Hydrology and Earth System Sciences Discussions

Interactive comment on "A decision tree model to estimate the value of information provided by a groundwater quality monitoring network" *by* A. Khader et al.

Anonymous Referee #1

Received and published: 11 February 2013

The paper is very well thought and researched. Overall, I enjoyed reading it. Though, I have minor comments, feedback, and suggestions that would help improve the paper and polish it up. It would be interesting to see future applications on your contribution in other areas of the world with other contaminants, in particulate, in places where the value of information could be incredible (Maybe Aquifers in Texas and California!). The paper references a key research in (Khader and McKee 2012) but not yet published. I'm thrilled to read this paper when it comes out.

Here are general comments, feedback, and suggestions that follow the development

the story of the paper :

*Please be consistent in using contamination and pollution. Generally contamination is used in the context of an already existed harmful substance in groundwater while pollution is used in the context of introducing harmful substances to groundwater (e.g., wastewater). I think in your paper context, it should be used as contamination.

*To clearly set the problem or motivation of your paper, I think you should rewrite the first couple sentences in the abstract something like: "Groundwater contaminated with nitrate poses a serious health risk to infants when this contaminated water is used for culinary purposes. To avoid this health risk, first, people need to know whether their culinary water is contaminated or not. Therefore, there is a need to design an effective groundwater monitoring network, acquire information on groundwater conditions, and use acquired information to inform management options. These actions require time, money, and effort"

*In page 13806, line 17, at this point; I would use the blue baby syndrome instead of the scientific name. Just to engage your reader with something familiar.

*In page 13806, line 17, "no" instead of "not"

*In page 13807, line 21-25: long sentence. I would break into two sentences.

*Page 13811, line 16, what do you mean by "active cells"?

*Page 13812, line 17, so each cell has a distribution of nitrate, then did you take the average nitrate value to decide whether it's greater than 45 mg/L? Or what did you consider?

*General question: how did you implement your decision tree model? did you use spreadsheets or any specific software? It would be interesting to mention it in your paper.

*Page 13812, line 20, is the $150 considered as one-time cost (i.e., permanent treat-

ment)?

*How about follow-up costs if any?

*Page 13813, line 9, use "might" instead of "may"

*Page 13815, line 12, how often the nitrate sampling was at? $12 per well per year sounds very inexpensive and probably for one sample. Also, I'd put the dollar sign before the number.

*Page 13817, lines (9-12) please explain what are the RVM runs? Also cite this work since it is from a previous research.

*I'd mention type 1 error before type 2. Just for the sake of better flow of ideas. Unless you have a reason for doing the opposite way.

*Page 13821 lines 10-16. I'd re-write this paragraph to better communicate your ideas.

*Page 13819, lines 1-3, re-write the first sentence.

*Was the survey conducted through mail or direct interviews? What was the time frame of this interview? Did you get the Institutional Review Board acceptance on the study? If so, please do mention it.

*Page 13821, line 1-2, how much (%) did you relax the abidance ratio?

*Later in page 13822, line 26, you mentioned that 86% of people is served by wells . . .I would move these details to section 3 where it's more relevant.

*Page 13825 line 25, I'd mention the decision tree method earlier in the conclusion, like in line 7. It's your contribution after all.

*Page 13826 line 14: ". . . . .Eocene Aquifer but" Instead I'd say "but probably using a modified version of the proposed monitoring system."

**Notes on Figures:

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Figure 1:

It's a little hard to read when printed, use a bit larger font.

Figure 2:

i) Its hard to read the legends. Use larger fonts ii) Nitrate values in the legend should be reported in significant figures iii) I believe this figure should be cited (Khader and McKee 2012) since it presents previous work results iii) I'd modify the legend of the left map to show "existing groundwater wells". You may use circles to represent them.

Figure 3:

*In the decision tree model, the second management option of "Recommend not using the Aquifer Water" sounds not realistic in particular in such a dry area. I'd either add "for drinking water" to the option or I'd use "Consider further treatment".

*In the management option of "Proposed monitoring" I think you should include the chance of nitrate concentration actually being <45 or >45 in the bottom scenario with [p2]. Just like the above scenario in the same management option.

Figure 4:

*This figure has a lot of great ideas; please make it a bit larger

Figure 5:

*I wonder why there isn't a significant cost difference between full and partial abidance!

Figure 6:

*Why there is a big difference in the willingness to pay between the proposed and perfect monitoring systems? If I understand right, is this caused by the RVM model deficiency to predict the actual nitrate? The RVM model sounds to produce much better results compared to conventional models. So the chance of error should be pretty small, is that right?

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Figure 7:

*It's a bit hard to distinguish between the legends items in black and white print. I'd use a different color scheme. Or I'd layout the legend horizontally and order the legend items in the same order of the three columns

*The bottom line, you've done a great work, but you may want to consider minor revisions like the above to better communicate your incredible contribution.