

Interactive comment on “Hydrological education and training needs in Sub-Saharan Africa: requirements, constraints and progress” by D. A. Hughes

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I will try and address the comments in sequence:

I agree that some of the questions have already been addressed and in a revised version of the paper will attempt to make more of the recent progress that has been made.

1/1: I agree that the paper often lacks empirical evidence. I found it very difficult to obtain such evidence for some of the issues that are raised. This evidence is simply not available and it is almost inevitable that the paper will read like an opinion article.

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Some of the comments that are included in the paper are based on discussions with a wide range of people in the region - it is not easy to find evidence for the opinions expressed in these discussions. However, is that a reason for them not to be expressed in a special issue on hydrological education?

Tabulating the findings of the applications made to RISE would hardly count as empirical evidence as this information is only available within the applications sent to Rhodes University. However, I can perhaps offer a little more information here.

1/2: The issue of lack of financial support for staff members salary costs is a recurring theme in almost all discussions that I have had with research groups in the region (with a few notable exceptions where one or two posts have been created). Again it is almost impossible to document this as fact, but when one looks through the funding constraints of very many calls for proposals they explicitly exclude staff salaries and only allow for travel and living costs, meeting costs, sometimes student bursaries (but not always) as well as research running costs. It may be that the European counterparts can get access to funds to cover salary costs, but this is frequently not the case in southern Africa.

1/3: I have to say that the reviewers experience of translating research into practice is very different to mine. I have been involved in WRC and SADC projects for many years and while there are platforms for such discussions there is often very little in the way of tangible outcomes. The WRC has recognised this to be a problem within South Africa and they often find it very difficult to get buy in from the Dept. of Water Affairs to implement the research products that they have sponsored. I can also consider providing a detailed example from SADC who supported (with the WRC) a feasibility study for a SADC wide water resources assessment and readily accepted the suggestions made - nothing happened after that.

1/4: Once again, there may be links between academics and sector ministries, but are they effective - my experience (as well as the experience of others that I have discussed

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this with) suggests that they are rarely so.

1/5 and 6: I agree with the comments and I will be happy to modify this statement as it sounds more negative than I really intended. I think that the main point is that there are networks and groups, but at least some operate in isolation (despite attempts to bring them together). Some of the other comments are related to the role of WaterNet, which I did not refer to very much. That is not an indication that I do not believe it is valuable, it is more a reflection of the fact that I was aware of another paper being submitted to the same special edition that specifically addresses WaterNet (and I will now change the reference from Love to Jonker et al as referred to in the comments). In a revised version of the model I will make further reference to the WaterNet programme and its outputs and benefits.

1/7: These are not incompatible - the pool has certainly been shrinking and it remains to be seen whether or not the recent crop of postgraduate students will reverse this trend - I will try and make this point more clearly.

3/1: I will have to look in more detail at this point and revise the paper accordingly. There are a number of issues that are not only related to a lack of science-based training, some of which are financial.

3/2: It is almost impossible to analyse these situations without a great deal of additional information that could only be collected through a detailed survey of attitudes. Many other sciences have noted the same result and have attributed it to better financial opportunities in the expanding business sector within SA. Why this does not appear to affect other southern Africa countries is difficult to determine. It still remains an issue.

3/3: SA FRIEND became inactive through lack of funding.

4: I will try and address the geographical bias.

The statement about resources not being used to their fullest advantages came from recent discussions with colleagues from those two universities.

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I did not mean to imply that thesis based MSc's are 'better' than course-work based programmes. One of the issues is what constitutes 'a significant component of the- sis research'. This is a topic of debate within the SA Council for Natural Scientific Professions who register scientists - they are reluctant to accept course-work MSc's without some proof that 50% of the qualification is based on a research thesis. I am not suggesting that I agree with this, only that there is some debate about this point.

I am happy to modify the point about WaterNet and science-based training. I agree that the statement in the paper does not really prtray the situation as it is.

I will try and emphasise what I mean by an improved science based agenda and make some suggestions for who should lead this.

I agree that some of what I mean by an improved network does exist (and I will make that point clearer). However, the comments authored by van der Zaag are coming from within the WaterNet programme, while there are others outside this programme who are less aware of its benefits and less able to take advantage of them (this is based on comments from other people). I would therefore still argue that there is room for improvement. I am happy to change the paper to make this point more clearly and to emphasise the very positive role that WaterNet has played.

The final point about Physics and Chemistry of the Earth is an interesting one. I repeated the Scopus search using 'Hydrology' and 'Africa', but I analysed the results in a different way. I looked at the authors who ranked in the top 20 number of contributions. 11 came from France (West African hydrology), 4 from South Africa, 2 from Denmark and 1 each from Australia, Netherlands and the US. There are many ways in which this type of information can be analysed. Perhaps the main point about P&CE is that the publication is derived from papers presented at the annual WaterNet conference that offers opportunities to young local scientists (and water managers and engineers) to present their research. A further analysis (if this point needs to be followed up on) could be based on how many of the young scientists who have published in this journal

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have gone on to publish in other (open to unsolicited papers) international journals?

The comments from Prof van der Zaag are extremely helpful and I will try and address them all within the revised manuscript. However, I doubt very much that a great deal more empirical evidence can be collected in the time frame available for this publication.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 8, 10565, 2011.

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