Author Reactions to RC

The whole idea of modeling is to represent a system mathematically/physically in order to derive information from a catchment. This is what SWAT has tried to do in this work by linking model structures and catchment structures. I would therefore not think of any better focus for this paper.

This focus of this paper was to apply SWAT to simulate flow under the scenarios of land cover changes. The title of the paper is therefore precise to this focus. The abstract then quickly highlight the contents of the paper.

Yes, I agree that previous studies over the catchment have not been cited; I now include some recent ones as follows:

Additional references:

Page 1780 after line 19:
Githui F, Mutua F, Bauwens W. 2009. Estimating the impacts of landcover change on runoff using the soil and water assessment tool (SWAT): case study of Nzoia catchment, Kenya. *Hydrological Sciences Journal* **54**(5): 899–908. DOI: 10.1623/hysj.54.5.899.

Page 1780 after line 20:
Mati BM, Mutie S, Gadain H, Home P, Mtalo F. 2008. Impacts of landuse/cover changes on the hydrology of the transboundary Mara River, Kenya/Tanzania. *Lakes and Reservoirs: Research and Management* **13**(2): 169–177. DOI: 10.1111/j.1440– 1770.2008.00367.x.

Page 1781 after line 3:

Olang LO. 2009. *Analysis of land cover change impact on flood events using remote sensing, GIS and hydrological models. A case study of the Nyando River Basin in Kenya*. PhD thesis, University of Natural Resources and Applied Life Sciences, Vienna, Austria.

On page 1767 lines 5-10; the text has been rewritten to improve the quality as follows:

“During the study the available water capacity (SOL AWC) was varied within the range of ±0.05mm of water/mm of soil. The result showed that SOL AWC affects stream flow. SOL AWC affects both the surface flow and base flow and an increase in SOL AWC results into decrease in stream flow because of an increase in the ability of the soil to hold more water. An increase in the initial curve number (CN2) increases the stream flow, but the effect is more pronounced on surface runoff. The slight increase in total stream flow could be as a result of the ratio of surface run off to base flow.
The amount of stream flow contributed by the base flow was more than 50% of the total stream flow as shown by base flow separation. The goodness of fit between observed and simulated stream flow was determined for the (1GD03) station. R^2 was found to be 0.24 while the NSE was 0.46 respectively. The low value of R^2 and NSE could be attributed to data gaps in the station records and the effects of combined tributaries. The station is located about 10 km upstream of

Ahero Bridge just before the flood plain. The model over estimated the low flows at this station while the estimated high flows were close to the observed."

Page 1767 line 11: The authors acknowledge the low value of R^2 = 0.24. This is what was supported by the data and points to the fact that the model structure and input data need to be refined i.e. more detailed soil classification and land use information could improve the results. However, this is a fairly attempt of the application of the model and scenarios could only be built from the results obtained.

Page 1768 line 26-27: revised to: "These effects are compounded by replacement of certain crops, which alters the leaf area index (Calder, 1992). Land use changes due to agricultural expansion remain one of the notable threats to the hydrology of most regions in Kenya. The study results of the Nyando Basin generally depict good trends in conformity with similar studies carried out in the region (Mati *et al*., 2008; Githui *et al*., 2009)."

Page 1769: section: **"1.2 Application of GIS in hydrological modeling"** has been included because the model structure relies on GIS techniques; from generating the DEM to developing the HRUs. The objective here was not to reproduce the background data used in the analysis but to flash the final outputs.

Page 1772 line 18-19: revised to: "The land use/cover data was obtained from ICRAF for the two varied years that is for 1987 and 2003.The impact of land use/cover change on flow characteristics have also been investigated by Githui et al (2009) and Olang' et al (2009) for Nzoia and Nyando basins in Kenya respectively."

Page 1773 line 16 under "weather data": revised to:

In order to make reference to the figures and the tables across the text as suggested by the Referee, the following revisions are done:

"Rainfall data were available for twelve rainfall recording stations in and around the Basin (table 2). The collected data ranges between 1960 and 2000 though there were quite a number of missing data. The other weather data used were temperature data (maximum and minimum) for Kericho and Kisumu Meteorological stations (table 3).

Page 1774 line 15: "Under parameter sensitivity"…revised to…." This is defined as the ability of the soil to hold water and depends on the soil characteristics hence varied within the soil profile and also in the basinshown in table 4"

Page 1775 line 9/10: revised to " The default value of ESCO as used during this work was 0.95, this parameter was varied between 0.1–0.95 (table 5)."

Page 1775 line 19: revised to "In this study the GWQMN was varied in the range of between 0% and 50% (table 5)."

Page 1777 line 2-3: revised to “The goodness of fit between the observed and simulated stream flow was computed for station1GD03, the R_2 was found to be 0.24 while the NSE was 0.46, respectively. These results together with other calibration results can be seen in table 6 and table 7.”

Page 1777 line 23-24: The value of R2 for SWAT model is in itself a measure of the goodness of fit.

Page 1778 line 1-5: revised to “A comparison on the land use/cover maps for the two years 1980 and 2003 showed that there has been a notable change in land use/cover in the basin over the years. According to the land use/cover map there has been a slight decrease in forest cover by 7.6% while the area under swamp has seen quite a decline of about 34% (table 8).”

Page 1778 line 24: revised to “The land use/cover map was then loaded in the SWAT interface using the varied scenarios while keeping the other parameters constant, then stream flow was simulated for each scenario to establish the impact of land use/cover change on the stream flow. The results from the land use/cover changes scenario showed that different land use/cover categories have different stream flow characteristics (table 9).”

Page 1779 line 1-5: revised to “frequency characteristics of the simulated stream flow vary depending on the land use/cover type and scenario. In this study mean stream flow ranged between 19.48m_3 to 32.14m_3. For scenario A: Scenario with low forest cover (0%) gave the highest mean stream flow (32.14m_3) while the scenario with 50% forest cover gave the lowest mean stream flow of 19.48m_3 (table 10).

Page 1782 Table 1: Thank you. This was an error. The two river names should be changed to “Nyando”