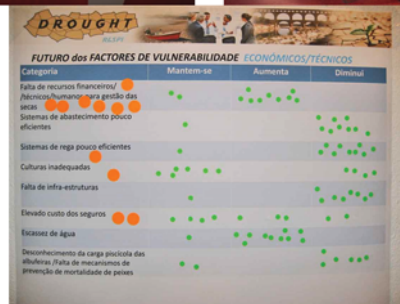




## Technical Report No. 14

# EVALUATION 2<sup>ND</sup> PHASE CASE STUDY DIALOGUE FORA



Eleni Kampragou, Joaquín Andreu, Alessandro de Carli, Dionysis Assimacopoulos, Carlo Bifulco, Susana Dias, Antonio Massarutto, David Haro Monteagudo, Dario Musolino, Javier Paredes, Francisco Rego, Abel Solera

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**Photos:**

Top Left: 2<sup>nd</sup> Case Study Dialogue Fora meeting for the Po River Basin, Linda Oud

Top Right: 2<sup>nd</sup> Case Study Dialogue Fora meeting for the Jucar River Basin, David Haro Monteagudo

Bottom: Photo: Matrix for discussing future state of the underlying causes of vulnerability, Susana Dias

## **Abstract**

This document presents the outcomes from the second round of Case Study Dialogue Fora (CSDF) meetings organised within the DROUGHT-R&SPI project. In total three meetings were held: Parma, Italy (12<sup>th</sup> February 2013), in Lisbon, Portugal (16<sup>th</sup> May 2013), and in Valencia, Spain (27<sup>th</sup> June 2013). The workshops aimed at discussing with local stakeholders future vulnerability to drought on the basis of climate projections and socio-economic development scenarios.

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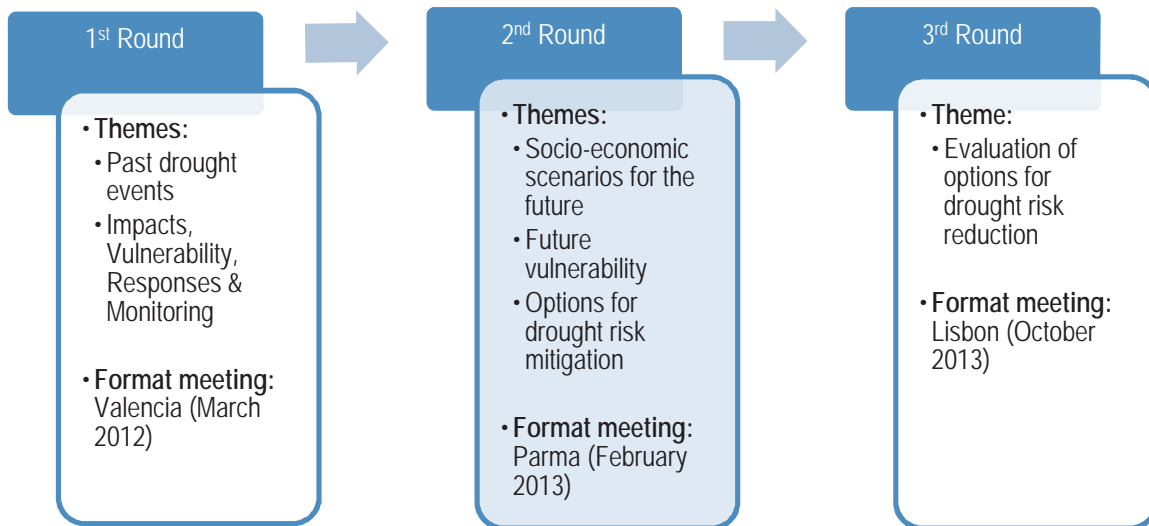
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# 1 Introduction

The second Round of Workshops (Figure 1. 1) concerns future scenarios, addressing stakeholders view on future vulnerability to drought and on potential options for long-term risk mitigation. The information collected during these workshops will mainly support the activities for Task 2.5 “Future socio-economic and environmental impacts, and vulnerability assessments” and Task 2.6 “Identification and evaluation of responses and policy options for drought risk mitigation”.



*Figure 1. 1: The three Rounds of DROUGHT-R& SPI Case Study Dialogue Fora meetings*

The “format” meeting of the 2<sup>nd</sup> Round was organised in Parma for the Po River Basin (February 2013). Two other Workshops followed in Lisbon, Portugal, and Valencia, Spain. A Workshop has not been organised for three Case Studies:

- The Netherlands Case Study: Drought management is not a priority for The Netherlands and there was limited interest by the stakeholders.
- The Switzerland Case Study: Stakeholders participate in another Swiss drought-related project (development of a prototype of an “Information platform on Drought”), in which members of Drought R&SPI consortium are involved. Thus, there was limited interest in attending another drought-related workshop.
- The Syros Case Study: A Workshop on socio-economic development scenarios for the island was already organised by the Case Study Leader under the framework the FP7 WASSERMed project.

This document is structured as follows:

- Section 2 provides a brief overview of the outcomes of the 2<sup>nd</sup> Round of CSDF Workshops.
- Session 3 concludes the document with an overall evaluation of the Workshops.
- The Annexes provide the Workshop minutes, the agendas and the participant lists for the three events.

## 2 Overview of the 2<sup>nd</sup> Round of Workshops

The 2<sup>nd</sup> Round of CSDF Workshops aimed at: (i) presenting DROUGHT-R&SPI results with regard to future drought hazard (Task 2.4 analysis) to the CSDF members, (ii) discussing the issue of future vulnerability to drought on the basis of Task 2.4 results and anticipated future socio-economic conditions, (iii) developing scenarios regarding the future state of the Case Study and its vulnerability profile on the basis of these scenarios, and (iv) preliminary discussing options for future drought risk reduction, on the basis of Task 2.3 results (policy gaps, recommendations). The questions to guide the discussion with the stakeholders are listed in Table 2. 1.

