams. The water naturally flows and does not accumulate in the crowded places in the village and above. ▪ Temešvár village is one of the driest places in the Czech Republic but once in a while the torrential rainfall really surprises us. ▪ Financial funds ▪ We have most of this, of course. We have prepared the ORP Crisis Plan, the ORP Flood Plan and the City Flood Plan, but we would need up-to-date things, methodologies for citizens to protect their buildings. ▪ It would like to work out, map, prepare measures - best on the spot for your participation, etc. ▪ ** the same letter as above (see D05)
DE	▪ Free provision of digital surface models with the possibility of simulations for heavy rain events ▪ Online event databank for Saxony ▪ Not only print educational media! Videos, graphics, interactive and attractive educational material (apps, games, material for scholar education, books for children etc.); material suitable for social media use for the prevention but also during events (e.g. prepared tweets with rules of conduct, hazard of drowning in basements or driving / passing through flooded areas) ▪ Improve general public relations, „exciting“ articles in daily journals
HU	▪ more financial and more expert support to maintenance and renewal of drainage systems rural and urban areas
PL	▪ guidelines for designing, spatial planning, including protection against such phenomena as heavy rains

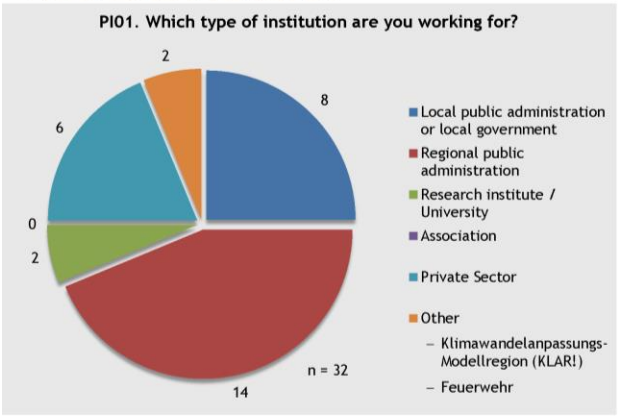
7. Annex II

The following handouts present the country specific results of the online survey.

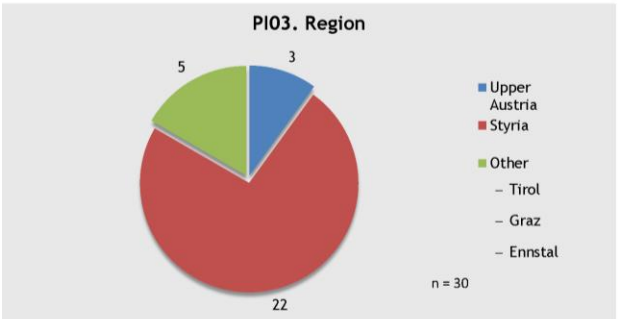
7.1. Survey results in Austria

PI: PERSONAL INFORMATION

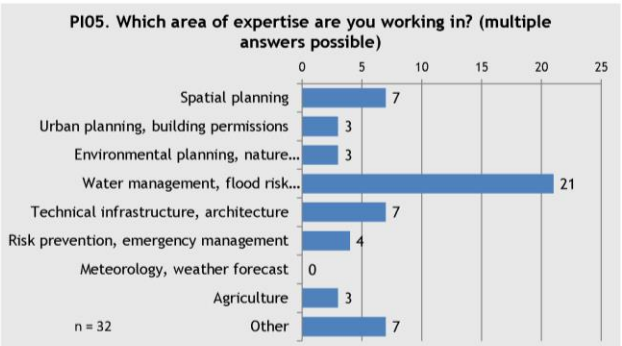
PI01. Which type of institution are you working for?



PI03. Region



PI05. Which area of expertise are you working in? (multiple answers possible)

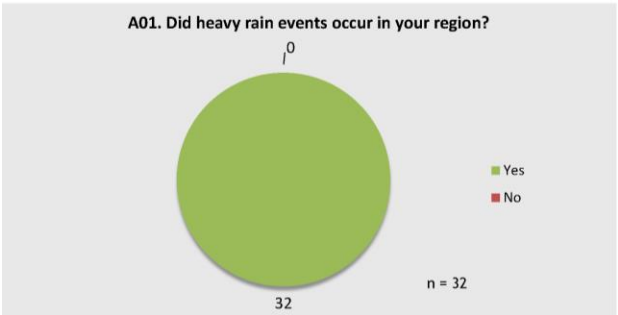


Other

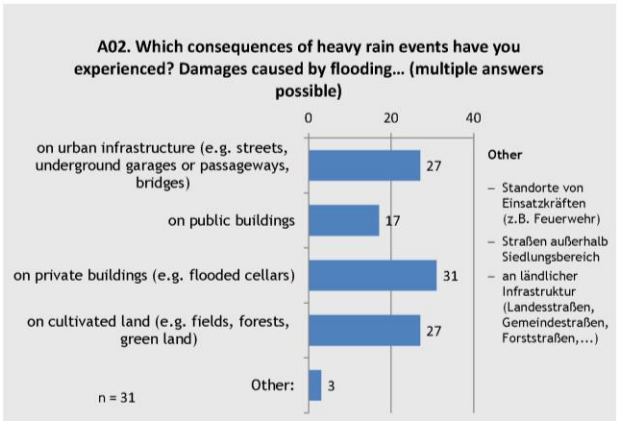
- Bewusstseinsbildung, Kommunikation, Projektmanagement
- Geologie
- Komunalpolitik
- Gemeinde
- Geologie
- Katastrophenschutz

A: EXPERIENCES WITH HEAVY RAIN

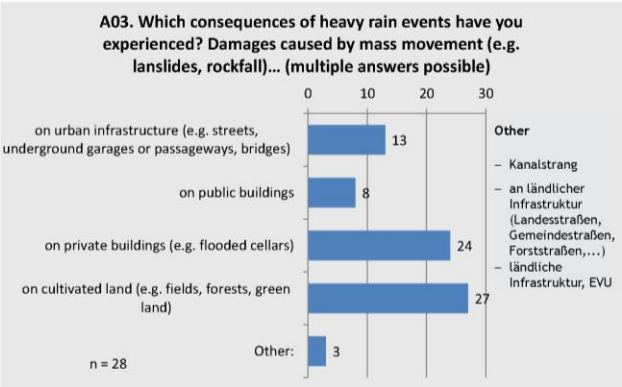
A01. Did heavy rain events occur in your region?



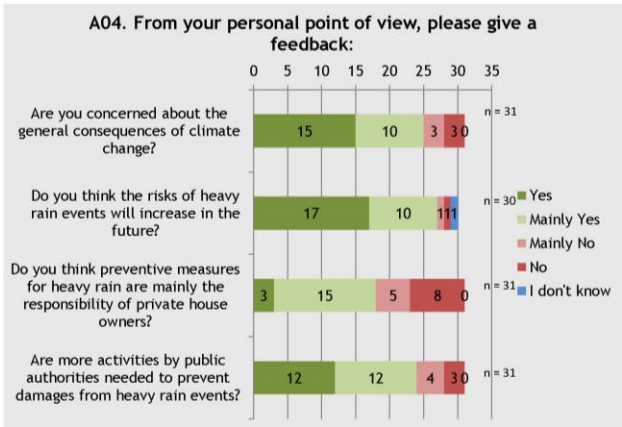
A02. Which consequences of heavy rain events have you experienced? Damages caused by flooding... (multiple answers possible)



A03. Which consequences of heavy rain events have you experienced? Damages caused by mass movement (e.g. lanslides, rockfall)... (multiple answers possible)

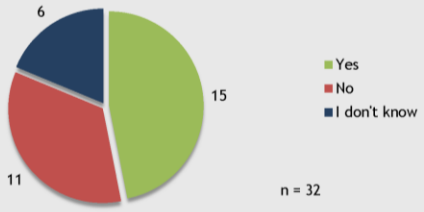


A04. From your personal point of view, please give a feedback:

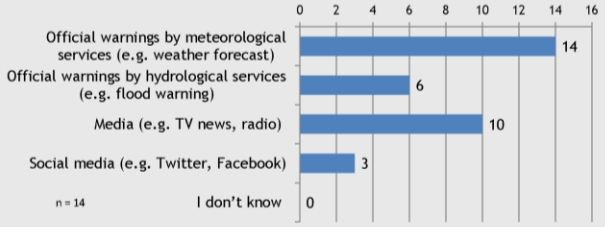


B: PRACTICAL USE OF EARLY WARNING SYSTEMS

B01. Do you know an early warning system for extreme events like heavy rain?



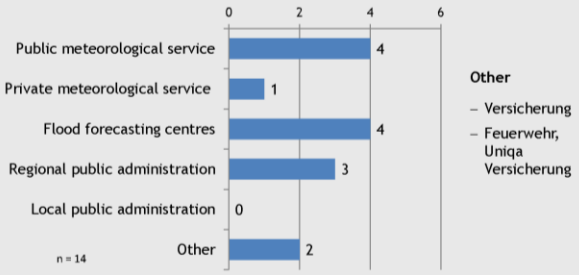
B02. How does information about an upcoming heavy rain event reach you?



B03. What is the name of the early warning system?

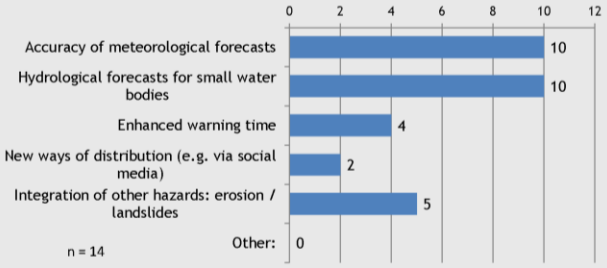
- ZAMG
- INCA der ZAMG
- Wetterwarnungen Zamg, Morecast Ubimet
- Dienstleistung der Versicherung per SMS
- ZAMG, Hydrographie Steiermark
- ZAMG und LWZ Steiermark

B04. Who is operator of this system?



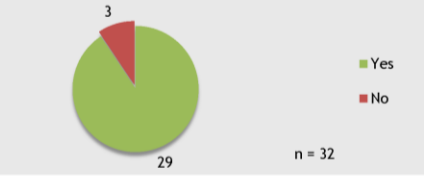
B05. From your personal point of view, please give a feedback:

B06. In your region and from your professional point of view: How can early warning systems improve?

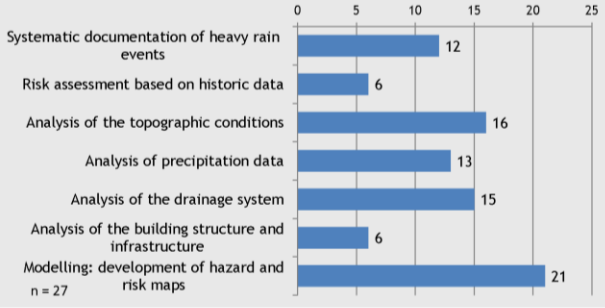


C: ASSESSMENT AND MAPPING OF HEAVY RAIN RISKS

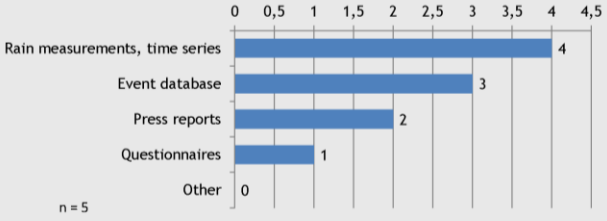
C01. Has your institution dealt with heavy rain risks?



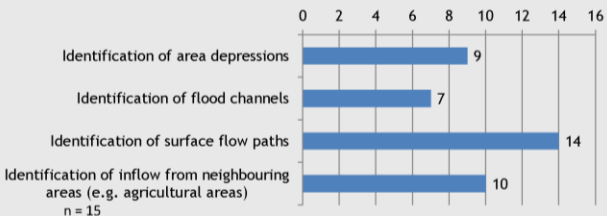
C02. With the help of which analysis does your institution assess heavy rain risks? (multiple answers possible)



C03. Which historic data for risk assessment has your institution analysed? (multiple answers possible)



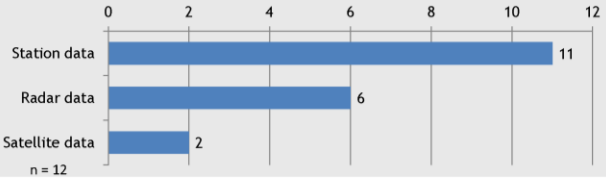
C04. Which analysis of topographic conditions (e.g. mapping of area depressions) has your institution done? (multiple answers possible)



C05. Please name other analyses of topographic conditions implemented by your institution:

- Hangwasserkarten
- Hangwasserkarte
- Sediment & Geschiebpotential
- Hochwasserrückhaltebecken durch Gemeinde
- flächendeckende GIS-Erstellung der Fließwege mit Korrektur des DGM (Durchlässe, ...)

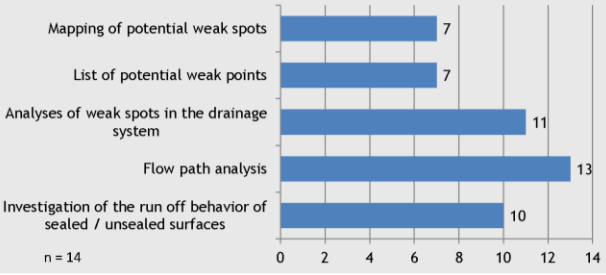
C06. Which source of information did you use to analyse precipitation data (e.g. extreme value statistics)? (multiple answers possible)



C07. Which data sets / model did you use?

- Inca, Stationsdaten
- Starkregenauswertung, Ehyd.gv.at
- WegenerNet
- zivilingenieurbüro
- Hydropraphisches Jahrbuch, Auswertungen der Hydrographie Steiermark

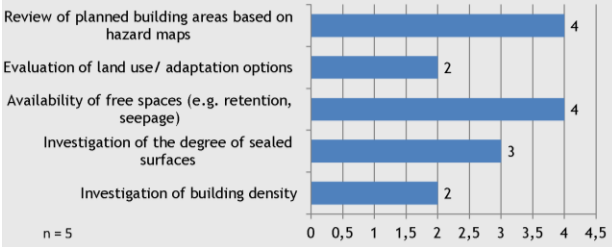
C08. Which analysis of the drainage system (weak spots) has your institution done? (multiple answers possible)



C09. Please name other analyses of the drainage system implemented by your institution:

- Systematische Analyse persönlicher Auskünfte und Wahrnehmungen von Betroffenen und Beobachtern
- Listenrechnungen, numerische Analysen
- Hochwasserdokumentationen nach Katastrophenereignissen

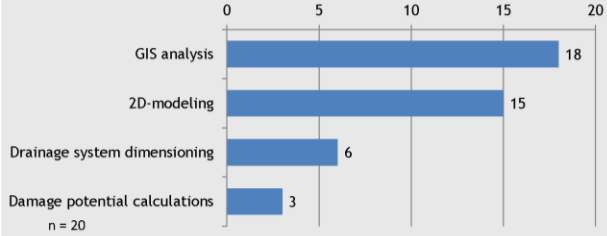
C10. Which analysis of the building structure and infrastructure has your institution done? (multiple answers possible)



C11. Please name other analyse of the building structure and infrastructure implemented by your institution:

- Laserscananalyse der Gebäude

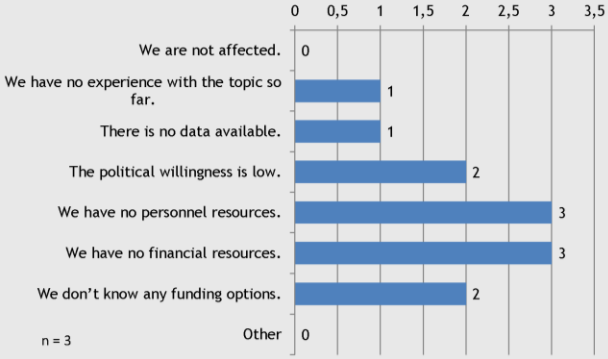
C12. Which modeling has your institution done to develop hazard and risk maps? (multiple answers possible)



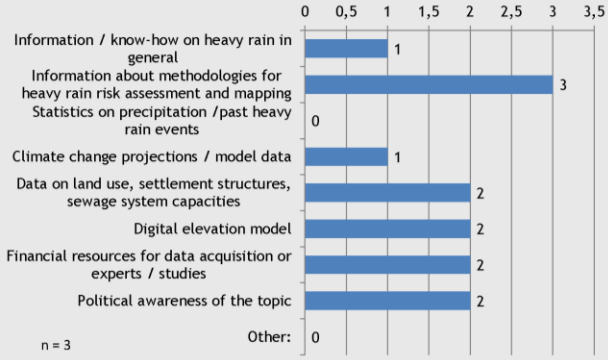
C13. Please name other analyses to develop hazard and risk maps implemented by your institution:

- 1D Modellierung

C14. If your institution has not conducted any heavy rain risk assessment (yet) - Why not? (multiple answers possible)

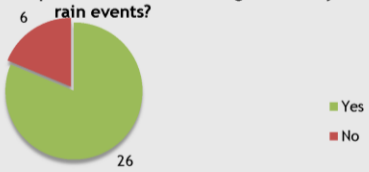


C15. In your personal opinion, what would you need for a heavy rain risk asessment or mapping? (multiple answers possible)

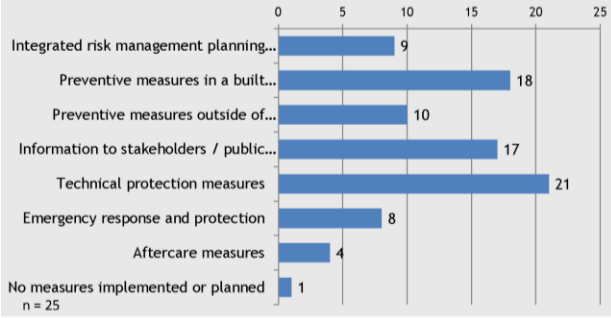


D: MEASURES TO MITIGATE HEAVY RAIN RISKS

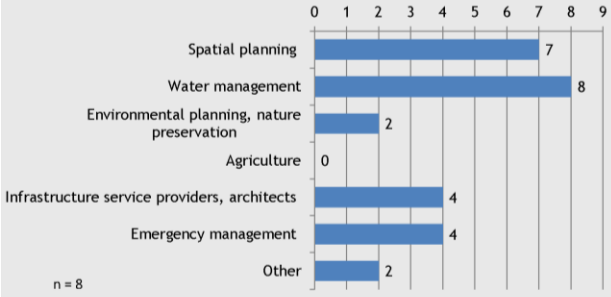
D01. Has your institution planned or implemented measures which can prevent or reduce damages of heavy rain events?



D02. Which measures to reduce heavy rain risks has your institution planned or implemented? (multiple answers possible)



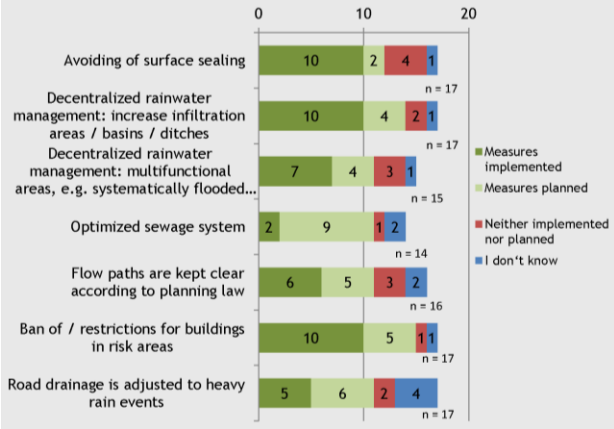
D03. Which of the following stakeholders are included in the integrated risk management planning process in your institution? (multiple answers possible)



Other

- Gemeinden
- Landesgeologie

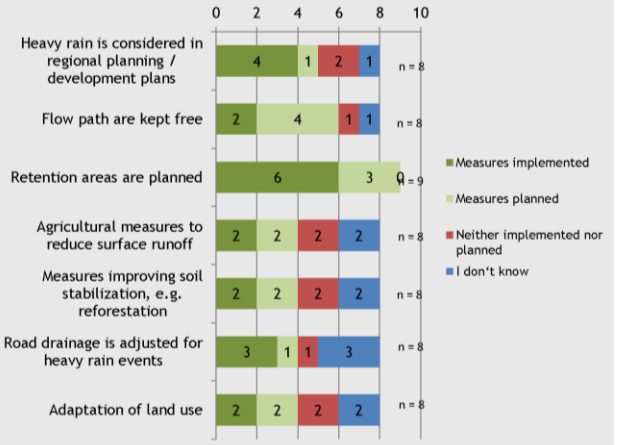
D04. Please specify implemented or planned preventive measures in a built environment / urban area!



D05. Which other preventive measures in a built environment / urban area has your institution planned or implemented?

- geplant sind bzw. teilw. umgesetzt u.a.: Bewusstseinsbildung, Information aller Stakeholder & der Bevölkerung, Erstellung von Infoblättern für Notfall-/ Katastrophenereignisse, Kommunikationsschulung für relevante Stakeholder, Bildungsangebote für alle Altersstufen (Vom Kindergarten bis zur Erwachsenenbildung)
- Angaben und Vorgaben für hochwasserfreie +/- 0,0 Niveaus an Gebäuden
- dezentrale Regenwasserbewirtschaftung bei Neubauten und Generalsanierungen, Trennsystem zur hydraulischen Optimierung des Kanalsystems
- Rückhaltebecken

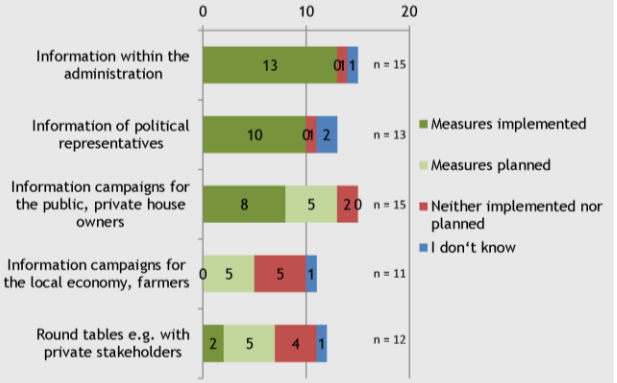
D06. Please specify implemented or planned preventive measures outside of settlement structures!



D07. Which other preventive measures outside of settlement structures has your institution planned or implemented

- geplant sind bzw. teilw. umgesetzt u.a.: Bewusstseinsbildung, Information aller Stakeholder & der Bevölkerung, Erstellung von Infoblättern für Notfall-/ Katastrophenereignisse, Kommunikationsschulung für relevante Stakeholder, Bildungsangebote für alle Altersstufen (Vom Kindergarten bis zur Erwachsenenbildung)

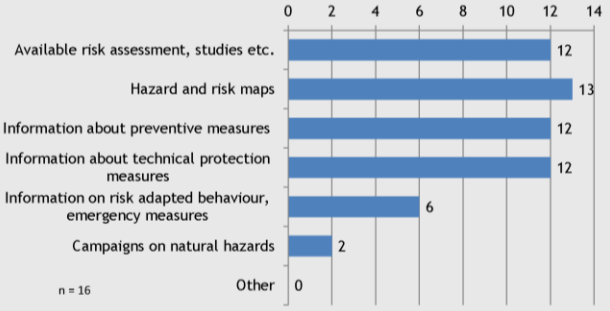
D08. Please specify implemented or planned activities regarding public relations / raising awarenes of stakeholders and public!



