

Assessing domestic water use habits for more effective water awareness campaigns during drought periods: a case study in Alicante, Eastern Spain
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Response to Reviewer 1

(Reviewer 1's comments are in italics)

First of all we really appreciate all the comments made by Reviewer 1 (R1), which have helped to critically reflect on how to improve the manuscript.

We will deal with the comments point by point:

The authors are touching a relevant topic: domestic water use habits and how to better address those in awareness campaigns for reducing water consumption during periods of water shortage. Also the household survey that has been conducted in 2011 in Alicante bears some interesting results that could inform awareness campaigns that aim at reducing water consumption. Nevertheless, I have a general concern if the paper is of significant for NHESS as in my view and in the current state it does not represent a substantial contribution to the understanding and management of natural hazards. Therefore I would recommend to consider a different journal where the scope includes either the socio-economic dimension of water use and consumption or sustainability communication strategies, e.g. HESS, Sustainability Science etc. Or otherwise to make more clear how the problem addressed and the results of the study relate to the scope of NHESS.

If the editor though decides that the article fits the scope of NHESS I have some recommendations for the revisions.

RESPONSE 1: Basically our paper deals with drought management at the scale of individual users manifested through changes in water habits. Therefore we disagree with the fact that the reviewer does not completely see this paper within the scope of NHESS. However, we think that many of the comments and critiques she/he makes are very pertinent and will help to raise the quality of the manuscript. Reviewer 1 raises many questions, which hardly could be dealt with at the same time without much expanding the length of the paper. In any case, we will take all them into account when working out the revisions.

Research questions and objective: Please define the research question(s) you address in your paper and that you are able to and do answer on basis of the results of the survey. Were there any hypotheses that lead the research design and can they be verified or falsified on basis of the results? The research objective is stated as “to provide more accurate knowledge of existing behaviors in water use by urban households in Alicante”. You could be more precise here: what do you mean by accurate knowledge, what exactly do you want to investigate? Which knowledge is needed to improve water awareness campaigns? And how does this contribute to the scientific debate on water consumption/water conservation?

RESPONSE 2: We do agree with reviewer 1 that we have to better define the research objective and the research questions. As to the research objective by “accurate knowledge” we mean ascertaining clearly the most relevant habits in the use of water by individuals. Since water conservation campaigns are mostly addressed to improve efficiency in water use and increase water savings, knowledge about habits provides a basis on which develop such measures (for example, if we know that people usually do not take baths, messages advising people to shower instead of taking baths do not make much sense). The study of habits through surveys such as the one proposed in the paper has made important scientific contributions in understanding the behavioral dimensions of our relationships with natural resources and hazards, especially water. See for example the review in Hurliman et al 2009 that we cite in the paper.

Central concepts: Please be more precise and consistent about what you focus on and define the central terms in the introduction. Is it “water use habits” or “water use behaviour” that you have investigated and what does this cover? Do the awareness campaigns that you relate to focus on “water conservation”, “water consumption” or “water saving habits”?

RESPONSE 3: We think that the terms “water use habits” is widely used in the academic literature so we stick to this concept. On the other hand, awareness campaigns combine actions and messages that focus on water conservation and consumption and water saving habits.

Systematic assessment of water use habits: Based on the definition of central terms I would recommend a systematic procedure for assessing the water use habits that includes defining central aspects that need to be considered, thresholds that could be defined for evaluating the results of the survey and criteria that lead to recommendations for improving water awareness campaigns. So far it remains unclear why the aspects that have been surveyed and presented in the results are relevant for assessing awareness campaigns.

RESPONSE 4: The aspects that have been surveyed have been not randomly determined but are the result of a long trajectory researching on water use habits in Spain, both on indoor and outdoor uses, and both in qualitative and quantitative terms. We can back our choices with more references.

Also it is not transparent how you come to your conclusion e.g. on page 6874 that the assessed habits “indicate an already existing prudent behaviour” or on page 6873 that “habits did not appear overly extravagant in terms of consumption”. What defines extravagant or prudent use and how does this quantify in consumption?

RESPONSE 5: What defines extravagant versus prudent water use comes from a comparison with domestic water use benchmarks, as well as the recommendations from the World Health Organization on minimum water use (Howard and Bartram 2003; we have included this reference in the article) and with existing reviews (e.g. Hurliman et al. 2009):

Howard,G and J. Bartram 2003 Domestic water quantity, service level and health. Geneva, Switzerland, World Health Organization.

