

Interactive comment on “Potentials and limits of urban rainwater harvesting in the Middle East” by J. Lange et al.

J. Lange et al.

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Dear Editor, dear HESS Publication Team,

We are very grateful for the constructive comments of the two anonymous referees that will really help us to make our paper more convincing and straightforward. We will take into account all of them, we do not see a reason for a rebuttal. As follows, please find our answers to the different comments and how we want to address them in a revised manuscript.

1. Referee #1:

1.1 Uncertainty of rooftop runoff volumes (weak correlation found in fig. 5): We agree

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that this uncertainty should really be propagated into the assessments of Tables 1/2. For this we will include uncertainty bands into fig. 5 and use their confidence interval (e.g. 95%, but this depends on the scatter of the data) to define uncertainty ranges to be used for Tables 1/2.

1.2 Perceived water quality depends on intended use: Also this is a crucial point we will address. Indeed, the perceived quality of the harvested water depends on the intended use and there is no way to conclude from a subjective evaluation of the users that are satisfied with their water for garden irrigation that the same water is good for drinking. We will include this thought into the discussion and weaken our conclusion on water quality accordingly. Also we will modify Fig. 8 and omit the grouping for water quality (see also our answers to referee #2 (2.1)).

1.3 RWH as emergency drinking water Indeed this is a good idea to advocate the use of RWH. We will follow up this idea in our discussion. For this purpose we will calculate the actual volumes harvested by the installed cisterns and relate them to the number of persons supplied. We will also discuss the effect of roof adaptation, which actually is contained in the sensitivity analysis of our model (Fig. 6).

1.4 Specific comments a) P 10370, line 22 & P10383, line 10 : Regular checks of water quality: we will omit this statement, since, indeed, more information would be needed to keep up such a request (see also our answers to referee #2 (2.2)). b) P 10372, line 16: we will modify accordingly c) P 10379, line 12: this will be modified, see also 1.2 above. d) P 10382, line 5: we will include roof types as a fifth source of uncertainty in the regional estimates.

2. Referee #2

2.1 Efficiency of RWH / economics of systems This is a valuable additional aspect on the actual value of RWH which we will include into the revised manuscript. For this purpose we will use published data on water consumption and prices in Ramallah (Magiera et al., *Manag. Env. Qual.*, 17(3), 289-298, 2006). For the rainfall station

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with the largest annual rainfall volume we will run our model for all reported systems, constantly subtracting daily water consumption from the accumulated water volume in the cisterns and hence will determine overflow occurrence. As follows, we will calculate for all our reported RWH systems the volumes of actually used water and divide it by cistern volume to arrive at cistern efficiency. We will include these two results (overflow yes/no and cistern efficiency) into a modified version of fig. 8, where we omit the grouping based on water quality.

2.2 Required disinfection (Page 10373; lines 9-11) This was already criticized by referee #1 (See 1.4 a above). We will omit the request for regular water quality checks.

2.3 Unclear phrase (Page 10375 line 26) We will re-phrase as proposed by the referee: 'Incomplete records were not excluded from the analysis but rather treated in a similar way as independent data from low rainfall seasons.'

2.4 Perceived water quality depends on intended use (Page 10379 line 12) This is true and was already remarked by referee #1, see 1.2 above. We will weaken our conclusion on water quality accordingly. As requested, we will modify Fig. 8 and omit the grouping for water quality for the sake of a study on cistern efficiency (see 2.1 above).

2.5 Specific comments a) Page 10371 line 10: we will rephrase as suggested: "Already two-thousand years ago the Nabateans..." b) Page 10374 line 7: we will re-formulate this passage accordingly. We will use the data of Klein (1998): From 770 Mm³/year about 20 Mm³/year (2.6%) are released willingly for agricultural use and for Christian pilgrimage at the Yardenit baptism site (0.5 km from the lake). c) Page 10376 line 14: we will replace "eventually" by "any possibly" d) Page 10379 line 1: indeed our data includes houses and buildings with multiple apartments, so the term "building" is misleading. We will modify according to the referee and use the term "household" instead of "building".

Jens Lange on behalf of all co-authors, Freiburg, Germany, Feb. 06.2012.

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