Table 2. 1: Questions to guide group discussions for the 2<sup>nd</sup> Round of Workshops

Group discussion on future vulnerability (socio-economic scenarios & vulnerability profiles)	Group discussion on potential options for improving preparedness to drought
<ul style="list-style-type: none"> <li>• Which drought events (in terms of severity or impacts) would justify a change in the "Business as Usual" scenario?</li> <li>• Which factors can influence future vulnerability to drought?</li> <li>• Which are the desired /undesired future (socio-economic &amp; environmental) conditions for the Case Study?</li> <li>• Is the described future logical and/or plausible?</li> <li>• What type of drought impacts you anticipate in the future?</li> </ul>	<ul style="list-style-type: none"> <li>• How could drought management be improved?</li> <li>• What are the options for improving long-term preparedness to drought?</li> </ul>

The paragraphs that follow briefly describe the outcomes of each CSDF Workshop, emphasising on the discussion outcomes on scenarios, future vulnerability to drought and options for long-term risk reduction.

### 2.1 The Parma Workshop

The CSDF Workshop on "Preparing for future droughts: Anticipated impacts and options for risk reduction" was the "format" event of the 2<sup>nd</sup> Round of Workshops. It was held on the 12<sup>th</sup> of February 2013 in Parma (venue: Sala Du Tillot - Camera di Commercio di Parma) and was attended by project partners, members of the External Advisory Board, and representatives from key stakeholder groups in the Po River Basin (Table A.2). The workshop aimed at discussing: (i) future vulnerability to drought of the Po River Basin, and (ii) options for long-term risk reduction.

The workshop was organised in two sessions (the agenda is given in Table A.1):

1. *Session 1* was dedicated to lessons learnt from past drought management efforts and the views for the future, with regard to the vulnerability of the Po River Basin to drought. A series of presentations were given by project partners and a representative of the Po River Water Authority, in order to introduce the most important issues regarding future vulnerability to drought in the Po River Basin.
2. *Session 2* was organised as a group discussion on vulnerability to drought and options for future drought risk reduction.





Figure 2. 1: Photo from the 2<sup>nd</sup> CSDF Workshop in Parma

The discussion on the future for the Po River Basin was based on the presentations given on past drought impacts, current plans for drought management, future drought hazard and potential options for drought risk reduction. Stakeholders were given time to present their view. The main discussion points can be summarised as follows:

- Farmers have established their water use/withdrawal rights in time and there is limited intervention by the state for altering this scheme. So, it is difficult to discuss for the future, as the experience so far shows that local society is resilient to change.
- There are mainly political difficulties for changing practices. The uncertainty related to climate projections hinder any efforts for adaptation. In addition:
  - There is limited sharing/dissemination of knowledge on drought/ Climate Change risks that may lessen resistance to change.
  - There is no information on past drought impacts and their assessment that could be used for discussing the need for adaptation of the agricultural sector.
- Markets have the highest influence in crop selection than the availability of water resources (e.g. there was a 30% decrease in corn production when the prices fell).
- A series of traditional products (e.g. Prosciutto di Parma, Parmigiano Reggiano) are produced in the Po River Basin. Even though technical advances have been (and can be) adopted, there is no option for changing crops, as these are required for producing the above mentioned products. The area is water rich and thus in case of drought, it is easier just to reduce production, rather than modifying cultivation practices.
- There have been significant changes in the past decades in the energy production industry that affected water use and management.
- Since 1992 a stakeholder committee is operating. The committee has been established on a voluntary basis, as there is no such requirement in the corresponding water legislation. The committee is mainly met during the development of the RBMPs. In addition there is a “permanent table” for water management that meets frequently (in summer even once a week) in order to exchange information. An important issue remains the improvement of trust among stakeholders towards the development of water and drought management plans.
- The exiting technical background can support the development of drought management plans.

## 2.2 The Lisbon Workshop

The CSDF Workshop for the Portugal Case Study was held on the 16<sup>th</sup> of May at the CEABN (Institute of Agronomy, Lisbon). It had the form of small-scale group discussions and thus it was attended by representatives of key stakeholder groups and members of the ISA-CEABN (Figure 2. 2). The agenda (Table C.1) included two sessions:

1. During the first session a brief presentation was given on past drought events in Portugal, followed by a group discussion on future vulnerability to drought and scenarios.
2. The second session was dedicated to strategies and options for long-term drought risk mitigation.



Figure 2. 2: Photo from the 2<sup>nd</sup> CSDF Workshop in Lisbon

The group discussions were organised using the Delphi method. The stakeholders were asked to:

1. Pinpoint their views about:
  - The future state of underlying vulnerability factors (as defined in the 1<sup>st</sup> CSDF Workshop), according to three trend classes (increase, decrease and stable), using colour stickers (in green) on four large panels (Figure 2. 3);
  - The vulnerability factor considered most important in the future (in orange);
3. Fill an anonymous questionnaire regarding: (i) drought and water scarcity perception, (ii) future scenarios, and (iii) long-term preparedness and mitigation measures, including some Blueprint options.

