

WP3.4 Guadiana Case Study

Deliverable 3.4.4

Interim stakeholder report

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Policy Summary

This document provides an interim report of the main practical issues associated to the development of the informal participatory process for the Guadiana Case Study of the NeWater project.

The introduction outlines the current state of affairs in the basin, so as to frame the ensuing sections of the text. The focus then shifts to outlining who were the stakeholders involved in the process, why they were engaged, and what were their respective roles and objectives. A description of the participatory methodology ensues, with particular attention to how meetings were organized to cover the key issues for discussion. In addition, the text dwells on explaining the progress towards meeting the objectives of the process, explores the factors driving stakeholder involvement up to this point and outlines the main aspects to take into account for the future.

The reader may conclude that informal, non-binding frameworks for dialogue may be appropriate to build trust and understanding among stakeholders. This is perceived as an achievement in itself in the Guadiana case, given the lack of a participatory tradition and the climate of conflict among stakeholders and water managers. The impartial nature of this forum largely explains why the basin's key water actors have been willing to get involved over the last two years, and also the different initiatives on their part to include new voices in the process.

On the other hand, a non-binding forum is likely to give in to stakeholder fatigue after some time. In order to maintain the stakeholder attention, the objectives of such an initiative must be clear from the very outset, and results must be presented on a regular basis.

While each basin calls for different solutions, the Guadiana experience shows how informal participation frameworks can support water management practices in highly conflictive catchments through providing a transparent forum for dialogue among the main stakeholders.

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1. Introduction

The following pages make up Deliverable 3.4.4 “Interim stakeholder report” for WP3.4 Guadiana Case Study.

The “case study background” provides an overview of the current state of affairs in the Guadiana basin. While not strictly part of the report, this section is perceived as a key element to support ensuing sections of the text.

The remaining part of the report is structured according to the guidance provided by WP3.1 leaders CEMAGREF. Essentially, it comprises the answers to a series of questions regarding the participatory process within the Case Study (Annex 5.1).

2. Case study background

The semiarid Upper Guadiana basin, central Spain, spans an area of 16,000km² and is home to about 500,000 people. Over the last thirty years, rapid change and adaptation have been key to water resources management in the basin. Groundwater use has virtually offset the effects of the region’s endemic drought problems, thus supporting irrigation-based social and economic welfare and acting as the main driver behind the region’s prosperity. On the other hand, intensive pumping has also been a catalyst for unwanted environmental effects. The clash between human development and environmental protection is currently at the heart of widely voiced water conflicts, both at the inter and intra-basin scale, and calls for further adaptation in the dawn of the Water Framework Directive.

The area presents a continental semiarid climate, where long dry periods alternate with short wet sequences, and hot dry summers follow short mild winters. Average rainfall is 415mm, and temperatures range from an average 5°C in winter to about 25°C in summer.

Together with Toledo and its surroundings, the area boasts the most dynamic economy of the Castilla-La Mancha autonomous community, an otherwise depressed and scarcely populated region (Fornes et al., 2000).

Groundwater is by far the most valuable water resource in the area. Today, aquifer-based irrigation accounts for 95% of the total water uses, to irrigate over 150,000ha.

Intensive groundwater development for agriculture began in the 1970s, mostly through the initiative of individual farmers. Since then, groundwater irrigation has brought significant social and economic benefits to the region, mainly due to the ready availability of the resource on demand and to the resilience of aquifers against droughts (Hernández-Mora et al., 2003; Garrido et al., 2006).

Groundwater development mostly took place in an uncontrolled manner, while Spain’s water authorities traditionally focused on building and managing surface water infrastructures

(Llamas and Martínez-Santos, 2005). This has led to significant management uncertainties, particularly in regard to pumping and irrigation data, an occurrence which, on the other hand, seems commonplace in many semiarid regions of the world (Shah, 2004; Kretsinger and Narasimhan, 2006; Villholth and Giordano 2007).

Pumping caused severe effects on groundwater-dependent wetland ecosystems such as UNESCO's "Mancha Humeda" Biosphere Reserve or RAMSAR-listed "Las Tablas de Daimiel" National Park (Llamas, 1988; Martínez-Alfaro and Castaño, 2001). European subsidies favoring irrigation of water-intensive crops contributed to aggravate these effects during the 1980s and 1990s (Bromley et al., 2001). In recent years, and despite water-saving measures adopted under the EU Common Agricultural Policy, the situation of the area's aquifers has not been corrected.

While there is a significant conflict between environmental conservation groups and farmer associations, this is not the only dispute at the basin scale. Official estimates state that over half of the existing wells in the area are currently unregistered and are therefore potentially illegal (Guadiana Water Authority, 2005). Attempts to correct this situation have traditionally fallen short of potential, largely due to the heterogeneity of views held by different farmer lobbies. Conflicts between farmers and the Water Authority are fuelled by a sense of urgency derived from the EU Water Framework Directive, which establishes an obligation to all Member States to recover a sound qualitative and quantitative state of their surface and groundwater bodies by 2015.

A dropping water table (up to 1m/yr in some areas over the last 40 years) has also raised concerns as to the sustainability of current abstraction patterns. Even if agriculture is steadily losing importance as an economic sector, aquifer exhaustion is seen as potentially serious social problem in the mid-term (Guadiana Water Authority, 2005). This is because agriculture not only provides over 40% of the jobs in some municipalities, but also because it is the base for a significant share of the area's industrial sector.

The reallocation to the region of part of the water from an existing water transfer from the Tajo river basin in central Spain to the Segura river basin in the southeast, and which crosses the Castilla La Mancha region, is advocated by some as a potential solution to the Mancha Occidental water problems. However, this initiative is not only opposed by environmental conservation groups, but also by strong social pressure within the Segura basin, current recipient of the transfer, and an incipient citizen movement opposing the transfer within the Tajo basin.

The National Water Plan Law, passed by the Spanish Parliament in 2001, requested a specific water plan for the Upper Guadiana basin in order to deal with the aforementioned complexities. The Upper Guadiana Water Plan should have been ready within a year, but conflicting views on the part of stakeholders and water authorities have so far brought all negotiations to a stalemate. As of summer 2007, the final outcome of the plan is still uncertain.

In the past, public participation in water decision making in Spain in general and the Guadiana basin in particular has been restricted to limited participation of water users in the decision making processes of Water Authorities. However other stakeholders and the

general public have largely been excluded from formal participatory structures and no informal settings have been available.

In such a situation, where conflict is commonplace, water data inappropriate and sustainability an issue of concern, involvement of the main social actors is perceived as essential in order to devise adaptive water policies for the future.

While the adaptive management concept is manifold and difficult to capture in a few words, it could be said that it is a learning-oriented approach to handle ecosystems and natural resources under uncertainty. In other words, it is a flexible form of management, akin to a scientific experiment, that operates on a typically iterative fashion while relying heavily on stakeholder input.

Despite its potential appeal, the adaptive management concept does not seemingly translate well into practice (WWPRAC, 1998; Lee, 1999; Stankey et al., 2003), largely due to its requirement for a long-term commitment as well as to commonplace stiff legal and institutional frameworks. However, the adaptive approach presents some interesting contributions to natural resources and ecosystems management. Perhaps the most significant one is its implicit understanding of the “trialogue” approach, which essentially conceives natural resources governance as a three-way communication between science, the government and the civil society (Turton et al, 2007; Marin et al., in press).

Thus, the rationale behind NeWater research in this basin is that, in conflict-prone situations, science can contribute to bridge the gap between the different social actors by providing ad-hoc technical tools and a non-binding framework for dialogue.

3. Mid-term reporting on progress on the stakeholder processes

3.1 Factual elements of stakeholder involvement in the case study

Actors involved in the case study and their roles.

People involved in the Guadiana Case Study can be broadly placed in two categories, namely researchers and stakeholders.

The core **research team** is made up by WP3.4 and WP1.7 NeWater partners UCM (Complutense University of Madrid), UPM (Polytechnic University of Madrid) and IGME (Geological Survey of Spain), while other project members have also been present at different stages of the stakeholder process (CEMAGREF, GEUS, USF, SEI). Primary coordinating responsibilities for the case study activities fall with the UCM team, in collaboration with UPM and IGME partners. IGME is a national research institution with primary responsibilities for monitoring groundwater levels and quality in the aquifer. IGME was initially identified as a potential stakeholder in the area. However, its involvement soon became that of a research institution providing relevant data and information on groundwater variables in the area and collaborating in the coordination of stakeholder activities. In order to enable its formal participation as part of the research team, a request was made to incorporate IGME as a full scientific partner in the NeWater project.

