

## ***Interactive comment on “Agricultural groundwater management in the Upper Bhima Basin, India: current status and future scenarios” by L. Surinaidu et al.***

**Anonymous Referee #1**

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General comments: Sustainability of groundwater resource is major challenge in basaltic aquifers of India. The authors really made significant effort to address the issue and recommend certain options to policy makers through numerical groundwater modelling techniques in Upper Bhima basin, India. However, in the study entire area is taken as single unit and broad averaging of different parameters was done for such large area, which is characterised by highly heterogenous, anisotropic and complex system. In such scenario, plausible options at local level/watershed/microlevel could have been more meaningful for followup in the ground level. Specific comments: The authors have mentioned that data from 135 pumping tests tested on dug and bore

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wells were interpreted using Jacob and Theiss equations – The validity of these methods for estimation of specific yield (particularly for dug wells) is questionable- How it is justified The authors have attributed relatively high sp yield used in the model to predominantly dug wells that bias the upper most weathered part of the aquifer. In the study area, the weathering is generally limited to 20 m only, whereas the depth considered is 50 m in the study. The S value is low in the zone lying below weathered zone down to 50 m, whereas the same value (as applicable in weathered zone) is taken for entire zone- Needs explanation. The Deccan trap basalts constitute complex, anisotropic and, multi layered systems. Since the area is vast and consist of different flows and aquifer characteristics vary widely both spatially and laterally. In the present study a generalisation was made into 3 sections, limiting the study to top 50 m (weathered zone with sub-horizontal sheet joints), which was considered as single and uniform zone throughout the area- Broadly averaged inputs were given for different parameters without considering the complexities – Needs justification. The rainfall in the area (46,000 sq km) is highly variable- both spatially and temporarily (as given in page 10661)- Entire area is taken as single unit and recharge inputs are averaged in the model and the return irrigation component is excluded- How do they reflect ground situations in varying recharge situations. The recommendations are not given at watershed/microlevel and given at whole sub-basin level-which presents diverse hydrogeological, hydrological and developmental situations- In such background, how to apply these recommendations at particular watershed/microlevel- even these may not be applicable in all areas considering diverse situations. The authors may give limitations of the study and its recommendations Calibration was done for three observations only- Given such huge area with complex hydrogeological systems, more representative wells could have been given.

Page no: 10662, line 7-8: “—————or dug-cum-bored wells screened in the weathered portion of the basalt”- to be modified Some sentences need corrections: eg.. page : 10658 line 6- “model predictions of different climate change.. ..” line 26 “ .. . . . . . The limit of groundwater development. . . . .” needs to be checked. To be uniform:

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Upper Bhima basin, Southern India or Upper Bhima basin (as given in page 10659), southwestern India (as given in fig.1) rain fall- to be corrected (page 10665)

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