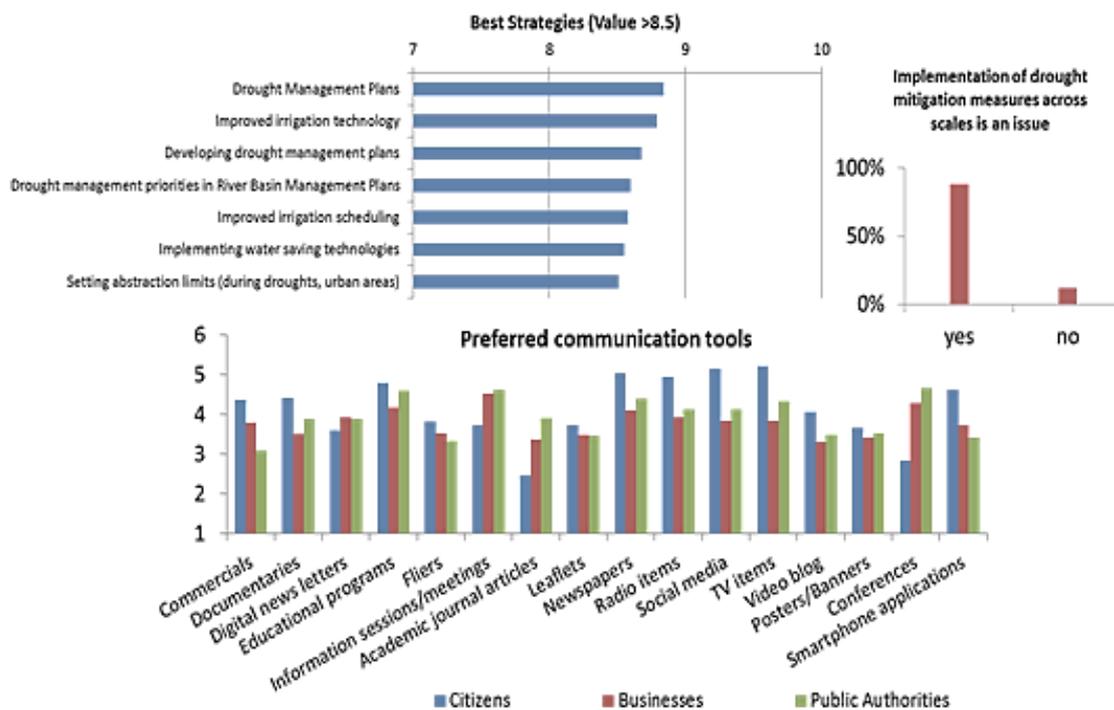




Technical Report No. 30

IDENTIFICATION OF DROUGHT MESSAGES FOR POLICY MAKERS, BUSINESSES AND CITIZENS



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Cover: Results from survey evaluation (adapted from Witmer & Wolters, 2015)

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Abstract

Drought is a complex phenomenon and dealing with drought requires not only the fundamental understanding of droughts, but also the development of management strategies, taking into account the desires of the stakeholders, policy and the natural environment. To deal with drought deliverable 4.6 of the DROUGHT R&SPI project aims to deliver messages to different audiences related to drought. These messages have been identified using a survey launched at European (and global) level. The results were used to develop several messages to three major stakeholder groups: Public Authorities, Businesses and Citizens. The survey explored and evaluated advices of numerous projects and evaluated their proposed mitigation and scarcity options through a survey. Besides testing for the importance and desirability, communication strategies have also been evaluated. The desire for water saving technologies, techniques and drought management strategies and plans are clearly observed as crucial items in drought management. The demand for development of suitable indicators on smaller scales (regional) remains. For the communication strategies the three stakeholder groups need specific strategies, in which Businesses and Public Authorities appear to have similar preferences in order to obtain information (meetings, information sessions/conferences and educational programmes), whilst Citizens have a preference towards the media and smart phone applications. The development of suitable indicators remains an important issue. In order to deal effectively with droughts the integration of stakeholders, researchers and policy makers is crucial.

Contents

- 1. Introduction 1
- 2. Survey background and structure 2
- 3. Results 5
- 4. Discussion..... 12
- 5. Conclusions 15
- References..... 17
- Annex 1 Survey.....A-1
- Annex 2 Survey resultsB-1

1. Introduction

Droughts have added up to 100 billion euros of damage in Europe during the past 30 years (Commission of the European communities, 2007). According to recent reports on climate variability (IPCC, 2013a) Europe will be subjected to increasing climate variability and more intense dry periods (especially Southern Europe) (Wolters et al., 2015). The increased (winter) temperatures and heatwaves are likely to be expected for large parts of Europe (IPCC, 2013b). Lower precipitation rates and reduced discharge could lead to droughts. The vulnerability towards droughts of various sectors (agriculture, industry and urban environments) indicates the relevance and urgency to develop strategies to reduce the impacts of droughts. Increased pressure on water resources during scarcity periods and changes in precipitation patterns require the improvement of strategic measures, planning and adapted policies. These actions are aimed to increase resilience while safeguarding economic growth and improved safety for inhabitants of Europe.

Therefore the aim of the Deliverable 4.6 is to support the development of drought messages and explore strategy options and deliver messages on drought mitigation options to different audiences (also based on UNESCO WWDR3- target groups (World Water Assessment Programme, 2009) and in line with current development of target groups set by the EU); with special focus on Public Authorities, Businesses and Citizens on European level. The messages developed are in line with the Hyogo Framework of Action (HFA) with special focus on the following three Priorities of Action (UNISDR, 2007):

- Ensure that disaster risk reduction is a national and local priority with a strong institutional basis for implementation (HFA 1st Priority of action),
- Identify, assess and monitor disaster risks and enhance early warning (HFA 2nd Priority of Action)
- Use knowledge, innovation and education to build a culture of safety and resilience at all levels (HFA 3rd Priority of Action)

Several studies are currently focussing on modelling, impacts and effects of climate change however the practical implementation and preparation to impacts of droughts, but this information is frequently too complex for the general public. Therefore several questions do arise; What should be the focus and role of the different audiences? Which tools are most suitable to use for drought mitigation? How can we deliver the information best to the appropriate audiences? These questions are consisting of multiple dimensions and are difficult to deal with on their own.

In order to understand the drought process better, gain insight in the actors and come up with a policy advice for decision makers, businesses and citizens a survey was being developed and spread on a European level. This report will first discuss the methodology, followed by the results, discussion and conclusions. It has been written as an additional part of the Master Thesis completion of F.P. Witmer ("Drought Risk Reduction Messages- Moving from Paper to Action") for Wageningen University (Water Resource Management Department).

2. Survey background and structure

Droughts are creeping phenomena, of which impacts take time to manifest. This allows for companies, governments and citizens to use a variety of options to deal with droughts. The severities of the impacts drought are strongly affected by the dependence of the water users on the regularity of precipitation events and access to water. The way a drought is being perceived differs per actor, per (climatic) region and per governance level. To sustain economic productivity, access to water forms a key element for the economic competitiveness of the European communities. By implementing monitoring and measuring systems, drought development could be tracked in order to implement measures and avoid negative impacts; i.e. by initiating drought management plans at certain threshold levels (Andreu 2014b), prioritising water uses (Vial, 2014; Van Lanen, 2014; Rijksoverheid, 2015a), launch drought messages by the Government (Van Lanen, 2014; Rijksoverheid, 2015b) or deliver information to different stakeholders.

The DROUGHT R&SPI project uses the WWDR3 report stakeholder groups for the focus of advice. However, the WWDR3 report includes a very wide range of stakeholders: Urban Mayors and Local Government, Parliamentarians, Political Leaders and Cabinet ministers, NGOs, Development Agencies, Business Leaders, Youth, Financiers, Ministers of Finance and Religious Leaders (World Water Assessment Programme, 2009). These groups are not all required within the European community. Currently the focus of the EU is shifting towards integration of science, policy and towards three main stakeholders; Public Authorities, Businesses and Citizens of the European Union (Pietrosanti, 2014; European Parliament, 2013). At the same time the recently launched Horizon 2020 research and innovation programme indicates the (European Parliament, 2013; European Commission, 2014) the European Commissions' aim is "...to ensure Europe produces world-class science, removes barriers to innovation and makes it easier for the public and private sectors to work together in delivering innovation" (European Commission, 2014), the focus of this survey is on three main stakeholders: (1) Public Authorities, (2) Businesses and (3) Citizens. Therefore this deliverable aims to take these recent developments into account by analysing the applicability of different measures and communication strategies to deal with the dynamics, hazards and threats and options for these groups.

To evaluate the best options for drought management for these three groups the survey has been developed focussing on delivering drought messages to various audiences in the European Community. The survey was developed using the various options of the "Blueprint to Safeguard Europe's water resources" (hereafter referred to as "Blueprint"), the output project reports developed by related projects (i.e. DEWFORA, AfricanClimate, DROP and others), project output from the DROUGHT-R&SPI consortium, results of the 3rd Drought Dialogue Forum held in Brussels and various other options which are linked to drought management and water scarcity.

The survey requested respondents to evaluate; different options, communication strategies and applicable scales (see Annex 1 and Annex 2 for the survey and the results). This chapter deals with the survey structure, background and launch.

2.1 About the survey design and software

For the development of the survey a web-based survey programme "Qualtrics" has been used (<http://www.qualtrics.com>). The software allows for complex survey design, with unlimited number of questions and unlimited number of respondents. The software allows for processing of large data sets anonymously using a uniform link. The survey can be distributed by sharing the link in an e-mail of web page and only stores the IP data of the respondent's pc. The software encrypts the respondents' identity by assigning a unique number to each respondent.

The questions had been clustered by topic to guide the respondent through the survey. The statements focus mainly on applicability, options to mitigate and scale levels. These forms in most papers studied for

the MSc. Thesis literature review and project reports the bottlenecks for developing management plans. The aim is to identify which measures are perceived to be valuable / important. Another important aspect is to identify the best ways of conveying information to the appropriate audiences.

The lay-out was kept basic Wageningen UR-Qualtrics template. To reduce drop-out rates and allow for correction of responses a back button and progress bar had been included, as the questionnaire is not testing development of knowledge within the survey but focusses on the respondents' ideas. By including these tools the user feels more in control and is allowed to change a response based on a new insight obtained further down the questionnaire. The progress bar allowed the user to track their progress and is aimed to reduce the dropout rate by indicating the percentage of questions left. The questions were not numbered to reduce dropout rates and unconscious biases.

The survey was developed to create an anonymous platform for participants to respond to the various options and messages and was designed to include a wide audience of respondents. The survey was designed using an iterative design using three test phases including; 1) Internal evaluation, 2) Test amongst peers and 3) Testing amongst experts of similar background. After the last survey adaptation the survey was launched to approximately 420 respondents.

2.2 Survey structure

The survey aimed to obtain information on the options, scales, audiences' importance and communication strategies using an anonymous survey. The survey has been developed to take approximately 30 minutes (to be completed during a lunch break) and avoid high dropout rates. The survey included control questions in order to identify if the participant could be a suitable candidate, which have been used at a later stage as a filter during the processing of the dataset. The general structure of the survey consisted of five sections;

- 1 Personal background
- 2 Identify the participant's vision on scales, levels, target audiences
- 3 Specific measures divided into main headings (statements are clustered according to topic)
- 4 Identification of the most effective communication strategies
- 5 Open questions to leave contact details and/or final remarks

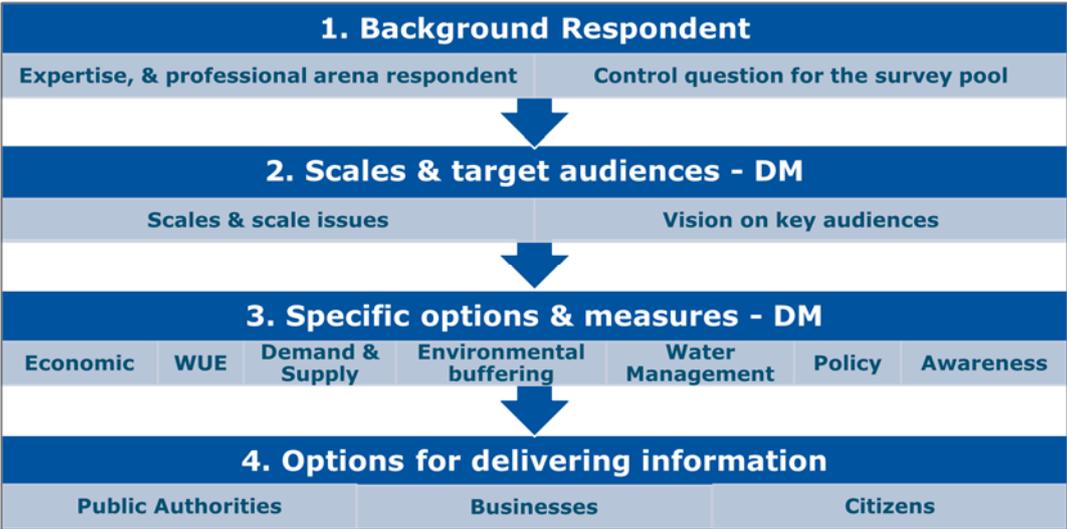


Figure 1 Survey structure and sub-sections (Witmer & Wolters, 2015)

Section 1 Personal background

This section included questions on the country of origin (to identify regional preferences of candidates), the professional arena & scale level in which the participant is active and last the control question which could be used to filter participants which are not familiar with droughts. This last group is automatically led to the final message of the survey to avoid pollution of the respondents' pool.