Stakeholders comprise a representative sample of the main collectives that influence water management at the basin scale. Based on over 20 years of research experience of the research team in the Upper Guadiana, an initial list of stakeholders was made up, including all those groups, institutions and individuals with interest or management responsibilities in the area. In an initial phase these included:

- Management organizations: IGME, representatives of the national government with direct responsibilities in the area—Guadiana Water Authority and Director of the Tablas de Daimiel National Park—;representatives of the regional government with relevant management responsibilities in the area—Department of Agriculture, Directorate General of Water, Department of Environmental Conservation—;
- Representatives of agricultural and environmental advocacy organizations;
- Individuals and institutions active in water issues in the region.

These were approached by the NeWater team at the beginning of the project, and invited to participate in an initial introductory meeting (Meeting #0) (see table 1 on page 12). Participants at the meeting were asked to identify other relevant stakeholders that had not initially been invited but that should be included in the project. Since no additional stakeholders were identified, this served to confirm that all relevant stakeholders had been

initially included. However, participants at this first meeting highlighted the need to guarantee the participation of the regional government's agricultural department at these meetings. The research team made sure this participation was assured in later meetings. While not all stakeholder groups have participated at every meeting, the most significant ones (Water Authority, Regional agricultural department, representatives of water user associations, environmental advocacy organizations and agricultural advocacy groups) have been present throughout. Stakeholders that have participated on a regular basis throughout the project include:

- General Directorate for Water, Spain's Ministry for the Environment (national agency responsible for water management).
- Guadiana Water Authority, Spain's Ministry for the Environment (agency responsible for implementing water policies at the basin scale, autonomous to a great extent but ultimately dependent on the General Directorate for Water).
- Agriculture Department, Castilla-La Mancha Regional Government (agency responsible for the implementation of agricultural policies at the regional level).
- Daimiel Centre for Water, Daimiel Municipal Government (centre for education on water issues in general and groundwater and wetlands in particular, closely linked to Las Tablas de Daimiel National Park).
- General Community of Water Users of Aquifer 23, water user association that encompasses users in the Western Mancha aquifer (this association is mostly made up of farmers, who in turn account for over 90% of the region's consumptive water uses).
- Community of Water Users of the Campo de Montiel Aquifer (made up of farmers and municipalities in the Campo de Montiel Aquifer, adjacent to the Western Mancha aquifer)
- Groundwater User Association of Spain (civil association representing several communities of groundwater users from all over Spain).
- ASAJA (Association of Young Farmers; a farmer union representing mostly large land owners).
- COAG (Farmer and Rancher Coordinating Organization; a farmer union representing mostly small and medium sized farmers in the region).
- Environmental conservation organizations of both regional (Ecologistas en Acción de Castilla- La Mancha) as well as national (WWF-Adena) influence (advocates of the need to restore the area's aquifers and wetland ecosystems).
- Individual actors (including farmers, lawyers and national and international scientific experts and observers with a particular interest in water management issues in the area).

As per project objectives (see below), the role of the stakeholders has been to define the needs for research and tool development, as well as to provide appropriate inputs. On the other hand, the research team has focused on facilitating a much needed informal dialogue among stakeholders.

What have been their respective objectives?

Objectives of the stakeholders:

- Take part in an informal, non-binding participation forum. This is perceived as an objective in itself since conflict is widespread among stakeholders, and public participation fora have largely been lacking in the study area up to this point. Additionally, as various stakeholders stated at the first meeting (Meeting #0) the “un-official” and confidential character of the stakeholder forum, detached from any real decision-making process, “allows us to say things and state positions we would never be able to state publicly”, thus contributing to a more transparent dialogue and build trust among the different stakeholder groups.
- Clarify concepts and uncertainties and build a common understanding of basic management parameters. These uncertainties derive primarily from a lack of consensus among stakeholders on basic management parameters in the Western Mancha Aquifer, such as aquifer recharge, storage and sustainable yield, total groundwater abstractions, and existing groundwater users (both legal and illegal).
- Profit from the adaptive management tools developed by the research team.

Objectives of the research team:

- Set up an informal framework for dialogue among the main water actors. The ultimate aim of this initiative is to make inroads towards public participation in the dawn of the Water Framework Directive.
- Contribute to narrow down the uncertainties that currently hamper adequate groundwater management at the basin scale.
- Obtain information from stakeholders pertaining to water use variables; farming practices; economic outputs; goals and expectations of stakeholder participatory processes; and needs for information and clarification on water management parameters.
- Develop adaptive water management tools, as requested by water actors, incorporating the information provided by the stakeholders.

What kinds of artefacts have been used in the interactions with the stakeholders and how did this usage impact on the quality of the exchanges?

Interactions between the research team and the basin’s stakeholders has relied primarily on facilitated and guided discussion sessions, articulated around the main themes that are of

concern in the basin and that were identified in Meeting #1 : the economics of irrigation and other agricultural issues; institutional design and public participation; hydrogeological issues, the impacts of climate change and wetland conservation.

To prepare and guide each meeting, the research team developed:

- A questionnaire that helped guide the discussion on the issues and facilitate dialogue (see Annex 5.2). A different questionnaire was developed by the research team for each of the meetings. Questionnaires were divided into sessions and included both open-ended as well as specific questions when they related to issues of particular concern. They proved to be very helpful in focusing the discussion, maintain a fairly conflict-free and cooperative atmosphere, and obtain useful information about the primary issues of concern.
- A written questionnaire for some particularly relevant or sensitive issues for stakeholders to fill out and hand in to researchers at different points in the discussion sessions. After the first 3 meetings (introduction; context setting; and agricultural economics) the research team realized that the small group discussion format used resulted in some valuable information being lost. Additionally, stakeholders expressed some concern that their specific viewpoints were not being adequately reflected in the small group reports. As a result, in the last two issue-oriented meetings, written questionnaires were used for each individual stakeholder to fill in the response and return it to the research team.
- Short and straightforward power point presentations of each main topic of concern were presented before each discussion session to help centre the debate. Each meeting started with a general power point presentation by a member of the research team where the “state of the art” knowledge on each issue was presented. In other meetings, shorter issue oriented presentations were prepared to introduce each discussion block. These presentations were instrumental in establishing a two-way dialogue with stakeholders, providing technical information on each topic, and thus moving the debate beyond the more conflicting and site-specific issues to seek points of agreement and solutions. This has been particularly important given that stakeholder interaction in the area has been characterized by conflict and animosity. Different interest groups publicly defend fixed positions on different issues and been reluctant to move beyond them or been open to new approaches. By having a “scientist” from outside the region—and thus perceived as “impartial” by stakeholders—provide some basic technical information on each issue from which to start talking, stakeholders, for the most part, had to move beyond their main position and focus on the issues on the table and the need to find points of agreement, clarification or additional information. Additionally, the presentations served, in some cases, to present research results thus giving feedback to stakeholders throughout the process.

- Participants were divided into smaller discussion groups where an effort was made to have all interest groups represented. While in the first meeting break out into groups was done informally by the stakeholders themselves, in consecutive meetings the research team used color codes to make up the discussion groups prior to the meeting. This was done in order to guarantee that different view points and interest groups were represented in each group.
- A flip chart was used at each meeting by the facilitator to write down the main conclusions from each discussion group in the plenary sessions. These notes served a double purpose. On one hand it helped give stakeholders the reassurance that their concerns and opinions were being heard and recorded. On the other hand, these notes have been used by researchers for their work and to prepare the meeting reports.

What kinds of participatory methods have been used? By whom and on which basis were they chosen? Please describe your overall case study approach here including meetings and other strategies of exchange. Please also say if you used any indicators to assess this participation in the research.

In terms of the overall approach, the case study presents a two-fold objective. First, to create a suitable environment for changes towards adaptive water management, and second, to develop site-specific adaptive management tools.

Creating a suitable environment for change towards adaptive water management.

