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Testing and validation of the simulation model "SCUAF" (Soil Changes Under Agroforestry) for local conditions

Crop simulation models provide means of handling the complexity by integrating knowledge of plants, weather, soil and management practices. SCUAF (Soil Changes Under Agroforestry)is one such model, which simulate the impact of erosion on soil properties and its productivity.

However, the validity of SCUAF under different conditions was not tested widely. Therefore, the objective of this study is to study the applicability of SCUAF under different conditions and suggest suitable modifications.

In this study, the validity of SCUAF was evaluated for Himalayan valley, Intermediate zone of Sri Lanka, Andean hillsides and Kenya. Simulations were run for 20 year period and necessary graphs for observed and predicted values were obtained. Root mean square error (RMSE) was also computed to measure the strength of prediction.

In the case of Himalayan valley, the model was able to predict sole tree and crop yield with a reasonable accuracy. However it could not adequately predict the amount of soil erosion. In second experiment , the medel was able sto predict the maize and tree yield with a reasonable accuracy (RMSE<4). In third experiment, sole cropping cassave yield was predicted with higher accuracy (RMSE<2.007) than intercropping (RMSE<3.527). The RMSE associate with soil erosion is less than four. In fourth experiment, maize yield was predicted with reasonable accuracy (RMSE<2.5) than biomass(RMSE<7.514).

The study reveals that in general SCUAF can simulate soil changes and yield upto a reasonable accuracy. Therefore, SCUAF has a wider use in studying g soil and productivity changes under agro forestry or forestry and evaluating their sustainability.