Supplementary Material

With the following figures we want to show a) the hydrological model performs reasonably well with the parameters from the presented assessment strategy, b) substituting the original Shuttleworth-Wallace approach for potential evaporation calculation by the approach after Hargreaves improves the performance, c) the cropping agent works and the model simulates different harvest results depending on the agent's strategy, which can be converted to market value, d) hydrological feedbacks of different land use strategies could not be assessed with the integrated model. This will be fully explained and substantiated in the revised MS.

Fig. 1: WASA_crop Performance - Simulated vs. Gauged Discharge with Seasonal Lag Crosscorrelation, Mod Catchment, Madhya Pradesh, India, 1992-1996.

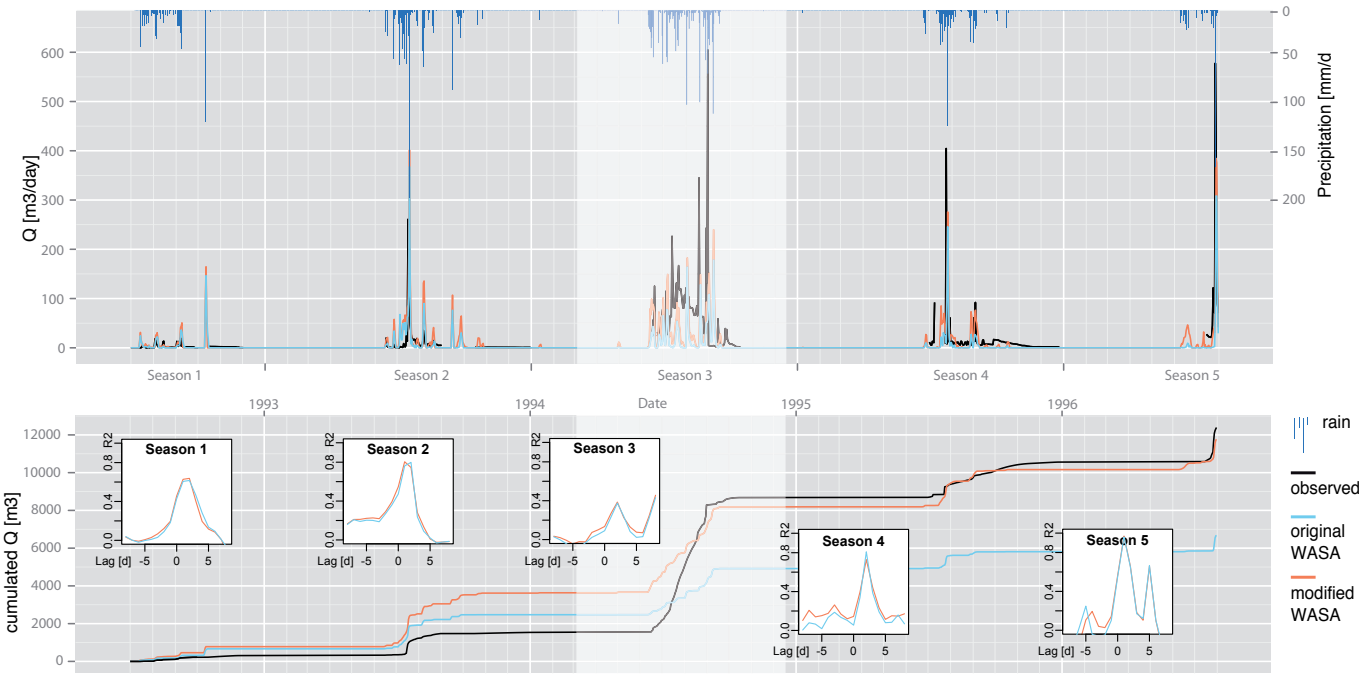

Figure 1 presents the simulated discharge of WASA using uncalibrated parameters from the presented data assessment. While the „original" WASA calculated pot. evaporation based on Shuttleworth-Wallace underestimated the discharge (blue), the „modified" WASA using Hargreaves shows a reasonable fit (orange). In season 3 the performance is very bad, as the model seems to have problems to represent base-flow. However, during this season the gauge data might be erroneously high, which can be shown by a water balance assessment. Moreover, the lower panel includes seasonal lag crosscorrelation diagrams pointing out the timing error due to the utilisation of the remote climate station data.