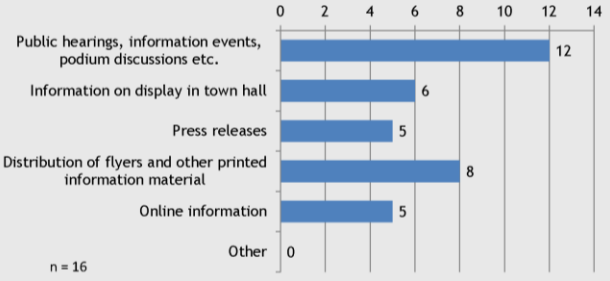
D09. Other activities regarding publicity, raising awareness of stakeholders and public:

- Informationen an Bürgmeisterkonferenzen,...
- Bürgerversammlung, Gemeindezeitung
- Pressemeldungen in lokalen Medien, Interviews, Facebookseite mit entsprechenden Informationen zur Modellregion, Workshops mit relevanten AkteurInnen & ExpertInnen (Katastrophenschutz & Infrastruktur, Land-, Forst- & Wasserwirtschaft)

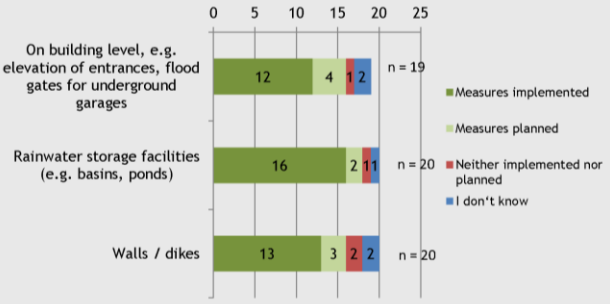
D10. Which information was or will be provided? (multiple answers possible)



D11. How was the information provided? (multiple answers possible)



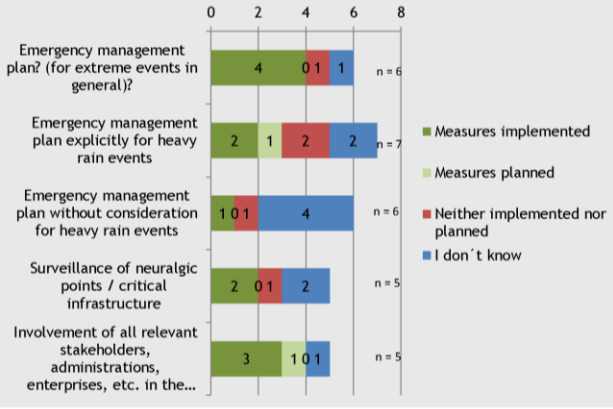
D12. Please specify implemented or planned technical protection measures!



D13. Which other technical protection measures has your institution planned or implemented?

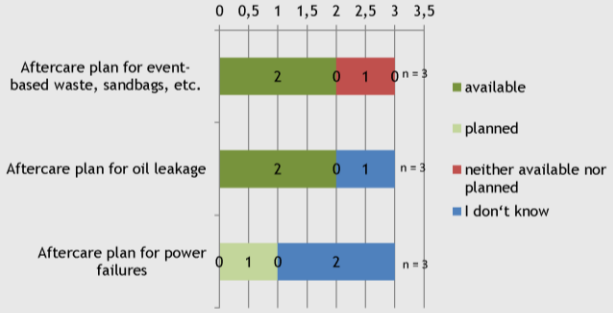
- Entwässerungskonzepte diemumzusetzen sind im Rahmen von Widmungen,...
- Retensionsbecken, Wildbachverbauung, etc.
- Hochwasserrückhaltebecken und Linearmaßnahmen an Bächen in Vorbereitung, Geschiebesperren und Linearmaßnahmen an Wildbächen in Vorbereitung
- Speicherkanäle
- Hochwassersichere Tore an Zufahrten und Einfahrten, Zusätzliche Pumpen und Pumpensümpfe im Gebäudebereich, Tiefpunktentwässerungen mit Alarmeinrichtungen

D14. Please specify implemented or planned activities regarding emergency response and protection measures!



D15. Which other activities regarding emergency response and protection measures has your institution planned or implemented?

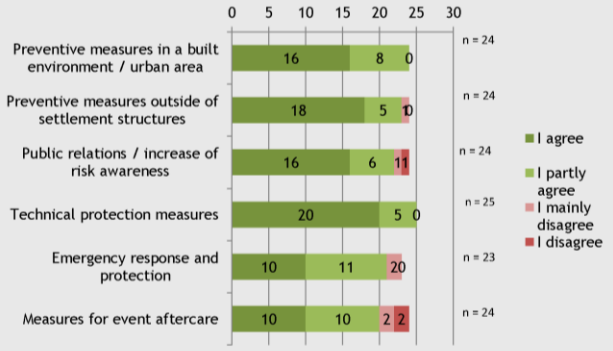
D16. Are you prepared for aftercare in your institution or region?



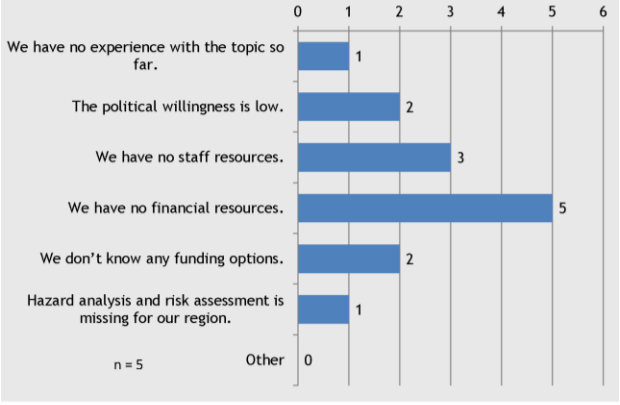
D17. Which other aftercare measures has your institution or your region planned or implemented?

- Schadensbehebungen an der wasserbaulichen Infrastruktur

D18. Please assess the categories of activities according to your personal and professional opinion! Which measures do you personally think are the most effective ones?



D19. If your institution or region has not implemented any measures (yet), why not? (multiple answers possible)



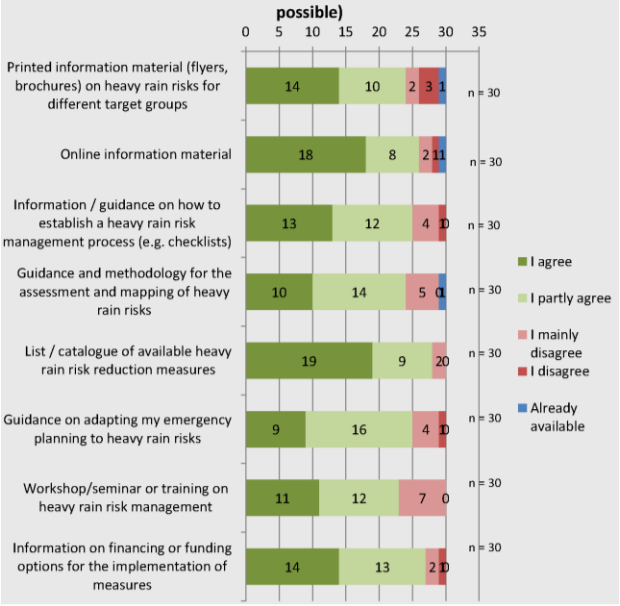
D21. What else would help you to implement (further) measures to reduce heavy rain risks?

- Kompetenz bei Raumplanern
- Verstärkte Schulung der Baubehörden und Bausachverständigen um die Starkregenrisken bei Baumaßnahmen innerorts bewußter zu machen
- Verbesserungen der Beziehungen der Aktueren untereinder (Nachbarm, Planer, Behörden,...)
- Gesamtheitliche Risikobetrachtung - Diskrepanzen zwischen Gefahrenzonenplan und Abflussuntersuchung sind für Kommunen problematisch (unterschiedliche Parameter und Auswirkungen auf Raumplanung), unterschiedliche Ansätze erschweren die Erklärbarkeit gegenüber Bürgern und lokalen Politikern
- höheres/größeres Bewusstsein aller BürgerInnen bezogen auf Klimaschutzprobleme!

D20. In your personal opinion, what would help your institution to implement (further) measures to reduce heavy rain risks?

E: DEMANDS, WISHES

E01. Which kind of support and materials would you personally want / need for your institution or region? (multiple answers possible)



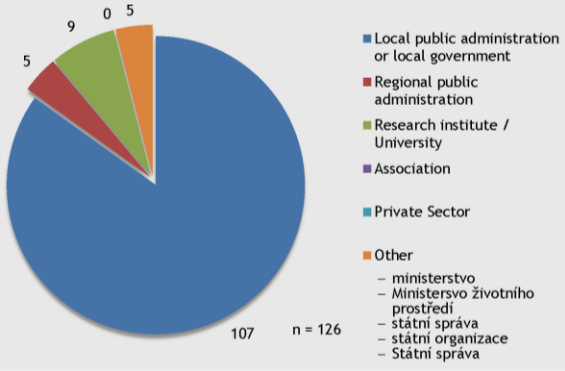
E02. Other support and additional materials you personally want or need:

- Filmdokumente von nicht unbedingt spektakulären Ereignissen zur Stärkung der Identifikation von Betroffenen und Verantwortlichen mit der Problemlage. Also Filmdokumente von Ereignissen die "jeden" treffen können.
- Gezielte Katastrophenübungen zu diesem Thema!
- Bevölkerung aufklären - In Hanglage Verbot von Grünlandumbruch sowie weniger Versiegelung von Verkehrs- u. Parkflächen.

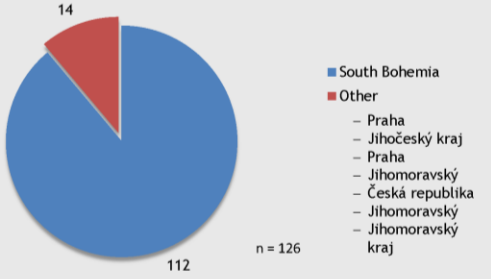
7.2. Survey results in Czech Republic

PI: PERSONAL INFORMATION

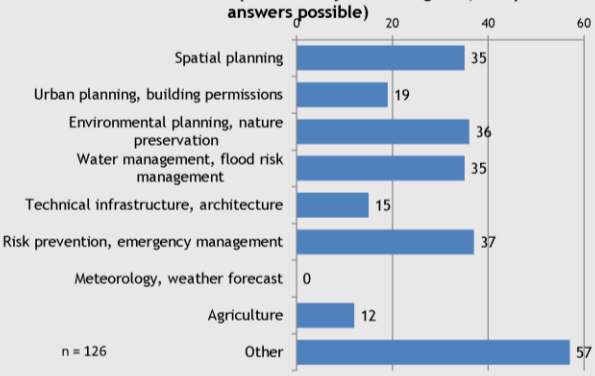
PI01. Which type of institution are you working for?



PI03. Region



PI05. Which area of expertise are you working in? (multiple answers possible)

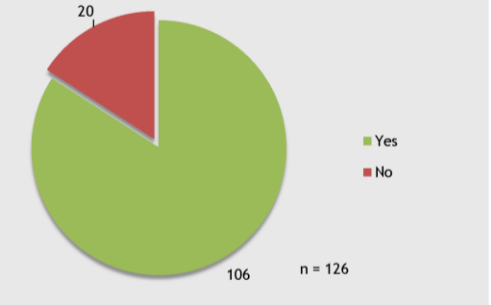


Other

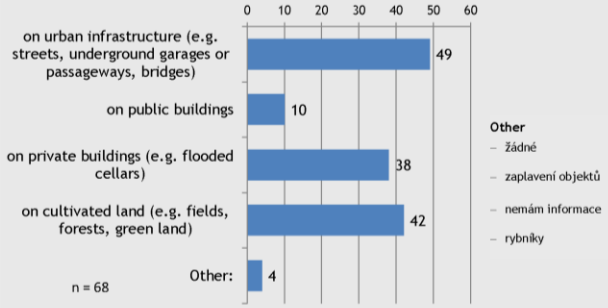
- SSL, ovzduší, ZPF
- státní správa
- odpady, ovzduší, ochrana zvíře
- starosta obce
- starosta obce
- Obec starosta
- Vedení města
- Starosta obce
- místostarosta
- důchodce
- územní samospráva
- Obecní úřad
- starosta
- průmysl
- OVM
- starosta
- starosta obce
- samospráva
- silniční správní úřad
- starosta
- Obecní úřad
- doprava
- Obec
- starosta
- Starosta
- Potravinářství
- logostika
- místní samospráva
- samospráva
- stavebnictvý
- úředník
- starosta obce
- STAROSTKA
- obecní úřad
- obecní úřad
- obecní úřad
- odbor hospodářské správy a invest
- Vedení OÚ
- obecní úřad
- starosta
- všechno
- veřejná správa
- obecní samospráva
- Hydrologie
- Obecní úřad
- starosta obce, ekonomie
- starostka
- samospráva
- Pozemkové úpravy
- klimatologie
- Státní správa
- místní samospráva
- vzdělávání a výzkum
- starosta
- místní samospráva
- samospráva
- OÚ Hlavatce

A: EXPERIENCES WITH HEAVY RAIN

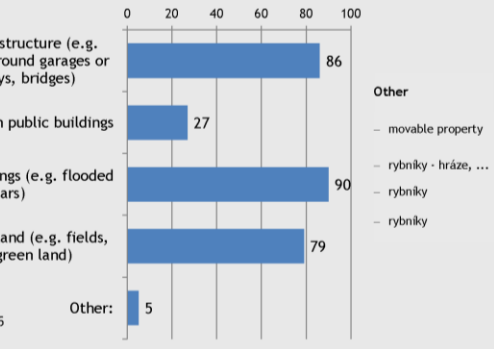
A01. Did heavy rain events occur in your region?



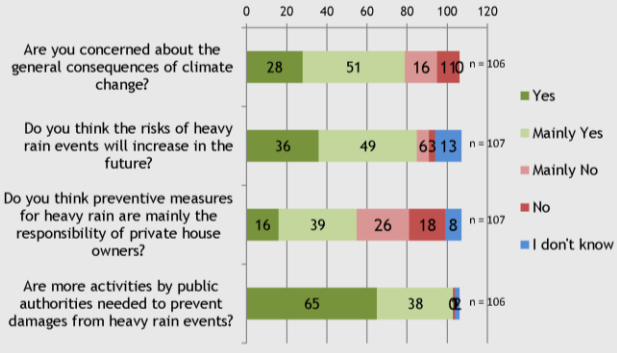
A03. Which consequences of heavy rain events have you experienced? Damages caused by mass movement (e.g. lanslides, rockfall)... (multiple answers possible)



A02. Which consequences of heavy rain events have you experienced? Damages caused by flooding... (multiple answers possible)

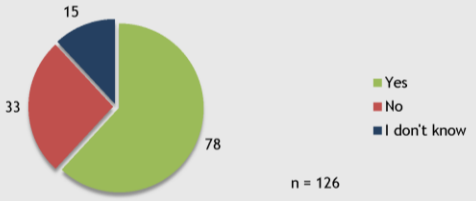


A04. From your personal point of view, please give a feedback:

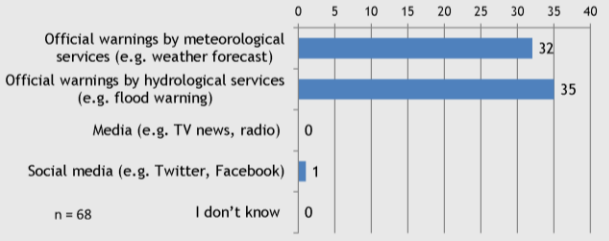


B: PRACTICAL USE OF EARLY WARNING SYSTEMS

B01. Do you know an early warning system for extreme events like heavy rain?



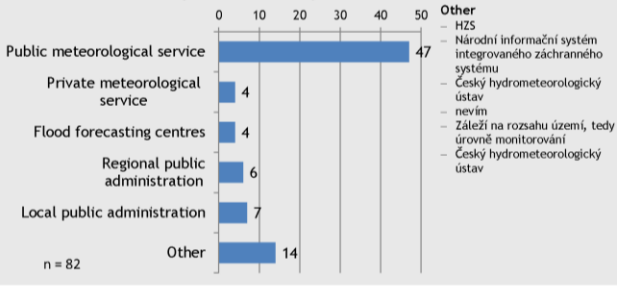
B02. How does information about an upcoming heavy rain event reach you?



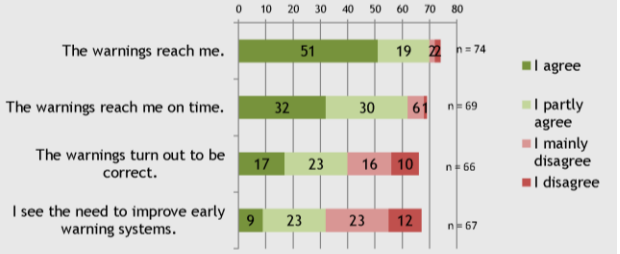
B03. What is the name of the early warning system?

- Hydrometeorologický monitoring Povodí Vltava
- POVIS
- POVIS
- mail a mobilní telefon
- ČHMÚ
- IZS
- Výstraha ČHMÚ
- info kanál ČHMÚ
- Národní informační systém integrovaného záchranného systému
- Krizové orgány ORP Strakonice - systém včasného varování
- ČT
- SIVS
- Hydrometeorologický ústav
- výstraha CHMI
- Výstraha ČHMÚ
- POVIS
- Předpovědní výstražné informace od ČHMÚ
- OPIS HZS Jihočeského kraje
- IK CK CHMU
- Hlásná povodňová služba
- OPIS HZS Výstraha ČHMÚ
- Systém integrované výstražné služby
- Výstrahy na portal.CHMI.cz
- srážkoměr, hladinoměr na toku
- nevím
- Sirény, mobilní rozhlas.
- Hlásná a předpovědní povodňová služba
- nevím
- HZS JČ kraje
- OPIS HZS
- nevím
- a okresní krizový štáb
- SIVS
- SIVS
- Výstraha na možné přívalové srážky
- Hlásná a předpovědní povodňová služba
- lokální varovný systém
- Hlásná povodňová služba
- Indikátor přívalových povodní; meteorologický radar
- Hasičský záchranný sbor Jčk
- Varování místním rozhlasem, varovný systém obce se srážkoměrem a měřením vodních stavů na místním vodním toku.
- Systém integrované výstražné služby (SIVS)
- OPIS MV-GŘ HZS ČR
- čhmú, OPIS HZS kraje- dostáváme smsky na mobil, Aladin
- nevím

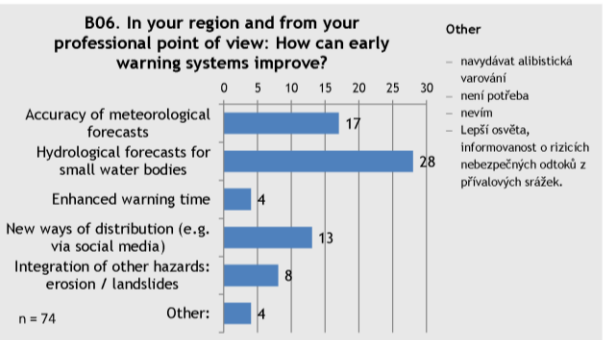
B04. Who is operator of this system?



B05. From your personal point of view, please give a feedback:

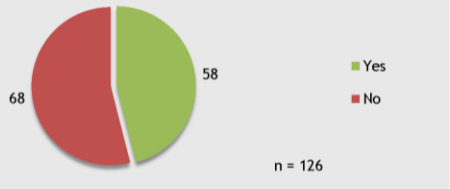


B06. In your region and from your professional point of view: How can early warning systems improve?

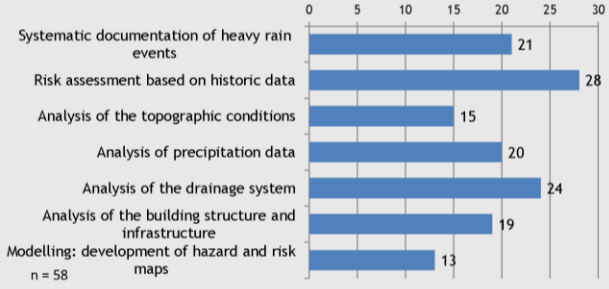


C: ASSESSMENT AND MAPPING OF HEAVY RAIN RISKS

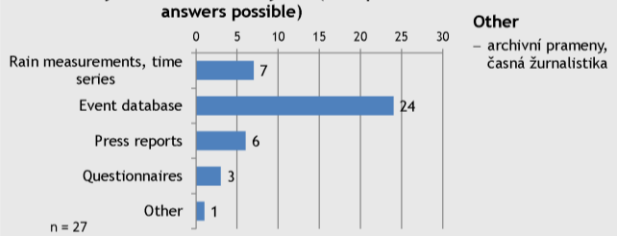
C01. Has your institution dealt with heavy rain risks?



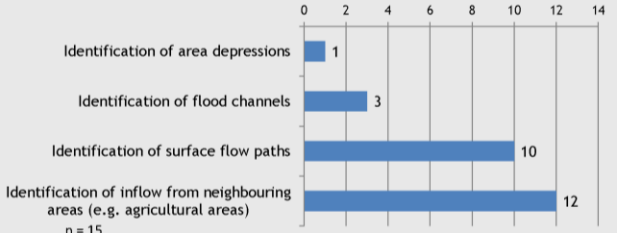
C02. With the help of which analysis does your institution assess heavy rain risks? (multiple answers possible)



C03. Which historic data for risk assessment has your institution analysed? (multiple answers possible)

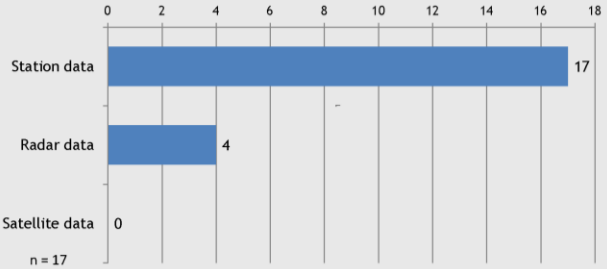


C04. Which analysis of topographic conditions (e.g. mapping of area depressions) has your institution done? (multiple answers possible)



C05. Please name other analyses of topographic conditions implemented by your institution:

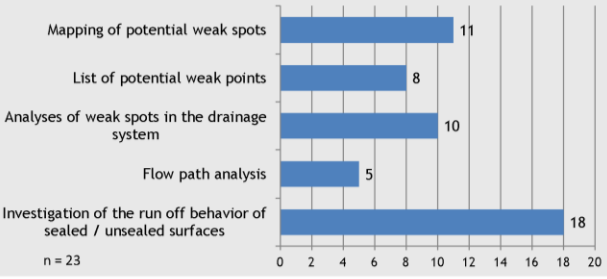
C06. Which source of information did you use to analyse precipitation data (e.g. extreme value statistics)? (multiple answers possible)



C07. Which data sets / model did you use?

- N- leté průtoky na základě CN křivek
- jednoduchý srážkoodtokový model
- DesQ-MaxQ, HEC-HMS
- veřejně dostupné-čhmú apod.

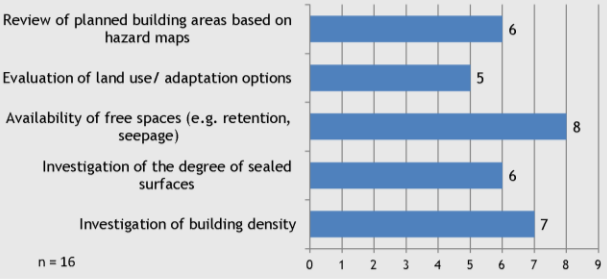
C08. Which analysis of the drainage system (weak spots) has your institution done? (multiple answers possible)



C09. Please name other analyses of the drainage system implemented by your institution:

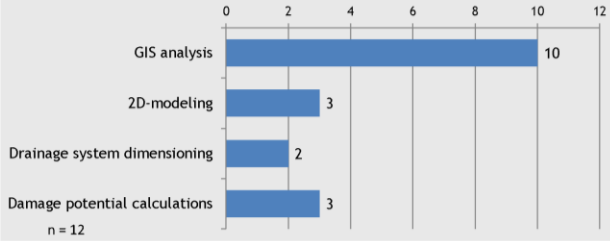
- Vybudování POLDRU

C10. Which analysis of the building structure and infrastructure has your institution done? (multiple answers possible)



C11. Please name other analyse of the building structure and infrastructure implemented by your institution:

C12. Which modeling has your institution done to develop hazard and risk maps? (multiple answers possible)

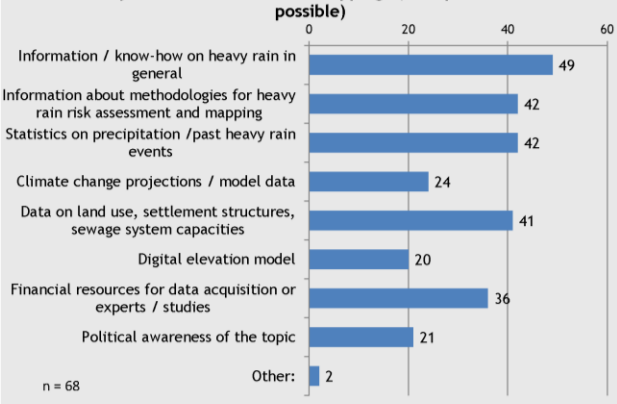


C13. Please name other analyses to develop hazard and risk maps implemented by your institution:

C14. If your institution has not conducted any heavy rain risk assessment (yet) - Why not? (multiple answers possible)

Other
- jde o výjimečný stav - řešený v rámci povodňové ochrany
- malá četnost, minimální škody
- stupeň nebezpečí je nízký, umíme včas reagovat
- není v naší kompetenci
- není v naší kompetenci
- nejsme k tomu kompetentní
- otázka není pro moji instituci relevantní (zaměstnavatel univerzita)

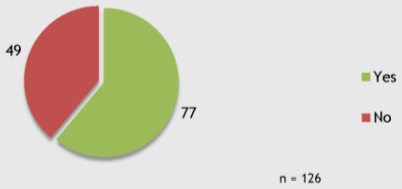
C15. In your personal opinion, what would you need for a heavy rain risk asessment or mapping? (multiple answers possible)



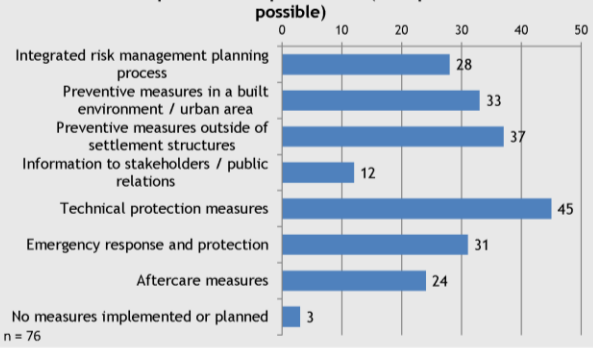
Other
- průzkum terénu + vyhodnocení škrtících bodů
- Prevence !!!