Efficient introduction and problem setting in sections 1-4: You could be more efficient when setting the scene and only consider those aspects relevant for the reader to understand the problem setting, previous research and case study specifications in order to evaluate the results presented. E.g. the details on urbanisation process of the case study area seem not relevant for understanding or discussing the results. The background on awareness campaigns in Alicante is quite detailed but in my view not needed at that length in order to understand the survey design or interpretation of results. Please check section 1 to 4 for potential of reducing the text to the essentially needed and rather elaborate more on the interpretation of results and conclusions drawn from this.

RESPONSE 6: We appreciate this recommendation. We will reduce the length of sections 1 to 4 without losing the most important facts about urbanization patterns in Alicante and information on past water campaigns, which we think are both important to contextualize the case study for the international readers.

Methods used: I miss a critical evaluation of the method used. A general problem with surveys that try to evaluate behaviour (or habits) is that they only deliver information on stated – and not actual - behaviour and when focussing on environmental issues there might be a risk of receiving socially expected answers. In how far this has been considered in the design of the survey and in the interpretation of results? Further it would be interesting to know your selection criteria for the municipalities and if the sample taken reflects the population (e.g. ration of Spanish and foreign participants, distribution of age, income, average household size etc.). Again I miss a critical evaluation of potential biases in the discussion, for example due to high ration of retired people and women among the respondents. Results, discussion, conclusions: In my view you could be more detailed and concise in the interpretation and discussion of your results and the conclusions you draw from this discussion for improving awareness campaign.

RESPONSE 7: We do agree with R1 that we should provide a critical reflection of the methods use and their limitations. We can either include it either in section 5 or in the section 7 (discussion and conclusions). It is true that when asking people about their habits there is a risk of receiving socially expected answers instead of the true behaviors. Nonetheless, our survey was designed to present the questions avoiding any kind of judgment or suggestion about the best environmental conduct. And in the survey design we specifically attempted to phrase questions so that were not easily answered with sympathetic responses.

You stay behind the potential of the material presented. How does the stated behaviour relate to other studies? How do they translate into water consumption? It would be very interesting and the paper would really benefit if you could estimate the households' water consumption in litre/capita/day based on average figures, e.g. for litre/per minute showering or per watering gardens with x qm lawn. This could corroborate your conclusions of the households being “not overly extravagant in terms of consumption” and detail it. Based on a translation into consumption in litres you could identify areas where future campaigns should focus on. I believe you miss a lot of detailed hints to water saving possibilities by not going into detail. E.g. you state that campaigns often recommend to shower instead of taking a bath which would relate to the infrastructure and habits. Nevertheless your survey shows that 75% respondents do have a bath tub

and around 200 respondents seem to use it on a regular basis. This sound to me that there still could be some potential for water reduction here. Another aspect you only elaborate very little is the usage of water saving devices. The interesting question is why only so few households have water saving devices installed. A more detailed analysis might give hints to this: e.g. what characterises those households etc. These are only two examples where I expect that you would gain more insights from the material through some more statistical analysis.

RESPONSE 8: We appreciate all the recommendations to make the most of the material presented and to raise more policy oriented recommendations for future water campaigns. We can definitely incorporate some of these observations in the discussion session for instance the potential for water savings by insisting in showers instead of baths but we should be also aware of not overestimating this.

In the discussion I would be interested how your results from Alicante relate to other studies and could be transferred or not to other regions. What is new and interesting for the scientific debate on water consumption and improving water awareness campaigns.

RESPONSE 9: When revising the discussion section we will stress better how our study relates to other made elsewhere and more importantly the avenues and limitations for transferring to other contexts what has been learnt in the Alicante case. In any case it is important to remark that most studies on water conservation campaigns have been made in areas such as California or Australia and have been primarily addressed to outdoor uses. To our knowledge, however, examples outside these areas are rare and studies focusing on habits are also rare.

In your recommendations for awareness campaigns you remain rather general and not focused enough. What is the main take home message? Summarizing my rather critical comments: I would recommend to revise the article focussing the material, results and discussion on the research question(s) and the main message still to be defined and to submit it to a different journal that focuses on socio-economic dimension of water management or on sustainability communication. Then you capitalize the valuable empirical material gathered in your survey and contribute to the scientific debate on improving water conservation on household level in a more effective way.

RESPONSE 10: We will rewrite our recommendations for awareness campaigns along more specific lines. We thank Reviewer 1 for all the recommendations made, which for sure will help to improve the quality of the manuscript.