

## ***Interactive comment on “Virtual industrial water usage and wastewater generation in the Middle East/North African region” by S. R. Sakhel et al.***

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Referee number 3:

We thank the Referee for his valuable and insightful comments.

Referee number 3: “The paper is poorly presented due to an apparent lack of English language skills. The first and foremost comment to the authors is to send the manuscript to a copy-editor to improve the standard of written English”

Authors: We are going to improve the standard of written English by sending our manuscript to a copy-editor.

Referee number 3: “The methodology of the paper remains unclear throughout the

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paper. The authors should insert a paragraph or two to clarify their methodological approach. It also re-mains unclear whether the authors have liaised with the WFN group around Arjen Hoekstra. If not, it is highly recommended because of the importance of the topic“

Authors: Can the referee kindly tell us what exactly is not clear about our methodology so that we can clarify it by a paragraph or two? We have contacted Arjen Hoekstra and sent him a copy of this manuscript to have a look at it but he told us that he was very busy and was not able to read our manuscript.

Referee number 3: “Some of the references used in the manuscript are at best problematic. Wikipedia is NOT a useful source for information on water resource management in the MENA region. The additional use of grey literature should be decreased to a level of academic sincerity“

Authors: We are going to delete Wikipedia as a useful source of information on water resources management. We did a great effort in collecting the references in this manuscript and it is impossible to find better ones in the MENA region.

Referee number 3: “A simple but in my view useful way of improving the structure of the paper is to solely focus on the vw export of the oil and fertilizer industry. It would also enable the paper to stick to GCC economies. I am always very, very sceptical of academic research that tries to incorporate a large number of highly diverse economies that are in addition exposed to either warfare (Syria) or severe economic crises (Tunisia and Egypt). By including the olive oil and livestock industry, the paper also loses the initial topical strength. Processed livestock products are rather imported to the MENA region than exported to Europe. I understand the authors want to use slaughterhouses to support their wastewater argument. This should be done in an additional paper. Similar objections apply to the role of olive oil mills. The authors are touching sensitive political ground due to the importance of the olive oil industry for countries like Palestine or Lebanon. Again, olive oil is also rather imported to the MENA region than exported.

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Only the conclusions clarify, meat and olive oil are processed in the selected countries. To what extent this is still relevant is highly questionable. In the references, the reader can comprehend that this paper was written before the Arab Spring. This a severe problem of this paper. A large number of industries have been closed down in countries like Egypt, Syria (!!!) and other North African countries due to the social and political turmoils. It makes the analysis of the paper meaningless“

Authors: We thank the Referee indeed for this valuable and important comment. We shall improve the structure of the manuscript by focusing on the virtual water exports of crude oil, refined petroleum products, fertilizers, potash, pig iron and olive oil. We do not agree to cut off olive mills since they have a high pollution potential and are very relevant. The MENA region exports around 87,000 tons of olive oil to EU and imports around 13,000 tons from EU (UN comtrade year 2001). As for the leather sector MENA exports around 20,000 tons of leather to EU while MENA imports around 14,000 tons (UN comtrade year 2001) while the meat sector in the MENA region exports around 6,200 tons to EU while it imports around 230,000 tons from EU (UN comtrade year 2001). So based on the numbers we presented the referee is wrong. We shall exclude the meat and leather industries. Nevertheless, it has no impact as the title of the paper is focusing export to quantify the impact on the local conditions in MENA countries. The stress would even be worth if the meat and the leather would be completely produced in MENA countries. The argumentation that the paper is meaningless due to the changes is not relevant as the region will be also in the next years not stable and this should not end up in not discussing the topics. However, we will emphasize the changes (war, Arab Spring) and the influence on the topic.

Referee number 3: “This paper can be published if the authors focus on the GCC economies only and leave out any countries that have been affected by the Arab Spring. The authors should also focus on a main message, and this is in my view crude oil waste water usage, instead of providing a confusing analysis. It is also mandatory to mention that the research was carried out before January 2011“

Authors: We shall present a message in the manuscript which is the crude oil wastewater usage. Can the referee kindly tell us what is confusing about our analysis? We shall mention that this work was done before January 2011.

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 999, 2013.

**HESD**

10, C2080–C2083, 2013

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