The first of these objectives is tackled through active stakeholder involvement and educational activities targeted to a larger public. This is perceived as an important achievement in itself, given the climate of conflict that traditionally exists among the main water actors and the fact that participation in water management has traditionally been limited to water users, with other stakeholders and the public at large were excluded from formal participation settings. Therefore there had been little opportunity for conflicting views to be shared in a neutral and constructive setting. Stakeholder involvement is achieved through a series of parallel activities:

- (a) A series of meetings, where the main interest groups were represented (including water users, environmental conservation organizations, farmer unions, individual stakeholders and those institutions responsible for water and agricultural policy).
- (b) Training and dissemination activities: workshops with teachers of the Ciudad Real region and farmers from the Western Mancha aquifer and development of an educational poster.

Each of these activities is described in more detail in the following paragraphs.

(a) Stakeholder Meetings

Since most of the area's current conflicts seem to arise from the overall lack of agreement on water data and the related uncertainties (e.g. how much water is available, how much is abstracted, how much can be abstracted in a sustainable way), the seminars were designed to enable managers and stakeholders to sit down together and discuss these issues in an informal, non-binding forum. In order to facilitate participation, it was made clear from the beginning that the role of the research team was to provide an unbiased framework for discussion and social learning, rather than to influence sensitive aspects of decision-making. In fact, according to the evaluation of the participatory process conducted by CEMAGREF (Correa, 2007), it is precisely the non-binding character of these meetings that has allowed the cooperative and non-conflicting nature of the meetings.

While UCM is the overall responsible for the process, NeWater partners UPM and IGME have collaborated actively in the case study (Llamas et al 2007, Varela-Ortega et al 2007). Stakeholder engagement has taken place via the following meetings, all of them held between spring 2005 and the beginning of 2007 (see also Annex 5.3).

- Meeting #0: Introduction (April 2005).
- Meeting #1: Needs for research, tools and capacity building (October 2005).
- Meeting #2: Social and economic aspects of water management (May 2006).
- Meeting #3: Governance aspects of water management (October 2006).
- Meeting #4: Hydrological aspects of water management and climate change (November 2006).

The first meeting intended to establish contact with the main actors, present the project to them and obtain a willingness to collaborate. Once this was achieved, a second meeting was organised in order to determine needs for research, tools and capacity building, as well as to help determine how to break down and discuss water issues during the participatory process. Three thematic seminars ensued, focusing respectively on economic, legal-institutional, and hydrological aspects of the area's water policy. Figure 1 illustrates the structure of the participatory process during the first two years of the project.

Using the tools described in question c) above, meetings were organized around questionnaires developed by the research team, whose working experience in the area goes back to the 1970s. Questionnaires were broken down into discussion sessions that lasted between 60-90 minutes each. Discussion sessions started with a brief presentation by a research team member to highlight the main issues and the state of the art knowledge of the problem being discussed. Meeting participants were divided into smaller discussion groups, where an effort was made to guarantee that a diverse set of viewpoints was represented. Given that between 30 and 40 people participated in each stakeholder meeting, the break out into smaller groups was key to ensure that everyone had ample opportunity to participate in the discussion. Additionally, the small group format was more conducive to build trust among different stakeholder groups, one of the goals for stakeholders identified in meeting #0.

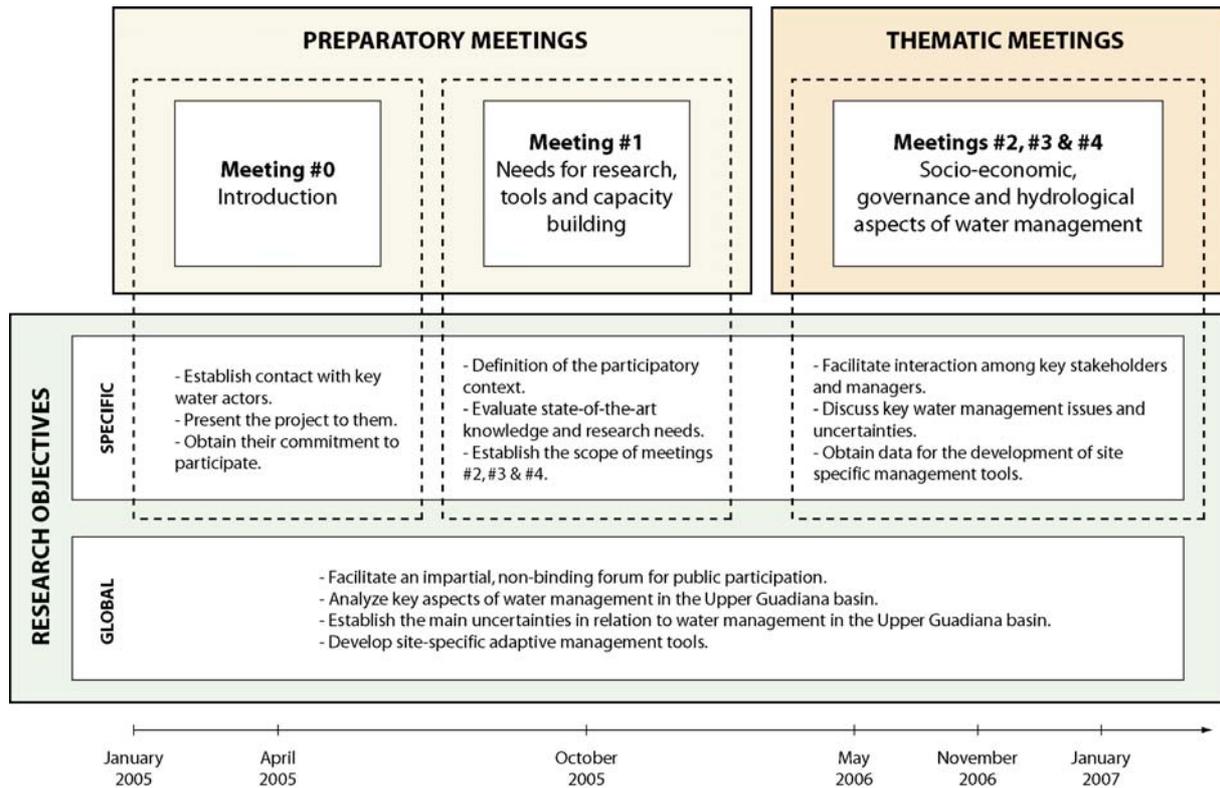


Figure 1. Schematic representation of the case study approach for the first two years of the project.

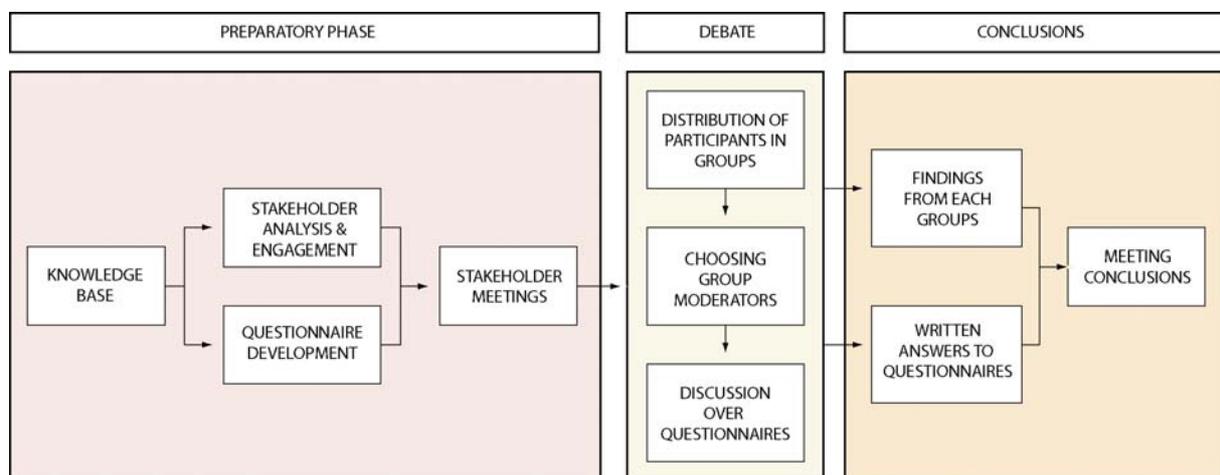


Figure 2. Schematic representation of the meeting process.