Section 2 "Identify the participant's visions on scales, levels and target audiences" was created in order to give the participant confidence and these questions are key issues in most reports. The scales form the biggest challenges in dealing with drought and therefore needed to be assessed first to obtain the largest response rate.

Section 3 "Specific measures" is dealing with drought were divided into main headings (statements are clustered according to topic), aimed to identify specific measures mentioned in various reports (Blueprint etc.). These measures were tested in the following list of sub-sections and were ranked on their importance (ranging from a value 1-very unimportant to value 10- very important):

- Economic options
- Water use efficiency options
- Demand and supply options
- Environmental buffering
- Water management measures
- Drought Warning indicators
- Policy making options
- Awareness raising options

Section 4 "Identification of the most effective communication strategies" focusses only on information distribution to the three major groups identified by the European Union (Public authorities, Businesses and Citizens). The respondents were request to relate each group to sixteen different communication tools which resulted in a ranking of the importance of the tools. The range was given in six steps ranging from very unimportant to very important (1-6), forcing the respondent to make a decision by leaving a neutral response out of the equation.

Section 5 focussed on obtaining additional contact details for in-depth interviews and included additional responses which had not been taken into consideration. This was to allow respondents to voice an idea or concept which had not been included in the survey, these questions were least important and posed last to avoid a drop-out of participants in an early stage.

2.3 Launching the survey

The survey had been launched using a cover letter and was sent to approximately 420 respondents (who were also asked to share the link of the survey with other relevant persons). The first launch of the survey happened on Thursday 29th of January 2015 and a reminder was being set for 11th of February 2015, closing the survey at February the 20th 2015. The survey had been launched on a Thursday. The choice of a Thursday was strategic as this moment in the week allows for most participants to respond (usually less pressure and not yet before the weekend). To activate respondents a reminder was planned and sent on Wednesday the 11th of February for a similar reason, just ahead of a lunch break in order to enhance the response rates. The organisers of the DROUGHT-R&SPI Conference (10-13 March 2015, Valencia) also shared this survey amongst their participants, indicating the necessity of the topic to a large pool of peers which took part in a conference on similar topics.

3. Results

The results are disseminated for each block (headings 3.1 to 3.4), and the complete list of results including statistics can be found in Annex 2. The analysis has been limited to the respondents with expertise on drought (study-, work- or live around drought). The survey received 83 effective responses. There was a certain 'drop-out rate', i.e. not all respondents completed the entire survey (55 individuals completed the entire survey). The results of the individuals who did not complete the survey could still be included in the analysis. The analysis of the results uses the same order as the survey, to keep consistency. First the results of the background of the respondents are discussed, followed by scales and audiences, then the specific measures to deal with drought and last the best communication strategies for Public Authorities, Businesses and Citizens.

3.1 Background of the respondents

The results of the survey shows that the largest groups of respondents came from Spain, The Netherlands, Germany, France, Belgium and Greece (see Figure 2). From all the respondents by far the majority is involved in water management, followed by professions related to the environment, science & academia and agriculture (Figure 3). Most of the respondents are involved in activities on national level, followed by river basin and regional level. The respondents were allowed to give multiple responses for the questions of Figure 3, Figure 4 and Figure 5 which is shown by the amount of responses related to the amount of respondents.

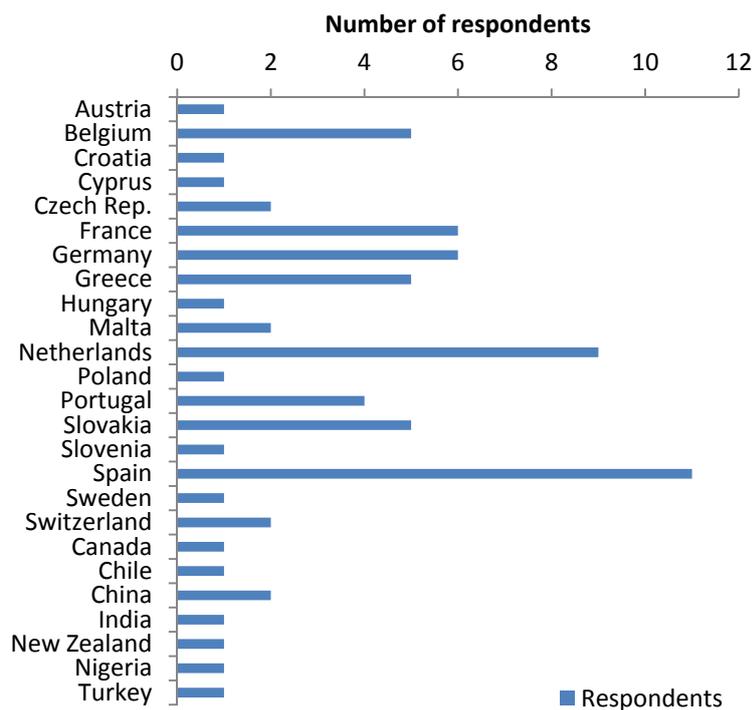


Figure 2 Country of residence of respondents

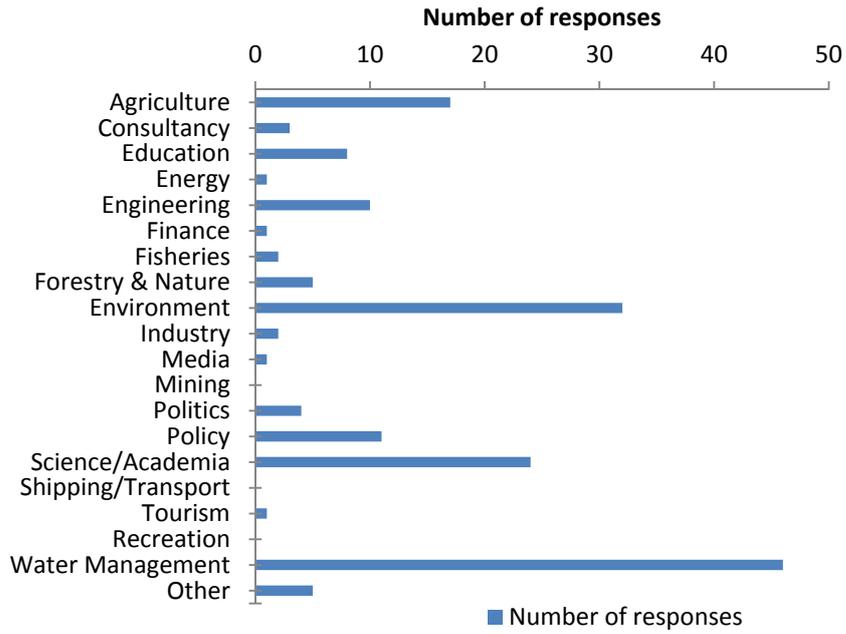


Figure 3 Professional fields of the respondents (respondents were allowed to use multiple responses)

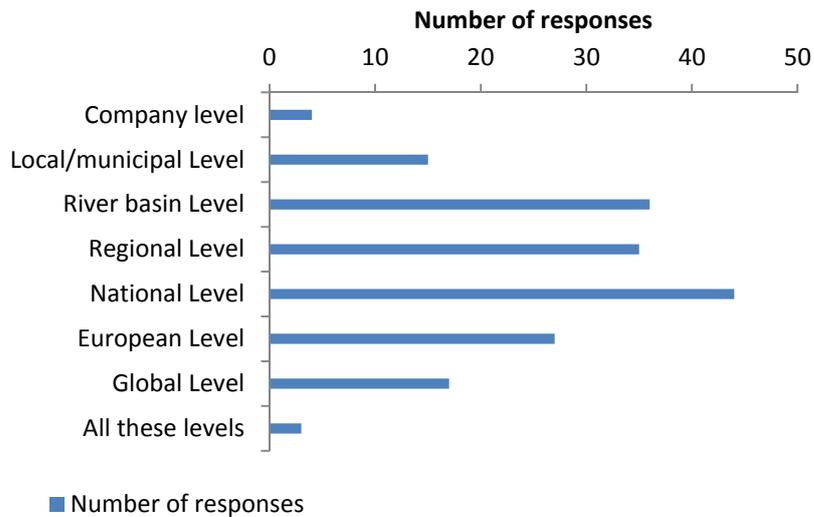


Figure 4 The scale levels on which the respondent is active (multiple answers possible).

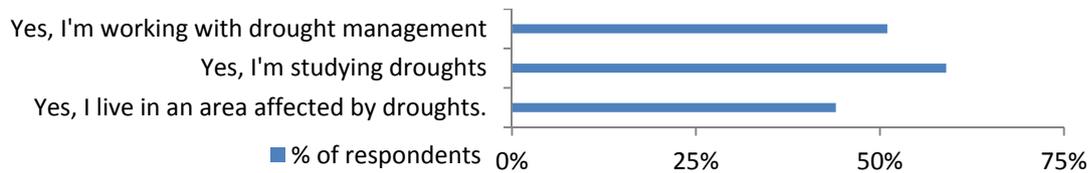


Figure 5 Relation to droughts of the respondents (% of total)

3.2 Scales, Levels and Target Audiences

The results of scales levels, target audiences and approaches are shown in Figure 6, Figure 7, Figure 8 and Figure 9. The second section of the survey focused on the scales, stakeholder importance and approaches. The results indicate that the preference and importance is given to management strategies on river basin level and regional levels. The European level and household levels are valued lower as effective scales to deal with drought. At the same time the majority indicated that implementation of strategies across scales is an issue in drought management (Figure 7).

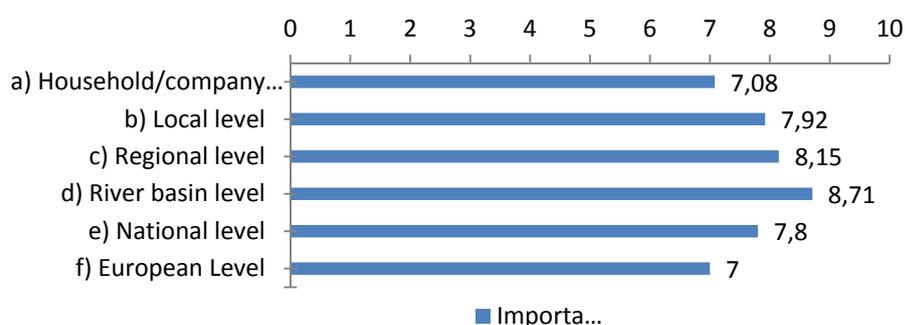


Figure 6 The importance of different scale levels in drought management according to the respondents (1-very unimportant to 10- very important).

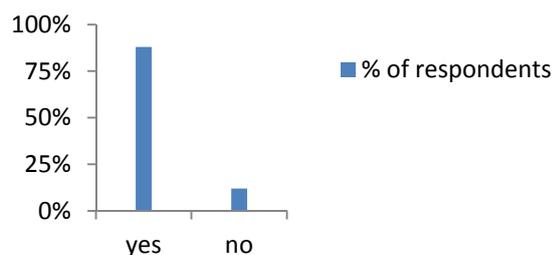


Figure 7 Coordination of measures across scales is an issue in drought management (% of respondents, single answer).