D: MEASURES TO MITIGATE HEAVY RAIN RISKS

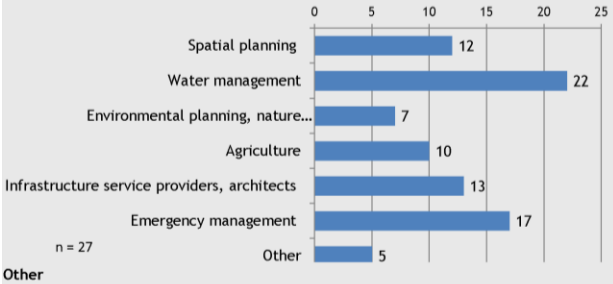
D01. Has your institution planned or implemented measures which can prevent or reduce damages of heavy rain events?



D02. Which measures to reduce heavy rain risks has your institution planned or implemented? (multiple answers possible)

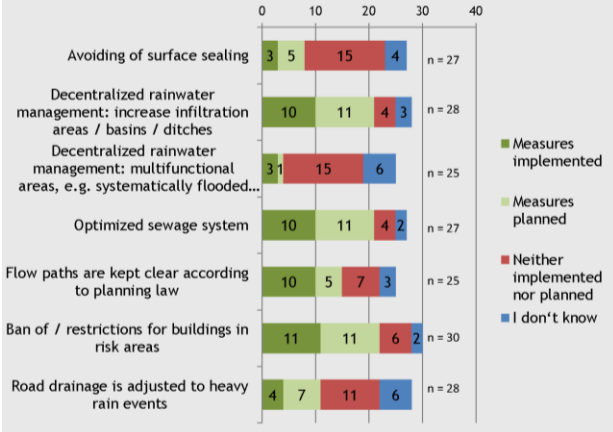


D03. Which of the following stakeholders are included in the integrated risk management planning process in your institution? (multiple answers possible)



Other
- krizové řízení
- krizové řízení
- výzkuné instituce,státní instituce
- JSDH ROudná
- Povodí Vltavy

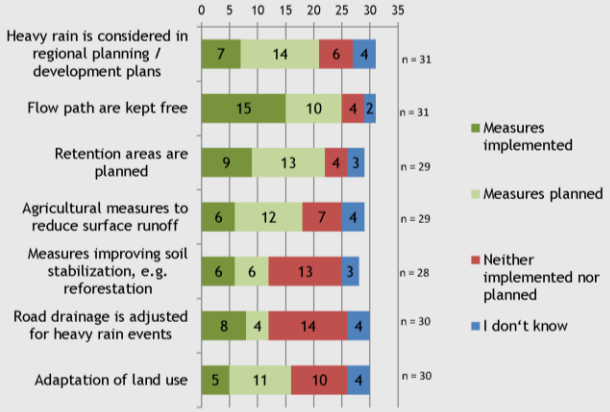
D04. Please specify implemented or planned preventive measures in a built environment / urban area!



D05. Which other preventive measures in a built environment / urban area has your institution planned or implemented? *

* See last page

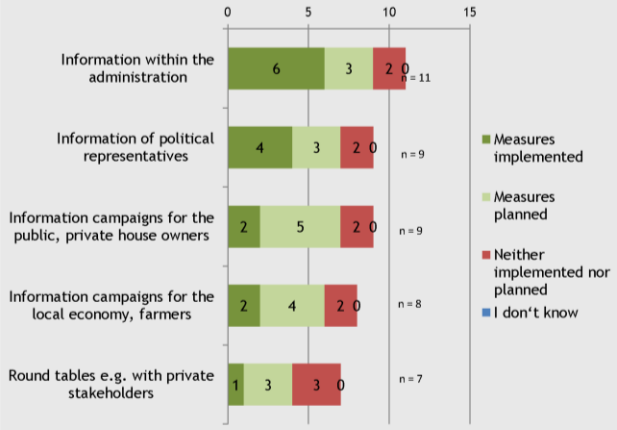
D06. Please specify implemented or planned preventive measures outside of settlement structures!



D07. Which other preventive measures outside of settlement structures has your institution planned or implemented

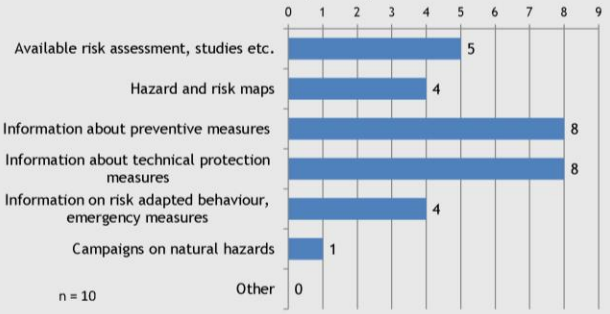
- Pouze návrhy , nikoli plánování.

D08. Please specify implemented or planned activities regarding public relations / raising awarenes of stakeholders and public!

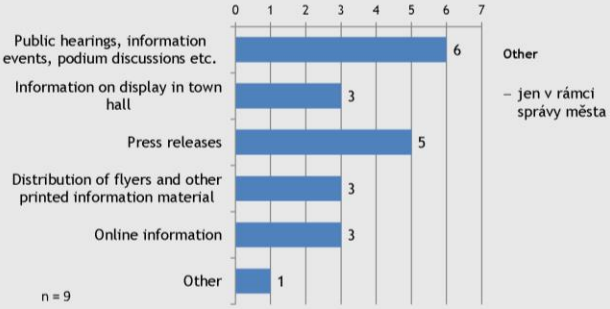


D09. Other activities regarding publicity, raising awareness of stakeholders and public:

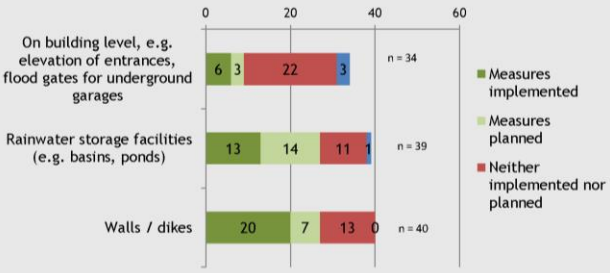
D10. Which information was or will be provided? (multiple answers possible)



D11. How was the information provided? (multiple answers possible)



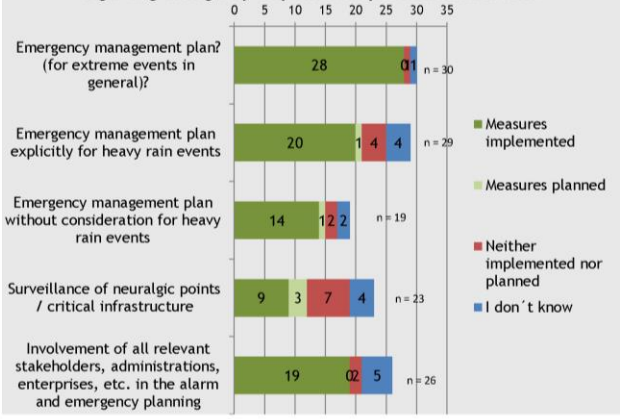
D12. Please specify implemented or planned technical protection measures!



D13. Which other technical protection measures has your institution planned or implemented?

- Odstranění možných problémových staveb, pro uvolnění odtoku přívalové vody
- Přehrážka na toku s okny - propustí regulované množství čisté vody (bez větví apod.)
- obtoková stoka pro obce Debrník, Hlavatce

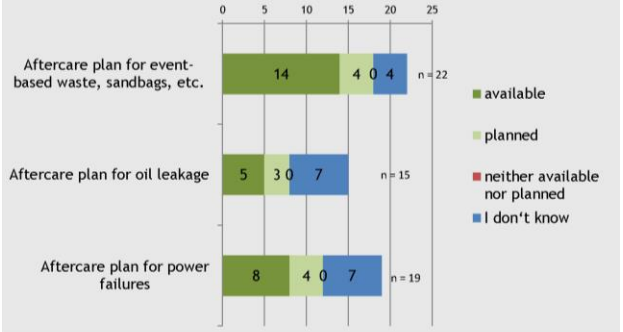
D14. Please specify implemented or planned activities regarding emergency response and protection measures!



D15. Which other activities regarding emergency response and protection measures has your institution planned or implemented?

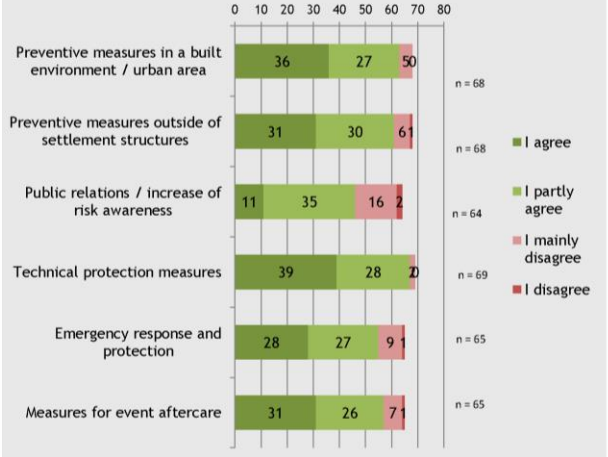
- V městysu je vybudovaný varovný protipovodňový systém včasného hlášení - srážkoměr a "místní rozhlas"

D16. Are you prepared for aftercare in your institution or region?



D17. Which other aftercare measures has your institution or your region planned or implemented?

D18. Please assess the categories of activities according to your personal and professional opinion! Which measures do you personally think are the most effective ones?



D19. If your institution or region has not implemented any measures (yet), why not? (multiple answers possible)

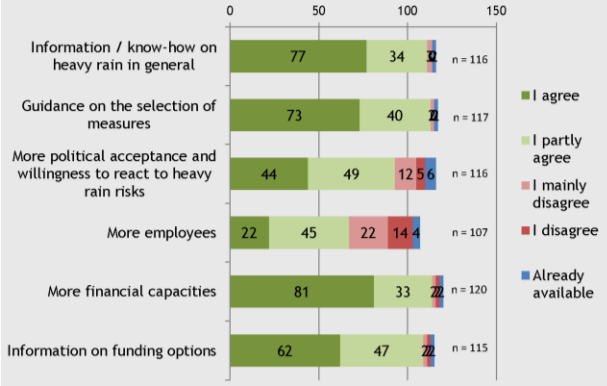
Other

- zatím nebyl s přívalovými srážkami problém
- Nebyly povodně
- není nutné opatření
- Absence legislativní opory
- otázka není relevantní

D21. What else would help you to implement (further) measures to reduce heavy rain risks?

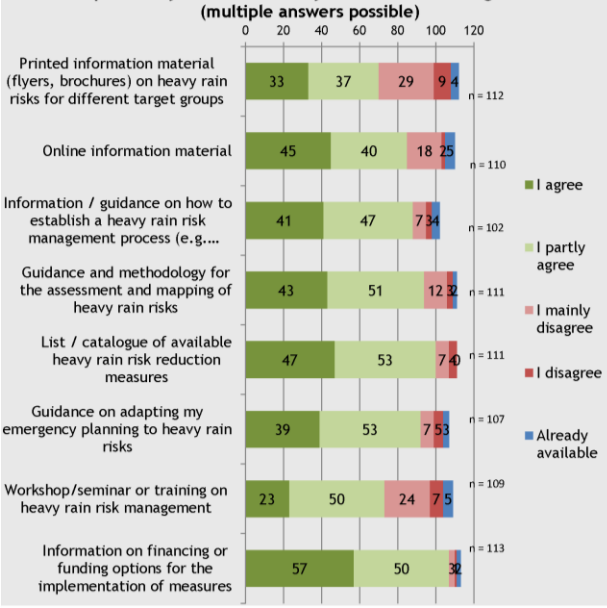
- zahrnout do povodňových plánů
- Chybí legislativa.

D20. In your personal opinion, what would help your institution to implement (further) measures to reduce heavy rain risks?



E: DEMANDS, WISHES

E01. Which kind of support and materials would you personally want / need for your institution or region? (multiple answers possible)



E02. Other support and additional materials you personally want or need:*

* See last page

*** D05. Which other preventive measures in a built environment / urban area has your institution planned or implemented?**

- Protipovodňový val v severní části obce

- Nutné zmapování a provedení opatření, výzvu jsem zaslal kompetentním vedoucím odborů: Kolegyně a kolegové, Zasílám vám v příloze průvodní dopis. Nemusíte ho číst celý, ale můžete, stačí pouze první dva odstavce. Vzhledem k tomu, že tuto tematiku taktéž máte ve svých gescích, zejména OŽP, žádám Vás o zaslání podkladů, vašich postřehů takto: - Kde v našem městě a přidružených obcích máme oblasti, kde se vyskytujou přívalové deště a bleskové povodně (potvrdit nebo doplnit) - namátkou mně napadá - od shrora kolem Dusíkovy strouhy s potokem až k řece - Děkanský potok od lesa až k řece - Ulice Rámy přes Vinařického náměstí (i když po těch úpravách tam asi už tolik problémů není) - alej míru dolů - Tyršova ulice od shora přes náměstí Míru - Mostecká ulice - část v ulici Na brodech před jatkama - v Nuzicích, Netěchovicích, Předčicích, Kolodějích, Vescích - tady jestli máte podrobné údaje - Jaká opatření by v těchto oblastech bylo nejlepší provést ke zmírnění škod a ke zvýšení ochrany občanů a majetku Já pak na základě toho vyplním dotazník. Odpověď vedoucího OŽP: Dobrý den, Váš výčet oblastí s ohrožením bleskovými záplavami je pro město téměř kompletní, doplnil bych asi ještě ulici Ke Hradu, Jiráskovu ulici „Peklo“ - tam bývá problém s ucpanou mříží na odtoku, oblast potoka Račina (chataři i dolní obytné objekty), na Hlinkách Hlinecká ulice v úseku za kulturním centrem, kde voda teče právě do Pekla a svažitý úsek Komenského ulice pod Blanicí. Na Malé straně Bohunická ulice, zejména úsek od sběrných surovin a Svazarmu, obě větve Husovy ulice a Havlíčkova ulice s nedostatečnou kapacitou kanalizace. Z přidružených obcí Nuzice - nedostatečná kapacita propustku pod komunikací Týn - Bechyně a s tím spojené zaplavování návsi, Předčice - voda z polí nad vsí ohrožuje jednak novou zástavbu u silnice na Týn, jednak se může po cestě shora od Veselské silnice dostat až na náves a do domů pod cestou. Koloděje u mostu - ohrožení od Hosteckého potoka. Koloděje Vesce ohrožení z polí nad kapličkou - částečně vyřešeno nízkým náspem podél polní cesty. Zde je ohrožen i rekreační areál u Lužnice vodami z Bílinského potoka. Hněvkovice - možnost přívalu z polí po cestě do vsi. Netěchovice + Jarošovice zatím nebyly hlášeny významnější problémy. Opatření lze přijmout dost těžko, v některých případech (Nuzice - suchý poldr nad vsí v ceně 6-8milionů) neřešitelné kvůli vlastnickým vztahům k vhodným pozemkům. Zde je problém i v zásahu do majetku kraje (propustek pod jejich silnicí) a navíc vybudování cca 100m kapacitního potrubí pod nuzickou návsí. Údolí Hosteckého potoka v Kolodějích - lze řešit pouze zkapacitněním průtočného profilu pod komunikací vedoucí mezi jednotlivými objekty. Předčice - lze se pokusit o odklon vod z polí v trase původní (dnes rozorané) polní cesty zadem na Račinu, ale tím se navýší průtok v Račínském potoce, což není příliš žádoucí (opět podle současných kapacitních možností koryta Račiny). Obecněna území celého města a přidružených obcí by tato problematika vyžadovala posouzení a propočet odborníka v oblasti hydrologie včetně odhadu nákladů na realizaci. S přáním pěkného dne Ivan Palma

*** E02. Other support and additional materials you personally want or need:**

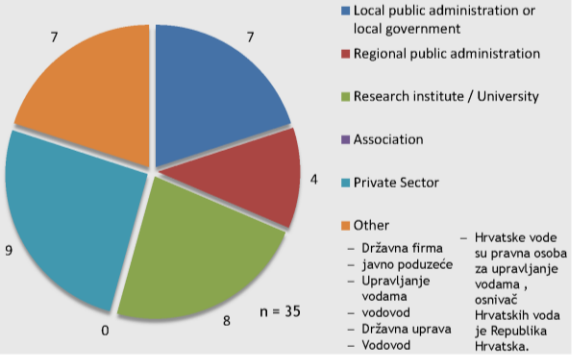
- V našem případě je třeba požadovat od plastníků přilehlých pozemků vodoteče včasné odstranění dřevin bránící průtoku a správci povodí dát takové množství finančních prostředků, aby pravidelně čistili toky. Voda přirozeně odteče a nehromadí se ve zúžených místech v obci i nad.
- Obec Temešvár patří mezi nejsušší místa v JČ, ale jednou za čas nás přívalové srážky opravdu překvapí.
- FINANČNÍ PROSTŘEDKY
- Většinu z toho samozřejmě máme, máme zpracovaný Krizový plán ORP, Povodňový plán ORP a města, ale potřebovali bychom aktuální věci, metodiky pro postup občanů při ochraně svých objektů apod.,
  Chtělo by to rozpracovat, zmapovat, připravit opatření - nejlépe přímo na místě za Vaší účasti apod.
  Oslovil jsem kompetentní vedoucí odborů o zaslání konkrétních údajů:
  Kolegyně a kolegové,
  Zasílám vám v příloze průvodní dopis. Nemusíte ho číst celý, ale můžete, stačí pouze první dva odstavce. Vzhledem k tomu, že tuto tematiku taktéž máte ve svých gescích, zejména OŽP, žádám Vás o zaslání podkladů, vašich postřehů takto:
  - Kde v našem městě a přidružených obcích máme oblasti, kde se vyskytujou přívalové deště a bleskové povodně (potvrdit nebo doplnit) - namátkou mně napadá
  - od shrora kolem Dusíkovy strouhy s potokem až k řece
  - Děkanský potok od lesa až k řece
  - Ulice Rámy přes Vinařického náměstí (i když po těch úpravách tam asi už tolik problémů není)
  - alej míru dolů
  - Tyršova ulice od shora přes náměstí Míru
  - Mostecká ulice
  - část v ulici Na brodech před jatkama
  - v Nuzicích, Netěchovicích, Předčicích, Kolodějích, Vescích - tady jestli máte podrobné údaje
  - Jaká opatření by v těchto oblastech bylo nejlepší provést ke zmírnění škod a ke zvýšení ochrany občanů a majetku
    Já pak na základě toho vyplním dotazník.
    Odpověď např. vedoucího OŽP:
    Dobrý den,
    Váš výčet oblastí s ohrožením bleskovými záplavami je pro město téměř kompletní, doplnil bych asi ještě ulici Ke Hradu, Jiráskovu ulici „Peklo“ - tam bývá problém s ucpanou mříží na odtoku, oblast potoka Račina (chataři i dolní obytné objekty), na Hlinkách Hlinecká ulice v úseku za kulturním centrem, kde voda teče právě do Pekla a svažitý úsek Komenského ulice pod Blanicí. Na Malé straně Bohunická ulice, zejména úsek od sběrných surovin a Svazarmu, obě větve Husovy ulice a Havlíčkova ulice s nedostatečnou kapacitou kanalizace. Z přidružených obcí Nuzice - nedostatečná kapacita propustku pod komunikací Týn - Bechyně a s tím spojené zaplavování návsi, Předčice - voda z polí nad vsí ohrožuje jednak novou zástavbu u silnice na Týn, jednak se může po cestě shora od Veselské silnice dostat až na náves a do domů pod cestou. Koloděje u mostu - ohrožení od Hosteckého potoka. Koloděje Vesce ohrožení z polí nad kapličkou - částečně vyřešeno nízkým náspem podél polní cesty. Zde je ohrožen i rekreační areál u Lužnice vodami z Bílinského potoka. Hněvkovice - možnost přívalu z polí po cestě do vsi. Netěchovice + Jarošovice zatím nebyly hlášeny významnější problémy.
    Opatření lze přijmout dost těžko, v některých případech (Nuzice - suchý poldr nad vsí v ceně 6-8milionů) neřešitelné kvůli vlastnickým vztahům k vhodným pozemkům. Zde je problém i v zásahu do majetku kraje (propustek pod jejich silnicí) a navíc vybudování cca 100m kapacitního potrubí pod nuzickou návsí. Údolí Hosteckého potoka v Kolodějích - lze řešit pouze zkapacitněním průtočného profilu pod komunikací vedoucí mezi jednotlivými objekty. Předčice - lze se pokusit o odklon vod z polí v trase původní (dnes rozorané) polní cesty zadem na Račinu, ale tím se navýší průtok v Račínském potoce, což není příliš žádoucí (opět podle současných kapacitních možností koryta Račiny).
    Obecněna území celého města a přidružených obcí by tato problematika vyžadovala posouzení a propočet odborníka v oblasti hydrologie včetně odhadu nákladů na realizaci.

    S přáním pěkného dne Ivan Palma

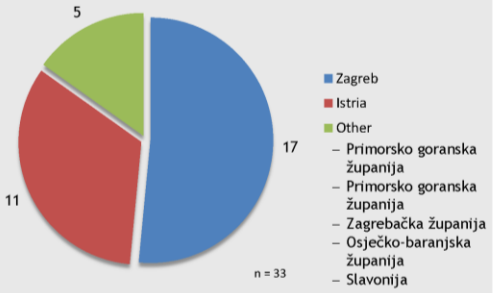
7.3. Survey results in Croatia

PI: PERSONAL INFORMATION

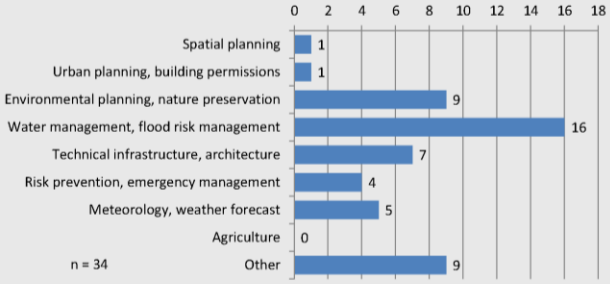
PI01. Which type of institution are you working for?



