Runoff analysis and solution in high steep slope agricultural landscapes

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**Keywords.** Water storage, Steep Slope Agriculture, SIMWE

**Abstract.** Steep slope agricultural systems play an important role in food production and economic development such as terrace landscapes. In Italy, terrace system in steep slope make a great contribution in wine production. However, the increase of the frequency of intense rainfall is considered one of major challenges to water conversation in terrace cultivation. The water and soil loss caused by these intense events induced runoff, largely decrease the value and sustainability of a terrace system. Thus, it is urgent to find the solution for mitigating the impact of extremely rainfall events in these precious landscapes. This study simulates the overflow situation before and after setting some water conservation practice in different climate scenarios to evaluate the resilience of designed water storages in the background of climate change. In detail, the study aims at: (1) to simulate overflow process in steep slope agricultural landscapes by GIS-based model SIMulated Water Erosion model (SIMWE); (2) to design realistic water conservation practices for study area based both field observation and model simulation; (3) to compare the influence of designed water storages in three plot-scale watersheds in reducing runoff and water saving in different climatic scenario; (4) to find the best water conservation practice in steep slope agriculture areas. Our study provides more realistic and intuitive guideline in designing water conservation practice in steep slope agriculture landscapes for local farmer and political makers. Furthermore, this study provides an example of improving resilience of steep slope agriculture landscapes under the adverse climate conditions, which is important for the design and management as well as sustainable development for terrace agricultural systems.