

MULTI-APPROACHES TO ESTIMATE THE RATE AND SOURCE OF LAND DEGRADATION IN A MICRO-CATCHMENT THE HANNANET CATCHMENT, SEHOUL, RABAT REGION, MOROCCO

Machmachi I.¹, Noura A.², Laouina A.¹, Laghazi Y¹., & Pépin Y.³

¹ *Chaire UNESCO-GN, FLSH, Université Mohammed V-Agdal, B.P. 1040, Rabat*

² *CNESTEN, Centre national de l'énergie, des sciences et des techniques nucléaires, Rabat*

³ *IRD Maroc, BP 8967 Agdal Rabat.*

The Grou and Bouregreg watersheds are affected by spreading erosion, with mainly a rapid incision of channels at the expenses of former accumulated colluviums, extension of gullies and important export of superficial material from the soils.

The normal land use type corresponds to cereal cultivations, associated to grazing on the whole types of lands (cultivated lands, forests and some remnants of the old pastures). Grazing consumes the whole residues in the croplands and degrades the forests and pastures.

The objectives of identification of the material sources and the evaluation of the rate of degradation led us to use many techniques of measurement in a small catchment equipped with a V-nodge. The other objective is to assess the efficiency of some WSC techniques proposed for land degradation mitigation. The hydrologic measurements permit to obtain a general overview of the functioning at this scale. They show a very rapid response of overland flow to intensive rain events.

Soil parameters are monitored at many measurement points: texture, stoniness, organic matter, saturated hydraulic conductivity... Soil surface observation and assessment (crusting, surface structure, roughness), crop characteristics (height, cover fraction, mulch cover fraction) and erosion features (rill and gully density and dimensions) give a regular overview of the surface behaviour. The monitoring concerns also field measurements of soil moisture, soil organic matter, surface roughness, infiltration rate.

Using the global results of runoff, at the catchment scale and the local measurements on soil and hydrology, the distribution of the surface overland flow and of erosion in the catchment are modelled, using the event-based LISEM which simulates surface runoff and erosion for individual rain events. LISEM works with maps of soil physical, soil surface and crop parameters. These maps are constructed by attributing parameter values to the various fields based on their land use and soil type.

The use of environmental radionuclides, as sediment tracer is an excellent and innovator tool for documenting rates and patterns of soil redistribution within the landscape. ⁷Be, a natural radioisotope with short half life of 53 days is highly adsorbed by fine soil particles in the upper soil layer. Its analysis is based on comparison between site inventories and local reference inventory. ⁷Be technique informs on soil redistribution related to rainfall events and on the rates of soil loss and gain, by using converting models. In our area it will also be used to study the efficiency of sustainable techniques of soil conservation. The samples are taken before management and two times later, one year and 2 years after implementation of the conservation measures.