PI03. Region



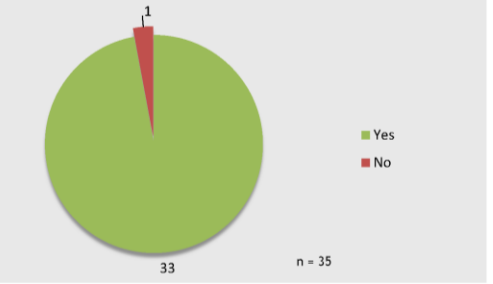
PI05. Which area of expertise are you working in? (multiple answers possible)



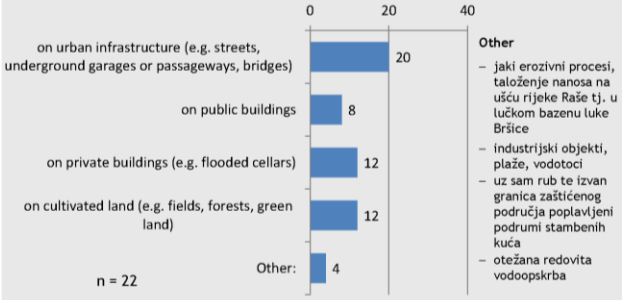
Other
- zaštita okoliša i prirode
- zaštita vodnih resursa
- projektiranje vodnih građevina, vodni doprinos, gis- katastar vodih građevina, izrada projektnih zadataka, itd
- Visoko obrazovanje
- vodoopskrba
- Numeričko modeliranje poplavnih valova
- Hidrološko prognoziranje
- Podtlačna odvodnja krovnih oborinskih voda
- Programiranje i korištenje EU fondova

A: EXPERIENCES WITH HEAVY RAIN

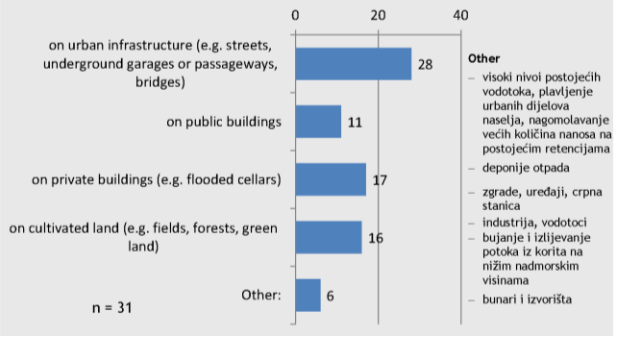
A01. Did heavy rain events occur in your region?



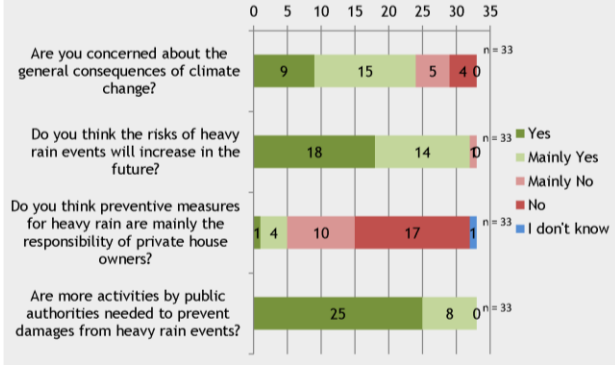
A03. Which consequences of heavy rain events have you experienced? Damages caused by mass movement (e.g. lanslides, rockfall)... (multiple answers possible)



A02. Which consequences of heavy rain events have you experienced? Damages caused by flooding... (multiple answers possible)

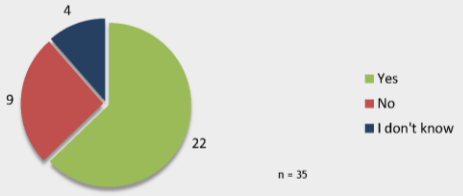


A04. From your personal point of view, please give a feedback:

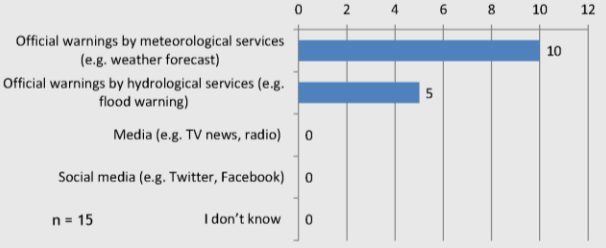


B: PRACTICAL USE OF EARLY WARNING SYSTEMS

B01. Do you know an early warning system for extreme events like heavy rain?



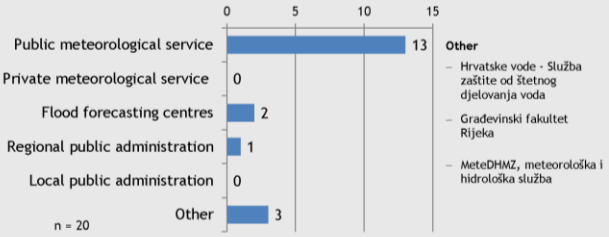
B02. How does information about an upcoming heavy rain event reach you?



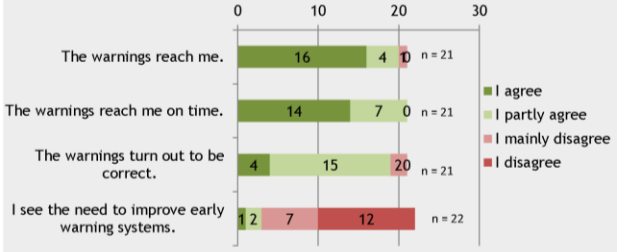
B03. What is the name of the early warning system?

- meteoalarm
- nema neko posebno ime, ali ukoliko postoje prognostički uvjeti za pojave kratkotrajnih jakih oborina, na web stranicama DHMZ-a, a s koje vijesti prenose i mediji, daju se i najave mogućih pojava poplavnih bujičnih voda
- meteoalarm
- Glavni i provedbeni plan obrane od poplave
- Prognoze DHMZ-a putem obavjesti nadležnih službi Hrvatskih voda putem e-maila
- DHMZ
- EWS
- Imamo instaliran meteorološki radar za detekciju oborina na GF u Rijeci, kao i nekoliko meteoroloških stanica na širem području grada Rijeke.
- Meteo i hidro alarm, Flash Flood guidance System, EFAS (European Flood Awareness System)
- meteoalarm
- Meteoalarm
- Meteo alarm

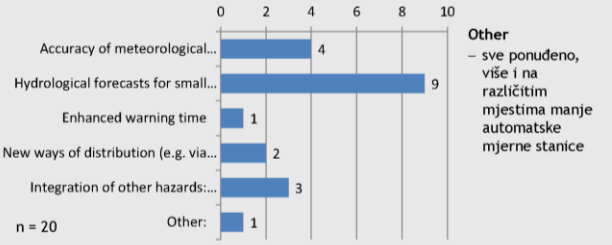
B04. Who is operator of this system?



B05. From your personal point of view, please give a feedback:



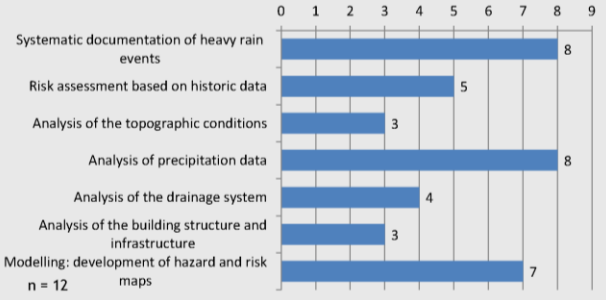
B06. In your region and from your professional point of view: How can early warning systems improve?



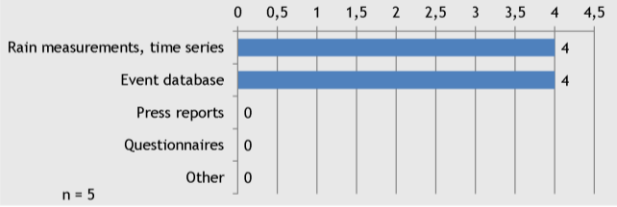
C: ASSESSMENT AND MAPPING OF HEAVY RAIN RISKS

C01. Has your institution dealt with heavy rain risks?

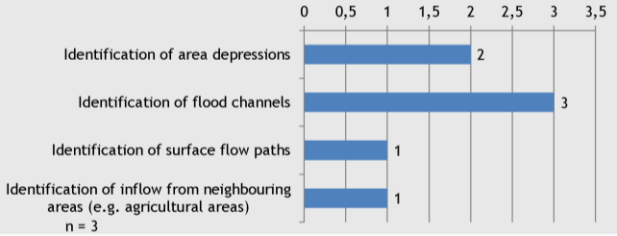
C02. With the help of which analysis does your institution assess heavy rain risks? (multiple answers possible)



C03. Which historic data for risk assessment has your institution analysed? (multiple answers possible)



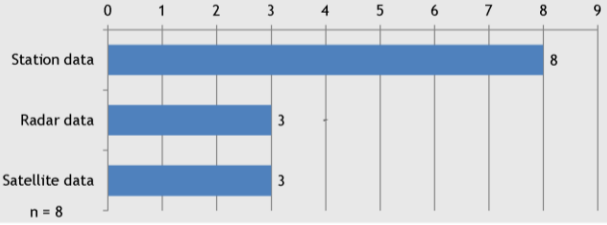
C04. Which analysis of topographic conditions (e.g. mapping of area depressions) has your institution done? (multiple answers possible)



C05. Please name other analyses of topographic conditions implemented by your institution:

- dodatna detaljna snimanja terena

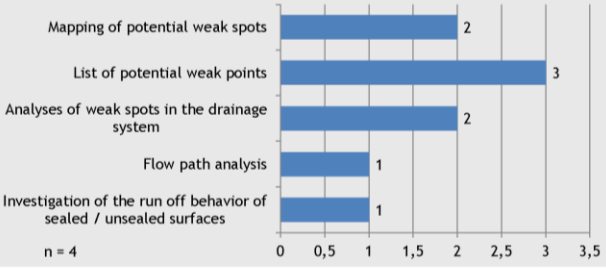
C06. Which source of information did you use to analyse precipitation data (e.g. extreme value statistics)? (multiple answers possible)



C07. Which data sets / model did you use?

- statistička obrada nizova oborina s postaja trajanja 30 godina i više
- Obrađene hidrološke podatke unutar različitih službi Hrvatskih voda, postojeća (stara) projektna dokumentacija , stare studije
- Baza DHMZ-a
- ALADIN, HEC-HMS
- NWP, reanalize, globalni i regionalni klimatski modeli.

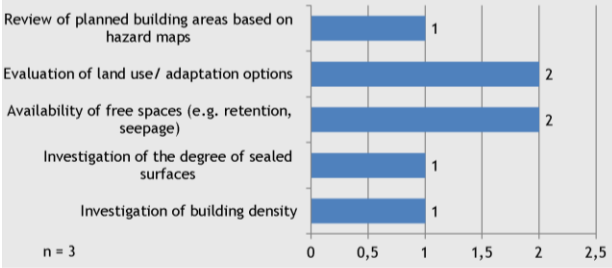
C08. Which analysis of the drainage system (weak spots) has your institution done? (multiple answers possible)



C09. Please name other analyses of the drainage system implemented by your institution:

- koincidencije događaja

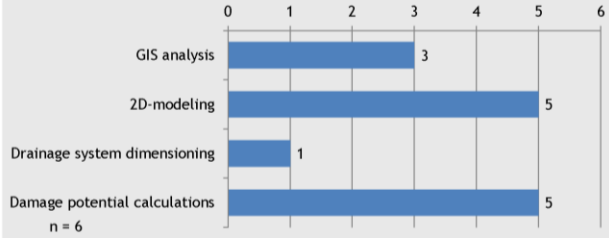
C10. Which analysis of the building structure and infrastructure has your institution done? (multiple answers possible)



C11. Please name other analyse of the building structure and infrastructure implemented by your institution:

- funkcionalnost i starost/stanje izgrađene infrastrukture

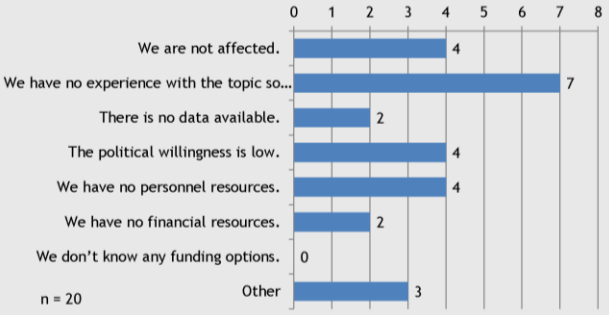
C12. Which modeling has your institution done to develop hazard and risk maps? (multiple answers possible)



C13. Please name other analyses to develop hazard and risk maps implemented by your institution:

- korištenje zemljišta, utjecaj na prostorno planiranje
- Ukratko sam se bavio (više teoretski) kartama opasnosti i rizika od geohazarda i poplavnih tokova.

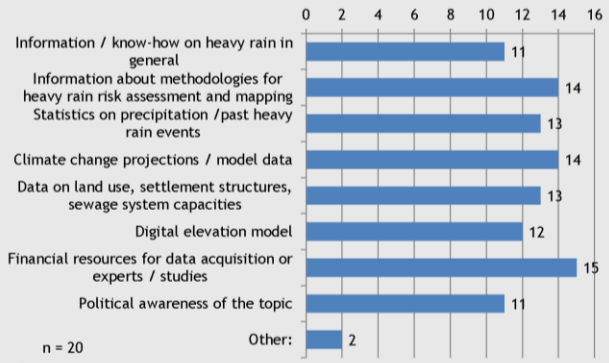
C14. If your institution has not conducted any heavy rain risk assessment (yet) - Why not? (multiple answers possible)



Other

- nismo neposredno zaduženi za takav tip aktivnosti
- Neznam
- nisam upoznata

C15. In your personal opinion, what would you need for a heavy rain risk asessment or mapping? (multiple answers possible)

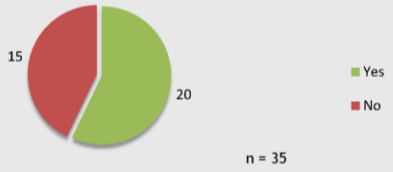


Other

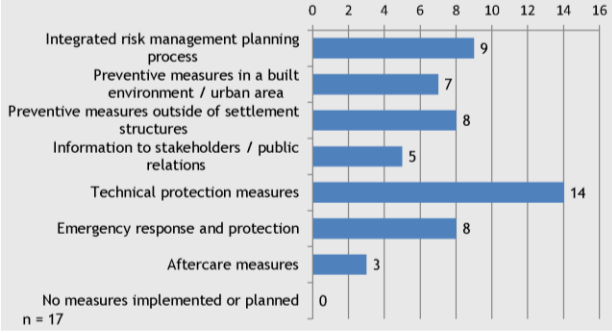
- Detaljnije praćanje oborina radarima i uz niz novih obrografskih stanica na širem području Zagreba. Samo 3 ombrografa je premalo za Grad Zagreb.
- Od svega pomalo prethodno navedeno

D: MEASURES TO MITIGATE HEAVY RAIN RISKS

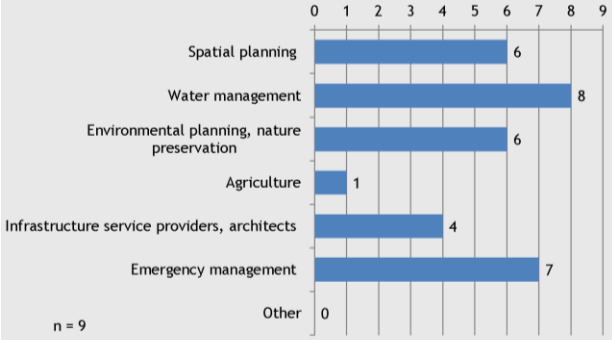
D01. Has your institution planned or implemented measures which can prevent or reduce damages of heavy rain events?



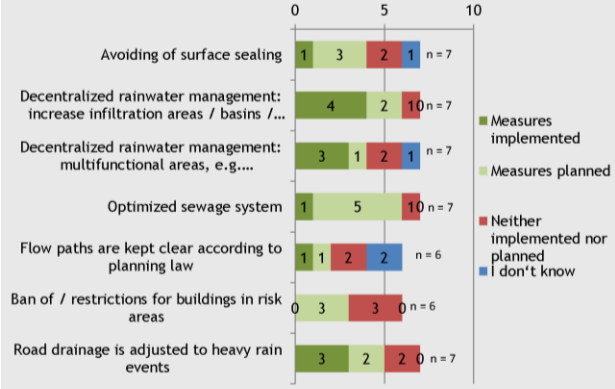
D02. Which measures to reduce heavy rain risks has your institution planned or implemented? (multiple answers possible)



D03. Which of the following stakeholders are included in the integrated risk management planning process in your institution? (multiple answers possible)



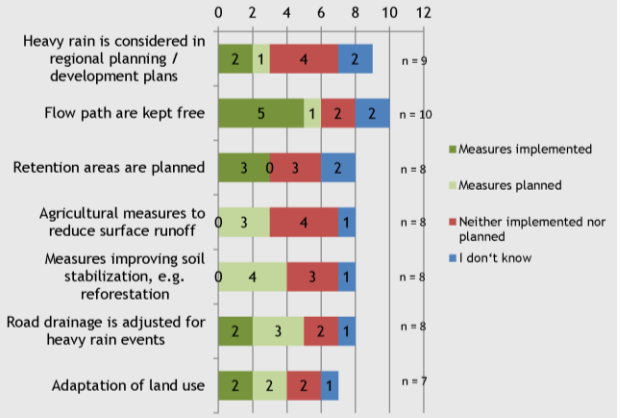
D04. Please specify implemented or planned preventive measures in a built environment / urban area!



D05. Which other preventive measures in a built environment / urban area has your institution planned or implemented?

- izgradnja retencija za regulaciju vršnih oborinskih otjecanja. stimulacija iniltracije oborinskih voda što bliže mjestu njihova formiranja
- Izgradnja većih retencija za prihvat većih vodnih valova. Te upoznavanje javnosti sa posljedicama poplava ako se ne izgrade te retencije jer je stanovništvo u čijoj se bilzini planiraju izgraditi te retencije, akumulacije, pregradni objekti dr. uvijek protiv. Ako se i desi kakva poplava na ljeto se sve zaboravi
- water sensitive urban design alati

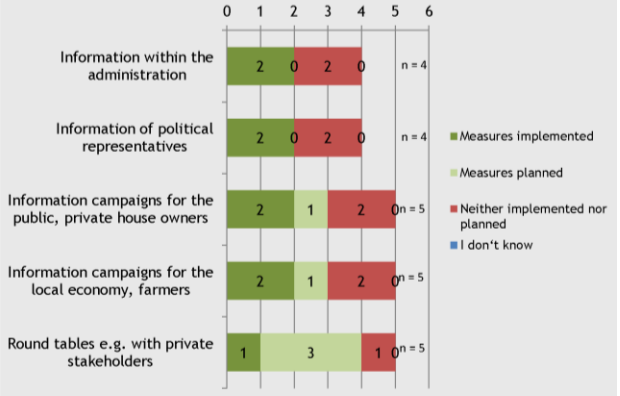
D06. Please specify implemented or planned preventive measures outside of settlement structures!



D07. Which other preventive measures outside of settlement structures has your institution planned or implemented

- gradnja višenamjeskih sustava za prihvat oborinskih voda i njihovo korištenje u poljoprivredi, veći stupanj infiltracije oborinskih voda što bliže mjestu njihova formiranja,
- veća aganžiranost na reguliranje bujica, vodnih tokova, zaštita od erozija (izrada karata erozija i klizišta), sagledavanje cijelog slivnog područja i određivanje potreba i prioriteta na tom području te prilikom izvođenja raditi veće dionice, definirati pravilnikom ili propisom povratne periode za dimenzioniranje vodotokova

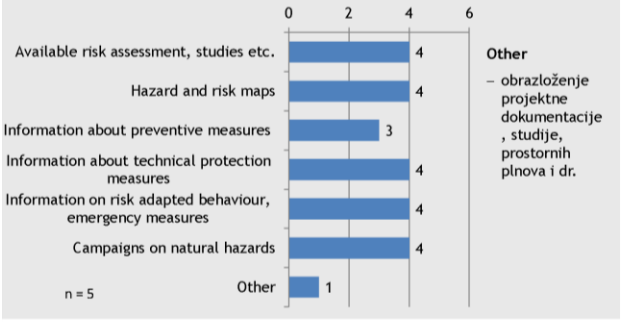
D08. Please specify implemented or planned activities regarding public relations / raising awarenes of stakeholders and public!



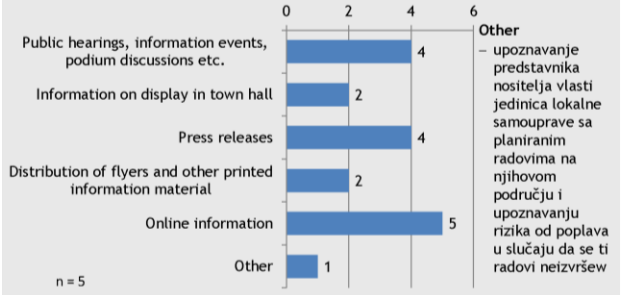
D09. Other activities regarding publicity, raising awareness of stakeholders and public:

- Upoznavanje javnosti putem medija, predvanjima, okruglim stolovima o provedenim radovima na obrani od poplva na tom slivnom području, Te planiranim budućim aktivnostima na obrani od poplavi.

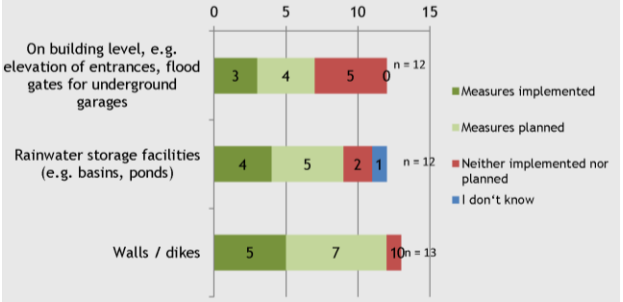
D10. Which information was or will be provided? (multiple answers possible)



D11. How was the information provided? (multiple answers possible)



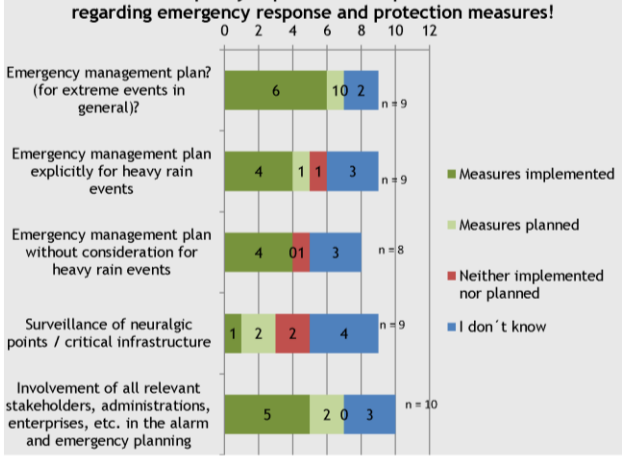
D12. Please specify implemented or planned technical protection measures!



D13. Which other technical protection measures has your institution planned or implemented?

- stožeri CZ, odluke i donošenje mjera
- retencioni prostori, lateralni kanali
- Bavimo se utjecajem na objekte visokogradnje, posobno velikih krovnih površina
- izgradnja retencija, akumulacija, oteretnih kanala, regulacije,

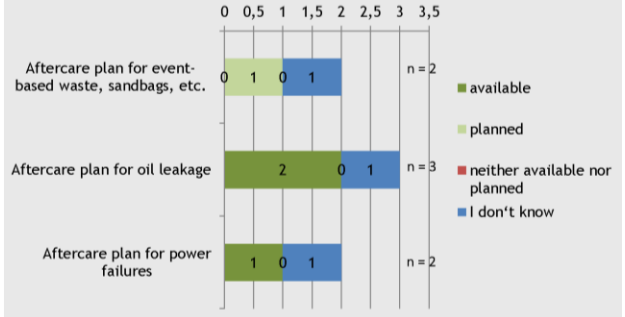
D14. Please specify implemented or planned activities regarding emergency response and protection measures!



D15. Which other activities regarding emergency response and protection measures has your institution planned or implemented?

- stožeri CZ, odluke i donošenje mjera

D16. Are you prepared for aftercare in your institution or region?

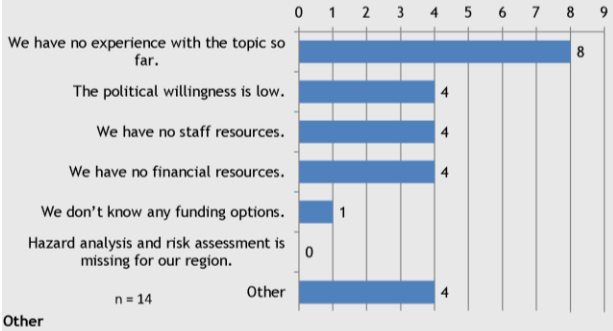


D17. Which other aftercare measures has your institution or your region planned or implemented?