The majority indicated (see Table 1) that overlapping jurisdictions, conflicting measures and differences across scales are the major bottlenecks. The coordination across scales is valued by the majority of respondents as problematic (Figure 7). The different laws, rules, legislations and frameworks make it difficult to deal with a drought on various levels and include measures which affect multiple levels (Table 1).

Table 1 Main issues related to coordination of measures across scales (43 responses, including multiple topics, ranked by the number of responses per topic)

	# responses related to the heading
Overlapping jurisdictions	8
Implementation of conflicting measures due to scales	7
Differences in needs across scales and contracts issued at larger scale areas	6
Drought is a multi-level problem and should be approached as such	6
Financing and prioritisation	5
Political interests at various scales	4
Scarcity is linked to upstream/downstream users issues.	4
Exchange of information, experience and approaches is needed between levels	4
Overestimating water resources due to governance at different scales (resources cross boundaries of different jurisdictions)	2
Changes of perception of the value of the water resource during a drought	1
Negative impacts of measures perceived by users at different scales	1
Different actors are exposed in different ways during a drought	1
End users have to implement the policies	1

The respondents were also asked to indicate the importance of different stakeholders in drought management (Figure 8). The values ranged between 1 (very unimportant) to value 10 (very important). The river basin authorities are values highest, followed by farmers and policy makers (mainly preferred national and regional), whilst the citizens are considered of lower importance (still important). The results confirm the target audiences chosen for the last section of the survey (Public Authorities, Businesses and Citizens). The respondents also indicated a strong preference towards pro-active drought management, indicating the need for planning and strategy development (Figure 9).

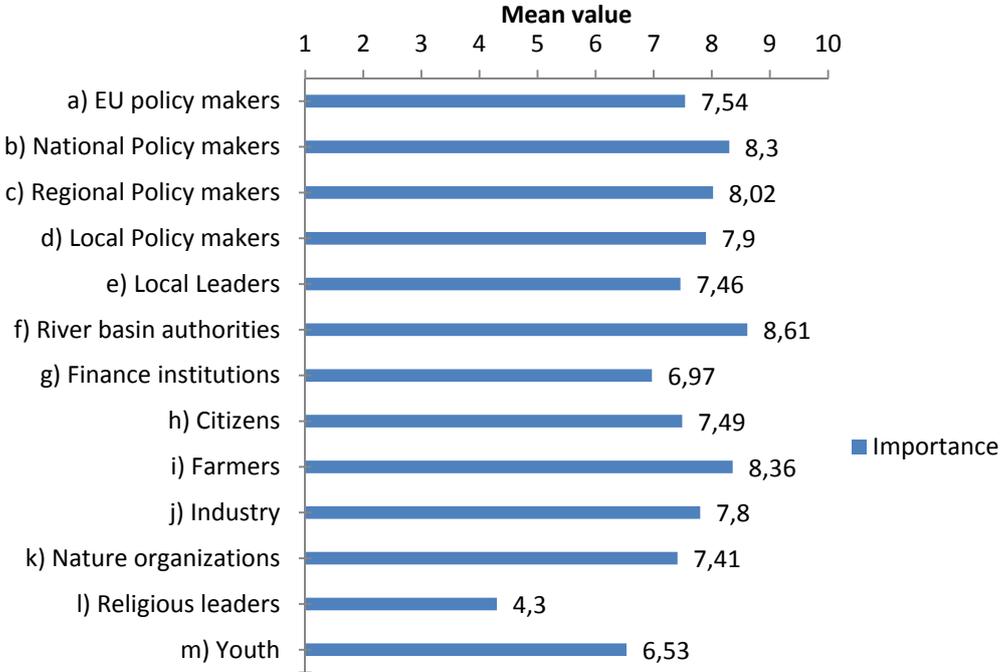


Figure 8 The importance of different actors related to drought management in Europe (based on the mean value given by respondents, 1- very unimportant, 10- very important).

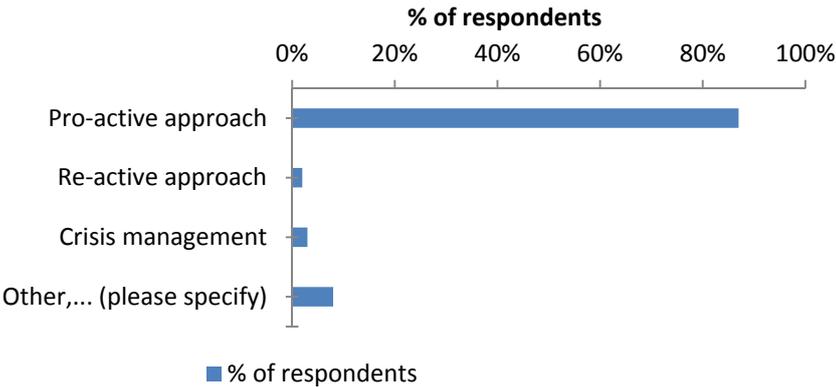


Figure 9 The best approach towards drought management

3.3 Mitigation options

The respondents were requested to indicate the importance (value 1-10) of various options related to drought management (see Figure 10) and the options listed in Table 2 are considered as the most important. All options are considered slightly important to very important. Therefore the results discussed will aim for the highest ranked options (mean value >8.0). The majority of preferences aim for developing management plans, improved techniques for water use and development of indicators. The table shows a preference towards drought management plans (development and implementation), technological improvement irrigation & water saving technologies and creating policy frameworks to limit water use. Also the development of information systems concerning droughts is ranked as very important. Table 2 and the extended list (Figure 10) show the mean values of each of the options.

Table 2 Most important strategies ranked between 1 (very unimportant) and 10 (very important)

Strategy	Mean Value	Variance
Drought Management Plans	8.84	3.64
Improved irrigation technology	8.79	1.7
Developing drought management plans	8.68	3.9
Drought management priorities in River Basin Management Plans	8.6	3.53
Improved irrigation scheduling	8.58	3.32
Implementing water saving technologies	8.55	3.31
Setting abstraction limits (during droughts, urban areas)	8.51	3.47
Emergency Drought Protocols	8.44	3
Crop change (less consumptive crops)	8.3	3.71
Improving irrigation system infrastructure	8.26	3.13
Water loss reduction in distribution networks	8.23	3.64
Information systems on development of a drought	8.2	3.69
Transboundary agreements on water allocation	8.16	4.14
Development of warning indicators triggered by natural hazard	8.12	4.61
Development of warning indicators triggered by impact	8.12	4.54
Using runoff reduction techniques/measures	8.07	3.38
Improving water retention capacity of the soil	8.05	4.37
Water use efficiency improvement in Industrial processes	8.02	4.45

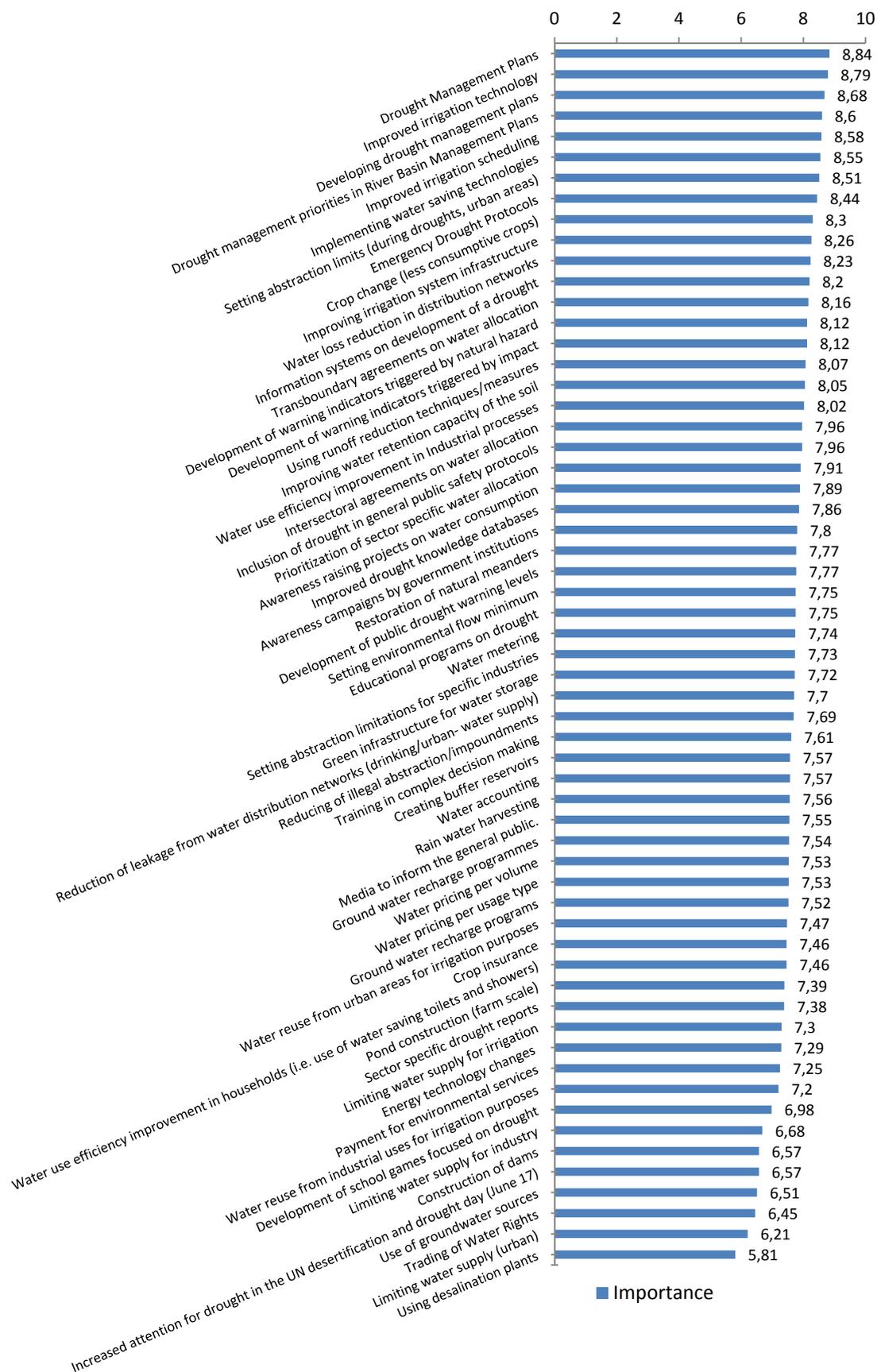


Figure 10 Mean ranking of participants views on different drought options (1- very unimportant to 10-very important)

3.4 Communication tools

The respondents indicated the most important communication tools concerning droughts differ per actor (see Figure 11). The results give distinct preferences for the various target audiences. In this case the responses were ranked in six different classifications; Very unimportant (1), Unimportant (2), Slightly unimportant (3), Slightly important (4), Important (5), Very important (6), which represent the values 1 to 6 in the y-axis of Figure 11. The highest ranked tools are listed for each of the three target audiences in order of importance:

- Public Authorities:
 1. Educational programs
 2. Meetings
 3. Conferences
- Businesses:
 1. Meetings
 2. Conferences
 3. Educational programs
- Citizens:
 1. General media
 2. Social media
 3. Educational programs
 4. Smartphone Apps