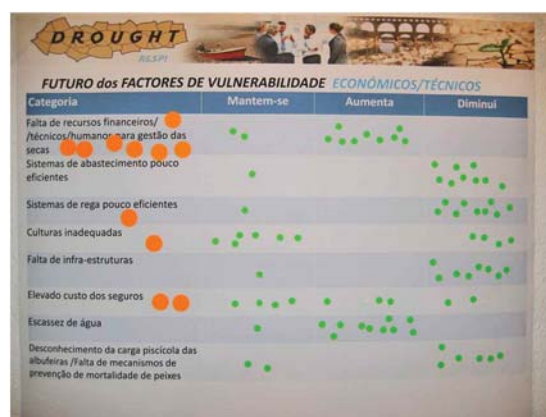


Figure 2. 3: Matrix for discussing future state of the underlying causes of vulnerability to drought in Portugal

A consensual storyline for the future of drought vulnerability factors was then developed considering stakeholders' opinion about the trend and importance of each factor under the most probable scenario of limited economic growth and population decrease (Table 2.2):

- Although communities will become more sensitive to drought, they will keep reluctant to change their habits and, therefore, given an increase in water scarcity, an escalation of conflicts in water use is forecasted.
- A reduction of institutional and policy gaps is foreseen, notably resulting in an increase in shared concern about transboundary water management. In contrast, the lack of incentives to prevent the impacts of drought will continue.
- Water supply systems for human use and agriculture will be improved along with an increase in strategic water reservoirs (multiyear). All this can be hampered by the increasing lack of resources in the short and medium term.
- Pessimistic view for the future of environmental factors, with climate change as a major concern.

**Table 2.2:** Stakeholder's view of the future state of underlying causes of vulnerability in Portugal (% of responses)

Underlying cause	Maintain	Increase	Decrease
<b>Social</b>			
Lack of sensitisation/ education in drought	10	10	80
Increase of population	25	0	75
Water use/ users conflicts	10	90	0
Water use habits/ life styles	64	27	9
Preferences (e.g. use of a specific crop)	73	27	0
<b>Institutional / Political</b>			
Lack of drought management plans	0	0	100
Lack of contingency plans for water use	0	0	100
Lack of shared measures for international river basin management	36	9	55
Absence/ low use of insurances	50	10	40
Lack of incentives for preventing drought impacts	80	0	20
Lack of emergency/aids programmes	10	0	90
Inefficient knowledge of reservoir uses	25	0	75
<b>Economic / Technical</b>			
Lack of resources (e.g. financial) for drought management	8	92	0
Inefficient water supply systems	10	0	90
Inefficient irrigation systems	10	0	90
Unsuitable crops	60	0	40
Lack of infrastructures	8	0	92
High insurance costs	45	30	25
Water scarcity	8	92	0
Lack of knowledge about fish biomass in reservoirs-fish mortality prevention schemes	30	0	70
<b>Environmental</b>			
Diffuse pollution	0	70	30
Increased river water abstractions	18	73	9

Underlying cause	Maintain	Increase	Decrease
Sand/grit extraction in rivers	80	10	10
Low production of groundwater/ small reservoir capacity	64	9	27
Climate Change	30	70	0
Excess of fish biomass in reservoirs	60	30	10

## 2.3 The Valencia Workshop

The 2<sup>nd</sup> Case Study Dialogue Fora Workshop for the Jucar River Basin took place in Valencia, on the 27<sup>th</sup> of June 2013 (venue: Room INNOVA, Ciudad Politecnica de la Innovacion, Universitat Politecnica de Valencia). The meeting participants included stakeholders and decision-makers for discussing with them future droughts risk and mitigation. The full list of participants is given in Table B.2.

The Workshop included two sessions:

1. *Session 1* focused on future drought management at the Jucar River. Stakeholders were given time to present their view about future drought episodes, the consequences these would have in different sectors and possible mitigation options.
2. *Session 2* was dedicated to options (e.g. governance, economic instruments) for improving long-term preparedness to drought.



Figure 2. 4: Photo from the 2<sup>nd</sup> CSDF Workshop for the Jucar River Basin

The Workshop was organised little before the publication of the new Jucar River Basin Hydrologic Plan, where new scenarios have already been developed with the consensus of all the interested parts. These scenarios describe:

1. Slow population increase rate;
2. Same industrial and agricultural water demands, or lower due to increased efficiency;
3. Decrease in mean stream flow values but with an increased variability due to climate change.

Stakeholders agree that vulnerability to drought should be relatively decreased by improving or advancing the existing framework for managing drought developed (drought indices and indicators, different scenarios considered and measures corresponding to each of them). However, vulnerability to drought may increase in some cases, if not carefully analysed. For example, irrigation users have been

investing in efficient irrigation techniques to decrease their total demand. This implies that resource supply reliability needs to be higher; otherwise, the same degrees of restrictions in agricultural demands, as experienced in past droughts, would produce higher losses.

Options discussed for improving long-term preparedness to drought are:

- Better integration of basin plans, drought plans and urban emergency plans;
- Detailed evaluation of socio-economic and environmental impacts of drought;
- Improvement of the existing Operative Drought Indicators system including other indicators such as SPI, Palmer, remote sensing based indicators, environmental indicators;
- Revision and updating of the existing drought plans;
- Better application of the figures for temporary water rights transfer and the center for water rights exchange;
- Improvement of drinking water infrastructures (variable contaminants concentration during droughts);
- Improvement of water distribution infrastructures;
- Improve the awareness campaigns among water users;
- Discounts to users that save water;
- Sensitive normative;
- Use of insurances, improvement of insurance methods;
- Development of public-private and multisectorial partnerships;
- More realistic quantification of the available resources and definition of allocation schemes on the basis of these quantities;
- Importance of environmental flows in future droughts.