Fig. 2: Exemplary Results Annual Harvest Amount from Catchment of Specific Crops at Different Agent Settings at all Simulated Realisations. A) Agent 1: Best local adaptation, B) Agent 3: Local adaptation and weather anticipation, C) Agent 7: Maximum profit and wrong weather anticipation; C1) pigeonpea; C2) millet; C3) sunflower; C4) sorghum; C5) chickpea; C6) maize; C7) cotton; C8) groundnut; C9) sugarcane; C10) soybean; C11) casawa; C12) wheat; C13) grass

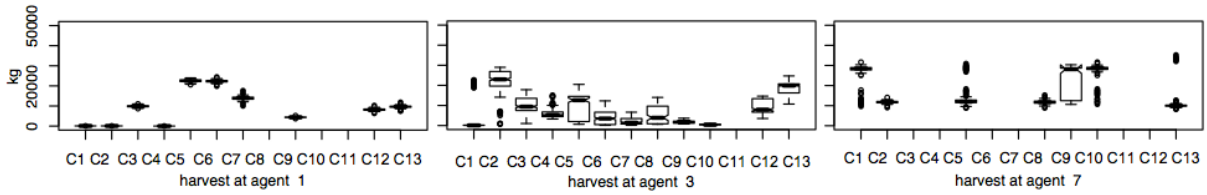

Fig. 3: Exemplary Results Profits from Crop Season Harvests at Different Agent Settings. 1) best local adaptation; 2) maximal profit; 3) local adaptation + weather anticipation; 4) weather anticipation + minimal erosion; 5) weather + fertility; 6) minimal input; 7) maximal profit + wrong weather; 8) full consideration of knowledge; 9) weather adaptation only

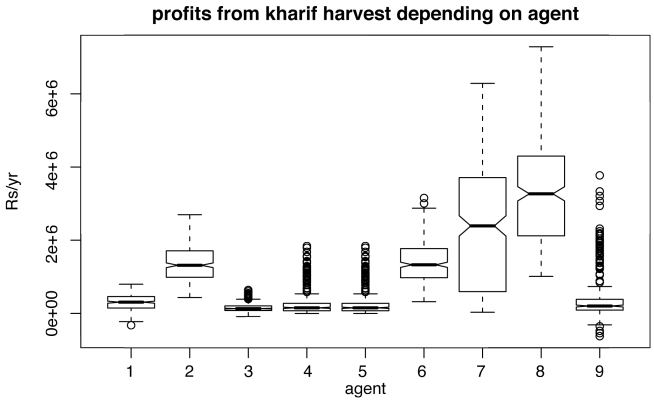

Figure 2 and 3 present results from the DSS showing that different agents produce different cropping realisations with different harvests and that this is further projected into gained profit. This will be fully presented in the revised MS.

However, when assessing the hydrological interaction of land use and water availability or potential erosion (amount of overland flow), the model performed rather poor. Further investigation of the model showed, that the sensitivity to water availability of the crop subroutine was too low. Table 1 presents a summary of a scoring of different agent settings to different hydrological characteristics. It becomes apparent, that no agent strategy scored everywhere good or everywhere poor.

Tab. 1: Scores of Agent Performance at different Hydrological Characteristics. Discharge: Few discharge gives higher scores. Overland flow (OF): Few OF gives higher scores. Evapotranspiration (ETP): Few ETP gives higher scores. Soil Moisture (Theta): High theta gives higher scores.

Agent No.	Total Discharge	SUB Discharge	SUB Over-land-flow	SUB ETP	SUB Theta	$\sum credits$
1	6	6	8	7	6	33
2	4	7	4	9	3	27
3	8	9	9	2	4	32
4	1	5	3	1	5	15
5	2	3	5	5	7	22
6	5	2	2	6	2	17
7	3	8	7	4	9	31
8	9	1	1	8	1	20
9	7	4	6	3	8	28