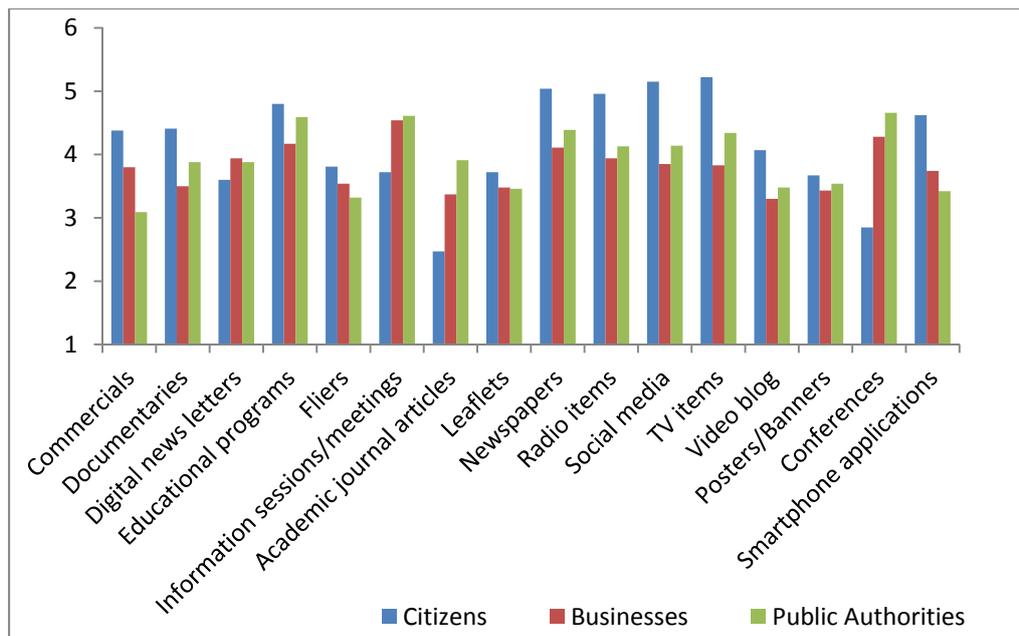


Figure 11 Importance of different communication tools (Witmer & Wolters, 2015)

4. Discussion

4.1 About the survey

The advantage was that most of the respondents also live in drought affected areas and therefore could reflect on the perspective of citizens. The survey may have been too long for quick responses and for future studies the preferable survey length should aim for approximately 15 minutes in order to reduce the drop-out rate. The amount of respondents was sufficient in order to make statements on European level, but for country or region specific statements too few respondents per area replied. For future studies it would be beneficial to have companies included in the drought survey, for which a direct approach could be beneficial. Their views could have given us a broader perspective related to the ins- and outs of drought management on company level. The results do give us a greater insight on European wide drought management preferences which can be used for future drought planning and research.

4.2 About the results

The majority of the respondents are active in the field at regional, river basin level and national level and their profession is mainly related to water management. This is reflected in the results in which the majority of responses indicated a need for drought management planning, improved preparedness, water saving technologies and protocols. The biggest challenge (88% of the respondents) is the cross scale implementation of drought management strategies. The complexity of the numerous frameworks, guidelines, combined with the legal complexity and jurisdiction differences between countries make it difficult to create a single management plan. Therefore management plans are often not universal and need local adjustment.

The majority indicated that the river basin is the preferred size for planning and analysis, closely followed by regional and national scales. In the detailed responses, the respondents indicated that regional planning and area-specific conditions need to be taken into account for successful drought management. The challenge would be to integrate the National and European frameworks in the regional plans to deal with drought.

Most of the respondents indicated also a strong tendency for technological improvement. Water saving techniques (agriculture, domestic and company level) are valued high and are seen as very important. This is an interesting phenomenon as the water savings as such will not reduce the impact of a drought (below average water availability) but are mainly tackling water scarcity. Therefore it could be debated whether or not the water saving techniques will actually save water or they merely will expand the productive area in non-drought seasons, thereby increasing dependence on water resources instead of reducing this dependence. This has always been a major challenge in agriculture and will not easily be solved. Severe effects of droughts will likely occur on rare occasions therefore forecasting and predicting of a drought becomes increasingly important as the dependence on water resources for economic and social development are increasing. Prediction and use of indicator is highly valued amongst to the respondents; both indicators focussing on the natural hazard as well as developing indicators which focus mainly on the impact.

One of the main concerns in drought planning and mitigation is the development of indicators of enough certainty to declare a drought and the political will to initiate a drought mitigation plan. The emergency plan could limit economic damage as production could be affected. Therefore a strongly developed drought management plan is preferred, including actions related to the indicators, thresholds. The desire for improved parameters, planning and mitigation plans could be initiated locally (although currently local drought impact parameters are often difficult to predict), but frequently are more suitable to issue at higher scale levels. All measures of Figure 10 are in general considered important, however each option has

significant spread (see also Annex 2), indicating that for some areas an option may work, whilst for other areas the option is much less applicable.

In order to deal successfully with a drought, communication strategies are crucial. The differences in communication between companies, governments and citizens should be considered and exploited in order to work successfully during a drought situation. As scientists work on strategies and thresholds, they often use safety margins and many different indicators. However, government institutions prefer a single indicator in order to initiate a response scenario.

The results of the study on communication strategies could be used for the development of communication strategies which need to be used at the appropriate time for the appropriate audiences. Governments and companies are quite similar in the desired communication strategies, whilst citizens need a completely different approach, more focussing on individual information by using media or smartphone applications. The development of applications and conveying information among citizens using mobile technology is an interesting new arena which could be very beneficial in quick and effective communication.

Related to the communication strategy, there is an important advice that came as a result of the discussions at the DROUGHT-R&SPI International Conference on drought (Valencia 10-13 March 2015). Experience in drought management dictates that the timing, the amount of warnings and type of communication needs to be uniform and critically evaluated in order to convey a clear and consistent message to the public. This is a prerequisite to ensure effective strategic planning and action. The latter requires the implementation of measures using the cooperation between scientists, policy makers and civil society.

Considerable (economic) and social impacts occur during a declared drought. Often the reduction of the abstraction volumes could hit various economic sectors, therefore impacting the GDP and this frequently poses a difficult decision for politicians. However, despite the negative effects there are also some opportunities not explored in this survey. The economic benefit of a drought could be beneficial for some companies who were able to sustain production. Also possible (more severe) negative impacts can be prevented by using emergency protocols. Taking preventive measures requires information systems, planning (production methods and preparation plans) and use of strategic protocols for the timed implementation of measures.

A practically applicable information system could help to expand the accessibility of citizens to basic alert levels in order to take action. There are opportunities to deal with the distribution of information; for example most mobile platforms already contain a weather forecasting application which are frequently used on global level. These apps show forecasts on local level (area specific information), which could include regional information on the state of a warning level. The cooperation between research, businesses, meteorological and governmental platforms should also focus on conveying the knowledge to the general public. The application could include the use of a warning level or colour in the weather forecast, adding a message on drought level (forecasted by meteorological agency) and active percentage of water availability (compared to long term mean) or message indicating the alert level (green- normal, yellow- lack of rain, orange- deficit, red- emergency situation (set by government)) to warn the general population there is a water deficit.

Media attention and use of these technologies can create awareness of the general public to their water security information, which is otherwise kept in a black box or difficult to disseminate. The spreading of information on alert levels should be used with care as over-exposure of a topic will reduce the

importance to the receiver. The alert levels should be accompanied by issued messages in different media to support choices and actions which the public could take to reduce the water consumption.

Educational programmes on droughts could help to support the long term awareness and knowledge base of the European community. Companies and governments need to be informed and create action plans and could best be reached using conferences and meetings, combined with information sessions to exchange information between science, policy, economy and societal problems on droughts and drought management.

5. Conclusions

Drought is a multi-stakeholder and multi-dimensional issue for which uniform measures are difficult to create and implement, and therefore management plans need to include local demands and make use of tailored advice to deal adequately with the uncertainties involved in dealing with drought.

The survey proved to be a useful tool to obtain insight into the preferences of a broad audience of respondents. The survey response rate was high enough for statistical analysis on European level (21%, 91 respondents replied). The survey results indicate that a pro-active approach to drought is highly valued by the majority of the respondents. At the same time, indicators triggered by impact as well as indicators triggered by the natural hazard are indicated to be of (equally) high importance.

Most respondents indicated that implementation of drought management measures across scales remains an issue in Europe. The development of management plans & implementation of improved irrigation techniques are valued highly as drought mitigation measures. However the reduction of demand of water due to improved technology will not automatically safeguard the reduction of water consumption, therefore a legal framework should be involved in managing the buffer of the saved resources as the reduction of water consumption per unit of use is likely to be compensated by increased production, allowing the total consumption to be the same but dependence to increase.

The impacts of droughts can be very severe if there are no more safety buffers and if society is unprepared. The latter implies the need for forecasting and early warning systems. The dependence on water resources, safety buffers and willingness to take risks play a role in the decision making processes and leads to determination of increase or decrease of vulnerability to a hazard.

Respondents gave a very high ranking to development of drought policy and drought management plans. Such plans provide the legal framework that will set boundaries needed to safeguard the communities that are residing in the areas for which the drought management plans are defined. The related information is to be communicated clearly to the appropriate audiences and that might lead to an improved and drought awareness!

The survey resulted in the development of the following messages related to drought which are compiled from the survey results. For the main stakeholders groups advice is listed based on the importance given to each statement by the respondents:

Public Authorities

- Need to focus on developing and implementing Drought Management Plans on governmental level
- Need to facilitate the exchange of drought mitigation plans on various scales
- Need to enhance inclusion of stakeholders in water allocation decisions
- Need to identify and set abstraction limitations during droughts (urban areas)
- Require prioritizing drought management in river basin management plans
- Should explore the use of runoff reduction techniques and measures (environmental buffering of water sources)
- Should create emergency drought protocols
- Explore and invest in information system development and distribution of information to different stakeholders before and during droughts
- Need to create and facilitate trans-boundary agreements on water allocation
- Focus on the development of warning indicators (both triggers for impact & natural hazard)
- Creating buffers and buffer areas

- Facilitating inter-sectoral agreements on water allocation
- Develop awareness raising campaigns and educational campaigns on water scarcity, droughts and water use

Businesses:

- Should develop and implement drought management plans on company level
- Could improve water efficiency in production or industrial processes and therefore reduce the dependence on water sources.
- Use and develop improved irrigation technology (Agriculture is the main consumer of fresh water supply)
- Improved irrigation scheduling can greatly reduce the water demand.
- Could use crop changes to reduce vulnerability (less demanding crops/cultivars for agriculture in drought affected areas)
- Develop and invest in applications which could be used to deal with droughts
- Invest in knowledge exchange and educational programs for employees to deal with drought

Citizens:

- Can reduce water consumption by adopting water saving technologies.
- Reduce water demand during critical periods (limit abstraction from sources)
- Educate the peers on water consumption
- Limit the abstraction of water during a drought.

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Annex 1 Survey

Drought messages for Europe

Introduction.

Dear participant,

Thank you for taking part in this survey which will take approximately 20-30 minutes to complete. The survey aims to identify your views on options to improve drought preparedness in Europe. We will use the results of the survey to produce messages on drought preparedness to various audiences involved in drought in Europe. The survey is part of the DROUGHT R&SPI project (EU FP7-Environment project, coordinated by Wageningen University) and an MSc thesis project (Wageningen University and Alterra), focusing on drought in Europe. The link can be used by an unlimited amount of participants and the survey will remain open until 20/02/2015.

Your response will be treated confidentially and cannot be related back to you in any way. For further information about this survey please contact Pascal Witmer (email; pascal.witmer@wur.nl).

Yours sincerely,

F. Pascal Witmer

*Environmental Science Group
Wageningen University
Wageningen
The Netherlands*

Q1.1 I'm living in;

- Austria
- Andorra
- Belgium
- Bulgaria
- Croatia
- Cyprus
- Czech Republic
- Denmark
- Estonia
- Finland
- France
- Germany
- Greece
- Hungary
- Iceland
- Ireland
- Italy
- Latvia
- Lithuania
- Lichtenstein
- Luxembourg
- Malta
- Monaco
- The Netherlands
- Norway
- Poland
- Portugal
- Romania
- Slovakia
- Slovenia
- Spain
- Sweden
- Switzerland
- United Kingdom
- Other...

