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'Terraced landscapes: Comparison of cultures and experiences'

**ALPTER Project Partner**: IREALP
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**Study area**: Valchiavenna

**Context and analysis:**

**SOIL-WATER INTERACTION IN THE BACKFILL OF DRYSTONE RETAINING WALLS – MONITORING THE VALCHIAVENNA PILOTE AREA OF PIANAZZOLA**

(Apuani T., Masetti M. )

The present work focus on the infiltration and groundwater flow processes, which occur in the backfill soil of dry-stone retaining walls.
The modalities with which infiltration and flow develop and evolve in terraced slope, often devoted to agricultural aims, have a duplex relevance. First they represent one of the slope stability controlling factors, governing the hydrostatic pressure and stress distribution in the backfill soil, and affecting the wall drainage capacity. Secondarily their knowledge constitutes a useful tool in agriculture management and in agronomy research.
The terraced pilote area is located in the Italian Central Alps, and develops along the paleo-landslide of Pianazzola. The main geological, geomorphological and hydrological features of the area were defined, and a number of "Data sheets for terraced slope (1:5000)", produced by the ALPTER project, were filled to detail the terracement characters.
An important phase of the research consists in field tests and monitoring. The geotechnical and hydrogeological investigations include both in site and laboratory tests. The in site natural soil density and water content were measured; representative soils were sampling and particle size analysis, organic content, maximum and minimum soil density, consistency limits and indexes, were determined. Additionally the shear strength properties (cohesion and shear strength angle) were obtained by direct shear laboratory tests.
The in site tests, mainly intended to define the soil hydraulic conductivity, were performed by guelph permeameter and double ring infiltrometer. The infiltration tests were coupled with direct measured of suction by tensiometer measurements. To monitor the variation of soil moisture and pore water pressure during at least a seasonal cycle, a portion of the terraced slope were equipped by a set of tensiometers at different depth, and connected to an automatic and continuous recording station. The data collected since October 2006 and related to climatic events are presented, providing information for the management of the agricultural activities (e.g. time and irrigation discharges ).

**Strategies and developed project (foreseen interventions and expected results):**

The following part of the research is devoted to flow modeling, applying a finite element numerical code. It is extremely important to validate the simulation by the comparison between direct measurements and calculated values of pore water pressure. Different scenarios can be simulated considering: soil anisotropy, low permeable layers, drained or undrained walls, and different recharge conditions. The results of the flow model represent an important input data for the stress-strain analysis of the soil-wall system stability. The aim is to analyze the effect of the flow in terms of maximum shear strain and wall deformation and to identify the relative importance of instability factors.