- spremnost za prijem značajnijeg dijela tereta onečišćenja u oborinskim vodama

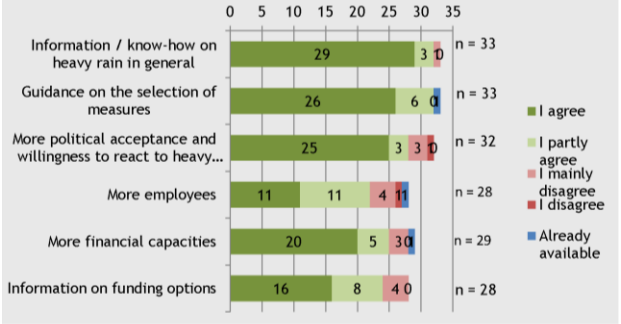
D18. Please assess the categories of activities according to your personal and professional opinion! Which measures do you personally think are the most effective ones?

D19. If your institution or region has not implemented any measures (yet), why not? (multiple answers possible)



Other
- Ne bavimo se provedbom mjera.
- Ne znam točan odgovor na ovo pitanje.
- Nemam informacija o tome
- Nisam upoznata

D20. In your personal opinion, what would help your institution to implement (further) measures to reduce heavy rain risks?

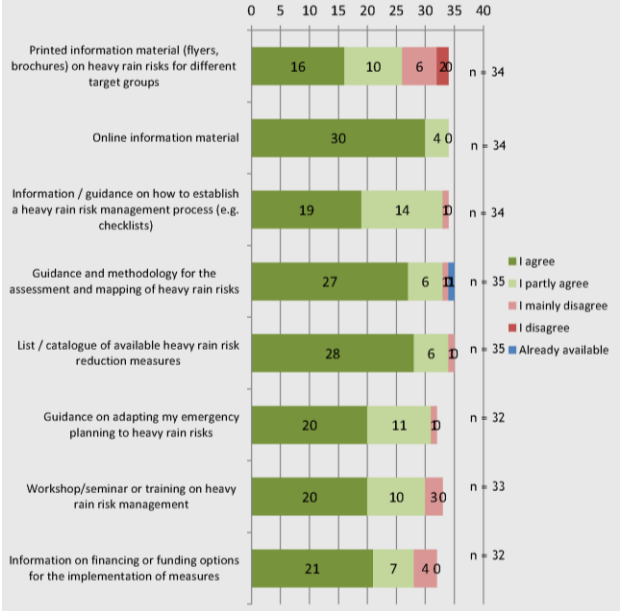


D21. What else would help you to implement (further) measures to reduce heavy rain risks?

- Javno dostupni podaci, oborine, vodostaji, na zanimljiv način za većinu populacije
- u našem je slučaju pojava oluja sa oborinama, posljedice vjetroizvale, klizišta, ponekad i plavljenje
- Podatke moramo kupovati od DHMZ?????, u Evropi su podaci dostupni besplatno!!
- Povezanost sa nacionalnim institucijama koje se bave navedenim pitanjem

E: DEMANDS, WISHES

E01. Which kind of support and materials would you personally want / need for your institution or region? (multiple answers possible)



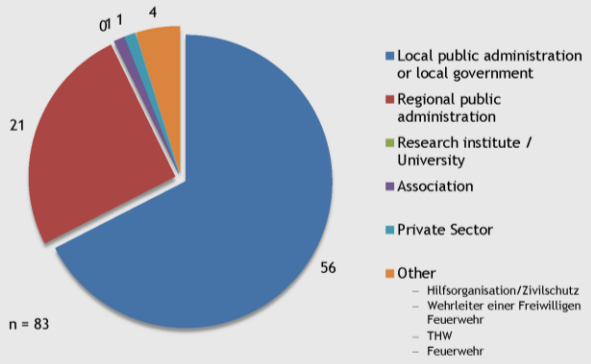
E02. Other support and additional materials you personally want or need:

- Dostupne informacije o oborinama, tlu, vodostajima i protocima, topografiji, klimi, bez dodatnog plaćanja
- Školovanje, uska specijalizacija , ne svaštarenje (obavljanje više vrsta poslova) , praćenje svijetskih trendova i noviteta u tom području te razmatranje mogućnosti njihove primjene u našim uvjetima
- problematiku postaviti na nacionalnu razinu, u strateške dokumente različitih sektora

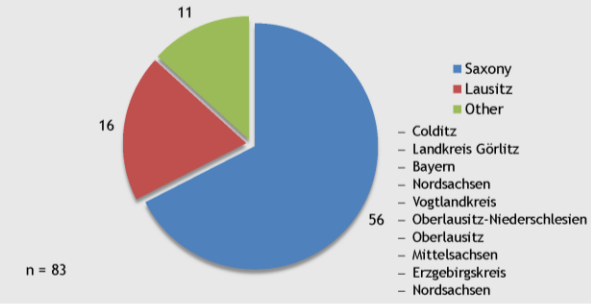
7.4. Survey results in Germany

PI: PERSONAL INFORMATION

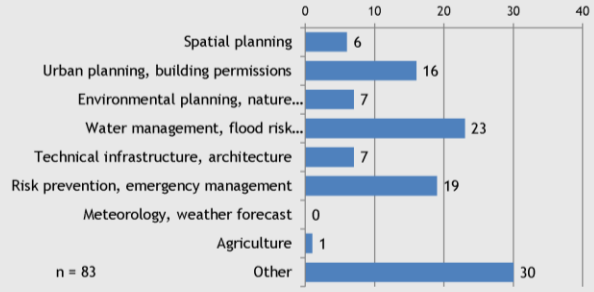
PI01. Which type of institution are you working for?



PI03. Region



PI05. Which area of expertise are you working in? (multiple answers possible)

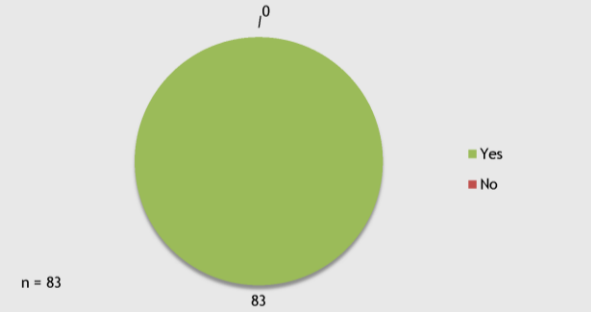


Other

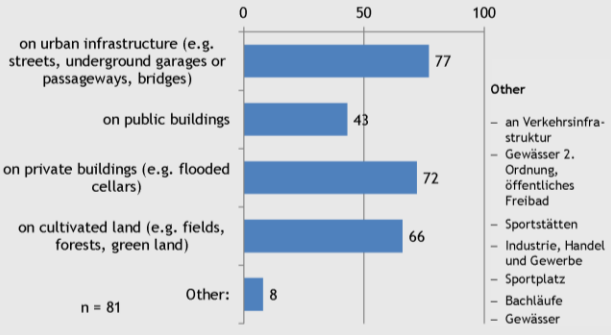
- Einsatzplanung/Einsatzleitung/Fachberatung
- Brand- und Katastrophenschutz
- Feuerwehr
- Abwehrender Brand- und Katastrophenschutz
- Feuerwehr
- Stadtverwaltung
- Bürgermeister
- Ordnungsamt
- Bürgermeister
- Gemeindeverwaltung
- Gemeindeverwaltung
- Verwaltung Sachgebiet Tiefbau, Gewässer
- Hauptamt
- Bauamt
- BM
- Kommunalverwaltung
- Bauamt
- Verwaltung/Bürgermeister
- Ordnungsamt / Feuerwehr
- Bauverwaltung
- Kommunalverwaltung
- Bauamt
- Gewässerschutz
- Wasserversorgung-/Abwasserbeseitigung
- Brandschutz, Rettungsdienst, Katastrophenschutz
- Bau- und Ordnungswesen
- Kommunale Bauverwaltung
- Verwaltung

A: EXPERIENCES WITH HEAVY RAIN

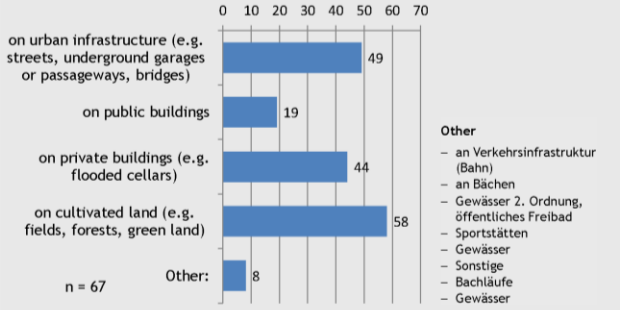
A01. Did heavy rain events occur in your region?



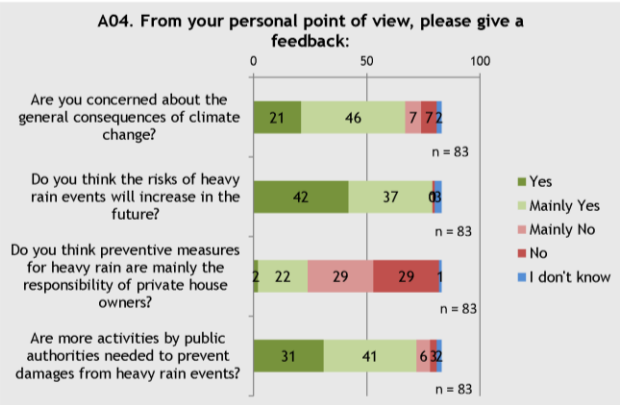
A02. Which consequences of heavy rain events have you experienced? Damages caused by flooding... (multiple answers possible)



A03. Which consequences of heavy rain events have you experienced? Damages caused by mass movement (e.g. lanslides, rockfall)... (multiple answers possible)

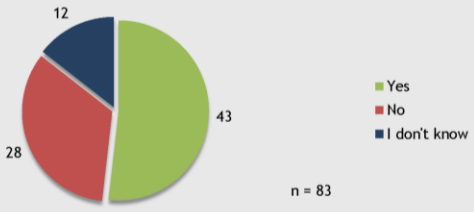


A04. From your personal point of view, please give a feedback:

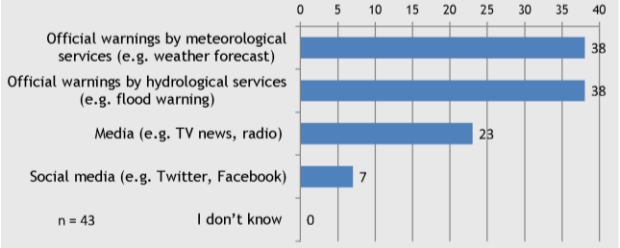


B: PRACTICAL USE OF EARLY WARNING SYSTEMS

B01. Do you know an early warning system for extreme events like heavy rain?



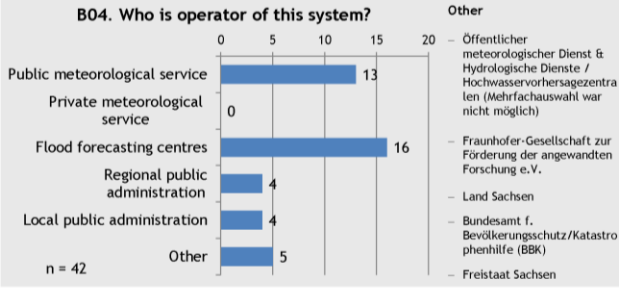
B02. How does information about an upcoming heavy rain event reach you?



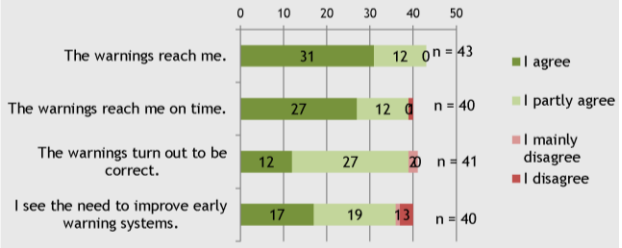
B03. What is the name of the early warning system?

- Hochwasserwarnung des Landeshochwasserzentums
- Hochwasserfrühwarnung
- Unwettervorhersagen des DWD
- DWD Warnwetter
- HWIMS
- Warnwetter
- WarnWetter - App des DWD
- BIWAPP
- FeWiS
- Nina, HWIMS
- Hochwasserfrühwarnsystem Sachsen
- HWIMS - Hochwasserinformations- und Managementsystem
- Hochwasserfrühwarnsystem LfULG
- DWD Unwetterwarnungen, HND Bayern
- Hochwasserfrühwarnung
- PowerAlarm
- biwapp
- KATWARN
- BIWAPP, NINA
- DWD
- Hochwassernachrichtendienst Sachsen
- Hochwasserfrühwarnsystem des SMUL
- Landeshochwasserzentrum Sachsen
- Bereitschaftsdienst Hochwasser
- HWIMS
- DWD, Mobikat
- BIWAPP
- NINA
- Unwetterwarnung
- DWD

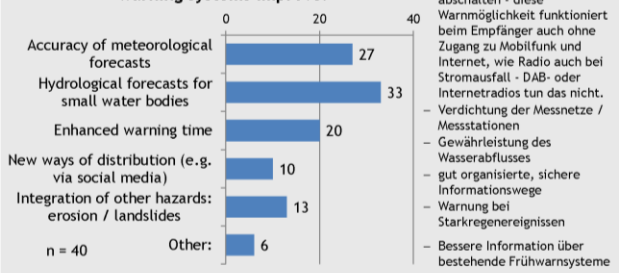
B04. Who is operator of this system?



B05. From your personal point of view, please give a feedback:

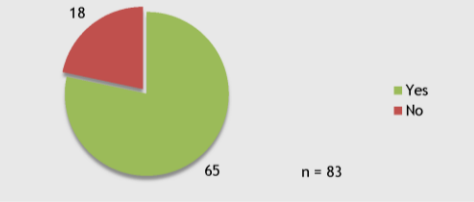


B06. In your region and from your professional point of view: How can early warning systems improve?

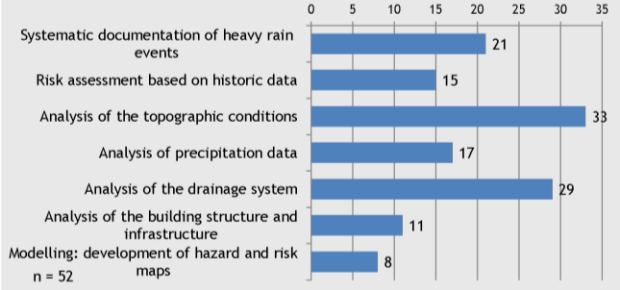


C: ASSESSMENT AND MAPPING OF HEAVY RAIN RISKS

C01. Has your institution dealt with heavy rain risks?

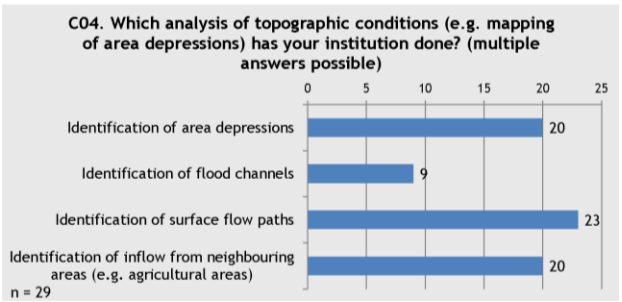


C02. With the help of which analysis does your institution assess heavy rain risks? (multiple answers possible)



C03. Which historic data for risk assessment has your institution analysed? (multiple answers possible)

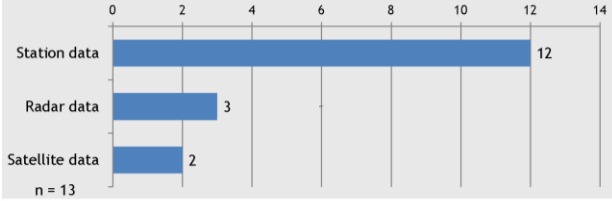
C04. Which analysis of topographic conditions (e.g. mapping of area depressions) has your institution done? (multiple answers possible)



C05. Please name other analyses of topographic conditions implemented by your institution:

- Vor-Ort-Begehung im Rahmen der Ausbildung der Zivilschutzhelfer
- nWAP
- Sichtung vorhandener digitaler Kartenbestände zu erosionsgefährdeten Hanglagen (zB. Regionalplan: Klasse "Gebiet mit potenziell großer Erosionsgefährdung durch Wasser");
- Entstellen im Gewässerquerschnitt durch z. B. Bauwerke wie Ufermauern, Brücken, Bebauung
- Befliegung und Auswertung nach Befestigung
- Vermessung

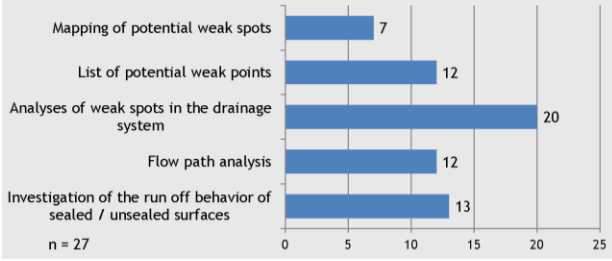
C06. Which source of information did you use to analyse precipitation data (e.g. extreme value statistics)? (multiple answers possible)



C07. Which data sets / model did you use?

- DGM2, Hydro AS

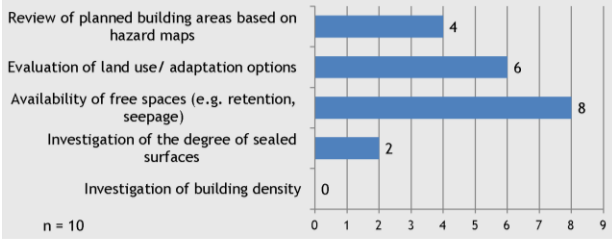
C08. Which analysis of the drainage system (weak spots) has your institution done? (multiple answers possible)



C09. Please name other analyses of the drainage system implemented by your institution:

- Analyse der Pflegemaßnahmen mit Anpassungen an herrschende Bedingungen
- Hydraulische Berechnung Kanalnetz
- hydrodynamische Berechnungen
- Gewässerschauen

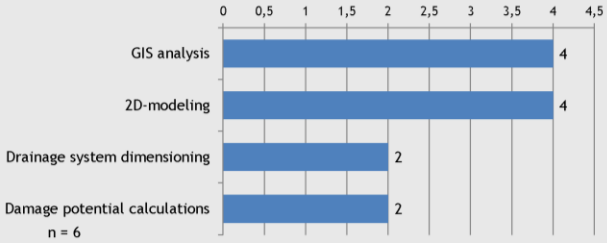
C10. Which analysis of the building structure and infrastructure has your institution done? (multiple answers possible)



C11. Please name other analyse of the building structure and infrastructure implemented by your institution:

- Anpassung Flächennutzungsplanung, Prüfung Bebauungspläne auf Anpassungsbedarf

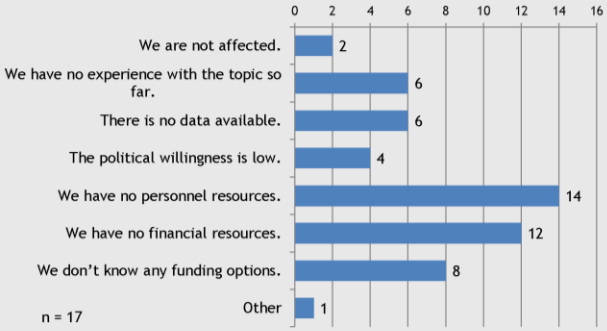
C12. Which modeling has your institution done to develop hazard and risk maps? (multiple answers possible)



C13. Please name other analyses to develop hazard and risk maps implemented by your institution:

- Anwendung vorhandener Daten des LfULG für raumplanerische Festlegungen
- Modellierungen in bzw. mit Ingenieurbüros, teilweise 3D
- Derzeit läuft Forschungsvorhabe (HiOS). Eines der Ziele ist die Entwicklung, Erprobung und Optimierung von Verfahren zur Ermittlung von Gefährdungen durch Oberflächenabfluss und Sturzfluten infolge von Starkregen. Dabei werden unterschiedliche Detailierungsstufen untersucht. Von einer bayernweiten Hinweiskarte (GIS basierter Ansatz) bis zu detaillierten gekoppelten hydrologisch-hydrodynamischen Simulationen mit verschiedenen Modellen.
- 1D-Modellierung, Regionalisierungsmodell für Einheitsganglinien nach Lutz (1984)

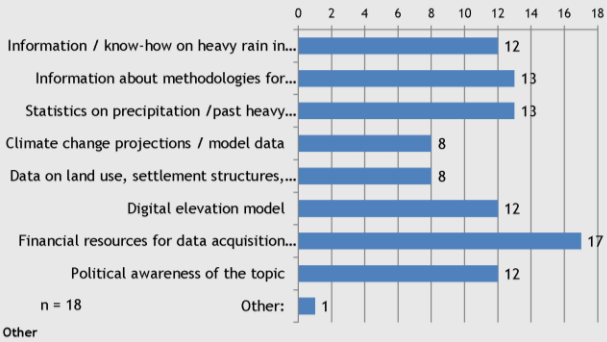
C14. If your institution has not conducted any heavy rain risk assessment (yet) - Why not? (multiple answers possible)



Other

- Frage der Zuständigkeit

C15. In your personal opinion, what would you need for a heavy rain risk asessment or mapping? (multiple answers possible)

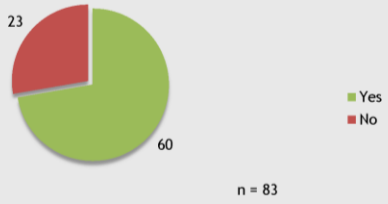


Other

- Grundlage/Auftrag

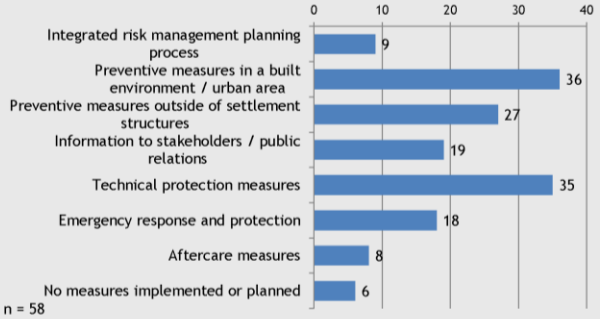
D: MEASURES TO MITIGATE HEAVY RAIN RISKS

D01. Has your institution planned or implemented measures which can prevent or reduce damages of heavy rain events?



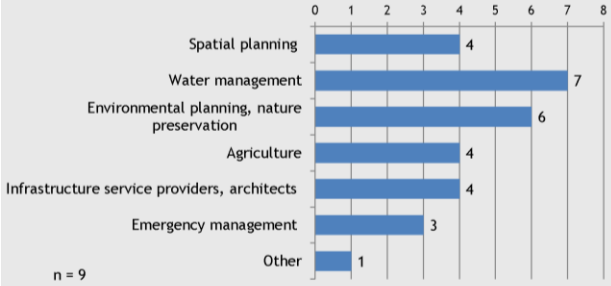
n = 83

D02. Which measures to reduce heavy rain risks has your institution planned or implemented? (multiple answers possible)



n = 58

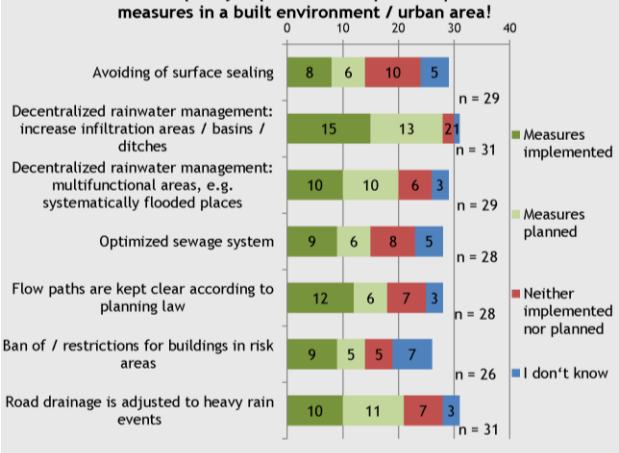
D03. Which of the following stakeholders are included in the integrated risk management planning process in your institution? (multiple answers possible)



n = 9

Other
- Der Freistaat Bayern fördert derzeit im Rahmen eines Sonderförderprogramms die Erarbeitung integralen Konzepten zum kommunalen Sturzflut-Risikomanagement. Empfänger der Fördermittel sind bayerische Kommunen, die ihm Rahmen der Konzepterstellung auch Dialoge mit betroffenen Akteuren im Risikomanagementprozess anstoßen sollen.