A group moderator/reporter was chosen in each group from among its members for each discussion session. Group members were allowed to choose their own moderators, although a request was made that a different group member should play that role in each discussion block. While at times the more outspoken members of the group would take over the moderator/reporter role, the rotation ensured that no single person could dominate the debate. Moderators were responsible for guiding the discussion in each break out group and reporting back to the main group in plenary sessions. In this sense, the rotation mitigated the

possible biases that could result from one single person being responsible for summarizing group results and reporting back to the plenary group. Figure 2 presents a schematic representation of the meeting process. Answers to questionnaires were used for several purposes, including driver analysis and scenario design.

(b) Training and dissemination activities

In order to contribute to create a climate for change towards adaptive water management, it was considered important by the research team to work with a wider audience beyond the actors more directly involved with groundwater management.

- A three day workshop was organized for primary, elementary and secondary school teachers from the Ciudad Real Province, where the Western Mancha aquifer is located. The workshop was organized in collaboration with the Education Department of the Castilla La Mancha regional government. The goal of the workshop was to introduce teachers to the problematic of the aquifer and provide ideas and support to help them to incorporate the issues into their teaching curriculum. The workshop was complemented with outreach materials and a one day field trip. Negotiations are underway with the Education Department to organize similar activities in the future and incorporate local groundwater issues into the region's educational curriculum.
- A one day workshop for farmers was organized in collaboration with the General Community of Groundwater Users of Aquifer 23 and held in November 2006. The workshop served to explain the basic characteristics of the Western Mancha aquifer and the different solutions for the problems derived from its intensive use that have been proposed by the Guadiana Water Authority (Special Plan for the Upper Guadiana or PEAG). Handouts including an educational poster, a fact sheet on the aquifer, and an outreach book on groundwater prepared by IGME were distributed to participants. Given that the lack of sufficient information is identified as one of the primary constraints to reach consensus in the region (Correa 2007; Hernández-Mora and Llamas 2007; Llamas and Martínez Santos 2006), the goal behind the workshop was to introduce the format to the groundwater user's association and encourage them to organize similar workshops in the future to distribute information among its members. While the NeWater research team is available to provide support for similar activities, the goal is to have the users' association incorporate these kind of initiatives into their annual activities.
- An educational poster was developed highlighting the main issues relating to groundwater use and environmental conservation in the region. The poster was distributed to all schools in the province as well as to public buildings, irrigation communities, agricultural outreach offices and other public spaces.

(c) Development of site-specific adaptive management tools

Although stakeholder meetings can be considered an achievement in themselves, particularly in view of the positive response and evaluation of the main stakeholders (Correa,

2007), meeting findings also provide inputs to develop and test stakeholder-requested adaptive management tools. This approach matches the opinion of several authors that system modelling may underpin decision-making in adaptive regimes (Walters 1986, Downs y Kondolf 2002). Thus, in the Guadiana Basin an important rationale behind NeWater research is that uncertainties may be narrowed down by developing adequate site-specific decision support systems and involving the main stakeholders in devising plausible water management scenarios for the future. This is particularly important given that, as was explained earlier, in the Guadiana Basin lack of certainty and consensus around basic water management parameters is one of the key components of the existing conflicts between stakeholders.

A first adaptive tool consists of a numerical groundwater flow model that simulates the response of the basin's main aquifer system to different scenarios (Chiang and Kinzelbach 2001, Martinez-Santos 2007). The main advantage of this modelling exercise is that it establishes a link between stakeholders, policy options and the physical reality of the aquifer. Therefore, it provides stakeholders with reasonably accurate forecasts as to the effects of different decisions on the availability of water resources in the aquifer, or as to the results of potential trade-off alternatives between economic and environmental uses on the recovery of the physical system.

The economic return of agricultural activities is, however, the actual driver behind groundwater use in the basin. Given that groundwater modelling only provides the physical side of things, other specific tools are required to assess the economic implications of different management decisions. Agro-economic models specific to the area have been developed by UPM NeWater partners. A first integration effort between agro-economic and hydrological models (WEAP21) was conducted in June 2006 with a workshop organized between UPM and SEI (WB2) (Varela et al., 2006). Further efforts at coupling groundwater modelling with agro-economic decision support systems are underway. Guadiana Water Authority staff actively participated in the workshop.

Information for building groundwater models and, more importantly, agro-economic models has been derived partly from the stakeholder meetings. More importantly, these meetings have served to validate and present the results thus becoming an integral part of the stakeholder process. Further efforts at disseminating modeling results to stakeholders will be made, since these results contribute to clarify concepts, deal with uncertainties and build consensus.

The second half of the participatory process, currently under implementation, also focuses on the development of formal participatory planning tools, such as a Bayesian Belief Network for the Upper Guadiana Basin. The development of the BBN is being done in an interactive setting, with active input from stakeholders, and in collaboration with GEUS (Denmark) and Oxford University. In this regard, the following activities have taken place and are being planned for the immediate future:

- Workshop held in Madrid in November 2006 with participation from IGME, GEUS, Oxford, UCM and Guadiana Water Authority to develop preliminary network

- Workshop held in Madrid with participation of GEUS, Oxford, UPM and UCM to further refine the network in April 2007
- Two meetings in May with stakeholders (one in Madrid with environmental interests and water managers, and one in Ciudad Real with farmers and agricultural administration) to discuss preliminary network and obtain feedback
- Workshop in Copenhagen with participation of UCM, UPM, GEUS and IGME to refine preliminary network
- Preliminary network will be contrasted with stakeholders in October 2007, in a plenary stakeholder meeting
- Incorporating stakeholder input, the final network will be presented in December 2007-January 2008.

3.2 Dynamics of the case study objectives in relation with stakeholder involvement

With regard to the initially-stated objectives, how have the overall objectives of the case study evolved until now?

The original objectives of the research team were validated and complemented with stakeholder input from meeting #0. Progress towards these objectives is considered satisfactory overall. From the stakeholder viewpoint, the project has seemingly provided an adequate framework for dialogue up to this point (Correa, 2007). Additionally, tool development tasks are taking place according to schedule.

The research team conducted internal reviews after each stakeholder meeting to evaluate whether the meeting format and outcomes met case study objectives. As a result of these internal evaluations, meeting format was progressively adapted to better meet goals.

The design and implementation of a participatory process by the Guadiana Water Authority (not yet unveiled but imminent) in order to comply with WFD requirements may result in the conclusion of the participatory meetings as organized to date and a necessary review of case study goals for the remainder of the project so that more tool and task-oriented forms of participation are designed. New goals, yet to be validated, can include:

- Development and refinement of tools to support adaptive management approaches
- Feedback of information to stakeholders
- Consolidate the work in the lower Guadiana and on transboundary issues.

Which part of this evolution (if any) can be attributed to the stakeholders (please specify the respective stakeholders)?

As stated above, stakeholders defined research objectives for the basin at the beginning of the process. Among others, these include the development of site-specific hydrological and economic models.

Table 1. Stakeholder attendance to project meetings.

Collective	Meeting attendance				
	1	2	3	4	5
General Water Directorate (Spain's Ministry for the Environment, national administration)	X	X	X	X	X
Guadiana Water Authority (Spain's Ministry for the Environment, national administration)	X	X	X	X	X
Agriculture Department (Castilla-La Mancha Autonomous Government, regional administration)			X	X	X
Environmental Conservation Department (Castilla-La Mancha Autonomous Government, regional administration)	x				
Daimiel Centre for Wetlands (Daimiel, municipal administration)	X		X		X
General Community of Water Users of Aquifer 23 (water user association.)	X	X	X	X	X
Community of Water Users of the Campo de Montiel Aquifer (water user association)	x		x	x	
Association of Groundwater Users of Spain (water user association, civil association)	X		X		X
World Wildlife Fund Spain (national environmental conservation group)	X	X	X	X	X
Ecologistas en Acción Ciudad Real (regional environmental conservation group)	X	X		x	X
Ojos del Guadiana Vivos (local environmental conservation group)	X				
Coordinadora de Agricultores y Ganaderos – Iniciativa Rural (COAG, farmer union)	X	X	X	X	
Asociación Jóvenes Agricultores (ASAJA, farmer union)	X	X	X	X	

Developing these tools implies long instances of tedious and time-consuming data-entry tasks, and is therefore hardly adequate for stakeholder involvement. However, stakeholders have provided a large amount of data without which these models cannot run. Besides, their input is heavily relied upon in terms of scenario design and simulation. Stakeholders also contribute significantly in terms of validating the models. This is mostly achieved through presenting the results to them and incorporating their observations.