### 3 Conclusive remarks - Recommendations

Three Workshops were organised in order to discuss future vulnerability to drought in the corresponding Case Studies (i.e. Po River Basin, Jucar River Basin and Portugal). In addition, the Workshops offered the opportunity to present the project results on future drought hazard and the evaluation of past responses to drought.

Significant challenges were identified when discussing future conditions with the stakeholders:

- The uncertainty related to climate projections hinders the discussion on the need for adaptation and improving preparedness to drought;
- Stakeholders are reluctant in discussing socio-economic development scenarios, as these are usually described in water management plans. However, it was stressed that economic development is the most influencing factor in framing future conditions;
- Future vulnerability to drought is difficult to frame, as it is perceived different by the various stakeholder groups and so far there is no systematic assessment of vulnerability at local, regional or national scale.
- Public awareness of water availability and drought risks is among the factors that will influence future preparedness to drought.
- Political will for change and adaptation will determine future drought policies and management aspects (e.g. institutional capacity, sectoral impacts, vulnerabilities, resource constraints);
- Options that could be promoted or improved for enhancing drought preparedness are: drought monitoring and planning, development of strategic reserves, legal provisions for controlling water uses and allocating water, establishment of participation processes.

A questionnaire survey for the evaluation of the 2<sup>nd</sup> Round of Workshops has not been undertaken. The limited response in the first survey indicated that stakeholders prefer to contribute during the Workshops and to participate in discussions rather than filling-in questionnaires. Nevertheless, their continuous participation in the Workshops shows that stakeholders: (i) are interested in sharing experiences and views with researchers, (ii) seek for informal participation processes for exchanging opinions between them, and (iii) consider drought an important challenge in water management and value the input received from the DROUGHT-R&SPI project:

- Jucar River Basin: 8 stakeholders participated in the 1<sup>st</sup> Workshop, 17 stakeholders in the 2<sup>nd</sup>, six (6) of which were in the 1<sup>st</sup> Workshop;
- Po River Basin: 19 stakeholders in the 1<sup>st</sup>, 16 stakeholders in the 2<sup>nd</sup>, nine (9) of which were in the 1<sup>st</sup> Workshop;
- Portugal: 17 stakeholders in the 1<sup>st</sup>, 15 stakeholders in the 2<sup>nd</sup>, nine (9) of which were in the 1<sup>st</sup> Workshop.

Overall, the workshop processes were considered successful in disseminating project outputs and discussing key issues regarding future vulnerability to drought. However, the Workshops had limited contribution to the development of scenarios, as there were already ones available in water management plans. That was also one of the reasons for not organising a CSDF meeting in the other three Case Studies (Netherlands, Switzerland, and Syros Island).

The 3<sup>rd</sup> Round of Workshops will conclude the process for Science-Policy Interfacing (SPI) in the DROUGHT-R&SPI Case Studies. The "format" meeting was already organised in Lisbon (8<sup>th</sup> October 2013) for the Case Study of Portugal. Stakeholders (12 in total) discussed and evaluated options for the long-term drought risk mitigation. Five more Workshops will be organised using the experience from the

previous CSDF events and the 3<sup>rd</sup> format meeting in Lisbon. Key recommendations for the organisation of the 3<sup>rd</sup> Round of events are to:

- Engage stakeholders that participated in the previous meetings;
- Distribute support material (e.g. overview of the outcomes of the previous events, guiding questions for the discussions) prior the meeting; and
- Provide sufficient time for discussion.

## Annex A: The Parma Workshop

Table A.1: Agenda of the 2<sup>nd</sup> CSDF workshop for the Po River Basin

10:00	Welcome by Henny van Lanen (Wageningen University), Francesco Puma (Autorità di Bacino del Po) and Lanfranco Senn (CERTeT-Bocconi)
10:15	The DROUGHT-R&SPI Case Studies: Past experiences and expected outcomes, D. Assimacopoulos (NTUA)
Session 1: Vulnerability of the Po River Basin to drought: Lessons learnt and views for the future	
10:30	Lessons learnt from the analysis of past drought events in the Po River Basin: a qualitative and quantitative economic evaluation, Antonio Massaruto and Dario Musolino (CERTeT-Bocconi)
10:45	The current DMP in the Jucar River Basin – Challenges for the future, Joaquin Andreu (UPVLC)
11:00	Vulnerability to drought of the Po River Basin: Issues & challenges, Claudia Vezzani (Po River Water Authority)
11:30	Coffee Break
11:45	Future drought hazard: A preliminary assessment for the Po River Basin, Henny van Lanen (WU)
12:00	Discussion on future vulnerability to drought in the Po river basin and future scenarios (Facilitator: Antonio Massaruto, CERTeT-Bocconi)
13:00	Lunch Break
Session 2: Options for future drought risk reduction: Strategic drought management and future RBMPs	
14:00	Cont'd discussion on future vulnerability to drought and discussion on options for long-term risk reduction (water scarcity vs. drought vs. prolonged drought) (Facilitators: Dionysis Assimacopoulos, NTUA and Antonio Massaruto, CERTeT-Bocconi)
16:00	Wrapping up and conclusions
16:30	Closure

Table A.2: List of stakeholders participating in the 2<sup>nd</sup> CSDF workshop for the Po River Basin