Answer If Question 1; I'm living in:(please tick appropriate box) → 35. Other... Is Selected

Q1.1 If you selected other please indicate your country in the text box below;

TEXT 1 The following section is related to your experience and profession

Q1.2 My profession is related to the following sector(s); (multiple answers possible)

- Agriculture
- Consultancy
- Education
- Energy
- Engineering
- Finance
- Fisheries
- Forestry & Nature
- Environment
- Industry
- Media
- Mining
- Politics
- Policy
- Science/Academia
- Shipping/Transport
- Tourism
- Recreation
- Water Management
- Other

Q1.3 My work is oriented on the following scale(s); (multiple answers possible)

- Company level
- Local/municipal Level
- River basin Level
- Regional Level
- National Level
- European Level
- Global Level
- All these levels

Q1.4 I have experience with drought(s); (multiple answers possible)

- Yes, I live in an area affected by droughts.
- Yes, I'm studying droughts
- Yes, I'm working with drought management
- No, I don't have experience related to drought

If No, I don't have experience... Is Selected, Then Skip To End of Survey

TEXT 2 The next section is related to levels, scales and drought management options

Q2.1 Which implementation level do you consider most important to focus on in order to reduce drought vulnerability? Please give a ranking for the importance each level (1- very unimportant, 10- very important);

Table A 1

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)	10 (10)
a) Household/company level	<input type="radio"/>									
b) Local level	<input type="radio"/>									
c) Regional level	<input type="radio"/>									
d) River basin level	<input type="radio"/>									
e) National level	<input type="radio"/>									
f) European Level	<input type="radio"/>									

Q2.2.1 Coordination of measures across scales is an issue in drought management

- Yes
- No

Answer If Coordination of measures across scales is an issue in drought management yes Is Selected

Q2.2.2 Why is coordination of drought management an issue? Please explain briefly in the text box below; (The following scales are considered; household/company -, local -, regional-, river basin-, national and European level)

Q2.3 Please indicate the importance of the following audiences to improve drought preparedness in Europe; (1- very unimportant, 10- very important)

Table A 2

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)	10 (10)
a) EU policy makers	<input type="radio"/>									
b) National Policy makers	<input type="radio"/>									
c) Regional Policy makers	<input type="radio"/>									
d) Local Policy makers	<input type="radio"/>									
e) Local Leaders	<input type="radio"/>									
f) River basin authorities	<input type="radio"/>									
g) Finance institutions	<input type="radio"/>									
h) Citizens	<input type="radio"/>									
i) Farmers	<input type="radio"/>									
j) Industry	<input type="radio"/>									
k) Nature organizations	<input type="radio"/>									
l) Religious leaders	<input type="radio"/>									
m) Youth	<input type="radio"/>									

Q2.4 Which kind of drought management works best to limit economic and societal impacts in Europe?

- Pro-active approach
- Re-active approach
- Crisis management
- Other,... (please specify) _____

TEXT 3 The following section contains options focused on economic value, water use efficiency, options to limit supply or demand, environmental buffering, water management, policy options and information distribution. Please indicate the importance of the following measures in drought management and rank each option with a value between 1-10 (1- not important at all, 10- very important).

Q3.1 Economic options, the importance of; (1- not important at all, 10- very important)

Table A 3

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)	10 (10)
a) Crop insurance	<input type="radio"/>									
b) Payment for environmental services	<input type="radio"/>									
c) Trading of Water Rights	<input type="radio"/>									
d) Water pricing per volume	<input type="radio"/>									
e) Water pricing per usage type	<input type="radio"/>									
f) Water metering	<input type="radio"/>									

Q3.2 Water use efficiency options, the importance of; (1- not important at all, 10- very important)

Table A 4

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)	10 (10)
a) Improved irrigation technology	<input type="radio"/>									
b) Improved irrigation scheduling	<input type="radio"/>									
c) Crop change (less consumptive crops)	<input type="radio"/>									
d) Water use efficiency improvement in Industrial processes	<input type="radio"/>									
e) Water use efficiency improvement in households (i.e. use of water saving toilets and showers)	<input type="radio"/>									
f) Water loss reduction in distribution networks	<input type="radio"/>									

Q3.3 Demand and supply options, the importance of; (1- not important at all, 10- very important)

Table A 5

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)	10 (10)
a) Limiting water supply (urban)	<input type="radio"/>									
b) Limiting water supply for irrigation	<input type="radio"/>									
c) Limiting water supply for industry	<input type="radio"/>									
d) Reducing of illegal abstraction/impoundments	<input type="radio"/>									
e) Implementing water saving technologies	<input type="radio"/>									
f) Setting abstraction limits (during droughts, urban areas)	<input type="radio"/>									
g) Setting abstraction limitations for specific industries	<input type="radio"/>									
h) Using desalination plants	<input type="radio"/>									
i) Energy technology changes (i.e. change towards energy produced with limited requirements of freshwater resources; wind, solar or tidal energy)	<input type="radio"/>									
j) Use of groundwater sources	<input type="radio"/>									
k) Ground water recharge programmes	<input type="radio"/>									
l) Creating buffer reservoirs	<input type="radio"/>									
m) Pond construction (farm scale)	<input type="radio"/>									
n) Construction of dams	<input type="radio"/>									
o) Rain water harvesting	<input type="radio"/>									
p) Water reuse from urban areas for irrigation purposes	<input type="radio"/>									
q) Water reuse from industrial uses for irrigation purposes	<input type="radio"/>									

Q3.4 Environmental buffering, the importance of; (1- not important at all, 10- very important)

Table A 6

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)	10 (10)
a) Green infrastructure for water storage	<input type="radio"/>									
b) Setting environmental flow minimum	<input type="radio"/>									
c) Improving water retention capacity of the soil	<input type="radio"/>									
d) Using runoff reduction techniques/measures	<input type="radio"/>									
d) Restoration of natural meanders	<input type="radio"/>									

Q3.5 Water management measures, the importance of; (1- not important at all, 10- very important)

Table A 7

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)	10 (10)
a) Developing drought management plans	<input type="radio"/>									
b) Ground water recharge programs	<input type="radio"/>									
c) Improving irrigation system infrastructure	<input type="radio"/>									
d) Reduction of leakage from water distribution networks (drinking/urban-water supply)	<input type="radio"/>									
e) Water accounting	<input type="radio"/>									

Q3.6 Drought warning indicators, the importance of; (1- not important at all, 10- very important)

Table A 8

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)	10 (10)
a) Development of warning indicators triggered by natural hazard	<input type="radio"/>									
b) Development of warning indicators triggered by impact	<input type="radio"/>									

Q3.7 Policy making, establishment of; (1- not important at all, 10- very important)

Table A 9

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)	10 (10)
a) Transboundary agreements on water allocation	<input type="radio"/>									
b) Intersectoral agreements on water allocation	<input type="radio"/>									
c) Drought Management Plans	<input type="radio"/>									
d) Emergency Drought Protocols	<input type="radio"/>									
e) Inclusion of drought in general public safety protocols	<input type="radio"/>									
f) Drought management priorities in River Basin Management Plans	<input type="radio"/>									
h) Prioritization of sector specific water allocation	<input type="radio"/>									
i) Training in complex decision making	<input type="radio"/>									

Q3.8 Awareness creation options, development of; (1- not important at all, 10- very important)

Table A 10

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)	10 (10)
a) Awareness campaigns by government institutions	<input type="radio"/>									
b) Information systems on development of a drought	<input type="radio"/>									
c) Development of school games focused on drought	<input type="radio"/>									
d) Development of public drought warning levels	<input type="radio"/>									
e) Educational programs on drought	<input type="radio"/>									
f) Improved drought knowledge databases	<input type="radio"/>									
g) Sector specific drought reports	<input type="radio"/>									
h) Increased attention for drought in the UN desertification and drought day (June 17)	<input type="radio"/>									
i) Media to inform the general public.	<input type="radio"/>									
j) Awareness raising projects on water consumption	<input type="radio"/>									

Q3.8 Are there any other measures you would include or consider? (If you have any additions please fill in the text box below)

- Yes, _____
 No

The following section focuses on ways to deliver information to target audiences for drought mitigation measures.

Q4.1 What would you consider the best option to inform public authorities on drought? (Please select the importance level for each communication tool)

Table A 11

	Not important at all (1)	Very Unimportant (2)	Somewhat Unimportant (3)	Somewhat Important (4)	Very Important (5)	Extremely Important (6)
a) Commercials	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Documentaries	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) Digital news letters	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) Educational programs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e) Fliers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f) Information sessions/meetings	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g) Academic journal articles	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h) Leaflets	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i) Newspapers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
j) Radio items	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
k) Social media	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
l) TV items	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
m) Video blog	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
n) Posters/Banners	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
o) Conferences	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
p) Smartphone applications	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q4.2 What would you consider the best option to inform businesses on drought? (Please select the importance level for each communication tool)

Table A 12

	Not important at all (1)	Very Unimportant (2)	Somewhat Unimportant (3)	Somewhat Important (4)	Very Important (5)	Extremely Important (6)
a) Commercials	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Documentaries	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) Digital news letters	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) Educational programs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e) Fliers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f) Information sessions/meetings	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g) Academic journal articles	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h) Leaflets	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i) Newspapers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
j) Radio items	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
k) Social media	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
l) TV items	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
m) Video blog	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
n) Posters/Banners	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
o) Conferences	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
p) Smartphone applications	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q4.3 What would you consider the best option to inform citizens on drought? (Please select the importance level for each communication tool)

Table A 13

	Not important at all (1)	Very Unimportant (2)	Somewhat Unimportant (3)	Somewhat Important (4)	Very Important (5)	Extremely Important (6)
a) Commercials	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Documentaries	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) Digital news letters	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) Educational programs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e) Fliers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f) Information sessions/meetings	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g) Academic journal articles	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h) Leaflets	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i) Newspapers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
j) Radio items	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
k) Social media	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
l) TV items	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
m) Video blog	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
n) Posters/Banners	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
o) Conferences	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
p) Smartphone applications	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q7 Do you have any further suggestions, messages, comments, or thoughts which need to be taken into consideration, concerning options and/or messages for drought vulnerability reduction of the European communities?

- Yes, (please fill in text box) _____
- No, I don't have any further comments

Q8 Would you like to participate in an in-depth interview focusing on key messages for drought vulnerability reduction of the European community? (The interview will be conducted in English or Dutch)

- Yes, (please leave your contact details below) (1) _____
- No, thank you (2)

Annex 2 Survey results

Question 1.5 has been used as control question

My Report

Last Modified: 03/20/2015

Filter By: Report Subgroup

1.1.1 I'm living in;

Table B- 1 Origin of respondents

#	Answer	Response	%
1	Austria	1	1%
2	Andorra	0	0%
3	Belgium	5	7%
4	Bulgaria	0	0%
5	Croatia	1	1%
6	Cyprus	1	1%
7	Czech Republic	2	3%
8	Denmark	0	0%
9	Estonia	0	0%
10	Finland	0	0%
11	France	6	8%
12	Germany	6	8%
13	Greece	5	7%
14	Hungary	1	1%
15	Iceland	0	0%
16	Ireland	0	0%
17	Italy	0	0%
18	Latvia	0	0%
19	Lithuania	0	0%
20	Lichtenstein	0	0%
21	Luxembourg	0	0%
22	Malta	2	3%
23	Monaco	0	0%
24	The Netherlands	9	12%
25	Norway	0	0%
26	Poland	1	1%
27	Portugal	4	5%
28	Romania	0	0%
29	Slovakia	5	7%
30	Slovenia	1	1%
31	Spain	11	15%
32	Sweden	1	1%
33	Switzerland	2	3%
34	United Kingdom	0	0%
35	Other...	11	15%

1.1.2 If you selected other please indicate your country in the text box below;

Table B- 2 Results if the response of Table 1 "other" was selected

Text Response
China
Turkey
India
China
Canada
I am currently living in Chile.
México
New Zealand
México
Nigeria

1.2 My profession is related to the following sector(s); (multiple answers possible)

Table B- 3 Professional field of respondents

#	Answer	Response	%
1	Agriculture	17	24%
2	Consultancy	3	4%
3	Education	8	11%
4	Energy	1	1%
5	Engineering	10	14%
6	Finance	1	1%
7	Fisheries	2	3%
8	Forestry & Nature	5	7%
9	Environment	32	44%
10	Industry	2	3%
11	Media	1	1%
12	Mining	0	0%
13	Politics	4	6%
14	Policy	11	15%
15	Science/Academia	24	33%
16	Shipping/Transport	0	0%
17	Tourism	1	1%
18	Recreation	0	0%
19	Water Management	46	64%
20	Other	5	7%