In addition, stakeholder response to NeWater meetings has been generally positive from the very outset (Correa, 2007). Table 1 the consistent participation of different stakeholder groups in NeWater project meetings. As a result, the dialogue framework can be considered highly representative. Active participation on the part of water and agricultural managers and key social actors has served the purpose of facilitating an informal interaction platform between them, helping to build relations at the personal level that may reflect positively on future instances of decision-making. Besides, most stakeholders have shown a frank attitude¹ during the discussion process, thus contributing to narrow down some of the many uncertainties that currently affect water management at the basin level.

3.3 Factors driving stakeholder involvement

At the outset of the process and with regard to implying the stakeholders what were the most important factors that had to be taken into consideration? How did you take these factors into consideration in the implementation of the process?

Several factors needed to be taken into account during the early stages of stakeholder involvement. Given the conflict-prone nature of the basin, the research team adopted a neutral approach to the problems. This was perceived as an appropriate course of action to first, facilitate an inclusive stakeholder process, and second, offer a transparent framework for dialogue. While stakeholder analysis and engagement relied on the extensive experience of the research team in the area, it was made clear from the very outset that stakeholders could invite other collectives to the meetings. This, in fact, did happen, granting the inclusion of the Agricultural Department of the Castilla-La Mancha Regional Government in the process. This approach seemingly caused a favourable impression among stakeholders, leading to active involvement on their part.

Besides, the stakeholder process has run parallel to important water management decisions such as the Upper Guadiana Water Plan. This provided an opportunity for NeWater, since stakeholders could see the meetings as an additional arena for discussion and a way to have an informal and non-confrontational access to decision makers through the representatives of the Guadiana Water Authority at the meetings. Agricultural and water managers, on their part, benefited from the meetings as a forum in which to gauge stakeholder opinion and try to address concerns and misconceptions. Also in this context, the meetings were perceived as a forum to exchange and obtain relevant and updated information. In this regard, however, it was made clear from the beginning that the role of the research team was not to influence sensitive aspects of decision-making, but to provide an appropriate framework for discussion and social learning.

¹ While this is obviously difficult to quantify, the different points of view have been discussed quite openly, thus leading to direct exchanges of opinions between stakeholders.

Finally, until very recently, public participation in the basin was limited to the participation of water users (primarily irrigators) in water decision-making. As a result, the project was presented to stakeholders as an opportunity to make inroads towards a more participative framework. This seemed attractive to managers and stakeholders alike, since the former are concerned with the participation requirements of the WFD and the latter were eager to have a say in the area's water management practices.

3.4 Future steps

What are the most important considerations for the remainder of the process?

There are several issues to take into account for the remainder of the stakeholder process. First, it is important that stakeholders have begun to see some 'scientific' project results. This need has been addressed to some extent by presenting and discussing the outcomes of the region's groundwater model that was developed by UCM at the more recent stakeholder meetings (those that have taken place in the context of the development of a Bayesian network). This experience seems to have contributed to maintain stakeholder interest in the project. Project coordinators are also currently evaluating the most appropriate format to present overall results of the participatory process to stakeholders. Most likely, this will be done through a written report and during upcoming stakeholder meetings.

In order to avoid stakeholder fatigue, it is also pertinent to give the stakeholder process a more formal appearance. This could be achieved through the implementation of site-specific participation tools that play on active stakeholder input and involvement.

Finally, the Guadiana Water Authority is preparing to launch its public participation program for the development of the Basin Management Plan under the Water Framework Directive. Efforts should be made to allow the experiences of the NeWater stakeholder participation process to inform the broader and binding process and avoid repetition, saturation and overlap.

Next stages to be implemented in continuity with current stage

As stated above, further stages will relate to the development of formal participation tools such as Bayesian Belief Networks. This, together with presenting and discussing the results obtained from adaptive management tools developed by NeWater researchers, will largely condition future instalments of stakeholder dialogue within this case study.

4. References

- Bromley, J., Cruces, J., Acreman, M., Martínez-Cortina, L., Llamas, M.R., 2001. Problems of sustainable groundwater management in an area of over-exploitation: the Upper Guadiana catchment, central Spain. *Water Resources Development*, 17 (3) 379-396.
- Chiang, H.W., Kinzelbach W., 2001. *3D-Groundwater modeling with PMWIN*. Springer-Verlag, Berlin. ISBN3-540-67744-5.
- Correa, J. 2007. Evaluation of stakeholder participatory process in water management in the Upper Guadiana Basin – NeWater Project. CEMAGREF, Montpellier.
- Downs, P., Kondolf, G., 2002. Post-project appraisals in adaptive management of river channel restoration. *Environmental Management* 29(4):477-496.
- Fornes J., Rodríguez J.A., Hernández-Mora N., Llamas M.R., 2000. Possible solutions to avoid conflicts between water resources development and wetland conservation in the Mancha Humeda Biosphere Reserve, Spain, *Phys. Chem. Earth.*, 25 (7) 623-627.
- Guadiana Water Authority, 2005. Plan Especial del Alto Guadiana: borrador del documento de directrices, Ministerio de Medio Ambiente, Madrid, Spain. 35p.
- Hernández-Mora, N., and Llamas, R. 2007. Stakeholder Meeting 3 Report: Institutional Aspects of Water Resources Management in the Upper Guadiana Basin. Internal NeWater report.
- Hernández-Mora N., Martínez-Cortina L., Fornés J., 2003. Intensive Groundwater Use in Spain. In: Llamas, M.R., Custodio, E. (Eds.), *Intensive Use of Groundwater: Challenges and opportunities*. Balkema Publishers, Lisse, The Netherlands, pp387–414.
- Kretsinger, V., Narasimhan, T.N., 2006. California's evolution toward integrated regional water management: a long-term view. *Hydrogeology Journal*, 14 (3) 407-423.
- Lee, K., 1999. Appraising adaptive management. *Ecology and Society* 3(2) 3.
- Llamas, M.R., 1988. Conflicts between wetland conservation and groundwater exploitation: two case histories in Spain. *Environmental Geology and Water Sciences*, 11 (3) 241-251.
- Llamas, M.R., Martínez-Santos, P., De Stefano, L., De la Hera, A., Martínez-Cortina, L., 2007. Hydrological aspects of water management and climate change in the Upper Guadiana Basin, Spain. Internal NeWater Report. Unpublished.
- Llamas, M.R. and Martínez-Santos, P. 2006. D 342 Stakeholder report for research needs, tools and capacity building: Guadiana basin. Report to the NeWater Project.
- Llamas, M.R., Martínez-Santos P., 2005. Intensive groundwater use: silent revolution and potential source of social conflict, Guest Editorial, *Journal of Water Resources Planning and Management* 131 (5) 337-341.
- Marín, L.E., E. Sánchez and V. Martínez, in press. The role of the Academies of Science for improved groundwater governance: The Peninsula of Yucatan, Mexico example. In: Ragone, S., Hernández-Mora, N., de la Hera, A., Bergkamp, G., McKay, J. (Eds.), *The global importance of groundwater in the 21st Century: Proceedings of the International Symposium on Groundwater Sustainability*. Westerville, OH. National Ground Water Association Press.