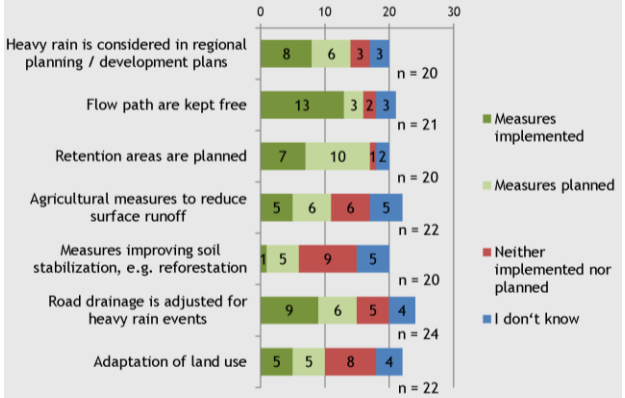
D04. Please specify implemented or planned preventive measures in a built environment / urban area!



D05. Which other preventive measures in a built environment / urban area has your institution planned or implemented?

- Optimierung der operativen Gefahrenabwehr und Nachsorge
- Hochwasserschutzkonzept
- Notwasserweg
- Freimachen der ableitenden Fließgewässer
- Anpassung von Straßenentwässerung
- Abbruch von Ufermauern / Anlegung bon Böschungen
- Erstellung HWSK für den Ortsteil Krebs
- Entgradigung von Bachläufen außerorts, Öffnung von Kanalen zu Gräben, Regenrückhaltebecken gebaut
- Versickerung von Niederschlagswasser aus privaten Grundstücken und neuen Erschließungsgebieten am Ort des Anfalls
- Herstellung von Stauraumgräben

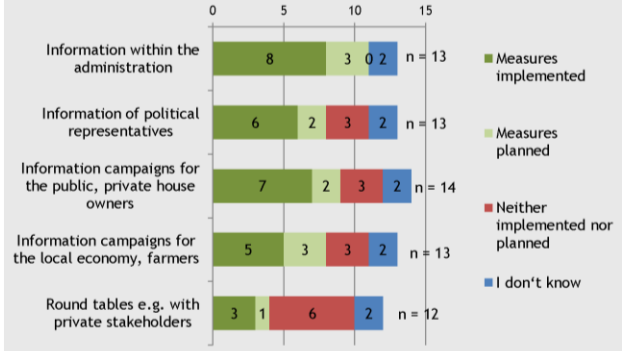
D06. Please specify implemented or planned preventive measures outside of settlement structures!



D07. Which other preventive measures outside of settlement structures has your institution planned or implemented

- Abstimmungsprozesse mit übergeordneten Behörden (bisher ohne Erfolg)

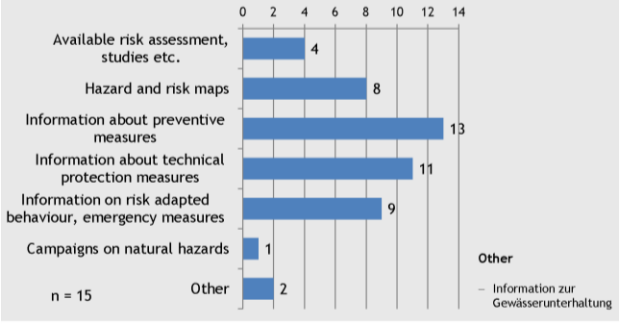
D08. Please specify implemented or planned activities regarding public relations / raising awarenes of stakeholders and public!



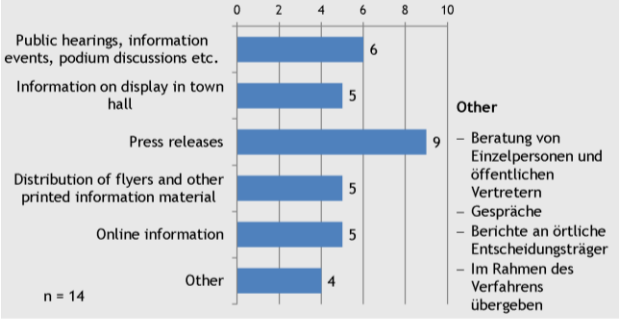
D09. Other activities regarding publicity, raising awareness of stakeholders and public:

- Einführung Wasserwehr
- Beteiligung im Verwaltungsverfahren
- anlassbezogene Bürgeranschreiben
- Beratung durch Bauamtsmitarbeiter, insbesondere zu präventivem Hochwasserschutz; Informationsveranstaltungen (insbesondere für Gewässerranlieger) durch unabhängige Verbände, laufende Schulung Mitarbeiter Bauamt/Bauhof

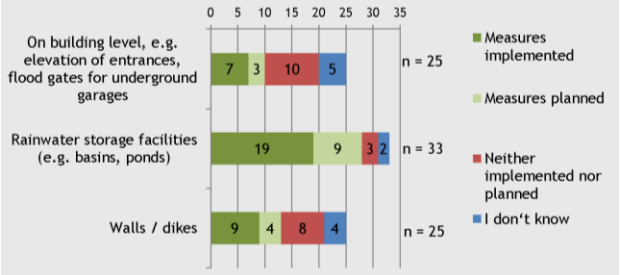
D10. Which information was or will be provided? (multiple answers possible)



D11. How was the information provided? (multiple answers possible)



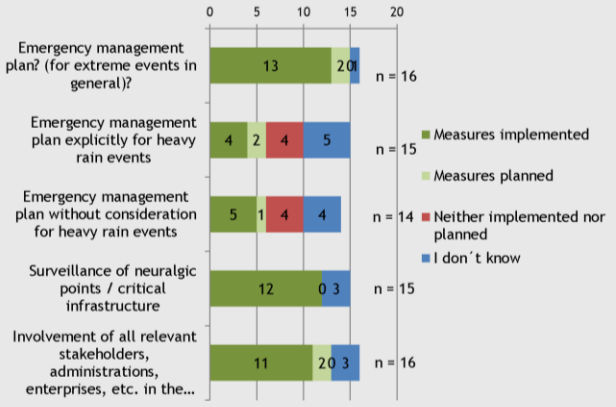
D12. Please specify implemented or planned technical protection measures!



D13. Which other technical protection measures has your institution planned or implemented?

- Rückgewinnung natürlicher Überflutungsflächen
- Wiederherstellung von Abfanggräben
- Anpassung von Infrastruktur (z. B. überflutbare Straßen)
- Ausrüstung der Wasserwehr
- Abriss von Gebäuden in Ufernähe
- technische Maßnahmen auf baulicher Ebene an Gebäuden und Infrastruktur
- Renaturierung von Bächen
- Optimierung des Abwassernetzes
- Vergrößerung von Kanälen, Durchlässen, Bachläufen und Gräben sowie Herstellung von Stauraumgräben

D14. Please specify implemented or planned activities regarding emergency response and protection measures!



D15. Which other activities regarding emergency response and protection measures has your institution planned or implemented?

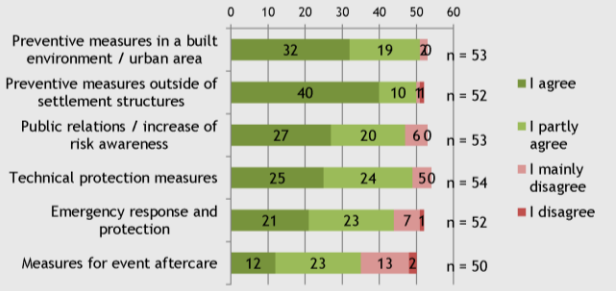
- Einholen von Wetterinformationen --> ggf. Frühwarnung
- Vorhaltung von Bekämpfungsmitteln bei Schadenseintritt
- Hochwassereinsatzplan der FFW in Niederau und Ortsteile

D16. Are you prepared for aftercare in your institution or region?

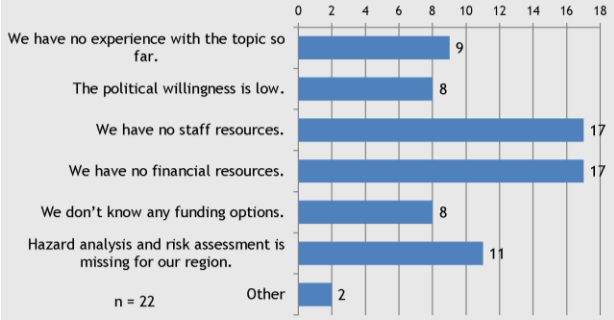
D17. Which other aftercare measures has your institution or your region planned or implemented?

- Optimierung der Aufräumarbeiten (z.B. Auspumpen von Kellern in Eigenregie der Betroffenen)

D18. Please assess the categories of activities according to your personal and professional opinion! Which measures do you personally think are the most effective ones?



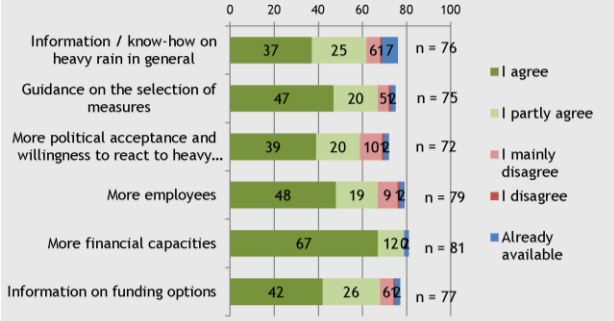
D19. If your institution or region has not implemented any measures (yet), why not? (multiple answers possible)



Other

- keine Umsetzungsbefugnis für Maßnahmen

D20. In your personal opinion, what would help your institution to implement (further) measures to reduce heavy rain risks?

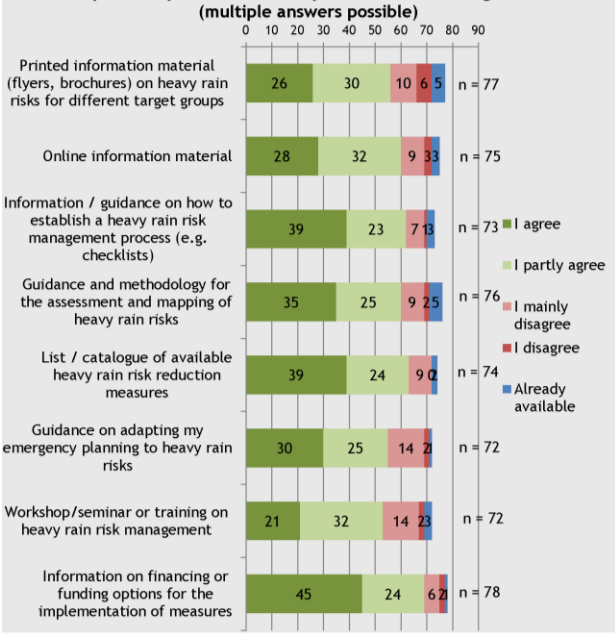


D21. What else would help you to implement (further) measures to reduce heavy rain risks?

- es geht nicht nur um das Reagieren, sondern vielmehr um das vorbeugende Anpassen
- Rechtliche Mittel für Flächenverfügbarkeit
- mehr Anreize für das ehrenamtliche Engagement schaffen
- Landesweite Erfassung und Ausweisung von Überschwemmungsgebieten auch von Gewässern 2. Ordnung
- Aufweichung von Naturschutzvorschriften zur Umsetzung von Hochwasserschutznmaßnahmen
- stärkere Berücksichtigung des Verursacherprinzips bei Landnutzungs- und Bewirtschaftungsformen, die wildabfließenden Oberflächenwasserabfluss signifikant begünstigen
- Verständnis der Flächeneigentümer/-nutzer bzw. besonders der landwirtschaftlichen Flächennutzer
- Verantwortung der Politik, bessere Abstimmung einzelner Förderprogramme
- Gefahrenkarten auf Grund Topographie und Bodenbeschaffenheit
- einheitliche Begriffsdefinitionen; Schließung gesetzlicher Regelungslücken (z.B. Nutzung von Verkehrsflächen zur Ableitung); mehr Akzeptanz und Berücksichtigung der Starkregen- und Hochwasserthematik bei Planern, Architekten, privaten Bauherren und in der Verwaltung (Kommunal, Träger von Infrastruktur wie z.B. Straßenbau); allgemein verbessertes Bewusstsein für Naturgefahren und Vernunft im Umgang von Natur aus vorhandenen Gefahren; Akzeptanz und Bereitschaft zur Übernahme von Eigenverantwortung
- Zusammenarbeit zwischen den Behörde
- Schwerpunkt liegt auf der Bodenerosion, hier könnte auf technische Maßnahmen verzichtet werden, wenn die Landwirtschaftliche Umnutzung (begrünte Abflussbahnen) politisch (seitens der Landwirtschaft) unterstützt würde
- Akzeptanz zwischen den Baulastträgern der Gwässer I. Ordnung und II. Ordnung
- Anpassung der Fördermittelpraxis an tatsächliche Gegebenheiten und vor allem Förderung des präventiven Hochwasserschutzes für Kommunen und Bevölkerung
- Schnellere Bearbeitung von Anträgen (wasserrechtl. Genehmigung, Entfall Planfeststellung etc.), Bearbeitung von Fördermittelanträgen (z.Z. 12 bis 24 Monate)
- Förderprogramme zur Errichtung von vorbeugenden Schutz bei Starkregen
- Aufklärungsmaterial für die Bevölkerung mit Darstellungen zu Eigenvorsorge

E: DEMANDS, WISHES

E01. Which kind of support and materials would you personally want / need for your institution or region? (multiple answers possible)



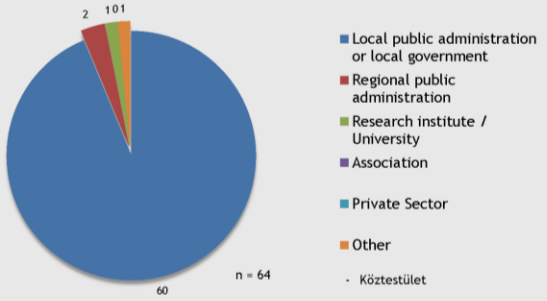
E02. Other support and additional materials you personally want or need:

- Kostenfrei Bereitstellung von digitalen Geländemodellen mit Simulationsmöglichkeiten für Starkregenereignisse.
- Sachsenweite onlinebasierte Ereignisdatenbank
- nicht nur gedrucktes Informationsmaterial! Videos, ansprechende Grafiken, interaktives und damit attraktives Informationsmaterial (Apps, Spiele, Material für Schulunterricht, Kinderbücher, etc.); Material, geeignet auch für Social Media Anwendungen zur Prävention aber auch im Ereignisfall (z.B. vorbereitete Tweets zu Verhaltensregeln, Gefahr des Ertrinkens im Keller oder bei Durchfahrt oder Durchwaten überfluteter Bereiche)
- allgemeine Öffentlichkeitsarbeit verbessern, "Spannende" Artikel in Tageszeitungen

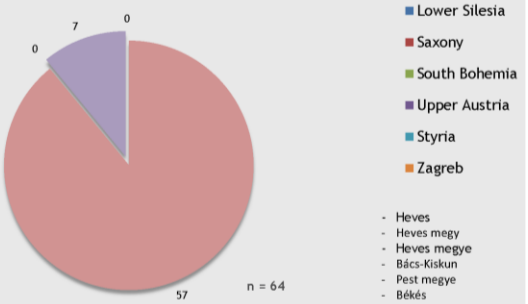
7.5. Survey results in Hungary

PI: PERSONAL INFORMATION

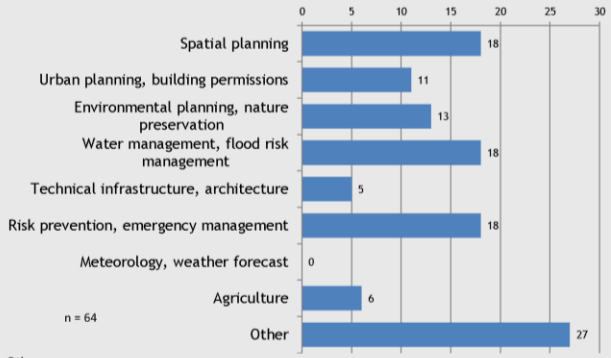
PI01. Which type of institution are you working for?



PI03. Region



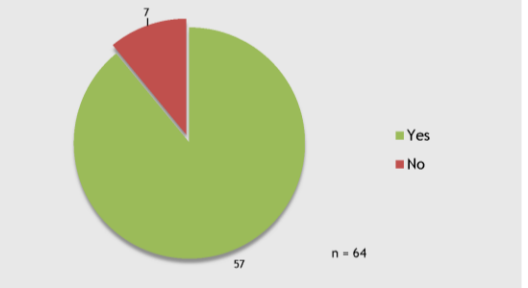
PI05. Which area of expertise are you working in? (multiple answers possible)



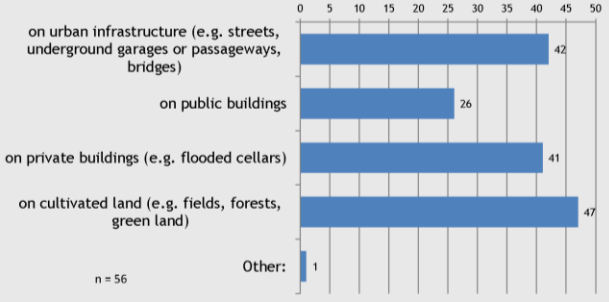
Other
- polgármester
- közigazgatás
- településüzemeltetés, -fejlesztés
- pályázatírás, projektmenedzsment
- Településüzemeltetés
- Önkormányzat
- Megyei szintű védelem
- Városüzemeltetés, beruházás
- államigazgatás
- műszaki
- hatósági

A: EXPERIENCES WITH HEAVY RAIN

A01. Did heavy rain events occur in your region?

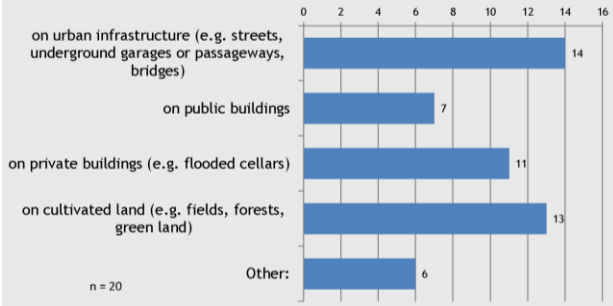


A02. Which consequences of heavy rain events have you experienced? Damages caused by flooding... (multiple answers possible)



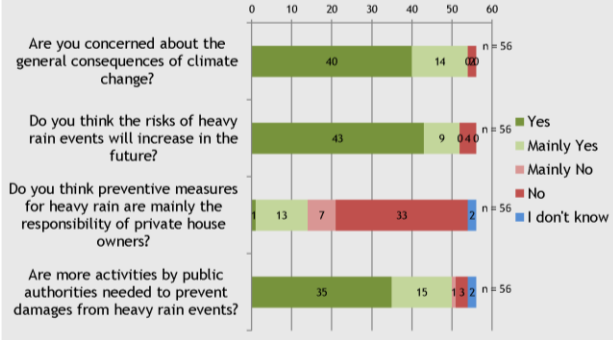
Other
- emberi élet, állati veszteség

A03. Which consequences of heavy rain events have you experienced? Damages caused by mass movement (e.g. lanslides, rockfall)... (multiple answers possible)



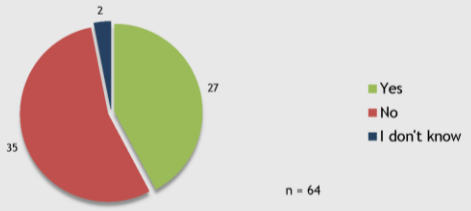
Other
- nincs tapasztalatom ilyen Mezőtúron, nincs, nem jellemző, nem volt ilyen

A04. From your personal point of view, please give a feedback:

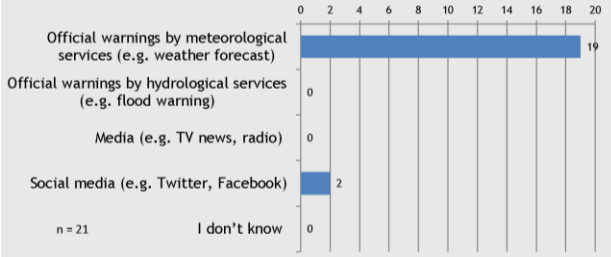


B: PRACTICAL USE OF EARLY WARNING SYSTEMS

B01. Do you know an early warning system for extreme events like heavy rain?



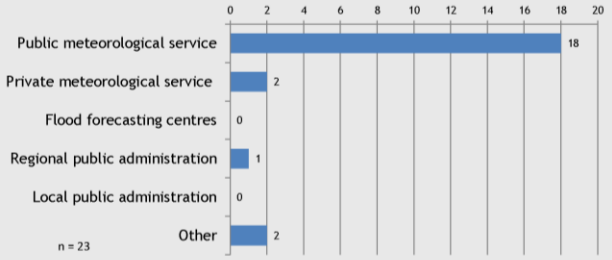
B02. How does information about an upcoming heavy rain event reach you?



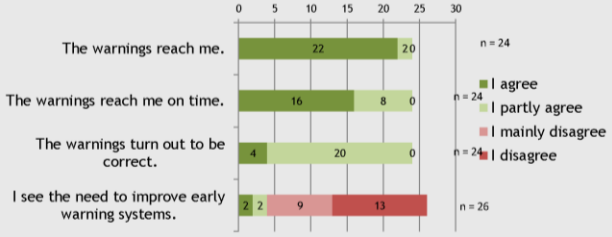
B03. What is the name of the early warning system?

- OMSZ radarkép
- ?...
- Időkép
- MTV Meteorológiai jelentés
- OMSZ veszélyjelzés
- OMSZ
- met.hu
- Időkép
- eumet, metnet.hu,
- Országos Meterológiai Szolgálat
- médiahírek
- Időjárásjelentés
- VÉSZ
- Katasztrófavédelmi igazgatóság, Helyi Védelmi Bizottság, Országos Meteorológiai Szolgálat

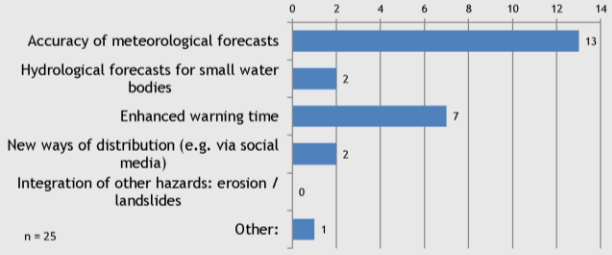
B04. Who is operator of this system?



B05. From your personal point of view, please give a feedback:



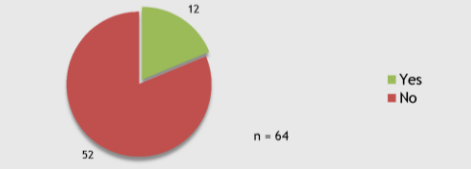
B06. In your region and from your professional point of view: How can early warning systems improve?



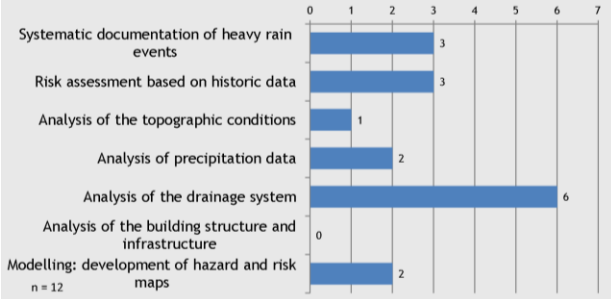
Other
- nem tartom szükségesnek

C: ASSESSMENT AND MAPPING OF HEAVY RAIN RISKS

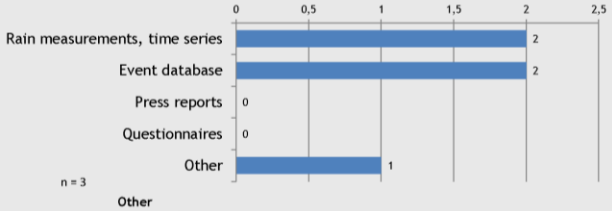
C01. Has your institution dealt with heavy rain risks?



