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Water yield estimation and sedimentation control in two Volta sub-basins: Tools towards integrated water resources management

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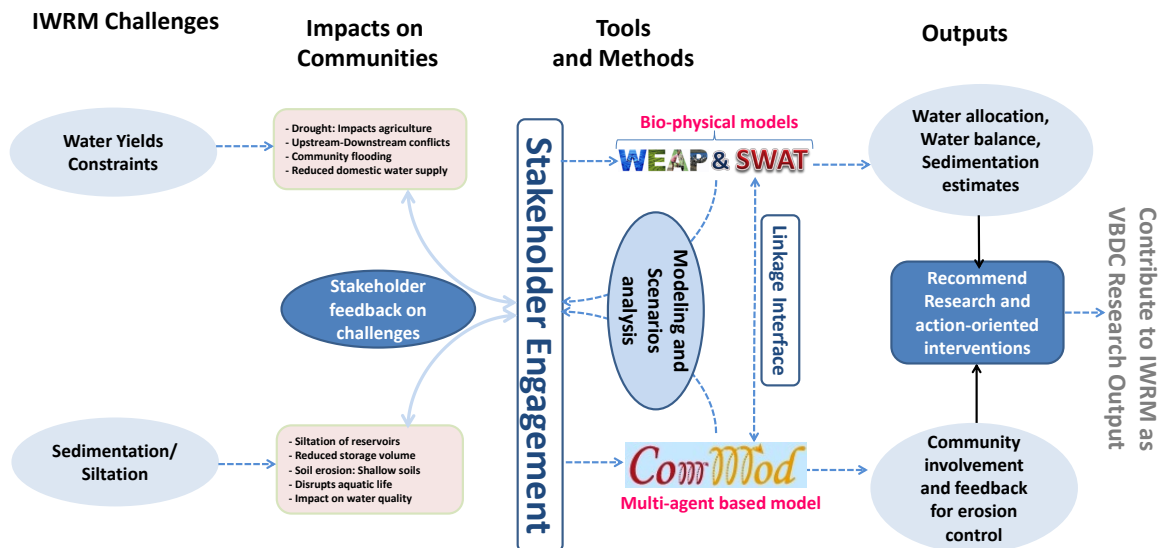
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Session: Spatial Analysis and Modelling



ESTIMATING WATER YIELD AND SEDIMENTATION USING A LINKAGE OF BIOPHYSICAL MODELS AND MULTI-AGENT BASED MODELS FOR AS INTEGRATED WATER RESOURCE MANAGEMENT (IWRM) TOOLS.

IN THE FIGURE ABOVE, COMMUNITIES ARE CHALLENGED BY LIMITED WATER AND SEDIMENTATION OF RESERVOIRS WHICH IN TURN IMPACTS AGRICULTURAL PRODUCTIVITY. USING A COMBINATION OF BIOPHYSICAL AND MULTI-AGENT TOOLS THAT INVOLVE STAKEHOLDER CONSULTATION, THE PROCESS WILL MODEL AND IDENTIFY PRACTICAL IWRM SCENARIOS AND INTERVENTIONS THAT REDUCE EROSION THUS RESULTING IN IMPROVED WATER RESOURCES MANAGEMENT AND REDUCED DROUGHT IMPACTS.

Key Message

Understanding of soil erosion and its mitigation serves as an integral component of Integrated Water Resources Management (IWRM) and can ensure that reservoirs are used productively. This study contributes to limiting sedimentation that is a serious threat to available storage and consequently overall community water provision and livelihoods in the Volta basin.

Summary

Small reservoirs form a major source of water supply in the Volta basin. However, sedimentation of reservoirs poses serious threats to overall water yield and storage, consequently impacting community water supplies and livelihoods. This study will assess basin-level water yields and sediment inflow deposited in reservoirs in two Volta sub-basins using the WEAP and SWAT models in combination with spatial analysis techniques. The WEAP Model will assess water allocations while the SWAT model will compute water balance, runoff and sediment yields. Ancillary measured sediment yield data will be used in combination with terrain-based distributed models in a GIS to identify and predict major areas of erosion in the two study sites. Social and biophysical dynamics will be concomitantly assessed through a multi-agent modeling framework (ComMod). To this end, the WEAP and SWAT models will be linked to the computer simulation tool of the ComMod platform. This will allow for assessing the consequences of local practices –and possibly proposed intervention- in terms of erosion (see figure). The results and the approach can be used as decision-support tools to identify practical IWRM interventions that reduce erosion e.g. vegetation strip-ways. It is anticipated that this will result in improved water resources management and reduce impacts of drought spell shocks on the affected communities and could be replicated elsewhere in the Volta basin.