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Interactive comment on "Optimizing micro watershed management for soil erosion control under various slope gradient and vegetation cover conditions using SWAT modeling" *by* Ghulam Nabi et al.

Anonymous Referee #3

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Review of manuscript HESS 2017-532

I evaluated the manuscript entitled "Optimizing micro watershed management for soil erosion control under various slope gradient and vegetation cover conditions using SWAT modeling". The manuscript is an important contribution to soil and water management using SWAT model. Scenarios were simulated and impacts on erosion and runoff control were described. However, the manuscript has several points that need improvement. The aim of this study mentioned in the Abstract and in the end of Introduction section does not reflect the Title and the Introduction. I believe that soil

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parameters do not have great importance to be in the Title. The problem or lack of knowledge is not clear in the manuscript and this lack seems to be related to techniques and structures used to runoff and erosion control. Most references cited in the manuscript are old. How can we know the gap in science without reviewing the information published in the last 10 years related to soil and water management and modeling? This needs great improvements and addition of recent published references and information related to the aim of the study. Some information on Materials and Methods are presented in the Results and Discussion section. Results and Discussion sections could be separated into two sections and more be better explored. All Figures must be improved.

Abstract: The aim of this study mentioned in the Abstract does not reflect the title. The first sentence of this section needs to be rewritten or more information must be included in this section, such as soil parameters. If the aim of study was to evaluate soil erosion, this parameter needs to be presented and described in the Abstract. What was the purpose of the optimization?

Introduction Out of the 19 references cited in introduction section, 17 of them were published before 2008 and just 2 were published in 2008. There are no references for the 2008-2017 period. How can we know the gap in science if we do not know the information published in the last 10 years related to soil and water management and modeling? Please insert in the manuscript new references and information related to the focus of this study in order to show the lack of knowledge. The first part of the introduction is too general and started to show the problem in specific areas in Pakistan. The aim of this study is not clear. The use of model is not the aim, because the model is a tool to reach the aim. Items “1.1 SWAT model description” and “1.2.1 Portrayal of study area” (Pages 3 - 5) should be in the “2 Material and methods” section.

Materials and methods: The Catchment-25 should be detailed. Figure 1 has low resolution and I was not able to see the details of the watershed, and streamflow and sediment yield monitoring section. For the Figure 1, I suggest a continental map indicating

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the country and all of studied watersheds. It is hard to me localizing all mentioned watershed in the map of Figure 1. Where are located the Dhrabi Watershed, and the Chakwal and Attock District, and where are located the watershed 1 to 6? Furthermore, maps of soil and land use are important. What are the land uses and soil classes in all of the small studied watersheds? Page 6, Lines 13-26: These procedures and model statistical evaluation should be in Material and methods section. Result section starts in Line 24, Page 6. Page 7, Lines 28-30: Add to Material and methods section. The topic "3.2 Model application with conservation structures" should positioned perhaps in Material and methods section. Page 9, Lines 13-20: These procedures and model statistical evaluation should also be in Material and methods section.

Additional comments: Page 2, Lines 8-9: Any reference for the mentioned studies? Agricultural soils are formed by several processes. Please clarify the sentence if it is related to any specific soil and specific region.

Page 3, Line 30: SWAT model is not a physically based model. This model there are several empirical equations and only some are physical equations.

Page 3, Lines 31-32: SWAT is commonly used for large watersheds, and studies in small agricultural watersheds are recent.

Tables 1 and 2 should be presented in just one table.

Figures 3 and 4 should be only one figure. I suggest showing side by side the charts of calibration and validation period, and sediment yield figures above runoff. Sediment yield may be presented as a line chart instead of bar chart; this form makes it easy to compare the effects of rainfall on runoff and sediment yield. The scale of charts for each variable can be the same for calibration and validation period.

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