C02. With the help of which analysis does your institution assess heavy rain risks? (multiple answers possible)

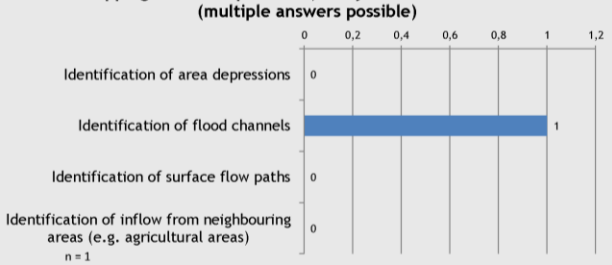


C03. Which historic data for risk assessment has your institution analysed? (multiple answers possible)



Other
- külön cég foglalkozik ezzel

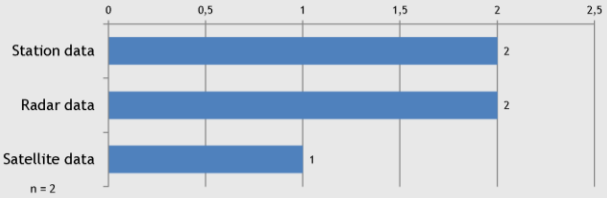
C04. Which analysis of topographic conditions (e.g. mapping of area depressions) has your institution done? (multiple answers possible)



C05. Please name other analyses of topographic conditions implemented by your institution:

-

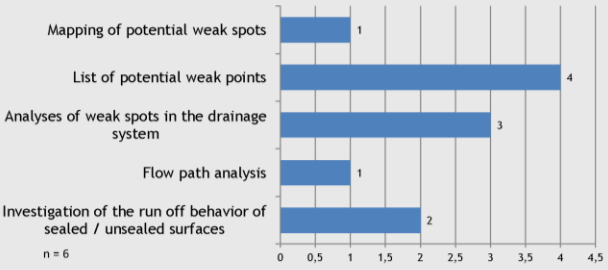
C06. Which source of information did you use to analyse precipitation data (e.g. extreme value statistics)? (multiple answers possible)



C07. Which data sets / model did you use?

- cspadékmérő állomásokm, radar

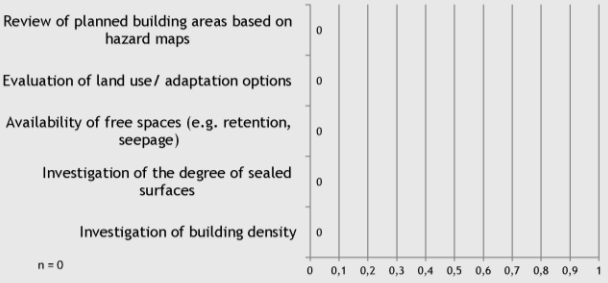
C08. Which analysis of the drainage system (weak spots) has your institution done? (multiple answers possible)



C09. Please name other analyses of the drainage system implemented by your institution:

- A csapadékvíz elvezető rendszer környezetének felmérése
- Karbantartottság rendszeres ellenőrzése.
- dugulások elhárítása, vékony átmérőjű átereszek cseréje

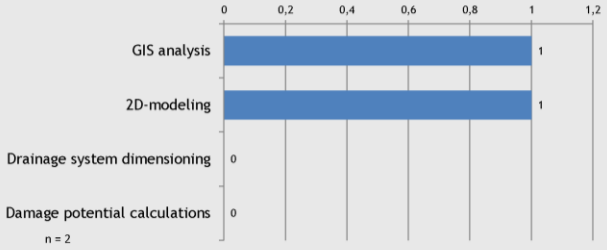
C10. Which analysis of the building structure and infrastructure has your institution done? (multiple answers possible)



C11. Please name other analyse of the building structure and infrastructure implemented by your institution:

-

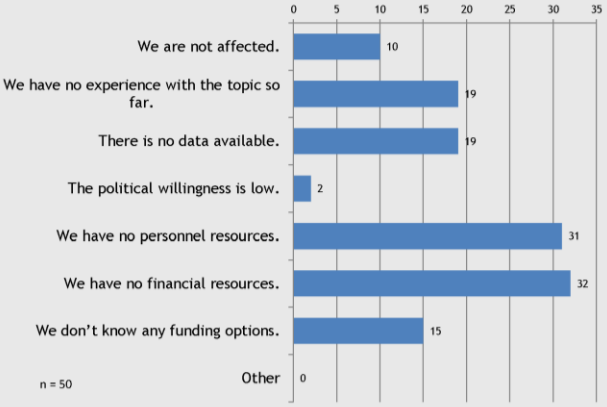
C12. Which modeling has your institution done to develop hazard and risk maps? (multiple answers possible)



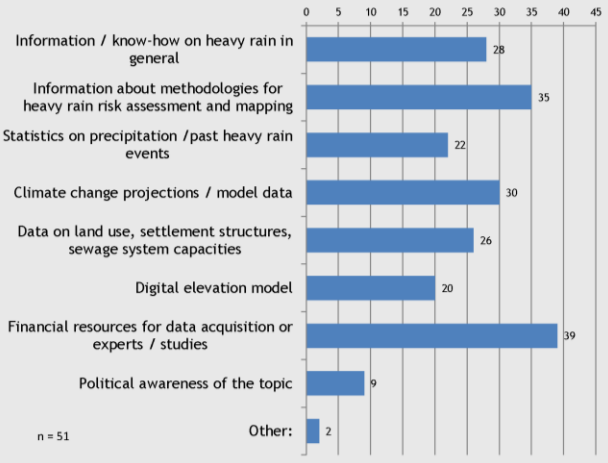
C13. Please name other analyses to develop hazard and risk maps implemented by your institution:

- ÁKK
- Belvíz-veszélyeztetettségi térképezés

C14. If your institution has not conducted any heavy rain risk assessment (yet) - Why not? (multiple answers possible)



C15. In your personal opinion, what would you need for a heavy rain risk asessment or mapping? (multiple answers possible)

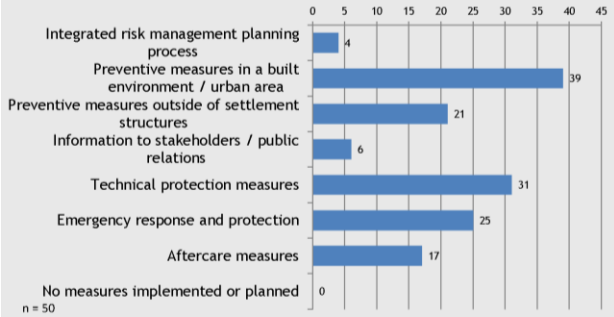


Other
- Pénz, pénz, ..csapadékvíz elvezető rendzser építésére úgy bel és külterületen egyaránt.
- nem releváns

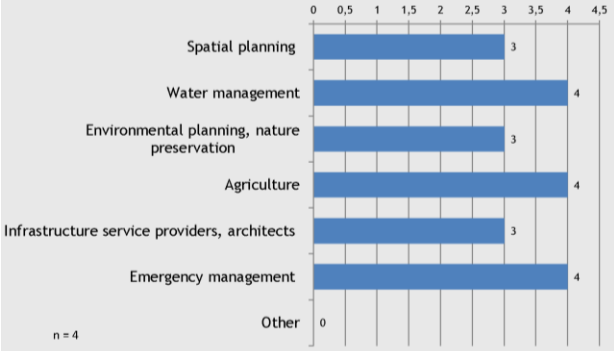
D: MEASURES TO MITIGATE HEAVY RAIN RISKS

D01. Has your institution planned or implemented measures which can prevent or reduce damages of heavy rain events?

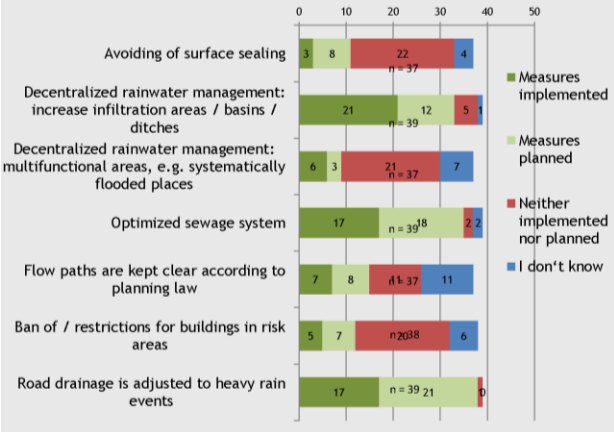
D02. Which measures to reduce heavy rain risks has your institution planned or implemented? (multiple answers possible)



D03. Which of the following stakeholders are included in the integrated risk management planning process in your institution? (multiple answers possible)



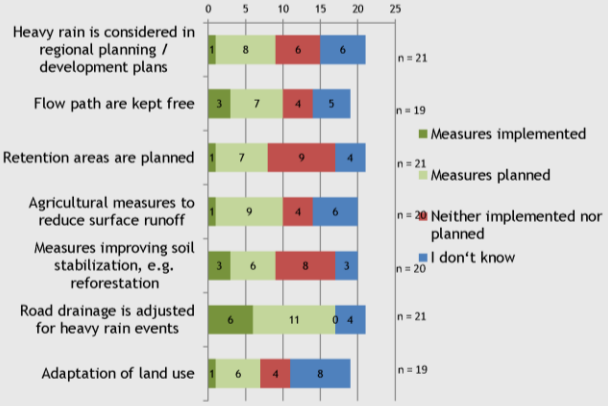
D04. Please specify implemented or planned preventive measures in a built environment / urban area!



D05. Which other preventive measures in a built environment / urban area has your institution planned or implemented?

- Az összes belterületi átemelő állomás várható csúcsidőszakra történő átalakítása, teljes felújítása. A rávezető fő gyűjtő csatornák teljes felújítása. A település 2/3-án a felszíni csapadékcsatorna (azutcák egy oldalán) történő teljes felújítása
- rendszeres zárt csatorna tisztítás
- árkok, átereszek rendben tartása
- Éves karbantartása a kiépített csatornahálózatnak.
- csapadékvíz elvezető árkok karbantartása
- területrész teljes vízelvezető rendszer átalakítása, felújítása pályázat alapján (tervezett)

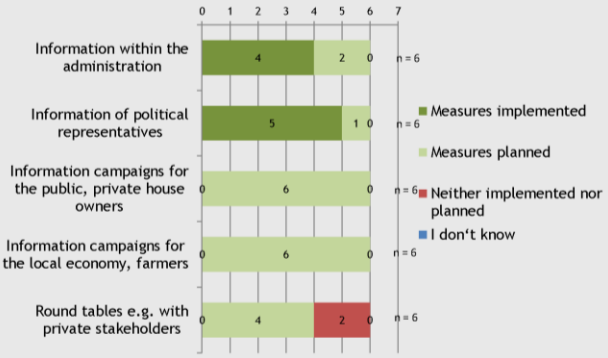
D06. Please specify implemented or planned preventive measures outside of settlement structures!



D07. Which other preventive measures outside of settlement structures has your institution planned or implemented

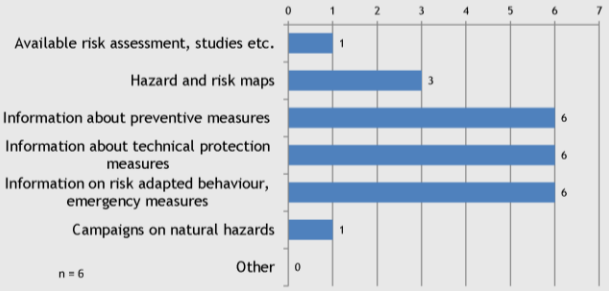
- megfelelő talajállapot, csatornák, műtárgyak karbantartása
- településről kivezető csatornák folyamatos kaszálása
- földutak karbantartása,
- talajok vízraktározó képességének növelése
- önkormányzati tulajdonban lévő belvízelvezető csatornák karbantartása

D08. Please specify implemented or planned activities regarding public relations / raising awarenes of stakeholders and public!

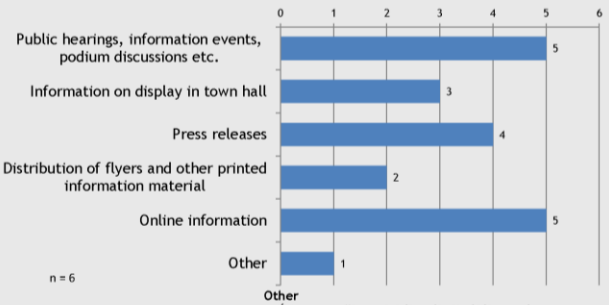


D09. Other activities regarding publicity, raising awareness of stakeholders and public:

D10. Which information was or will be provided? (multiple answers possible)

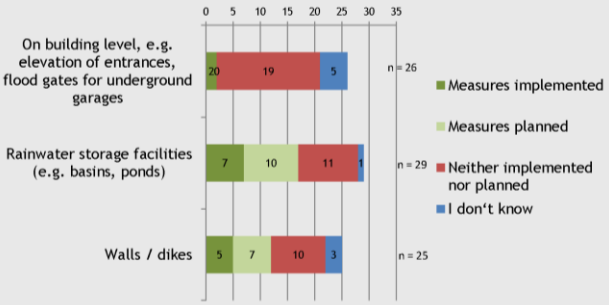


D11. How was the information provided? (multiple answers possible)



Other
- Érintett területen lakók szóbeli tájékoztatása.

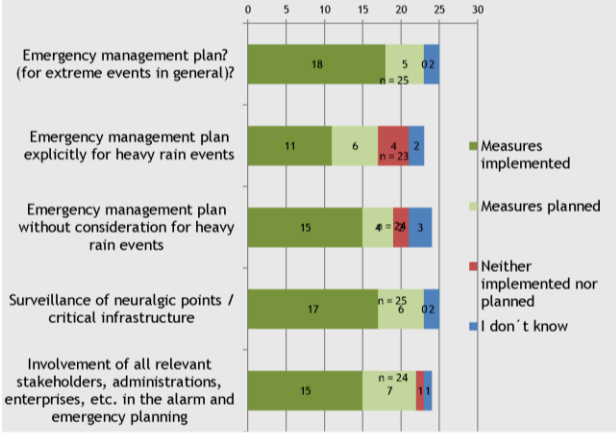
D12. Please specify implemented or planned technical protection measures!



D13. Which other technical protection measures has your institution planned or implemented?

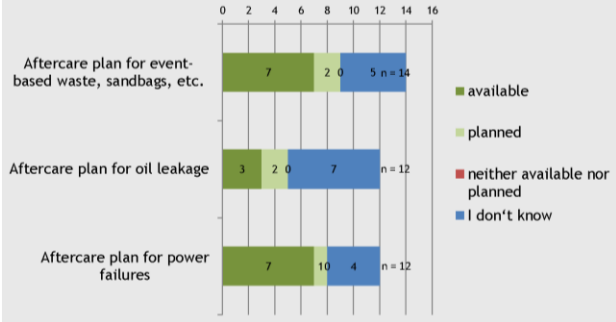
- Elkészült terv: Kenderes komplex belvízelvezető rendszer fejlesztés-kiviteli terv (I. ütem)
- Zárt csapadékvíz csatorna hálózat tervezése és későbbi fejlesztése
- Árok karbantartások
- Belvízelvezető árkok karbantartása
- szikkasztó árok, lefolyás biztosítása
- csapadékvíz elvezető csatorna létesítés, Településrendezési Terv szabályozza a beépítés feltételeit a belvizes területeken.

D14. Please specify implemented or planned activities regarding emergency response and protection measures!



D15. Which other activities regarding emergency response and protection measures has your institution planned or implemented?

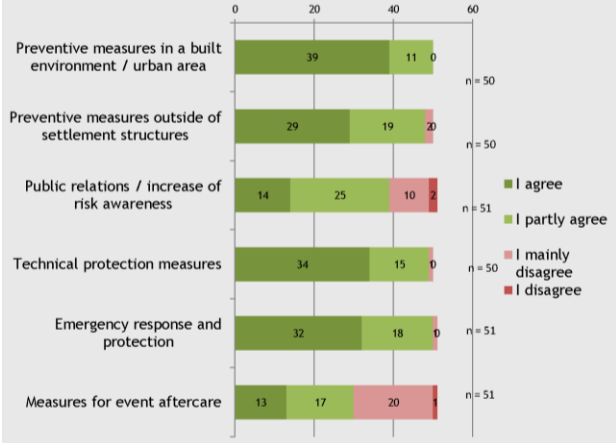
D16. Are you prepared for aftercare in your institution or region?



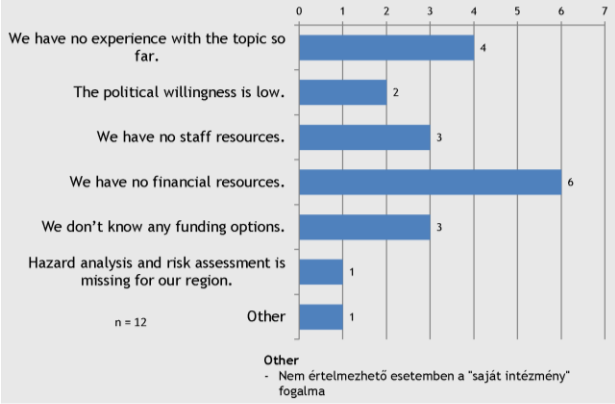
D17. Which other aftercare measures has your institution or your region planned or implemented?

- téves jelölés a "Nem tudom", útról a felhordott sár eltávolítás, kidölt fák eltakarítása

D18. Please assess the categories of activities according to your personal and professional opinion! Which measures do you personally think are the most effective ones?

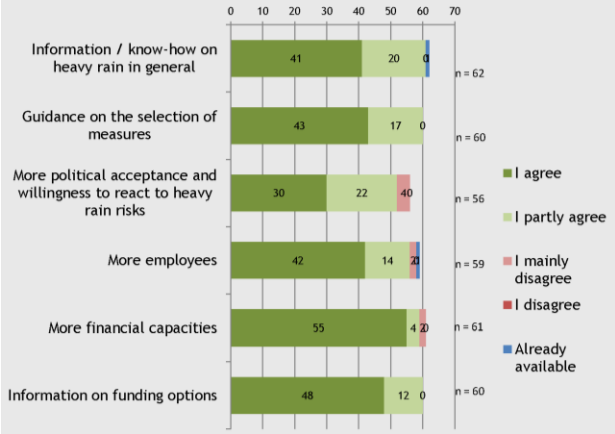


D19. If your institution or region has not implemented any measures (yet), why not? (multiple answers possible)



Other
- Nem értelmezhető esetemben a "saját intézmény" fogalma

D20. In your personal opinion, what would help your institution to implement (further) measures to reduce heavy rain risks?

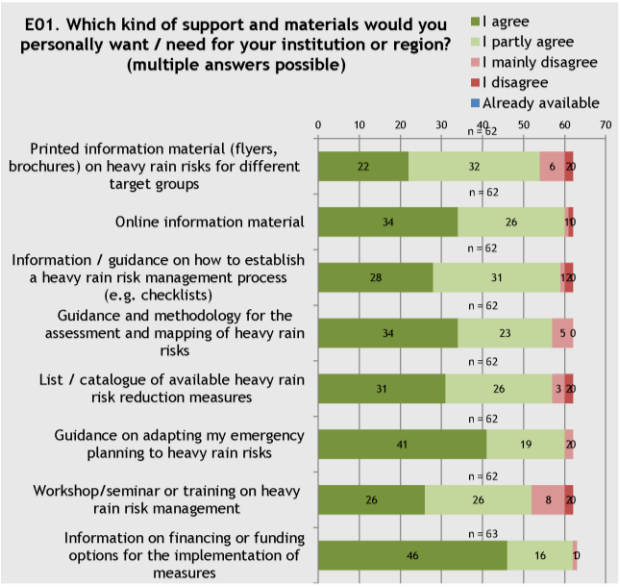


D21. What else would help you to implement (further) measures to reduce heavy rain risks?

- települések együttműködése
- Nem csak irodából tervezni a csapadékvíz elvezető rendszereket. Sok terepmunka és helyi információ begyűjtése alapján készüljön a terv.

E: DEMANDS, WISHES

E01. Which kind of support and materials would you personally want / need for your institution or region? (multiple answers possible)

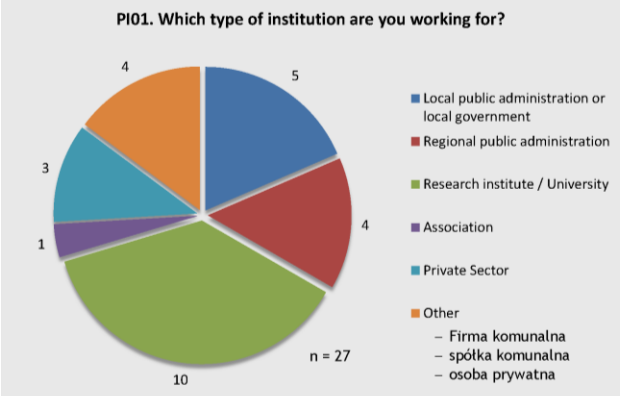


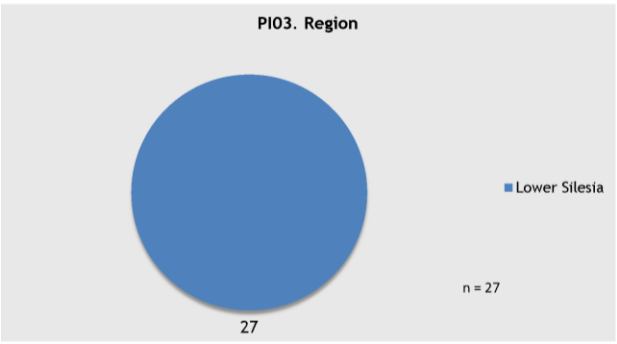
E02. Other support and additional materials you personally want or need:

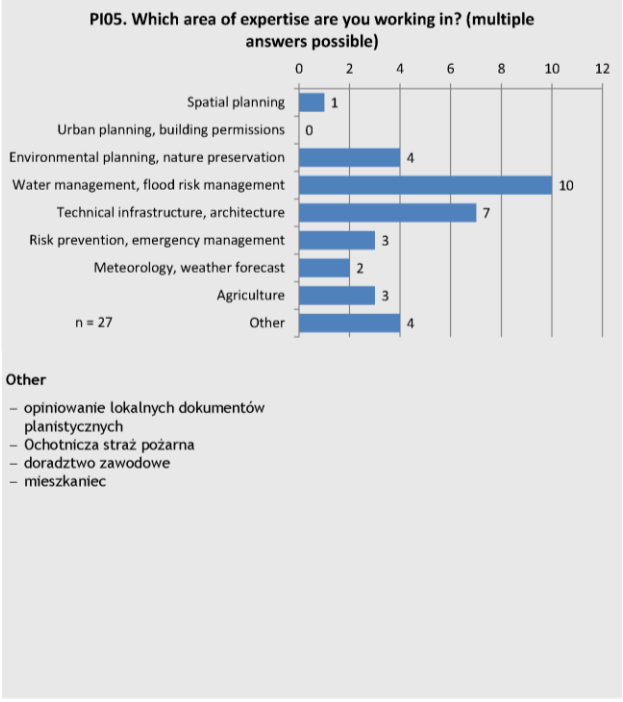
- A belvízelvezető rendszerek karbantartásához, felújításához mind kül- és belterületen nagy, vagy sok szakmai és anyagi támogatásra lenne szükség.