Name	Agency/ organisation
Francesco Puma	Autorità di Bacino del Po
Claudia Vezzani	Autorità di Bacino del Po
Anna Basoni	CNR-IREA, Research National Covinal
Marco Benati	Confagricoltura
Beatrice Bertolo	Autorità di Bacino del Po
Roberto Braga	Autorità di Bacino del Po
Massimo Buizza	Consorzio dell' Oglio
Christian Farioli	Autorità di Bacino del Po
Walter Mattalia	Regione Piemonte
Fernanda Moroni	Autorità di Bacino del Po
Luca Pacicco	National Institute of Agricultural Economics, INEA
Patrizia Pavesi	Autorità di Bacino del Po
Alessio Picarelli	Autorità di Bacino del Po
Giansandro Rossi	Foundatione AQUALAB
Angelo Cavallin	Università di Milano Bicocca – Aqualab
Sandro Campanini	Associazione Italiana Produttori Olivicoli, AIPO



**Table A.3: Minutes of the 2<sup>nd</sup> CSDF workshop for the Po River Basin**

<b>DATE:</b>	12/02/2013
<b>VENUE:</b>	Sala Du Tillot, Camera di Commercio di Parma, Parma
<b>ORGANISERS:</b>	CERTeT-Bocconi
<p><b>Brief minutes</b></p> <p>The 2<sup>nd</sup> CSDF for the Po River Basin was focused on the lessons learnt from past drought management and the views for the future, with regard to the vulnerability of the Po River Basin to drought. Besides the presentations given about the impacts and management of the past drought events, and the issues and challenges related to the vulnerability of the Po River Basin, the experience from drought management in the Jucar River Basin was also presented in order to provide some comparative elements for the discussion. A preliminary assessment of the future drought hazard for the Po River Basin was also presented as a starting point for the discussion among the stakeholders.</p> <p>The discussion was centred around future vulnerability to drought and options for improving long-term preparedness and was focused on agriculture and the energy production sector. The main outcomes from the discussion were that:</p> <ul style="list-style-type: none"> <li>• It is difficult to discuss for the future, as the experience so far shows that local society is resilient to change.</li> <li>• An important issue remains the improvement of trust among stakeholders towards the development of water and drought management plans.</li> <li>• Three are the sector of interest in the Po River Basin: Agriculture, Energy production and Environment.</li> <li>• The exiting technical background can support the development of drought management plans.</li> </ul>	
<p><b>Main discussion points – Results and recommendations</b></p> <p><i>A. Socio-economic scenarios</i></p> <p>The Po River Basin Authority is currently working on the Water Balance Plan (Piano di Bilancio Idrico) for the Po River Basin. In this plan three scenarios are defined:</p> <ol style="list-style-type: none"> <li>1. Current scenario (0). It is based on the spontaneous evolution of the characteristics of the water resources (their availability, quality and uses), not taking the measures which will be part of the Plan into account.</li> <li>2. Balance Scenario (1). This scenario on the contrary makes basis on the implementation of the measures defined in the Water Balance Plan, and then analyzes the consequent changes in the evolution of the availability, the quality and the uses of the water resources.</li> <li>3. Balance scenario with climate change (2). Differently from Scenario 1, the future evolution about the water resources is analyzed according to the climate change forecasts in 2020 and 2050. As a consequence, within this scenario the worst case scenario in terms of water availability is considered.</li> </ol> <p><i>B. Future vulnerability to drought</i></p> <p>The 1<sup>st</sup> and 2<sup>nd</sup> CSDF have allowed identifying some of the positive and negative factors can affect and determine the socio-economic vulnerability profile of the Po Basin.</p> <ul style="list-style-type: none"> <li>• There is limited potential for further improvement of the irrigation systems or change in the crop pattern</li> <li>• Increasing vulnerability of the agricultural sector due to the growing share of crops addressed to the energy sector (as it is increasingly hydro-demanding, in particular if it uses newly cultivated areas)</li> <li>• There are relevant regional differences in vulnerability that can affect the ability to manage with the global vulnerability of the Po Basin</li> </ul> <p><i>C. Options for improving long-term preparedness to drought</i></p> <p>Practices that can improve water and drought management:</p> <ul style="list-style-type: none"> <li>• Controls on illegal withdrawals</li> <li>• Reducing hydro-demanding crops</li> <li>• Improving technologies for water saving (for example, for irrigation systems)</li> <li>• Storage of groundwater</li> </ul> <p><i>D. Other issues</i></p> <p>None</p>	

## Annex B: The Lisbon Workshop

Table B.1: Agenda of the 2<sup>nd</sup> CSDF workshop for Portugal

9:30	Welcome - Participants' presentation
9:45	Objectives and expected results from the current stakeholders' workshop. The contribution of CS dialogue for fulfilling the objectives of the DROUGHT-R&SPI, Francisco Rego (ISA-CEABN)
Session 1: Development of future scenarios for the underlying causes of vulnerability to drought	
10:00	The past drought events in Portugal. Perspectives from DROUGHT R&SP, Susana Dias (ISA-CEABN)
10:15	Round table: Portuguese vulnerability to drought. Issues and challenges. Questions for group discussion: 1. Do you consider Portugal still vulnerable to drought events? 2. Will the main causes of vulnerability identified with the past drought events continue in the future? 3. Which are the best strategies for long-term drought mitigation?
11:15	Coffee Break
11:30	How will the factors that determine drought events evolve? DROUGHT R&SPI contribution, Francisco Rego & Susana Dias (ISA-CEABN)
11:45	Round-table: Identification and evaluation of future scenarios (regarding climate, runoff, droughts) Questions for group discussion: 4. How do you evaluate the scenarios regarding future drought events? 5. How do you integrate in your work the long-term drought scenarios?
13:00	Lunch Break
Session 2: Strategies and options for long-term drought mitigation	
14:30	Policy strategies and options for long-term drought risk mitigation, Carlo Bifulco (ISA-CEABN)
14:45	Round-table: Socio-economic, environmental and policy factors determining drought impacts and vulnerabilities in Portugal. Questions for group discussion: 6. What is your opinion about the current policy strategies for drought mitigation (at national, Iberian and European level)? 7. Which are the relevant factors (policy, technical, economic, social, and environmental) to consider in the long-term drought management?
16:00	Wrapping up and conclusion
16:30	Closure

