

Interactive comment on “Assessment of strip tillage systems for maize production in semi-arid Ethiopia: effects on grain yield and water balance” by M. Temesgen et al.

M. Temesgen et al.

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We thank referee #2 for his/her honest and detailed review. We very much appreciate the effort taken to help us to improve the paper.

The referee is right that the presentation was not completely clear and that the main results of the field trials and modelling were not well presented. The main conclusion of the paper is that strip tillage is indeed capable of reducing surface runoff and hence to enhance infiltration. The second innovation, subsoiling, is only beneficial if planting is done within a week from sub-soiling. Otherwise too much moisture is lost from the open soil. Only in 2005 was planting done shortly after subsoiling. In the other years

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the delay was much longer. As a result only 2005 demonstrated substantially higher yields for the early maturing variety.

We have completely re-written the paper and refined the modelling and the data analysis. We have addressed all the remarks made and substantially revised the paper. We thank the referee for the thorough and constructive review.

On the issue of definitions, we have included a paragraph explaining the differences between I, R, E_s and T. Indeed we did not do direct observations of these fluxes. Instead we used a conceptual model to separate these fluxes. Although this involves some uncertainty, it offers an objective way to analyse the effect of observed differences in surface runoff and leaf area index. The fact that the water use efficiency with respect to transpiration is nearly constant under the three treatments is a confirmation that the model performs reasonably well.

On the issue of validation, the referee is correct. We will not use the term validation anymore. By the way, the surface runoff accounts for 12-25% of the rainfall in the CONV case for the three subsequent years. This is not negligible. The STS brings the runoff down from 12 to 5% (2005), from 20 to 8% (2004) and from 24 to 10% (2003). This is also not a negligible reduction. The water balance model shows that if the soil is well managed it can increase the transpiration from 44 to 55%; an increase of 25%.

All detailed observations made, we address in our rebuttal that we submit together with the final version.

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