- Martínez-Alfaro P.E., Castaño, S., 2001. Infiltration assessment in Tablas de Daimiel National Park. In: Seiler, K.P., Wohlrich, S., (Eds.). *New approaches to characterising groundwater flow*. Swets & Zeitlinger Publishers. Lisse, The Netherlands. 1800p. P135-138. ISBN 902 651 848X.
- Martínez-Santos, P., 2007. Hacia la gestión adaptable de los acuíferos de la Mancha Occidental. PhD Thesis. Universidad Complutense de Madrid, Spain. 383p.
- Shah, T., 2004. Groundwater and Human Development: Challenges and Opportunities, in *Livelihoods and Environment*. Invited paper. World Water Week, Stockholm 15-20 August, 2004. Stockholm International Water Institute. Preprint 10p.
- Stankey, G., Bormann, B., Ryan, C., Shindler, B., Sturtevant, V., 2003. Adaptive management and the Northwest Forest Plan: rhetoric and reality, *Journal of Forestry* 101 (1).
- Turton, A.R., Hattingh, A.H., Claassen, M., Roux, D., 2007. Towards a model for ecosystem governance: an integrated resource management example. In: Turton, A.R., Hattingh, H.J., Maree, G.A., Roux, D.J., Claassen, M., Strydom, W.F., (Eds.), *Governance as a Dialogue: Government-Society-Science in Transition*. Springer-Verlag, Berlin. 354p. ISBN: 978-3-540-46265-1.
- Varela-Ortega, C., Rapallo, R. and I. Blanco-Gutiérrez. 2006. Adaptive management of water resources: Stakeholder participation for vulnerability and adaptation analysis using WEAP. Report of the WEAP21 use for water management in the Upper Guadiana Basin (Spain). Internal NeWater Report. Unpublished.
- Varela-Ortega, C., Blanco-Gutiérrez, I., Carmona-García, G., Esteve-Bengoechea, P., 2007. Economic and agronomic aspects of water management in the Upper Guadiana Basin (Spain). Internal NeWater Report. Unpublished.
- Villholth, K., Giordano, M., 2007. Groundwater use in a global perspective – Can it be managed?. In: Giordano, M., Villholth, K., (Eds.), *The agricultural groundwater revolution: opportunities and threats to development*. International Water Management Institute, Colombo, Sri Lanka. p393-402. ISBN-13:978 1 84593172 8.
- Walters, C.J., 1986. *Adaptive management of renewable resources*. McGraw-Hill, New York.
- WWPRAC, 1998. Water in the West: challenge for the next century. Report of the Western Water Policy Review Advisory Commission, Denver.

5. ANNEXES

5.1 Guidance for reporting document

5.2 Questionnaires

5.3 Pictures

Annex 5.1

Guidelines for mid-term reporting on progress on the stakeholder processes

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April, 2nd

All cases studies are now supposed to produce a stakeholder report. You may organize it in responding to the questions below. You may either answer the questions one by one or integrate the answers into a coherent text. Basically we suggest the format of a narrative of what has happened, if you feel comfortable with, associated to a time diagram.

Questions guiding your reporting:

0. Factual elements of stakeholder involvement in the case study

- a. Who have been the people involved in the case study and what have been their roles (researchers, case study coordination team, various stakeholders, please describe in a bit more detail especially the various categories and roles of stakeholders).
- b. What have been their respective objectives?
- c. What kinds of artefacts have been used in the interactions with the stakeholders and how did this usage impact on the quality of the exchanges?
- d. What kinds of participatory methods have been used? By whom and on which basis were they chosen? Please describe your overall case study approach here including meetings and other strategies of exchange. Please also say if you used any indicators to assess this participation in the research.

1. Dynamics of the case study objectives in relation with involvement of stakeholders

- a. With regard to the initially-stated objectives, how have the overall objectives of the case study evolved until now?
- b. Which part of this evolution (if any) can be attributed to the stakeholders (please specify the respective stakeholders)?
- c. To what extent these objectives have been shared by the various stakeholders and researchers? This can be tracked back through ex post reflexive analysis of changes in objectives, as well as through the current thoughts among stakeholders on the objectives of the case study.

2. Factors driving stakeholder involvement

- a. At the outset of the process and with regard to implying the stakeholders what were the most important factors that had to be taken into consideration?
- b. How did you take these factors into consideration in the implementation of the process?
- c. What other factors and events have influenced the case study process during its implementation?

d. How have these factors been dealt with?

3. Future steps

- a. What are the most important considerations for the remainder of the process?
- b. Further needs in conducting stakeholder processes
- c. Next stages to be implemented in continuity with current stage

Additionally to that textual part of the report, we suggest a schematic representation of stakeholder processes since the beginning of the project, made as a chronicle made of:

- major events
- evolution of level of activity in the project for the various categories of stakeholders concerned by it
- evolution of research activities (among the following categories: research setting, field work, modelling, analysis, reporting, knowledge management)

Annex 5.2

Questionnaires

The following pages include the original versions (in Spanish) of the questionnaires developed for stakeholder involvement in meetings #2, #3 and #4.

Meeting #2: Social and economic aspects of water management

SESIÓN I. REFORMA DE LA PAC: PAGO ÚNICO Y CONDICIONALIDAD. PROGRAMA AGROAMBIENTAL

Bloque A. Incidencia de la reciente reforma de la PAC sobre la agricultura de regadío y de secano en el alto Guadiana.

1. ¿Se aprecian cambios significativos en la distribución de cultivos?
2. ¿Cuál es la razón principal que explica los cambios observados en dicha distribución?
3. ¿Aprecia usted cambios significativos hacia técnicas de producción más extensivas?
4. ¿Cómo piensa usted que esto puede incidir en la renta de los agricultores? ¿aumenta? ¿disminuye? ¿en cuánto?
5. ¿Aprecia cambios significativos hacia un mayor ahorro de agua?

Bloque B. Condicionalidad de las ayudas.

6. ¿Qué medidas se están tomando para aplicar la condicionalidad de las ayudas de la nueva reforma de la PAC que ha entrado en vigor en enero de 2006?
7. ¿Se están aplicando las directivas de medio ambiente, como por ejemplo la directiva de nitratos, la directiva de aguas subterráneas o Natura 2000?
8. ¿Se están aplicando las "buenas condiciones agrarias y medioambientales que exige la reforma de la PAC?
9. ¿Se están aplicando las medidas específicas relacionadas con la sobreexplotación de acuíferos que recoge la legislación española sobre condicionalidad?

Bloque C. Programa agroambiental

10. ¿Considera usted que la nueva fase del programa ("medida agroambiental 7.1") responde adecuadamente a las necesidades de la zona?
11. ¿A qué nivel de compensación de rentas se acoge, en su opinión, la mayoría de los agricultores? ¿al 50% de reducción? ¿al 100% de reducción?
12. ¿Son correctas las compensaciones?

SESIÓN II. PLAN ESPECIAL DEL ALTO GUADIANA: EFECTOS SOBRE LA AGRICULTURA.

Bloque D. Efectos del PEAG sobre la agricultura

13. ¿Qué elementos/aspectos considera usted que debería incluir el PEAG?
14. ¿Qué puede aportar el PEAG a efectos de ahorro de agua en la agricultura?
15. ¿Qué opinión le merecen las últimas campañas de control? ¿estima que sería conveniente volver a la teledetección? ¿propondría usted algún otro sistema de control?
16. ¿Qué cantidad cree usted que debería pagarse a los agricultores en compensación por ceder sus derechos de agua?

SESIÓN III. EL FUTURO DE LA AGRICULTURA EN EL ALTO GUADIANA.

Bloque E. Cultivos y técnicas de producción.

17. ¿Qué cultivos ve más viables a medio o largo plazo a la luz de los cambios antes debatidos?
18. ¿Qué técnicas de producción y sistemas de riego cree usted que se desarrollarían según los cambios antes analizados?

Bloque F. Disponibilidad y costes de agua para regadío.

19. ¿Qué impacto considera que usted que tendría a medio o largo plazo sobre la disponibilidad y costes del agua la tecnología y las potenciales redistribuciones de cultivos?
20. ¿Cómo ve la posibilidad de aportes externos de agua, p.e. el trasvase de agua del Tajo? ¿qué precio estaría dispuesto a pagar por dichos aportes en €/m³?
21. Independientemente de los impactos ecológicos, y sin aportes externos ¿cuánto tiempo estima que pueden mantenerse los bombeos actuales?

22. ¿Cómo considera usted que puede influir la aplicación de la nueva Directiva Marco del Agua en la zona?

Bloque F. Impactos socioeconómicos.

23. ¿Cómo piensa usted que influirían los cambios previstos a medio o largo plazo en la producción agrícola sobre el desarrollo socioeconómico de la zona (creación de empleo, desarrollo de industrias auxiliares a la agricultura, servicios...)?
24. ¿Qué alternativas de futuro ve a la agricultura de regadío en el alto Guadiana?
25. ¿Qué papel puede jugar el fomento de un mayor espíritu empresarial dentro del colectivo de los agricultores?