**Table B.2:** *List of stakeholders participating in the 2<sup>nd</sup> CSDF workshop for Portugal*

Name	Agency/ Organisation
Carina Arranja	FENAREG (National Federation of Irrigation Farmers of Portugal)
Francisco Nunes Correia	IST – CEHIDRO (Centre for Hydrosystems Studies, Instituto Superior Tecnico, Lisbon University)
Gonçalo Leal	DGADR (General Directorate of Agriculture and Rural Development, Ministry of Agriculture and Sea)
Isabel Ferreira	ISA-DER (Department of Rural Engineering, Lisbon University)
João dos Santos Pereira	ISA – CEF (Forest Research Centre, Lisbon University)
José Luís Faustino	ICNF (Institute for Nature Conservation and Forests, Ministry of Environment, Spatial Planning and Energy and Ministry of Agriculture and Sea)
Lúcio do Rosário	CNCD-AFN/ICNB (National Commission of the United Nations Program to Combat Desertification - Institute for Nature Conservation and Forests, Ministry of Environment, Spatial Planning and Energy and Ministry of Agriculture and Sea)
Luís Simas	ERSAR (Regulatory Entity for Water and Waste services, Ministry of Environment , Spatial Planning and Energy)
Mariana Bernardino	IPMA (The Portuguese Sea and Atmosphere Institute, Ministry of Agriculture and Sea)
Patricia Veloso	EDP (Energies of Portugal)
Pedro Teiga	LPN (Union for Nature Protection) / UP (Oporto University)
Rui Cortes	UTAD (University of Trás-os-Montes and Alto Douro)
Teresa Avelar	GPP-MAMAOT (Office of Planning and Policies, Ministry of Environment, Spatial Planning and Energy)
Vanda Pires	IPMA (The Portuguese Sea and Atmosphere Institute, Ministry of Agriculture and Sea)
Vitor Martins	DGS – (General Directorate of Health, Ministry of Health)

Table B.3: Minutes of the 2<sup>nd</sup> CSDF workshop for Portugal

DATE:	16/05/2013
VENUE:	Lisbon
ORGANISERS:	ISA-CEABN
<p><b>Brief minutes</b></p> <p>ISA-CEABN team welcomed the participants and gave a brief presentation on the DROUGHT-R&amp;SPI progress linking the results from case-study Portugal with the project objectives. Goals and expected outcomes from this second workshop were presented. The third workshop was announced for the 8 October 2013 at ISA premises.</p> <p>The workshop was structured in two sessions. The first session dealt with the presentation of the project results on past drought events and the discussion of scenarios for the underlying causes of vulnerability to drought.</p> <p>ISA-CEABN team synthesised the Portuguese participation on the project outputs derived from research and stakeholders contribution. After a brief presentation of the technical reports, the discussion was centred on the past responses and causes of vulnerability to drought. Using the Delphi method, stakeholders were invited to express their opinion about the future of the vulnerability factors. Those were chosen by the ISA-CEABN team according the outcomes of the previous workshop and aggregated in social, institutional-political, technical-economic and environmental panels.</p> <p>After the coffee-break the discussion was centred on the identification and evaluation of future scenarios, regarding climate, runoff and droughts.</p> <p>ISA-CEABN Principal Investigator highlighted the on-going research on the evolution of some of the vulnerability factors and impacts:</p> <ul style="list-style-type: none"> <li>• Modelling the relationship between temporal and spatial trends in precipitation and runoff from 5 small river basins in mainland Portugal.</li> <li>• Modelling the burned area by forest fires in Portugal, using data from 1965 to 2011 and monthly temperature and accumulated precipitation of the two previous months as predicted variables</li> <li>• Exploring the effect of drought events in southern Portugal on the population trends of steppe birds, for the period 2006-2013.</li> </ul> <p>Future meteorological and runoff scenarios for Portugal, derived from global GGE scenarios, were the main focus of two presentations given by ISA-CEABN investigator and by Portuguese Institute of Ocean and Atmosphere investigator. In spite of using different forcing data, spatial scales and models, all scenarios predict an increase in temperature and a decrease in precipitation and groundwater, particularly during summer and in the southern regions, leading to an increase in drought duration and intensity. The first session ended with a presentation and discussion about the published/available socio-economic scenarios used to estimate changes in water demand for the most relevant sectors at river basin level.</p> <p>Session 2 dealt with strategies and options for long-term drought mitigation. Stakeholders were asked to fill in a questionnaire about drought perception, future scenarios and long-term action to mitigate drought impacts. Major results from this activity were discussed, with particular focus on feasibility and usefulness for Portugal of the long-term actions suggested in the document "Blueprint to Safeguard Europe's Water Resources".</p> <p>The workshop ended around 17.00h.</p>	
<p><b>Main discussion points – Results and recommendations</b></p> <p><i>A. Socio-economic scenarios</i></p> <p>The discussion about the future in drought management relied on the predictions available in the River Basin Management Plans (RBMP) for Portugal mainland. There, water consumption trends were forecasted for short (2009-2015), medium (2009-2021) and long (2009-2027) terms. For each period three different scenarios were considered: a baseline, an optimistic and a pessimistic scenario. These scenarios are linked with the socio-economic situations forecasted for the future in Portugal. The most relevant water consumption sectors are, and will be, Urban Supply and Agriculture, but also Livestock, Energy, Industry, Tourism, and Golf are taken into account, even if these sectors represent a smaller fraction of the water needs.</p> <p>The baseline scenario was built with projections taking into account the current state of national government programs and the European policy options and global economic factors (e.g., fuel price trend). The basis of socio-economic development scenario followed the main predetermined elements and assumed the implementation (although weakly articulated) of the ongoing governmental investment policies. The scenario definition was based on the main trend and relative analysis of driving forces within the expected evolution of macroeconomic context, according the DPSIR Methodology (Driving forces, Pressures, States, Impacts, and Responses). Gross Domestic Product (GDP) was the most important aggregate indicator in defining the baseline scenario, but many other factors were taken into account (e.g., demographic trends, governmental plans to develop the national economy</p>	

