

Author's Response to Editor's comments

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Comment 1

My principal concern (same as the two reviewers) is whether the manuscript makes a useful contribution to the literature. The paper goes into much detail about what they did and what instrumentation they employed, but it does not say much about what the authors learned!

This was noted as a weakness in the paper and has been addressed accordingly. The instrumentation details are scantily mentioned in each section of the manuscript while community participation has been elaborated in detail. Thus, the authors have refurbished the paper to reflect the lessons learnt (both the researchers and local community) and benefits. This is the foundation of the revised manuscript. Some of the lessons that the community learnt is the realization of the fact that they are able to do what the commercial farmers, on the downstream, were or are doing e.g monitoring rainfall, soil moisture etc in their farms which had previously been perceived as too difficult or complicated to undertake. These components of the hydrological cycle has a significant importance in their daily lives notable in determining planting dates of their main maize crop. One of the profound insights on the participatory learning framework at the Potshini catchment is the realization that is dissemination of information is a socio-cultural process and a critical component of developing sustainable change in a community and the spread of new ideas occurs mostly through the social and institutional fabric of the community.

Comment 2

2) What benefits did accrue to the community that lives within and near the catchment in return for their contribution to the project? Could they quantify the improvement in understanding of the hydrology of the catchment, the ability to make better predictions, towards sustainable management? Does the community have an appreciation for what they are getting in return for their involvement? Clearly, to be sustainable, the community must surely see some dividends for their participation.

Naturally, any engagement is founded on a purpose, either social or economic. Most of the smallholder farmers who participated in the monitoring exercise were driven by the desire to learn and gain knowledge on issues related to soil and water management so that they can apply on their farms. This knowledge, and any related knowledge, was communicated to the smallholder farmers. Payment for services was not the norm to those who participated in the installation process but rather an appreciation of their time. Again, it is noteworthy that the researchers indirectly provided avenues for other opportunities for some of the community members. One of the examples is where the researchers managed to facilitate the admission of the community facilitator for a 2-year diploma course in rural development at the University. He is now employed and the community are happy indeed for the achievement of one of their own. Thus, the community have appreciated their association and engagement with the researchers. Again, the smallholder farmers were also shown, during field days, some of the samples taken from different runoff plots treatments after rainfall events and it

was clear that samples obtained from runoff plots under conventional tillage systems had more sediment compared to those from conservation tillage. The smallholder farmers appreciated the results obtained from the runoff plots experiment, including the potential to conserve soil moisture and soil nutrients when using conservation tillage system. It was interesting to note that two of the three members of the community who participated in installing the runoff plots under the research programme were, a year later, hired by another research project in the same area to install runoff plots for monitoring runoff and sediment load under different engineered slopes e.g roads embankments etc. Thus, this was a direct benefit to the individuals who participated in the installation process.

Another example of the benefits to the Potshini community is monitoring of the shallow groundwater table in the Potshini catchment, which was observed to respond faster to rainfall events, occasionally reaching to less than 1m below surface, and receding to below the piezometer depths during the dry winter season. This information was shared and presented to the community, during community meetings, field days etc, and it was apparent that most of the community members had not anticipated of fluctuations of shallow groundwater in the area, during both wet and dry seasons. The community members managed to link these observations with the filling of their pit latrines with subsurface water during the wet season, especially those in the low lying areas, and failure of foundation in some houses in the community. The community members also mentioned the fact that some of the crop failure in the community is attributed to water-logging during the peak of the rainfall season. The researchers highlighted the fact that there was a potential danger of polluting the shallow groundwater resource in the community through the direct contact and mixing of the waste in pit latrines and the shallow ground water. This was supported by the fact that the soils in the catchment had a relatively high hydraulic conductivity (K_s). Thus, these results and observations were beneficial to the community where some members started using concrete blocks to build their pit latrines and also reinforcing foundation of their houses.

All the above information has been included in the revised manuscript.

Comment 3

3) From the description of the monitoring network I had the impression that this was well thought out, but then it will also be expensive to install and maintain this. Would the authors say that this is the minimum instrumentation they would need to understand the hydrology of the place? How much more do they know compared to what they knew in advance? How do they intend to communicate these advances to the community?

The set-up of the monitoring network was indeed expensive. This was a project funded initiative i.e the Smallholder System Innovations research programme-SSI. The authors feel that the instrumentation in place has facilitated getting an insight of the dominant hydrological process in the catchment i.e surface and subsurface water interaction, rainfall distribution, etc. It is useful to note that the Potshini catchment was previously ungauged and the network has enabled researchers to appreciably carry out water balance studies, based on the measurements obtained from the catchment. Thus, the network has provided a good platform for hydrological studies to be carried out in the catchment thus providing the basic understanding of the interaction of the dominant processes. However, it is acknowledged that these processes vary in time and space and hence the sustainability and enhancement of the monitoring network over time will facilitate a better understanding of both the spatial and temporal variation and occurrence of the dominant hydrological processes.

There has been great wealth of knowledge and information that has been generated from the monitoring network of which has been useful to both hydrological process understanding and sustainability of the Potshini community as elaborated in the response for comment 2 above.

Comment 4

As it is, the title talks about participatory approach, the text focuses much more on the technical details: the gap between these two aspects must be bridged.

This was noted as a weakness in the paper. The manuscript has since been edited and more emphasis has been towards detailing the participatory engagement of the community with very scanty highlights on the technical aspects.