Meeting #3: Legal and institutional aspects of water management

SESIÓN I. INICIATIVAS Y REFORMAS LEGISLATIVAS Y DE GESTIÓN: INCIDENCIA EN LA GESTIÓN DEL AGUA EN LA CUENCA DEL GUADIANA.

Bloque A. Directiva Marco del Agua.

1. ¿Conoce los elementos fundamentales de la Directiva Marco del Agua (DMA)? Por favor defina cuáles son.
2. ¿Cómo ha aprendido sobre el contenido de la DMA? (Por ejemplo por medio de conferencias, foros de debate, relaciones profesionales, Internet, etc.)
3. ¿En qué medida ha participado usted en la elaboración de los trabajos relacionados con la DMA que la CHG está preparando?
4. ¿Cómo cree que la aplicación de la DMA en el ámbito del Alto Guadiana va a afectar a su trabajo diario y sus intereses?
5. ¿Cómo cree que la aplicación de la DMA afectará la gestión del agua en el Alto Guadiana?

Bloque B. Propuesta de Reforma del Texto Refundido de la Ley de Aguas.

6. ¿Está usted familiarizado con el contenido de la propuesta de modificación de la Ley de Aguas? Por favor defina, en su opinión, los elementos fundamentales.
7. ¿Cómo ha conocido usted el contenido de la propuesta de reforma de la Ley de Aguas? (Por ejemplo por medio de conferencias, presentaciones del Grupo de Aguas Subterráneas, foros de debate, relaciones profesionales, Internet, etc.)
8. ¿En qué medida ha participado usted en las reuniones de debate organizadas por el Grupo de Aguas Subterráneas?
9. ¿Cómo cree que la reforma de la Ley de Aguas va a afectar a su trabajo diario y sus intereses?
10. ¿Cómo cree que la reforma de la Ley de Aguas afectará la gestión del agua en el Alto Guadiana?

Bloque C. Plan Especial del Alto Guadiana.

11. ¿Cuáles deben ser, en su opinión, los elementos fundamentales del Plan Especial del Alto Guadiana (PEAG)?
12. El PEAG se entiende como un adelanto en la definición y aplicación del programa de medidas que requiere la DMA. ¿Cómo cree que esta propuesta contribuirá a lograr los objetivos de la DMA?
13. ¿Cómo cree que la aplicación del PEAG va a afectar a sus intereses?
14. ¿Cómo cree que la aplicación del PEAG afectará la gestión del agua en el Alto Guadiana?
15. ¿Qué cambios específicos propondría al reciente borrador del PEAG (septiembre 2006) PEAG y con qué objetivos?

SESIÓN II. PARTICIPACIÓN EN LA GESTIÓN DEL AGUA E INFORMACIÓN PÚBLICA.

Bloque D. Participación e información en el contexto actual: participación reglada.

16. Por favor describa de qué modo, y en concepto de qué, participa usted en la gestión del agua en el Alto Guadiana en el contexto legal actual (Texto Refundido de la Ley de Aguas) (Por

ejemplo, miembro de la Junta de Explotación del Acuífero, Miembro de la Asamblea de Usuarios, etc.)

17. ¿Cuál es su nivel de satisfacción con su participación en la gestión del agua en el Alto Guadiana hasta el momento?
18. Por favor describa el tipo de información que utiliza en relación con el agua en el Guadiana. (Por ejemplo inventarios, niveles piezométricos, extracciones, etc.)
19. ¿De dónde obtiene esta información?
20. ¿Cómo la obtiene? (Por ejemplo, directamente de la CHG, de la Comunidad de Usuarios, de universidades, de la JCCLM, etc.)

Bloque E. La participación en el diseño del PEAG.

21. ¿En qué medida ha participado usted en la elaboración del PEAG?
22. ¿Cómo piensa participar de ahora en adelante?
23. ¿Le parecen suficientes las ofertas de la CHG en cuanto a la elaboración de un proceso participativo de definición del PEAG? ¿Qué modificaciones específicas sugeriría?

Bloque F. La participación desde la perspectiva de la Directiva Marco: Propuestas de las partes interesadas.

24. La DMA requiere una participación activa de los usuarios en la elaboración de los nuevos planes de cuenca. Esto implica la definición de quién debe participar, cómo deben participar, en qué momento y que instrumentos son necesarios para facilitar esta participación. Por favor comente los siguientes aspectos.
 - a. ¿Qué actores entiende usted deberían estar representados en un proceso de participación activa en la gestión del agua en el Alto Guadiana?
 - b. ¿Qué formato de participación facilitaría su activa participación en los procesos de toma de decisiones con respecto a la gestión del agua? (Por ejemplo reuniones informativas, consultas electrónicas, buzón de sugerencias; reuniones periódicas, establecimiento de un foro permanente de participación, etc.)
 - c. ¿Cómo diseñaría usted un proceso de participación, por ejemplo para la elaboración del plan de cuenca en el alto Guadiana? (refiriéndose a todos los aspectos indicados en la pregunta: formato, participantes, periodicidad, etc.)
 - d. La participación activa requiere un acceso fácil a la información. ¿Qué tipo de información requeriría para facilitar su activa participación en la gestión del agua?
 - e. ¿Qué medio le parecería más conveniente y adecuado para recibir esta información? ¿Con qué frecuencia ?

SESIÓN III. ORGANISMOS PARA LA GESTIÓN DEL AGUA : LAS CONFEDERACIONES HIDROGRÁFICAS Y LAS COMUNIDADES DE USUARIOS : PROPUESTAS DE REFORMA.

Bloque G. Las comunidades de usuarios.

25. En su opinión, ¿qué papel han jugado las Comunidades de Usuarios de Aguas Subterráneas (CUAS) en la gestión del agua en el Alto Guadiana?
26. ¿Cuáles han sido, en su opinión, las limitaciones (tanto externas como internas a las propias CUAS) que han dificultado una participación efectiva en la gestión del agua?
27. ¿Qué cambios ve necesarios para asegurar una participación efectiva de las CUAS en la gestión del agua?
 - a. En el contexto externo (Por ejemplo legal, de relaciones institucionales, acceso a la información pertinente, etc.)
 - b. Dentro de las propias CUAS (Por ejemplo en cuanto a transparencia tanto interna como de cara al exterior, procesos de toma de decisiones, profesionalización, financiación, etc.)

Bloque H. La reforma de los organismos de cuenca.

28. En el contexto de la Directiva Marco, los organismos de cuenca tienen nuevas competencias, y el enfoque de la gestión del agua ha cambiado. Por favor defina, en su opinión, el modelo ideal de organismo de cuenca que facilite una gestión eficaz y sostenible del agua en el Alto Guadiana.

Meeting #4: Hydrological aspects of water management and climate change

SESIÓN I. INCERTIDUMBRES SOBRE LOS RECURSOS HÍDRICOS.

1. ¿Qué grado de conocimiento hidrológico de la cuenca alta del Guadiana cree que existe por parte de los siguientes grupos? Valore de 0 a 10.
 - a. ¿De la administración
 - b. ¿De los usuarios?
 - c. ¿De los grupos conservacionistas?
 - d. ¿De los científicos?
 - e. ¿De la población en general?
2. Piensa que un mayor conocimiento de la hidrología de la cuenca alta del Guadiana es:
 - Imprescindible
 - Importante
 - No demasiado importante
 - Innecesario
 - Depende de para quién (matizar para quién)
3. En caso de que lo considere necesario ¿cómo piensa que se puede impulsar la educación e información hidrológica?
4. ¿Cuáles cree usted que son las principales lagunas de conocimiento en cuanto a la hidrología de la cuenca alta?
5. ¿Cómo cree usted que deberían subsanarse estas lagunas?
6. ¿Qué conocimiento o sensación tiene respecto a la evolución de los niveles del acuífero 23 en los últimos años? (suben, bajan, poco o mucho, por extracciones, por meteorología; si lo considera oportuno puede distinguir zonas del acuífero en la respuesta)
7. ¿Qué proporción de los pozos existentes (legales o ilegales) piensa que se ha secado en los últimos veinte años? ¿podría indicar el ámbito geográfico donde tenga noticia de que esto se ha producido?
8. Considerando una secuencia meteorológica “media” ¿cuál cree que es el volumen (en hm^3) de agua que se puede extraer del acuífero de la Mancha Occidental sin que varíen los niveles del agua (ni suban ni bajen)?
9. ¿Cree que la calidad del agua subterránea en la cuenca alta del Guadiana es un problema?
 - Fundamental, el más importante que hay
 - Bastante importante
 - A tener en cuenta, pero secundario
 - No es un problema por ahora
10. ¿Qué aspectos relacionados con la calidad del agua le preocupan de cara al futuro?
11. ¿Qué opina de la división del acuífero 23 en tres “masas de agua”, resultante de la aplicación de la Directiva Marco?