1.3 My work is oriented on the following scale(s); (multiple answers possible)

Table B- 4 Scale level of professional field

#	Answer	Response	%
1	Company level	4	6%
2	Local/municipal Level	15	21%
3	River basin Level	36	50%
4	Regional Level	35	49%
5	National Level	44	61%
6	European Level	27	38%
7	Global Level	17	24%
8	All these levels	3	4%

1.4 I have experience with drought(s); (multiple answers possible)

Table B- 5 Experiences with drought

Answer	Response	%
Yes, I live in an area affected by droughts.	31	44%
Yes, I'm studying droughts	41	59%
No, I don't have experience related to drought	0	0%
Yes, I'm working with drought management	36	51%

2.1 Which implementation level do you consider most important to focus on in order to reduce drought vulnerability? Please give a ranking for the importance each level (1- very unimportant, 10- very important);

Table B- 6 Importance of different implementation levels

#	Question	1	2	3	4	5	6	7	8	9	10	Total Responses	Mean
1	a) Household/company level	0	2	5	4	5	6	9	15	9	10	65	7.08
3	b) Local level	0	0	1	3	6	6	7	11	13	18	65	7.92
4	c) Regional level	1	1	1	1	3	0	8	16	19	15	65	8.15
5	d) River basin level	2	1	0	0	0	0	6	14	13	30	66	8.71
6	e) National level	1	1	1	3	3	8	9	9	11	20	66	7.80
7	f) European Level	2	2	3	6	4	4	12	13	3	15	64	7.00

Table B- 7 Statistics of Question 2.1

Statistic	a) Household/company level	b) Local level	c) Regional level	d) River basin level	e) National level	f) European Level
Min Value	2	3	1	1	1	1
Max Value	10	10	10	10	10	10
Mean	7.08	7.92	8.15	8.71	7.80	7.00
Variance	5.20	3.79	3.73	3.69	4.84	6.41
Standard Deviation	2.28	1.95	1.93	1.92	2.20	2.53
Total Responses	65	65	65	66	66	64

2.2.1 Coordination of measures across scales is an issue in drought management

Table B- 8 Coordination across scales

#	Answer	Response	%
1	Yes	57	88%
2	No	8	12%
	Total	65	100%

2.2.2 Why is coordination of drought management an issue? Please explain briefly in the text box below; (The following scales are considered; household/company -, local -, regional-, river basin-, national and European level)

[Table B- 9 Reason why implementation across scales is an issue](#)

Text Response
<ul style="list-style-type: none"> In order to avoid the implementation of "contradictory" measures and improve knowledge/experience exchange
<ul style="list-style-type: none"> European level -> different laws in application/not the same vision of droughts National level -> disagreement between politics river basin/local -> problem of money and priority (for the mayor, more important to be re-elected) household -> not feeling concerned (still have water)
<ul style="list-style-type: none"> Drought management should taken into account both sectoral approach and scale. Not all problems have the same level of importance and activities directed to reduce the impact need to be appropriately selected.
<ul style="list-style-type: none"> Due to overlapping jurisdictions and lack of proper coordination mechanisms among the involved institutions / actors.
<ul style="list-style-type: none"> drought affect all europe
<ul style="list-style-type: none"> Sometimes policy measures that are inflicted upon regional or local scales from the higher end of the spectrum may result in conflicts or counter-productive measures that complicate adaptation to drought or management of water resources in drought stricken areas. Something as simple as a landscaping contract that a government gives to a landscaping consortium over a number of years, regardless of the availability of water resources, may have negative implications at the local scale especially when water resources are used inefficiently and the wrong types of species are grown.
<ul style="list-style-type: none"> Drought management needs coordination among several scales, it's not only a household problem, its not only a local or regional - river basin, nor a national problem which could be solved easily
<ul style="list-style-type: none"> the problem is that too much sectoral decisions ar made without consideration to other sectors. Although it is understood that a basin is an appropriate unit for measures, the decisions are made at very local level or very national (EU) level.
<ul style="list-style-type: none"> Because there is so many different sectors involved - a lot of coordination:
<ul style="list-style-type: none"> depending on the drought, system and use there are several possibilities to manage the problem. In an area with a lot of companies it is probably more efficient to take measures in the local/regional/national watersystem whereas in an area with 1 minor company it can be more effective to take measures at company level. However, the measurments will effect each other and if measurements in the watersystem are taken, the Household/company at thsi moment doesn't have to take measures. So therefore coordination is necessary
<ul style="list-style-type: none"> There is necessary to coordinate the process in the European level and after to use it in national/regional/local scale. As a middle european country there is not so strong pressure to be involved in this issue, but the EU level coordination could help with strating to solve this topic.
<ul style="list-style-type: none"> because water is also used in other regions (upstream) than where drought appears (e.g. downstream). also regional or river-basin-based water availability needs to be coordinated with water use in households/companies.
<ul style="list-style-type: none"> Because it is complex and cross cutting issue, influencing different sectors such as agriculture, forestry, water management, municipalities, land use planning and others.
<ul style="list-style-type: none"> Drought is a regional & waterbasin issue which requires upstream and downstream collaboration to tackle it.
<ul style="list-style-type: none"> The sensitivity of drought as a problem with Climate Change on regional and river-basin level is low so far. Climate Change and drought adaptation initiatives in Switzerland are today on a national level, but measures are necessary on regional and river-basin level. So Coordination between these levels are an issue.
<ul style="list-style-type: none"> Measures at different scales need to reinforce each other - and not work against each other. Alignment of directions is important.
<ul style="list-style-type: none"> drought often occurs at a large scale, but it has different influences at different regions. drought management should collaboratively be proceeded across different scales, especially for the policy-making.
<ul style="list-style-type: none"> There are usually conflicting objectives among stakeholders. During droughts they perceive water as more valuable than in normal situations and they resist harder to apply measures which could affect them in a negative way
<ul style="list-style-type: none"> Coordinating knowledge, expertise, projects and ideas in order to reduce droughts
<ul style="list-style-type: none"> who is the money manager?
<ul style="list-style-type: none"> Avoids duplication of resources. Provides a better overall understanding of impacts, vulnerabilities, and adaptation measures associated with droughts a many levels.
<ul style="list-style-type: none"> coordination is needed to share information, coordination is needed to share tasks (who is responsible for what), coordination is needed to know which resources (human capital, water,...) are available. Management in general is not a stagnant issue, is changes and it is the task of the coordination to provide a structure/ orientation/ to guide - the same accounts in drought management always management can/ should be improved, and this goes along with the coordination as well
<ul style="list-style-type: none"> In the case of my country (Mexico), coordination between the different scales is a problem because the implementation of actions involves the participation of different entities of the federal, state and municipal governments, which often belong to different political parties. Therefore, it is a political problem.
<ul style="list-style-type: none"> At the local level, arrangements between stakeholders may limit the application of drought measures taken at the national or river-basin level.
<ul style="list-style-type: none"> National level (EU member states) drive European level. The EU sets Directives and Communications. This need to be implemented on the river basin scale. National scale needs to interact with river basin level (important level stakeholder consultation). Households/ companies are eventually affected, but are very dependent on the implementation on the river basin level (should be well represented by stakeholders).
<ul style="list-style-type: none"> At company level: drinking water companies may contribute to avoid drought in abstraction zone. Local/regional scale issues relate to water level management e.g. in relation to agriculture and natural areas. River basin is important to guarantee minimum flows for cross-border rivers. National is important as some of the measures may be imposed by national regulation. European level is only needed to create awareness and to guarantee that river basin approaches really work.
<ul style="list-style-type: none"> It is an holistic view. A local scale have effects on an European level and viceversa.
<ul style="list-style-type: none"> To ensure efficiency of the measures implemented and enhance coherence and consistency among measures accross different levels
<ul style="list-style-type: none"> Coordination at different levels is very important. Drought has different dimension taking into account the point of view. Households/companies in several areas of Spain are very vulnerable and the measures to apply depend on policies, markets and capabilities of each one to assume diferent level of losses (production or incomes). Our Agricultural Insurance System is a very important tool to reduce this vulnerability, but currently more and more areas, crops and farmers are exposed to drought. It is important to take into account climate change in the group of elements to define new ways to reduce the impact of drought, in Spain and all over the world.
<ul style="list-style-type: none"> droughts are linked with shortage of water availability and may lead to prioristaion of uses and efforts to use water more wisely. End Consumers will be affected (households/ companies) but they can also react by using water more wisely / abstain from wasting water. The local level (including municipalities) are key players between end users and the regional ...level and has a key role e.g. in providing and storing drinking water; the national and EU level has to provide an appropriate frame for water management in times of droughts; to avoid misunderstandings this is not a plea for an EU legislative framework but more a plea for exchange of experiences / approaches made at regional /national level
<ul style="list-style-type: none"> The implementation of European, national or regional policies have to be done mainly on local level.
<ul style="list-style-type: none"> There arn't borders between areas affected by drought
<ul style="list-style-type: none"> Drought in a region brings shortage in forrages , so it's important to have coordination between regions trough farmers unions to avoid speculation
<ul style="list-style-type: none"> Because it affects our lives in health and wealth
<ul style="list-style-type: none"> Implementation of measures at one level influences the avilaibility and acces of water other levels.
<ul style="list-style-type: none"> water utilization + consumption is complex and highly interlinked, concerning surface water as well as groundwater -> cannot examined seperately, if the optimum for an area is desired - although water use are regulated by governmental agencies, their view may end at the border of their district -> aims and measurements on a higher spatial scale have to be managed
<ul style="list-style-type: none"> l'eau est un bien public appartenantà tous. et nous devons en cas de sécheresse l'utiliser et la partager! et cela peut engendrer des conflits, dans l'usageet partage de l'eau,tout comme dans le besoin prioritairelles ménages,l'agriculture, l'aquaculture ,pisciculture,les stations de pompage d'eau publique etc... 1976et 3003 en france ont été des années catastrophiques. une gestion très rigoureuse de l'eau et de sa consommation,de son cout doit se mettre en place,localement ,régionalement ! et créer des réserves!
<ul style="list-style-type: none"> Drought management should be considered as a key part of the water management, and thus, action at the local (including household/company) level should respond to regional and/or river basin coordinated principles. For the same reason there should be further coordintaion with the national and European levels
<ul style="list-style-type: none"> Starting with the regional level the coordination can minimize drought impacts. at household/local level the predictibility of drought is lower because of too many small influencing factors.
<ul style="list-style-type: none"> The challenge is to find a balance between individual water management needs, which vary from field to field and household to household, and water management as a collective activity of a society.
<ul style="list-style-type: none"> to have a coherent message for all the people to have coherent actions between all the actor

- It will help to know the affected areas and to reduce the vulnerability risks.
- European level can give guidance so that droughts are tackled but this guidance needs to be applied at the appropriate level, which is the level of vulnerability with regards to droughts. It can be the river basin entirely but also only some part of it because the pressure is more important from a region to another. It needs then coordination between the different level to identify the needs and the solution that can be implemented, which also vary depending on the local regulation. For example water reuse is not allowed in every European country so it can be a solution for certain area but not for all. Finally, reducing water consumption is a key element in drought management and it is done at household /company level. Again different actions at different level need to be coordinated (educational programs, incentives...).