and to preserve water resources).

The pessimistic scenario (or minimalist) corresponds to a lower pressure on water resources, and it is associated with a more unfavourable perspective of development, compared to the present and with a moderate (or poorly) effectiveness of public policies, forecasted for 2015. The optimistic scenario (or maximalist), corresponds to a higher pressure on water resources due to the accomplishment of the main projects planned at regional and national level; the 'desired future' of this scenario requires good coordination and integration of policies and investments both, public and private. The GDP defined for both scenarios was considered as a percentage of the baseline GDP: 75% for the pessimistic and 125% for the optimistic scenario. Clearly the definition of these alternative development scenarios needs more specific data and the application of specific statistics methods.

#### *B. Future vulnerability to drought*

A consensual storyline for the future of drought vulnerability factors was developed taking into account stakeholder's opinion about the trend and importance of each factor under the most probable scenario of limited economic growth and population decrease.

The foreseen difficulty in changing water use habits and preferences will likely led to an increase in water use conflicts. However, the majority of the stakeholders have the perception that most of the underlying causes (social, technical/economic and institutional/political) will likely decrease in importance in the future, providing the means and funds. On the contrary it was not foreseen a decrease of importance for the causes of environmental vulnerability in the future, even those that can be potentially controlled (e.g. diffuse pollution, aggregates extraction in riverbeds).

#### *C. Anticipated drought impacts in the future*

In the stakeholders' opinion agriculture will continue to be the main sector with impacts from future drought events. However negative impacts on hydropower, water quality and aquatic habitats will also be a major concern.

#### *D. Options for improving long-term preparedness to drought*

Stakeholders were consulted about a list of options considered useful to mitigate the future drought events. Options were proposed by the ISA-CEABN team taking in account suggestions from "Blueprint to Safeguard Europe's Water Resources" and other successfully implemented in previous drought events.

The discussion was focused on the need for increase strategic and emergency water reserves (superficial and groundwater). As the heating systems are decisive measures in northern countries where living is limited by snow and cold, the water reservoir systems can help to overcome droughts in arid countries. Dams and channels can be accompanied by green infrastructures with the objective of increasing water caption, infiltration and accumulation in deeper grounds.

Measures towards leak reduction in water systems were also addressed. Leaks in the urban supply distribution systems must be avoided, taking in account treatment costs of drinking water: in this case efficiency is the main objective; on the contrary, leaks in agriculture distribution systems can be seen not as a problem but as a way of contributing to watering soils when water is scarce, decreasing the drought impact.

Best opportunities to improve preparedness to drought were considered:

- Investments to increase the efficiency of water use in all sectors, particularly in agriculture;
- Reuse of treated industrial wastewater;
- Use of treated urban wastewater;
- Improve the operation of existing dams and increase their number
- Implementation of green infrastructure, to promote water infiltration in the underground, and to decrease flow velocity in river basins.
- Awareness campaigns
- Securing environmental flows

#### *D. Other issues*

Different uses for surface water (rivers and reservoirs) and groundwater were acknowledged: superficial water for current uses, underground water as strategic reserve. This recommendation received general consensus.

## Annex C: The Valencia Workshop

Table C.1: Agenda of the 2<sup>nd</sup> CSDF workshop for the Jucar River Basin

9:30	Welcome and Seminar presentation, by Joaquin Andreu (UPVLC)
Session 1: Droughts in the new cycle of river basin planning (Moderator: Abel Solera, UPVLC)	
9:45	Present and Future Planning, Mitigation and Management of Droughts at the Jucar River Basin Agency, Teodoro Estrela, Chief of the Hydrologic Planning Office from CHJ Basin Agency
10:05	Future Droughts perception by different sectors and measures of preparation and mitigation. Participating stakeholders: <ul style="list-style-type: none"> <li>• Antonio Llopis (Valencia City Council)</li> <li>• Alberto Hervas (ARJ-USUJ-Traditional Surface Water Irrigators)</li> <li>• Francisco Belmonte (JCRMO-Junior Groundwater Irrigators) – Written Communication</li> <li>• Francisco Moreno (Iberdrola-Energy Company)</li> <li>• William Colom (AGRO-Environmental NGO) – Written Communication</li> <li>• Ernesto Serra (Canal Jucar Turia-Mixed Surface and Groundwater Irrigators)</li> </ul>
11:05	Discussion
11:45	Coffee Break
Session 2: Risk perception, economic instruments, public-private and multisectorial partnerships (PPP & MSP), risk conjunction, droughts within the European Union, science-policy interactio (Moderator: Javier Paredes, UPVLC)	
12:00	Water quality, environment, control and governance during drought episodes, Javier Ferrer (Water Commissioner from CHJ Basin Agency)
12:20	Improving knowledge and science-policy interfacing, Joaquin Andreu (UPVLC)
12:35	Coinciding risks in urban supply during droughts: infrastructures and water quality, Javier Macian (EMIVASA-Public-Private Water Company )
12:50	Historic droughts analysis under the frame of the DROUGHT-R&SPI project and conclusions towards future droughts, Lucia De Stefano (UCM)
13:05	Natural risks perception, risk mitigation and increase of resilience under the framework of the ENHANCE project, Maria Carmona (HZG)
13:20	Role of agriculture insurances in future drought episodes, Juan Carlos Cuevas (Agroseguro-Public-Private Insurance Company )
13:35	Discussion
14:45	Closure

