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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Assessment of land use impact on hydraulic threshold conditions for gully head cut initiation" *by* Aliakbar Nazari Samani et al.

Anonymous Referee #2

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The manuscript entitled "Assessment of land use impact on hydraulic threshold conditions for gully head cut initiation" presents experimental results regarding gully head initiation under different land covers. The major findings basically explain the dependency of critical shear stress to land cover conditions. Although the experimental setup and results are valuable, I believe the discussion is relatively weak. In several cases, the findings are already known as mentioned by the authors. Here, I provide some comments which can improve the quality of this manuscript; In several occasions the effect of upslope area on head initiation has been mentioned. However, the experimental results do not include any information in this regard. The upslope area and slope are two well studied channel initiation thresholds. Since the gully head resem-

bles channel heads in drainage network, I believe studying upslope area of gully heads would be valuable. Did the gully head create a connected network (similar to channel heads that form a channel network)? If yes, I think studying the characteristics (the density, branching behavior and spatial distribution) of the resulted network would be even more interesting than just focusing on the gully heads. My main concern about the experimental setup is the initial condition of soil in terms of moisture content. Was this considered in the experiment and how was its effects isolated? The discussion, mainly attributes the land cover to the erosional susceptibility of soil, however, I believe, the infiltration is also important here. Land cover affects the infiltration (as simply quantified in SCS-CN) and therefore impacts the erosional force (volume and velocity of overland flow) through the mass balance. Specific comments; Line 89- "which indicates no significant difference in the soil attributes, .." Line 111- To determine longitudinal slope with high precision, Table 2- I suggest represent the results visually in some figures. Line 169- was more the one for dry farming . . . Figure 3- The decreasing trend of depth is hard to observe in this figure. It is better to plot the depth rather than elevation. Line 182- There is a typo Line 185- It is better to report P in each figure. Line 187- I think 83 is not correct: b=-Tcr*Kc Tcr = b/Kc=0.3136/0.00038=825 Line 197- How the head imitation shear stress is calculated here? Section 3.3- It is better to represent Mean shear stress versus Number of heads in a figure and then discuss the relationship. Line 278: Kr or Kc? Line 288- delete "the English".

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