

## ***Interactive comment on “Shallow groundwater in sub-Saharan Africa: neglected opportunity for sustainable intensification of small-scale agriculture?” by J. Gowing et al.***

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We are grateful to the anonymous reviewer for his commendation of our efforts in engaging with work in SSA related to subsistence farming and the technical aspects of water supply. We are disappointed that he/she is reluctant to support publication of the experience in HESS.

We share the view of Dessalegn & Merrey (2015), that there is a need for previously published broad evaluations to be supplemented by “localised and detailed assessments”. Useful insights into the wider issues are revealed by the location-based case study approach reported in our paper. We have attempted to ensure that its relevance beyond the study site is apparent through our review of the literature. We argue there-

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fore that the case study approach is the most appropriate way to explore the potential of and constraints to developing shallow groundwater for small-scale irrigation in SSA.

We further argue that the work is novel in that we adopted a holistic and participatory, research-for-development approach. Our aim in adopting location-based research was to explore the problem from a user's perspective and to deliver a rigorous assessment. This was intended to achieve twin benefits of (i) providing strong evidence to stakeholders within the community of donors and government institutions, and (ii) engaging with local people who represent the primary beneficiaries in a way that both tests and promotes their willingness to participate. The impact pathway was designed into the research from the outset and we considered that there was more to be gained from in-depth research at one case study site rather than attempting to cover greater diversity of sites. Ideally, we would have aimed to achieve both objectives but funding was insufficient. In order to secure additional funding that would allow us to extend the reach we need to establish the credibility of the principles and underlying concepts of our argument. Without wishing to deny its limitations, our aim is to publish the results as they stand in order to argue that we have gathered sufficient evidence to show potential for success.

The reviewer comments that fluvial unconsolidated aquifers are well known as a consistent source of groundwater and that they are often used for both domestic purposes and agricultural activities in many other SSA countries. On the contrary, we reviewed the literature extensively in order to show that these resources suffer from official neglect despite their potential. The groundwater revolution that has transformed irrigation in much of Asia has not been transferred to SSA.

The reviewer further argues that what limits their use for irrigated agriculture is not that they are an unknown resources, it is that the communities do not have the economic resources to invest in the infrastructure. The existence of hotspots of autonomous development of shallow groundwater development indicates that this is a false assumption. We argue that shallow groundwater is the entry point for poor small scale farmers

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to intensify production and switch from subsistence to market-oriented agriculture. The problem is official neglect which fails to make available the appropriate technology for well drilling and water lifting. We argue that the nature of the problem is such that a participatory community-based approach is the only way to proceed.

The reviewer offers suggestions for further work on the community-based monitoring aspect, and modelling impacts of climatic variability, drought and flood conditions. These are sound suggestions and we are already pursuing further research along these lines. Publication of our findings to date will help to establish validity of our approach, to allow us to obtain funding to maintain and extend our initial studies at the present and other field sites.

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