**Table C.2:** *List of stakeholders participating in the 2<sup>nd</sup> CSDF workshop for the Jucar River Basin*

Name	Agency/ Organisation
Teodoro Estrela Monreal	CHJ (Basin Agency)
Javier Ferrer Polo	CHJ (Basin Agency)
Antonio Llopis Alandi	Valencia City Council (Urban)
Raul Asensio Martinez	Valencia City Council
Alberto Hervas Ferrer	ARJ – USUJ (Traditional irrigation)
Francisco Belmonte	JCRMO (Mixed irrigation)
Fernando Moreno Parrilla	Iberdrola (Hydroelectric power)
William Colom	AGRO (Ecology NGO)
Jorge Martorell	Canal Jucar-Turia (Mixed Irrigation)
Ernesto Serra	Canal Jucar-Turia
Carmen Pascual Hidalgo	Canal Jucar-Turia
Javier Macian	EMIVASA (Drinking water)
Ma Angeles Serrano	EMIVASA
Miguel Andres Folgado	EMIVASA
Juan Carlos Cuevas	Agroseguro (agriculture insurance)
María Mañez Costa	HZG
María Carmona Costa	HZG

Table C.3: Minutes of the 2<sup>nd</sup> CSDF workshop for the Jucar River Basin

<b>DATE:</b>	27/06/2013
<b>VENUE:</b>	Universitat Politècnica de València, Ciudad Politécnica de la Innovación, Room INNOVA
<b>ORGANISERS:</b>	UPVLC
<p><b>Brief minutes</b></p> <p>All the participants were convened for a meeting on future droughts risk and mitigation workshop at UPVLC. Joaquin Andreu welcomed and thanked the assistants. The agenda of the day was revised together with the main goals of the workshop.</p> <p>The first session dealt with planning towards future droughts in the Jucar River Basin and possible measures for their mitigation. Each stakeholder had 10 minutes to express their opinions on the topic. They showed their concerns about future drought episodes, the consequences these would have for them and possible mitigation solutions. Afterwards, there was a wrapping discussion to find the points that were common to all stakeholders and the points into conflict. The main conclusion, as during the first CS-DDF, was that the CHJ started something good during the 2005/08 drought episode by developing the Basin Drought Plan, but it can yet be improved with participation of all parties.</p> <p>The second session dealt with several manners to confront drought risk: Governance measures, economic instruments, public-private and multisectorial partnerships, science-policy interfacing. Different presentations were done showing how these can be used to improve preparedness and impact mitigation. Discussion about the topics addressed and their application to the Jucar River Basin was held afterwards.</p> <p>The workshop ended at about 15:00</p>	
<p><b>Main discussion points – Results and recommendations</b></p> <p><i>A. Socio-economic scenarios</i></p> <p>Slow population increase rate; same industrial and agricultural water demands, or lower, due to increased efficiency; decrease in mean streamflow values but with an increased variability due to climate change.</p> <p><i>B. Future vulnerability to drought</i></p> <p>There are already measures for preparedness developed (drought indices and indicators, different scenarios considered and measures corresponding to each of them). Thus, by improving or advancing in their development, vulnerability to drought should be relatively decreased.</p> <p>However, there are certain aspects that can find their vulnerability increased. For example, irrigation users have been investing in efficient irrigation techniques to decrease their total demand. This implies that resource supply reliability needs to be higher; otherwise, the same degrees of restrictions in agricultural demands as experienced in past drought would produce higher losses.</p> <p><i>C. Anticipated drought impacts in the future</i></p> <p>Similar to the ones already existing, namely: agriculture production losses, hydropower production decrease, worse water quality which would affect both environment and drinking water facilities, increased costs for drinking water production</p> <p><i>D. Options for improving long-term preparedness to drought</i></p> <ul style="list-style-type: none"> <li>• Better integration of basin plans, drought plans and urban emergency plans</li> <li>• Evaluation of socio-economic and environmental impacts of drought in more deep</li> <li>• Improvement of the existing Operative Drought Indicators system including other indicators such as SPI, Palmer, remote sensing based indicators, environmental indicators</li> <li>• Revision and updating of the existing drought plans</li> <li>• Better application of the figures for temporary water rights transfer and the center for water rights exchange</li> <li>• Improvement of drinking water infrastructures (variable contaminants concentration during droughts)</li> <li>• Improvement of water distribution infrastructures -&gt; Reduces uncontrolled spills, increases efficiency, decreases effective demand</li> <li>• Improve the awareness campaigns among water users</li> <li>• Discounts to users that save water</li> </ul>	



- Sensitive normative
- Use of insurances, improvement of insurance methods
- Development of public-private and multisectorial partnerships
- More realistic quantification of the available resources and do not allocate more than these.
- Importance of environmental flows in future droughts

*E. Other issues*

All the participants agreed that the schedule of the seminar, as well as the agenda were adequate. The topics presented were of real interest for them and several thanked the opportunity of expressing their opinion in front of all the system's stakeholders.