2.3 Please indicate the importance of the following audiences to improve drought preparedness in Europe; (1- very unimportant, 10- very important)

Table B- 10 The importance of different stakeholders in drought management

#	Question	1	2	3	4	5	6	7	8	9	10	Total Responses	Mean
1	a) EU policy makers	1	2	3	0	6	6	8	9	13	15	63	7.54
2	b) National Policy makers	1	1	0	2	2	2	5	16	13	21	63	8.30
3	c) Regional Policy makers	0	2	1	1	3	4	6	15	15	15	62	8.02
4	d) Local Policy makers	0	0	4	2	3	3	6	17	11	16	62	7.90
5	e) Local Leaders	0	0	4	5	3	7	7	13	7	15	61	7.46
6	f) River basin authorities	1	2	0	0	1	1	4	13	14	26	62	8.61
7	g) Finance institutions	2	4	2	2	2	7	12	13	9	8	61	6.97
8	h) Citizens	1	1	0	5	5	3	10	16	7	13	61	7.49
9	i) Farmers	1	0	1	1	2	2	7	13	13	21	61	8.36
10	j) Industry	0	0	1	3	3	2	11	24	5	12	61	7.80
11	k) Nature organizations	0	0	2	3	6	6	14	12	6	12	61	7.41
12	l) Religious leaders	20	6	3	4	6	4	6	4	3	5	61	4.30
13	m) Youth	3	1	3	5	9	6	8	12	5	8	60	6.53

Table B- 11 The statistics of Question 2.3

Statistic	a) EU policy makers	b) National Policy makers	c) Regional Policy makers	d) Local Policy makers	e) Local Leaders	f) River basin authorities	g) Finance institutions	h) Citizens	i) Farmers	j) Industry	k) Nature organizations	l) Religious leaders	m) Youth
Min Value	1	1	2	3	3	1	1	1	1	3	3	1	1
Max Value	10	10	10	10	10	10	10	10	10	10	10	10	10
Mean	7.54	8.30	8.02	7.90	7.46	8.61	6.97	7.49	8.36	7.80	7.41	4.30	6.53
Variance	5.51	3.86	3.88	4.12	4.85	3.81	5.97	4.59	3.53	2.83	3.71	9.94	6.08
Standard Deviation	2.35	1.96	1.97	2.03	2.20	1.95	2.44	2.14	1.88	1.68	1.93	3.15	2.47
Total Responses	63	63	62	62	61	62	61	61	61	61	61	61	60

2.4 Which kind of drought management works best to limit economic and societal impacts in Europe?

Table B- 12 Preferred approaches in Drought Management

#	Answer	Response	%
1	Pro-active approach	55	87%
2	Re-active approach	1	2%
3	Crisis management	2	3%
4	Other.... (please specify)	5	8%
	Total	63	100%

Table B- 13 Elaboration of the response "other" from Question 2.4

Other.... (please specify)
risk management
pro active approach with crisis management available for in case
all of the bother - learning from events, foresight, good management and risk management (if drought is understood as a risk)
It's not reactive, but it's best when people really experience a change

3.1 Economic options, the importance of; (1- not important at all, 10- very important)

Table B- 14 Evaluation of measures related to economic options

#	Question	1	2	3	4	5	6	7	8	9	10	Total Responses	Mean
1	a) Crop insurance	0	2	2	2	5	5	7	10	17	7	57	7.46
2	b) Payment for environmental services	2	2	2	2	3	5	8	15	8	10	57	7.25
3	c) Trading of Water Rights	3	4	4	1	4	5	14	13	5	5	58	6.45
4	d) Water pricing per volume	3	0	2	0	1	9	9	12	10	12	58	7.53
5	e) Water pricing per usage type	2	0	2	2	2	8	9	10	10	13	58	7.53
6	f) Water metering	1	2	1	2	5	3	6	9	14	15	58	7.74

Table B- 15 Statistics of Question 3.1

Statistic	a) Crop insurance	b) Payment for environmental services	c) Trading of Water Rights	d) Water pricing per volume	e) Water pricing per usage type	f) Water metering
Min Value	2	1	1	1	1	1
Max Value	10	10	10	10	10	10
Mean	7.46	7.25	6.45	7.53	7.53	7.74
Variance	4.54	5.76	6.36	5.20	5.06	5.46
Standard Deviation	2.13	2.40	2.52	2.28	2.25	2.34
Total Responses	57	57	58	58	58	58

3.2 Water use efficiency options, the importance of; (1- not important at all, 10- very important)

Table B- 16 Evaluation of measures related to water use efficiency options

#	Question	1	2	3	4	5	6	7	8	9	10	Total Responses	Mean
3	a) Improved irrigation technology	0	0	1	0	0	1	5	13	17	20	57	8.79
4	b) Improved irrigation scheduling	2	0	0	0	0	2	4	14	15	20	57	8.58
5	c) Crop change (less consumptive crops)	2	0	0	0	1	4	7	8	19	15	56	8.30
6	d) Water use efficiency improvement in Industrial processes	2	0	1	2	1	2	7	11	18	12	56	8.02
7	e) Water use efficiency improvement in households (i.e. use of water saving toilets and showers)	2	1	2	2	2	2	10	15	12	8	56	7.46
8	f) Water loss reduction in distribution networks	1	0	1	2	1	2	5	17	11	17	57	8.23

Table B- 17 Statistics related to Question 3.2

Statistic	a) Improved irrigation technology	b) Improved irrigation scheduling	c) Crop change (less consumptive crops)	d) Water use efficiency improvement in Industrial processes	e) Water use efficiency improvement in households (i.e. use of water saving toilets and showers)	f) Water loss reduction in distribution networks
Min Value	3	1	1	1	1	1
Max Value	10	10	10	10	10	10
Mean	8.79	8.58	8.30	8.02	7.46	8.23
Variance	1.70	3.32	3.71	4.45	5.09	3.64
Standard Deviation	1.31	1.82	1.93	2.11	2.26	1.91
Total Responses	57	57	56	56	56	57

3.3 Demand and supply options, the importance of; (1- not important at all, 10- very important)

Table B- 18 Evaluation of measures related to demand and supply options

#	Question	1	2	3	4	5	6	7	8	9	10	Total Responses	Mean
1	a) Limiting water supply (urban)	4	5	1	4	4	7	15	8	4	6	58	6.21
2	b) Limiting water supply for irrigation	4	1	1	1	2	8	6	13	11	10	57	7.30
3	d) Reducing of illegal abstraction/impoundments	3	2	2	2	2	2	5	6	13	18	55	7.69
4	e) Implementing water saving technologies	0	1	1	0	3	0	7	9	12	23	56	8.55
5	f) Setting abstraction limits (during droughts, urban areas)	0	2	0	0	3	2	3	11	15	21	57	8.51
6	g) Setting abstraction limitations for specific industries	1	2	0	0	5	5	5	16	10	12	56	7.73
7	h) Using desalination plants	5	4	6	4	3	5	13	9	4	4	57	5.81
8	i) Energy technology changes (i.e. change towards energy produced with limited requirements of freshwater resources; wind, solar or tidal energy)	1	3	6	0	3	3	6	13	6	15	56	7.29
10	k) Ground water recharge programmes	0	3	1	2	3	5	11	8	11	12	56	7.54
11	l) Creating buffer reservoirs	0	2	2	1	1	4	10	16	12	6	54	7.57
13	m) Pond construction (farm scale)	1	1	1	1	5	6	11	12	10	8	56	7.39
14	o) Rain water harvesting	1	2	2	2	1	8	9	9	6	17	57	7.56
16	n) Construction of dams	3	1	6	0	4	10	9	9	10	4	56	6.57
17	j) Use of groundwater sources	2	5	0	3	9	7	6	11	10	4	57	6.51
23	p) Water reuse from urban areas for irrigation purposes	1	4	1	1	1	5	11	10	12	11	57	7.47
24	q) Water reuse from industrial uses for irrigation purposes	3	3	1	1	4	3	9	12	10	10	56	7.20
25	c) Limiting water supply for industry	2	4	0	1	7	7	12	11	9	3	56	6.68

Table B- 19 Statistics of Question 3.3

Statistic	Min Value	Max Value	Mean	Variance	Standard Deviation	Total Responses
a) Limiting water supply (urban)	1	10	6.21	6.76	2.60	58
b) Limiting water supply for	1	10	7.30	6.28	2.51	57
d) Reducing of illegal	1	10	7.69	7.62	2.76	55
e) Implementing water saving	2	10	8.55	3.31	1.82	56
f) Settling abstraction limits	2	10	8.51	3.47	1.86	57
g) Settling abstraction	1	10	7.73	4.45	2.11	56
h) Using desalination	1	10	5.81	7.30	2.70	57
i) Energy technology	1	10	7.29	7.08	2.66	56
k) Ground water recharge	2	10	7.54	4.91	2.22	56
l) Creating buffer reservoirs	2	10	7.57	3.76	1.94	54
m) Pond construction	1	10	7.39	4.13	2.03	56
o) Rain water harvesting	1	10	7.56	5.64	2.38	57
n) Construction of dams	1	10	6.57	5.99	2.45	56
j) Use of groundwater	1	10	6.51	6.08	2.46	57
p) Water reuse from urban areas	1	10	7.47	5.61	2.37	57
q) Water reuse from industrial	1	10	7.20	6.67	2.58	56
c) Limiting water supply for	1	10	6.68	5.17	2.27	56

3.4 Environmental buffering, the importance of: (1- not important at all, 10- very important)

Table B- 20 Evaluation of measures related to environmental buffering options

#	Question	1	2	3	4	5	6	7	8	9	10	Total Responses	Mean
1	a) Green infrastructure for water storage	0	2	2	2	4	4	7	9	13	14	57	7.72
2	b) Settling environmental flow minimum	0	3	0	0	5	7	6	11	9	15	56	7.75
4	c) Improving water retention capacity of the soil	1	1	1	1	2	4	6	13	11	17	57	8.05
5	d) Restoration of natural meanders	1	2	2	0	2	5	6	14	10	14	56	7.77
6	d) Using runoff reduction techniques/measures	1	0	1	0	1	5	11	13	8	16	56	8.07

Table B- 21 Statistics of Question 3.4

Statistic	a) Green infrastructure for water storage	b) Setting environmental flow minimum	c) Improving water retention capacity of the soil	d) Restoration of natural meanders	d) Using runoff reduction techniques/measures
Min Value	2	2	1	1	1
Max Value	10	10	10	10	10
Mean	7.72	7.75	8.05	7.77	8.07
Variance	4.96	4.59	4.37	5.05	3.38
Standard Deviation	2.23	2.14	2.09	2.25	1.84
Total Responses	57	56	57	56	56

3.5 Water management measures, the importance of; (1- not important at all, 10- very important)

Table B- 22 Evaluation of measures related to water management options

#	Question	1	2	3	4	5	6	7	8	9	10	Total Responses	Mean
2	a) Developing drought management plans	2	0	1	0	0	1	5	7	17	24	57	8.68
4	b) Ground water recharge programs	1	0	3	0	6	3	9	16	8	10	56	7.52
5	c) Improving irrigation system infrastructure	0	1	1	1	0	4	8	12	14	16	57	8.26
6	d) Reduction of leakage from water distribution networks (drinking/urban-water supply)	1	2	0	3	1	4	10	13	11	12	57	7.70
7	e) Water accounting	1	3	1	0	1	6	10	13	11	10	56	7.57

Table B- 23 Statistics of Question 3.5

Statistic	a) Developing drought management plans	b) Ground water recharge programs	c) Improving irrigation system infrastructure	d) Reduction of leakage from water distribution networks (drinking/urban-water supply)	e) Water accounting
Min Value	1	1	2	1	1
Max Value	10	10	10	10	10
Mean	8.68	7.52	8.26	7.70	7.57
Variance	3.90	4.25	3.13	4.61	4.83
Standard Deviation	1.97	2.06	1.77	2.15	2.20
Total Responses	57	56	57	57	56

3.6 Drought warning indicators, the importance of; (1- not important at all, 10- very important)

Table B- 24 Evaluation of early warning indicators

#	Question	1	2	3	4	5	6	7	8	9	10	Total Responses	Mean
2	a) Development of warning indicators triggered by natural hazard	0	1	2	2	3	3	6	10	8	22	57	8.12
3	b) Development of warning indicators triggered by impact	1	0	1	2	4	3	7	8	10	21	57	8.12

Table B- 25 Statistics of Question 3.6

Statistic	a) Development of warning indicators triggered by natural hazard	b) Development of warning indicators triggered by impact
Min Value	2	1
Max Value	10	10
Mean	8.12	8.12
Variance	4.61	4.54
Standard Deviation	2.15	2.13
Total Responses	57	57

3.7 Policy making, establishment of; (1- not important at all, 10- very important)

Table B- 26 Evaluation of policy options in drought management

#	Question	1	2	3	4	5	6	7	8	9	10	Total Responses	Mean
1	a) Transboundary agreements on water allocation	0	1	2	1	1	8	1	11	13	18	56	8.16
2	b) Intersectoral agreements on water allocation	1	2	0	2	0	3	10	12	11	15	56	7.96
3	c) Drought Management Plans	1	1	1	0	0	2	0	10	14	28	57	8.84
4	d) Emergency Drought Protocols	0	1	0	1	2	3	5	13	12	20	57	8.44
5	e) Inclusion of drought in general public safety protocols	0	1	3	0	1	5	9	10	13	14	56	7.96
6	f) Drought management priorities in River Basin Management Plans	1	0	1	0	1	4	6	6	13	25	57	8.60
10	h) Prioritization of sector specific water allocation	0	2	0	1	3	5	5	17	11	12	56	7.91
12	i) Training in complex decision making	1	1	1	1	2	8	9	12	13	9	57	7.61