SESIÓN II. INCERTIDUMBRES SOBRE LAS EXTRACCIONES DE AGUA SUBTERRÁNEA.

12. Los últimos datos oficiales sobre extracciones facilitados por la Confederación Hidrográfica del Guadiana para la campaña 2005 (borrador PEAG) estiman que las extracciones en dicho año, según dotaciones SIAR, fueron de unos 350 hm^3 para el acuífero 23. En su opinión ¿se corresponde esta cifra con la realidad?
13. En caso de haber respondido “no” a la pregunta anterior, ¿a cuánto estima que ascendieron las extracciones reales para dicho acuífero en 2005 (en hm^3)?
14. ¿A cuánto estima que asciende el volumen total de extracciones (y la superficie en regadío en hectáreas) en el resto del alto Guadiana? (especifique zonas si lo desea)
15. De la manera más sucinta posible: ¿qué entiende usted por “extracciones ilegales”?
16. Desde su experiencia ¿diría que existe alguna característica generalizada dentro de las extracciones ilegales (si van asociadas a un determinado tipo de cultivo, etc)?
17. A día de hoy ¿cuál piensa que debería ser el volumen máximo de extracciones de agua subterránea en los distintos sistemas acuíferos de la cuenca alta del Guadiana?

18. ¿Cree que estos límites deberían evolucionar? En caso afirmativo ¿cómo y en función de qué?
19. ¿Cree que ese límite debería evolucionar? En caso afirmativo ¿cómo y en función de qué?
20. ¿Qué actuaciones (no más de tres) cree que serían necesarias para conseguirlo?
21. ¿Qué repercusión piensa que podría tener una potencial reasignación de los caudales del trasvase Tajo-Segura la problemática hídrica del alto Guadiana? (marque más de una respuesta si lo desea)
22. El término “recursos renovables” puede ser difícil de definir, como demuestra el hecho de que existan en la literatura definiciones parcialmente contradictorias ¿qué significa para usted?
23. ¿Considera representativa la cifra de 320hm³/año para el acuífero 23? (matice la respuesta si lo desea)

SESIÓN III. INCERTIDUMBRES SOBRE LA CONSERVACIÓN DE HUMEDALES.

24. Por favor díganos qué entiende por Reserva de la Biosfera de la Mancha Húmeda, Parque Nacional de las Tablas de Daimiel, Humedales ribereños y humedales endorreicos y conservación de humedales
25. Los datos disponibles (DGOH, 1991) indican que de los 113 humedales inventariados en la Reserva de la Biosfera de la Mancha Húmeda (prácticamente coincidente con el Alto Guadiana) una tercera parte, localizada preferentemente sobre el acuífero 23, están desaparecidos o seriamente degradados. ¿Está usted de acuerdo con esta estimación? En caso contrario ¿la considera corta o excesiva?
26. ¿Qué acciones cree usted que serían necesarias para garantizar la conservación a largo plazo de la Reserva de la Mancha Húmeda?
27. ¿Considera que los trasvases de agua del Tajo-Segura realizados desde 1988 han sido realmente útiles para conservar el Parque Nacional de Las Tablas de Daimiel o sólo han servido para mantenerlas en un “coma ecológico” asistido? Por favor matice su respuesta.
28. Por favor explique qué opinión le merecen las alternativas siguientes: intentar la conservación del Parque por todos los medios, o descatalogar las Tablas de Daimiel como Parque Nacional y centrar los esfuerzos en la conservación de otros humedales en mejor estado en la Mancha Húmeda.
29. ¿Le parece que si se restringen los bombeos significativamente subirán los niveles del agua subterránea y se recuperaran los humedales desaparecidos o seriamente degradados en la Mancha Húmeda? En caso afirmativo ¿cuántos años le parece que serán necesarios para conseguir esa recuperación?
30. Sin duda usted ha oído hablar del cambio climático debido a los gases invernadero y del Protocolo de Kioto para reducir la emisión de esos gases.
31. ¿Qué importancia puede tener ese impacto (positivo o negativo) para el Plan Especial del Alto Guadiana (PEAG)?
32. ¿Qué perspectivas de conservación ve en un marco de cambio climático en el que se prevén períodos de sequía y de lluvias más intensos y distribuidos de forma más irregular a lo largo del tiempo?

Annex 5.3

Pictures



Meeting venue. Fundación Ortega y Gasset, Madrid.



Information session (meeting #0). Fundación Ortega y Gasset, Madrid, April 2005.



Detail of the room where meetings #1, #2, #3 and #4 were hosted.



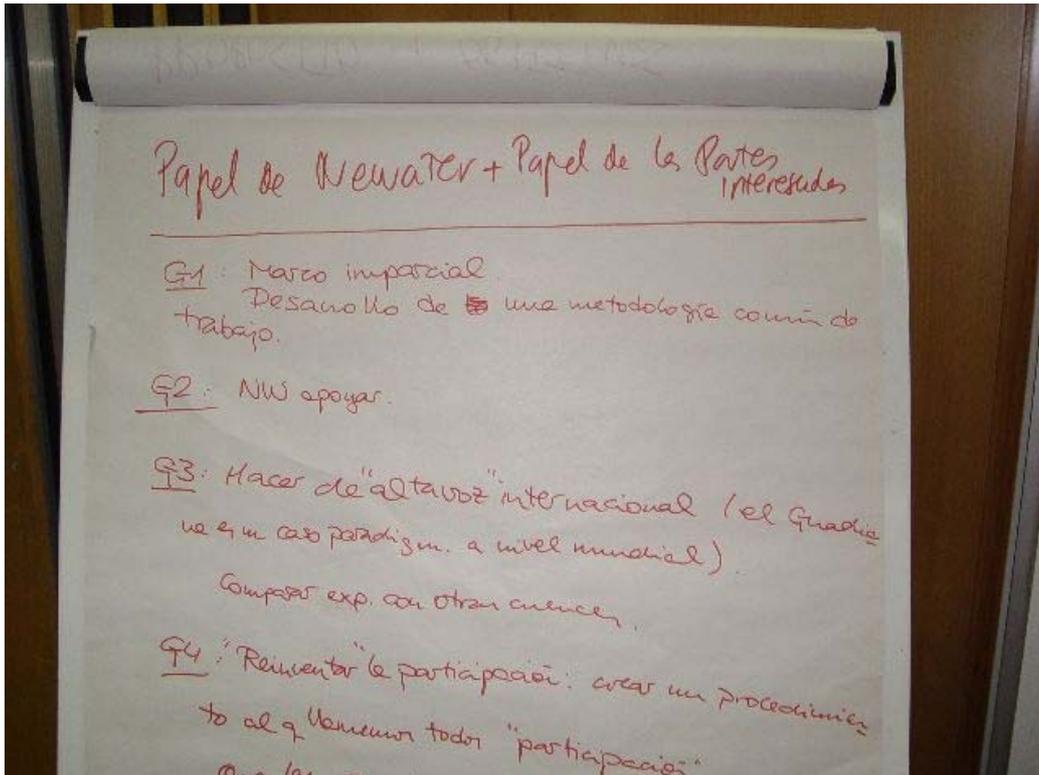
Groupwork during meeting #2, May 2006. The group includes B. Roncero and I. Villaseñor (Water User Association of the Mancha Occidental aquifer), E. Calleja (current president of the Guadiana Water Authority) and I. Blanco (UPM, WP1.7).



Facilitator Josefina Maestu at work during meeting #1, October 2005.



Plenary session during meeting #4, January 2007.



Role definition during meeting #1, October 2005.



Stakeholder meeting for the development of Bayesian Belief Networks. Ciudad Real, 2007.



Field outing with key water users. People stand on the dry riverbed of the Guadiana river (May 2006).



Field outing with key water users. Las Tablas de Daimiel National Park (May 2007).