7.6. Survey results in Poland

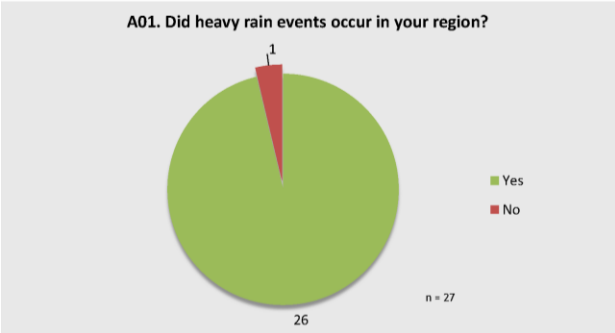
PI: PERSONAL INFORMATION

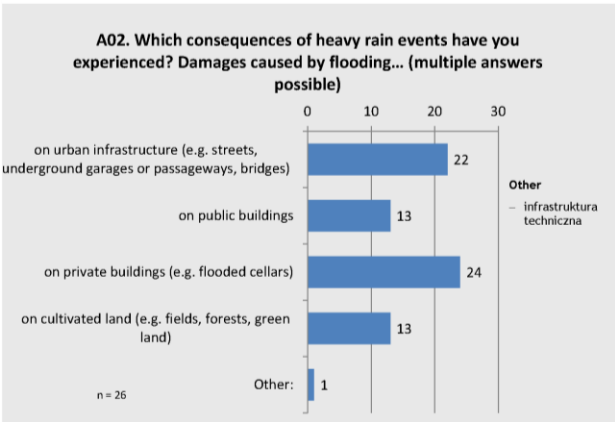


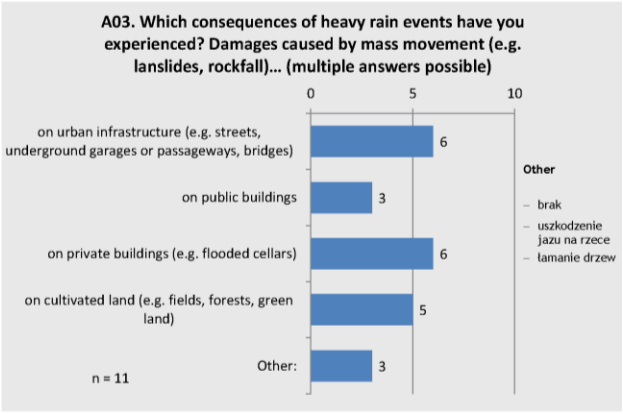


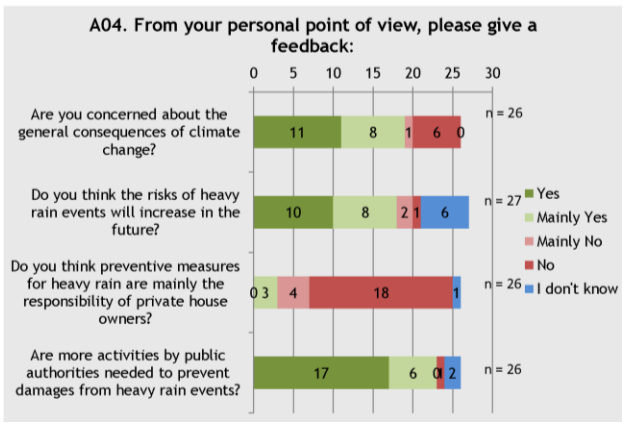


A: EXPERIENCES WITH HEAVY RAIN



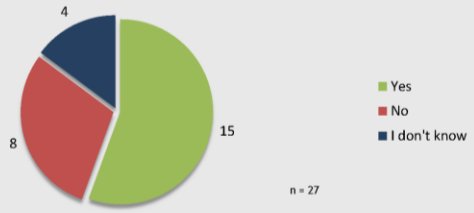




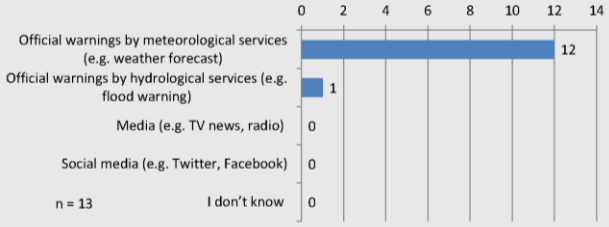


B: PRACTICAL USE OF EARLY WARNING SYSTEMS

B01. Do you know an early warning system for extreme events like heavy rain?



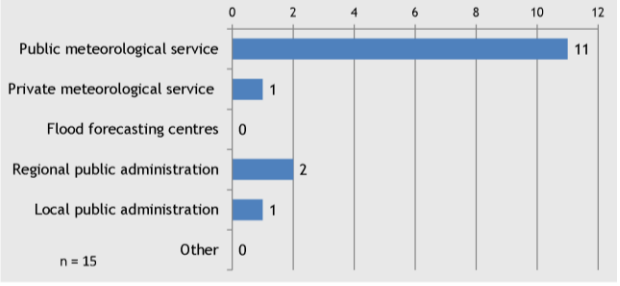
B02. How does information about an upcoming heavy rain event reach you?



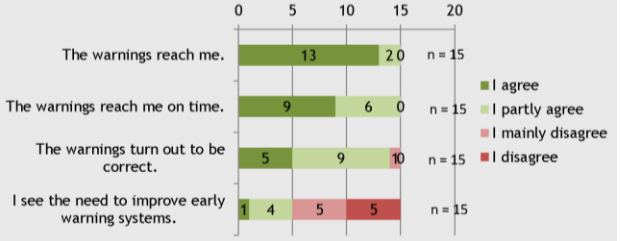
B03. What is the name of the early warning system?

- Regionalny System Ostrzegania
- SWO
- Serwis pogodowy IMGW-PIB
- KSO
- IMGW
- Antistorm

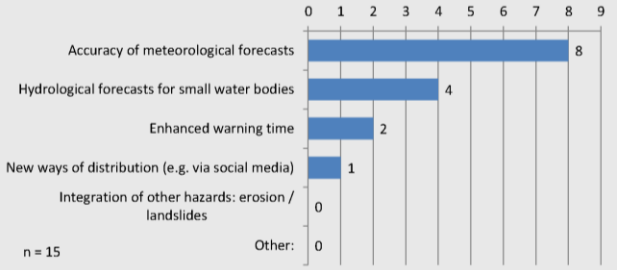
B04. Who is operator of this system?



B05. From your personal point of view, please give a feedback:

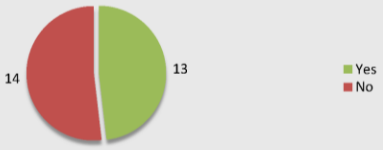


B06. In your region and from your professional point of view: How can early warning systems improve?

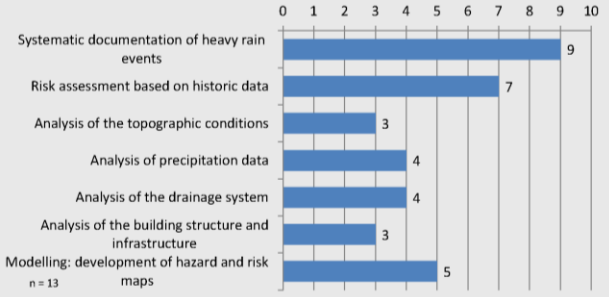


C: ASSESSMENT AND MAPPING OF HEAVY RAIN RISKS

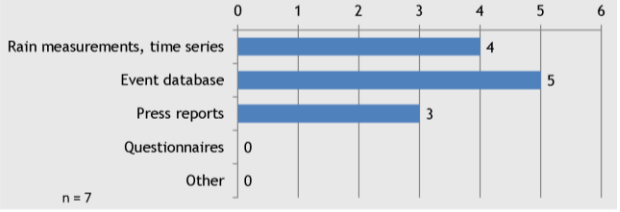
C01. Has your institution dealt with heavy rain risks?



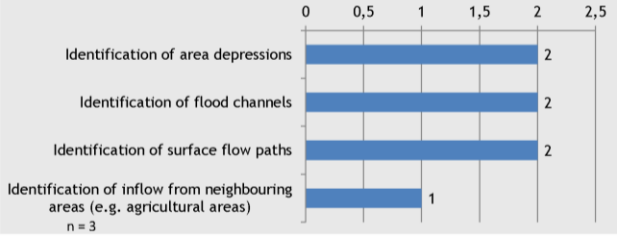
C02. With the help of which analysis does your institution assess heavy rain risks? (multiple answers possible)



C03. Which historic data for risk assessment has your institution analysed? (multiple answers possible)

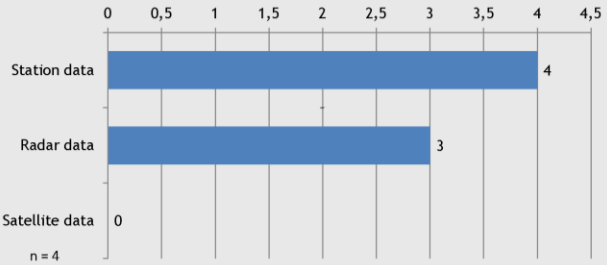


C04. Which analysis of topographic conditions (e.g. mapping of area depressions) has your institution done? (multiple answers possible)



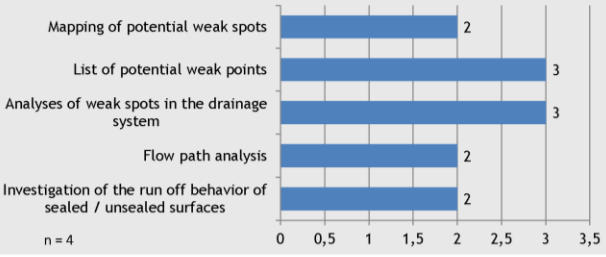
C05. Please name other analyses of topographic conditions implemented by your institution:

C06. Which source of information did you use to analyse precipitation data (e.g. extreme value statistics)? (multiple answers possible)



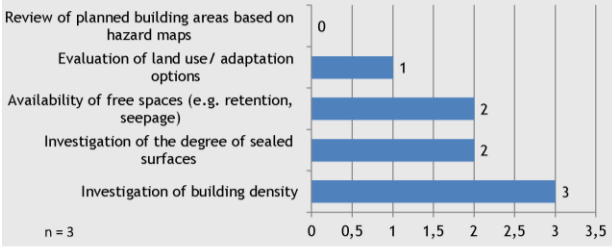
C07. Which data sets / model did you use?

C08. Which analysis of the drainage system (weak spots) has your institution done? (multiple answers possible)



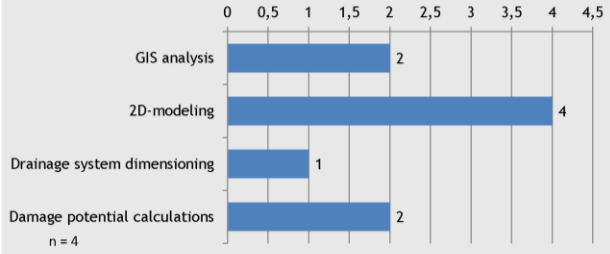
C09. Please name other analyses of the drainage system implemented by your institution:

C10. Which analysis of the building structure and infrastructure has your institution done? (multiple answers possible)



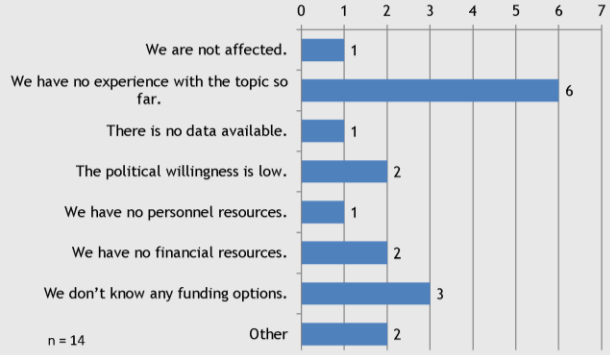
C11. Please name other analyse of the building structure and infrastructure implemented by your institution:

C12. Which modeling has your institution done to develop hazard and risk maps? (multiple answers possible)



C13. Please name other analyses to develop hazard and risk maps implemented by your institution:

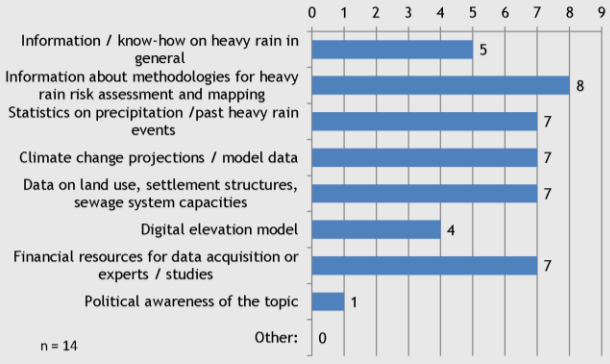
C14. If your institution has not conducted any heavy rain risk assessment (yet) - Why not? (multiple answers possible)



Other

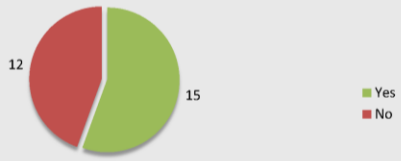
- ocena ryzyka jest poza naszymi kompetencjami, takie dane są niezbędne dla właściwego kształtowania zagospodarowania przestrzennego, zwłaszcza w kontekście gospodarowania wodami opadowymi
- Nie leży to w naszej kompetencji

C15. In your personal opinion, what would you need for a heavy rain risk asessment or mapping? (multiple answers possible)

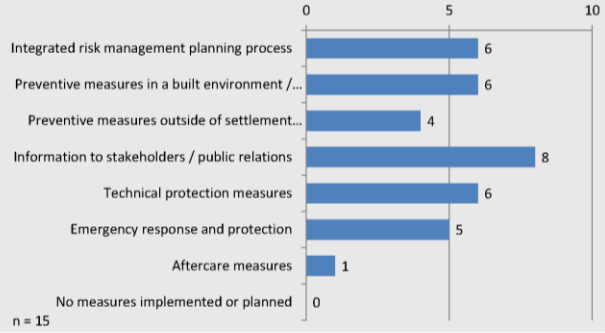


D: MEASURES TO MITIGATE HEAVY RAIN RISKS

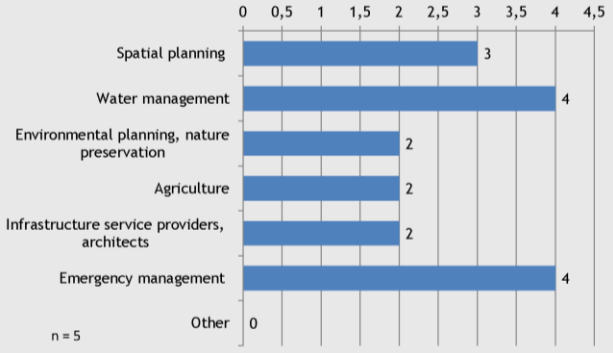
D01. Has your institution planned or implemented measures which can prevent or reduce damages of heavy rain events?



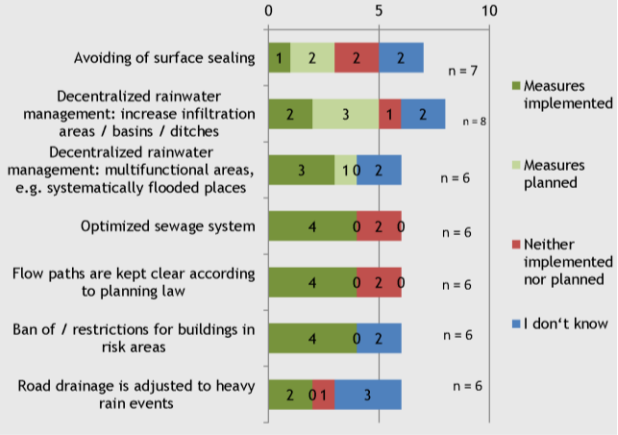
D02. Which measures to reduce heavy rain risks has your institution planned or implemented? (multiple answers possible)



D03. Which of the following stakeholders are included in the integrated risk management planning process in your institution? (multiple answers possible)



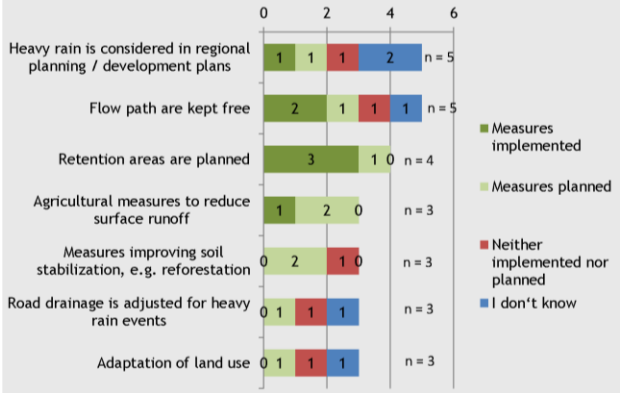
D04. Please specify implemented or planned preventive measures in a built environment / urban area!



D05. Which other preventive measures in a built environment / urban area has your institution planned or implemented?

- W projekcie Planu zagospodarowania przestrzennego województwa dolnośląskiego, a także w projekcie Planu zagospodarowania przestrzennego miejskiego ośrodka wojewódzkiego Wrocławia przewidujemy (opisując w dużym skrócie ze względu na ograniczenia ankietowe) działania zwiększające zdolności retencyjnej dorzecza Odry, oraz maksymalnego zatrzymywania wód deszczowych w miejscach ich opadu, a także postulujemy o wyznaczenie obszarów narażonych na ryzyko powodzi opadowych, zwłaszcza na obszarach miejskich województwa dolnośląskiego.

D06. Please specify implemented or planned preventive measures outside of settlement structures!



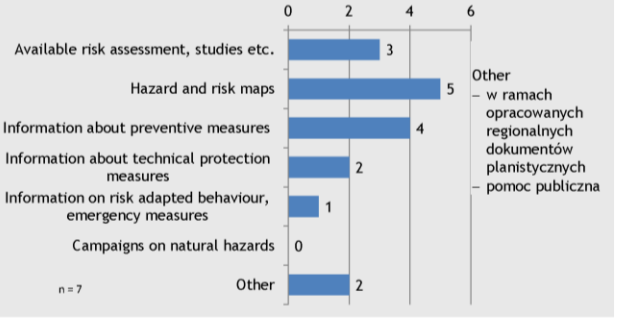
D07. Which other preventive measures outside of settlement structures has your institution planned or implemented

D08. Please specify implemented or planned activities regarding public relations / raising awarenes of stakeholders and public!

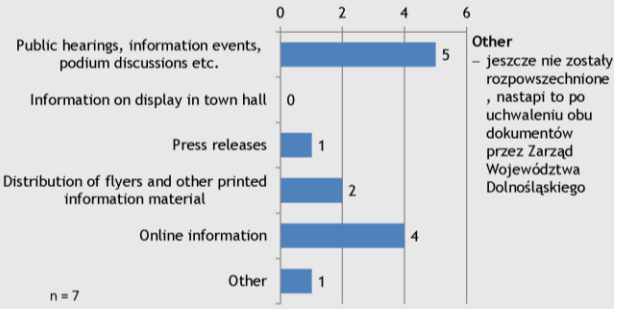
D09. Other activities regarding publicity, raising awareness of stakeholders and public:

- powoływanie komisji i szacowanie szkód spowodowanych deszczami nawalnymi u rolników

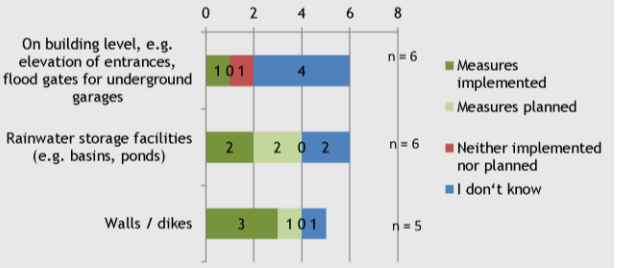
D10. Which information was or will be provided? (multiple answers possible)



D11. How was the information provided? (multiple answers possible)

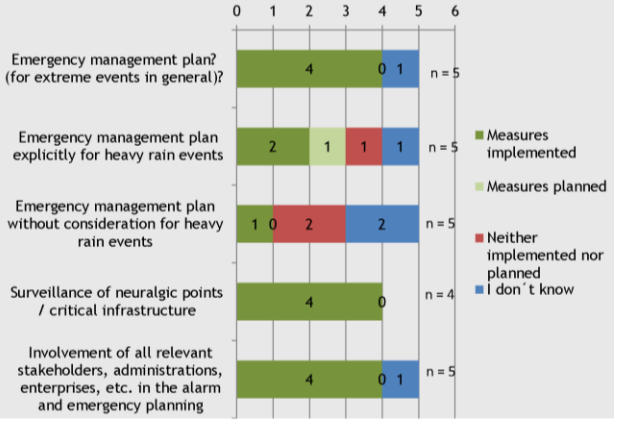


D12. Please specify implemented or planned technical protection measures!



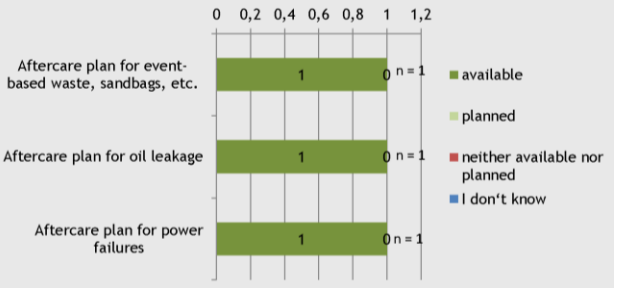
D13. Which other technical protection measures has your institution planned or implemented?

D14. Please specify implemented or planned activities regarding emergency response and protection measures!



D15. Which other activities regarding emergency response and protection measures has your institution planned or implemented?

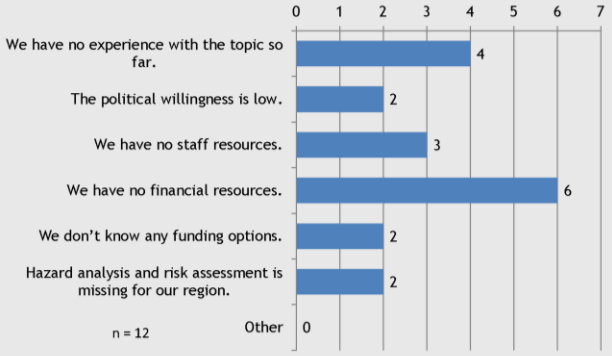
D16. Are you prepared for aftercare in your institution or region?



D17. Which other aftercare measures has your institution or your region planned or implemented?

D18. Please assess the categories of activities according to your personal and professional opinion! Which measures do you personally think are the most effective ones?

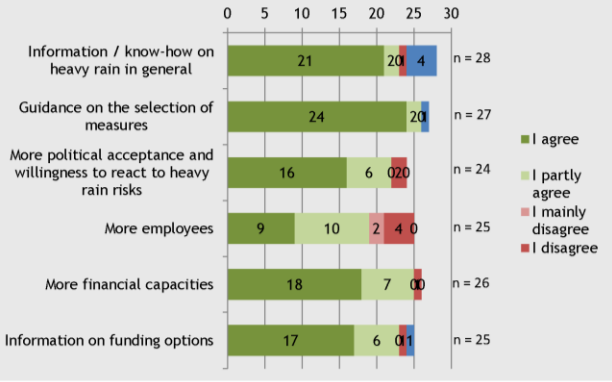
D19. If your institution or region has not implemented any measures (yet), why not? (multiple answers possible)



D21. What else would help you to implement (further) measures to reduce heavy rain risks?

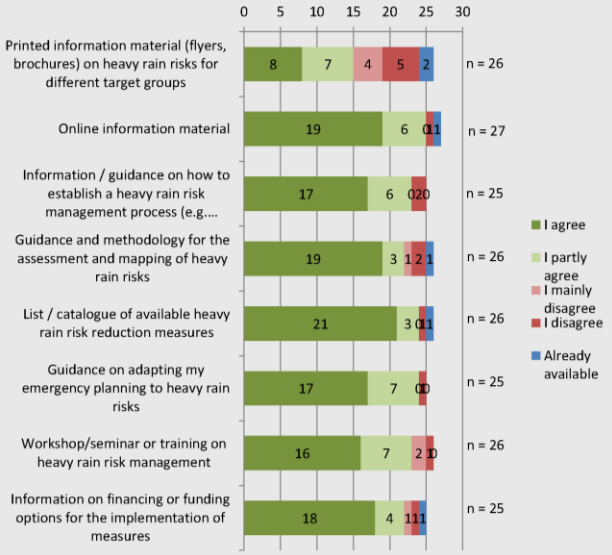
- akceptacja zmian w środowisku i próba dostosowanioa się do nowych warunków
- odpowiednie kompetencje do realizacji zadań

D20. In your personal opinion, what would help your institution to implement (further) measures to reduce heavy rain risks?



E: DEMANDS, WISHES

E01. Which kind of support and materials would you personally want / need for your institution or region? (multiple answers possible)



E02. Other support and additional materials you personally want or need:

- wytyczne do projektowania, planowania przestrzennego, z uwzględnieniem zabezpieczeń przed takimi zjawiskami jak ulewne deszcze

RAINMAN Key Facts

Project duration:	07.2017 – 06.2020
Project budget:	3,045,287 €
ERDF funding:	2,488,510 €
RAINMAN website & newsletter registration:	**www.interreg-central.eu/rainman**

Interreg CENTRAL EUROPE
RAINMAN
European Union
European Regional Development Fund

Lead Partner

LANDESAMT FÜR UMWELT, LANDWIRTSCHAFT UND GEOLOGIE | Freistaat SACHSEN

Saxon State Office for Environment, Agriculture and Geology

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Project Partner

Saxon State Ministry of the Interior
STAATSMINISTERIUM DES INNERN | Freistaat SACHSEN

Environment Agency Austria
umweltbundesamt

Office of the Styrian Government
Das Land Steiermark
Wasserwirtschaft

T. G. Masaryk Water Research Institute, p.r.i
VÚV TGM

Region of South Bohemia
The Region of South Bohemia

Croatian Waters
HRVATSKE VODE

Middle Tisza District Water Directorate

Institute of Meteorology and Water Management National Research Institute
IMGW

Leibniz Institute of Ecological Urban and Regional Development
Leibniz Institute of Ecological Urban and Regional Development

Project support

INFRASTRUKTUR & UMWELT
Professor Böhm und Partner

INFRASTRUKTUR & UMWELT
Professor Böhm und Partner

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