Table B- 27 Statistics of Question 3.7

Statistic	a) Transboundary agreements on water allocation	b) Intersectoral agreements on water allocation	c) Drought Management Plans	d) Emergency Drought Protocols	e) Inclusion of drought in general public safety protocols	f) Drought management priorities in River Basin Management Plans	h) Prioritization of sector specific water allocation	i) Training in complex decision making
Min Value	2	1	1	2	2	1	2	1
Max Value	10	10	10	10	10	10	10	10
Mean	8.16	7.96	8.84	8.44	7.96	8.60	7.91	7.61
Variance	4.14	4.47	3.64	3.00	3.96	3.53	3.61	4.03
Standard Deviation	2.03	2.11	1.91	1.73	1.99	1.88	1.90	2.01
Total Responses	56	56	57	57	56	57	56	57

3.8 Awareness creation options, development of; (1- not important at all, 10- very important)

Table B- 28 Evaluation of awareness options in drought management

#	Question	1	2	3	4	5	6	7	8	9	10	Total Responses	Mean
1	a) Awareness campaigns by government institutions	0	1	2	1	4	3	9	14	8	14	56	7.80
2	b) Information systems on development of a drought	0	1	2	1	1	2	8	11	14	16	56	8.20
3	c) Development of school games focused on drought	1	1	5	3	4	3	11	12	10	6	56	6.98
4	d) Development of public drought warning levels	0	1	3	0	1	9	5	13	14	10	56	7.77
5	e) Educational programs on drought	0	2	2	1	4	1	10	11	14	11	56	7.75
7	f) Improved drought knowledge databases	0	2	1	0	4	6	4	11	19	9	56	7.86
8	g) Sector specific drought reports	0	2	0	1	6	5	14	11	11	6	56	7.38
9	h) Increased attention for drought in the UN desertification and drought day (June 17)	1	2	4	5	7	8	6	8	8	7	56	6.57
10	i) Media to inform the general public.	2	2	1	0	5	3	10	10	9	14	56	7.55
12	j) Awareness raising projects on water consumption	2	0	0	2	5	3	6	12	9	17	56	7.89

Table B- 29 Statistics of Question 3.8

Statistic	a) Awareness campaigns by government institutions	b) Information systems on development of a drought	c) Development of school games focused on drought	d) Development of public drought warning levels	e) Educational programs on drought	f) Improved drought knowledge databases	g) Sector specific drought reports	h) Increased attention for drought in the UN desertification and drought day (June 17)	i) Media to inform the general public.	j) Awareness raising projects on water consumption
Min Value	2	2	1	2	2	2	2	1	1	1
Max Value	10	10	10	10	10	10	10	10	10	10
Mean	7.80	8.20	6.98	7.77	7.75	7.86	7.38	6.57	7.55	7.89
Variance	4.02	3.69	5.33	3.85	4.41	3.91	3.44	5.89	5.74	4.90
Standard Deviation	2.00	1.92	2.31	1.96	2.10	1.98	1.85	2.43	2.40	2.21
Total Responses	56	56	56	56	56	56	56	56	56	56

3.9 Are there any other measures you would include or consider? (If you have any additions please fill in the text box below)

Table B- 30 Other measures

#	Answer	Response	%
1	Yes,	5	9%
2	No	50	91%
	Total	55	100%

Table B- 31 Reply from Question 3.9

Yes, - suitability maps for water extraction from rivers - interconnection between water infrastructure - realtime information on internet about water supply and demand (for specific sectors or interdisciplinary) More prominent role of multi-month, seasonal, multi-year forecasting. Financial incentives may be applied. however, they should be cost-effective. formation a la consommation controlled drainage
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4.1 What would you consider the best option to inform public authorities on drought? (Please select the importance level for each communication tool)

Table B- 32 Information strategies to Public Authorities

#	Question	Not important at all	Very Unimportant	Somewhat Unimportant	Somewhat Important	Very Important	Extremely Important	Total Responses	Mean
1	a) Commercials	9	10	13	15	6	2	55	3.09
2	b) Documentaries	1	7	11	20	13	4	56	3.88
3	c) Digital news letters	2	3	13	22	14	2	56	3.88
4	d) Educational programs	1	1	7	12	25	10	56	4.59
5	e) Fliers	7	8	14	16	9	2	56	3.32
6	f) Information sessions/meetings	2	0	4	16	24	10	56	4.61
7	g) Academic journal articles	2	6	10	18	15	4	55	3.91
8	h) Leaflets	5	6	14	21	9	1	56	3.46
9	i) Newspapers	2	5	4	14	20	11	56	4.39
10	j) Radio items	2	7	6	16	17	8	56	4.13
11	k) Social media	3	4	7	17	18	7	56	4.14
12	l) TV items	2	5	4	15	21	9	56	4.34
13	m) Video blog	3	10	12	21	8	2	56	3.48
14	n) Posters/Banners	4	7	15	17	11	2	56	3.54
15	o) Conferences	1	1	4	16	22	12	56	4.66
16	p) Smartphone applications	7	10	7	18	10	3	55	3.42

Table B- 33 Statistics of Question 4.1

Statistic	a) Commercials	b) Documentaries	c) Digital news letters	d) Educational programs	e) Fliers	f) Information sessions/meetings	g) Academic journal articles	h) Leaflets	i) Newspapers	j) Radio items	k) Social media	l) TV items	m) Video blog	n) Posters/Banners	o) Conferences	p) Smartphone applications
Min Value	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Max Value	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Mean	3.09	3.88	3.88	4.59	3.32	4.61	3.91	3.46	4.39	4.13	4.14	4.34	3.48	3.54	4.66	3.42
Variance	1.90	1.38	1.17	1.19	1.82	1.19	1.53	1.45	1.77	1.82	1.72	1.68	1.45	1.56	1.14	2.10
Standard Deviation	1.38	1.18	1.08	1.09	1.35	1.09	1.24	1.21	1.33	1.35	1.31	1.30	1.21	1.25	1.07	1.45
Total Responses	55	56	56	56	56	56	55	56	56	56	56	56	56	56	56	55

4.2 What would you consider the best option to inform businesses on drought? (Please select the importance level for each communication tool)

Table B- 34 Information strategies for Businesses

#	Question	Not important at all	Very Unimportant	Somewhat Unimportant	Somewhat Important	Very Important	Extremely Important	Total Responses	Mean
1	a) Commercials	3	9	9	15	11	7	54	3.80
2	b) Documentaries	2	12	10	19	9	2	54	3.50
3	c) Digital news letters	2	7	7	17	18	3	54	3.94
4	d) Educational programs	3	6	5	16	13	11	54	4.17
5	e) Fliers	5	8	9	19	11	2	54	3.54
6	f) Information sessions/meetings	2	1	4	16	21	10	54	4.54
7	g) Academic journal articles	7	6	18	10	9	4	54	3.37
8	h) Leaflets	8	5	10	18	10	3	54	3.48
9	i) Newspapers	5	5	6	12	15	11	54	4.11
10	j) Radio items	5	5	7	16	13	8	54	3.94
11	k) Social media	5	7	9	13	10	10	54	3.85
12	l) TV items	4	9	8	12	13	8	54	3.83
13	m) Video blog	7	10	16	7	9	5	54	3.30
14	n) Posters/Banners	6	9	9	20	6	4	54	3.43
15	o) Conferences	3	3	5	17	17	9	54	4.28
16	p) Smartphone applications	7	7	7	12	12	8	53	3.74

Table B- 35 Statistics of Question 4.2

Statistic	a) Commercials	b) Documentaries	c) Digital news letters	d) Educational programs	e) Fliers	f) Information sessions/meetings	g) Academic journal articles	h) Leaflets	i) Newspapers	j) Radio items	k) Social media	l) TV items	m) Video blog	n) Posters/Banners	o) Conferences	p) Smartphone applications
Min Value	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Max Value	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Mean	3.80	3.50	3.94	4.17	3.54	4.54	3.37	3.48	4.11	3.94	3.85	3.83	3.30	3.43	4.28	3.74
Variance	2.05	1.50	1.56	2.10	1.76	1.35	2.05	2.07	2.44	2.20	2.47	2.33	2.29	1.95	1.75	2.66
Standard Deviation	1.43	1.22	1.25	1.45	1.33	1.16	1.43	1.44	1.56	1.48	1.57	1.53	1.51	1.40	1.32	1.63
Total Responses	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	53

4.3 What would you consider the best option to inform citizens on drought? (Please select the importance level for each communication tool)

Table B- 36 Information strategies for Citizens

#	Question	Not important at all	Very Unimportant	Somewhat Unimportant	Somewhat Important	Very Important	Extremely Important	Total Responses	Mean
1	a) Commercials	3	2	4	17	17	10	53	4.38
2	b) Documentaries	2	2	7	15	17	11	54	4.41
3	c) Digital news letters	5	6	13	13	13	3	53	3.60
4	d) Educational programs	0	2	7	9	18	18	54	4.80
5	e) Filers	3	5	11	16	16	2	53	3.81
6	f) Information sessions/meetings	3	5	15	14	13	3	53	3.72
7	g) Academic journal articles	11	22	9	7	3	1	53	2.47
8	h) Leaflets	2	10	9	15	14	3	53	3.72
9	i) Newspapers	0	0	4	11	18	21	54	5.04
10	j) Radio items	0	1	3	13	17	20	54	4.96
11	k) Social media	0	1	4	7	16	26	54	5.15
12	l) TV items	0	0	3	7	19	25	54	5.22
13	m) Video blog	3	5	9	12	18	7	54	4.07
14	n) Posters/Banners	3	7	15	12	14	3	54	3.67
15	o) Conferences	8	19	6	17	2	2	54	2.85
16	p) Smartphone applications	2	2	6	10	17	16	53	4.62

Table B- 37 Statistics of Question 4.3

Statistic	a) Commercials	b) Documentaries	c) Digital news letters	d) Educational programs	e) Filers	f) Information sessions/meetings	g) Academic journal articles	h) Leaflets	i) Newspapers	j) Radio items	k) Social media	l) TV items	m) Video blog	n) Posters/Banners	o) Conferences	p) Smartphone applications
Min Value	1	1	1	2	1	1	1	1	3	2	2	3	1	1	1	1
Max Value	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Mean	4.38	4.41	3.60	4.80	3.81	3.72	2.47	3.72	5.04	4.96	5.15	5.22	4.07	3.67	2.85	4.62
Variance	1.70	1.60	1.90	1.34	1.54	1.59	1.52	1.71	0.90	1.02	1.07	0.78	1.92	1.70	1.75	1.78
Standard Deviation	1.30	1.27	1.38	1.16	1.24	1.26	1.23	1.31	0.95	1.01	1.04	0.88	1.39	1.30	1.32	1.33
Total Responses	53	54	53	54	53	53	53	53	54	54	54	54	54	54	54	53

5.1 Do you have any further suggestions, messages, comments, or thoughts which need to be taken into consideration, concerning options and/or messages for drought vulnerability reduction of the European communities?

Table B- 38 Responses for follow-up interviews

#	Answer	Response	%
1	Yes, (please fill in text box)	3	6%
2	No, I don't have any further comments	51	94%
	Total	54	100%

Table B- 39 Written follow-up responses Question 5.1

Yes, (please fill in text box)
To take into account different perceptions of droughts GOOD LUCK WITH THE SURVEY! prevention
Drought is a natural phenomenon that will increase in the near future due to climate change. We should adapt our societies to it, using demand-based approaches and not try to fight against it increasing water supplies

5.2 Would you like to participate in an in-depth interview focusing on key messages for drought vulnerability reduction of the European community? (The interview will be conducted in English or Dutch)

Table B- 40 Follow-up interview

#	Answer	Response	%
1	Yes, (please leave your contact details below)	8	14%
2	No, thank you	48	86%
	Total	56	100%