



HAL
open science

Life Expectancy of Soils to Evaluate their Sustainability to Water Erosion

Frédéric Darboux, Jean-Baptiste J.-B. Paroissien, Alain A. Couturier, Benoît B. Devillers, Joël J. Daroussin, Yves Le Bissonnais, Damien D. Raclot

► **To cite this version:**

Frédéric Darboux, Jean-Baptiste J.-B. Paroissien, Alain A. Couturier, Benoît B. Devillers, Joël J. Daroussin, et al.. Life Expectancy of Soils to Evaluate their Sustainability to Water Erosion. *AgroEnviron 2010: Environmental Sustainability of Agricultural Management Systems in an Ever Changing World*, May 2010, Cancun, Mexico. hal-01005062

HAL Id: hal-01005062

<https://hal.science/hal-01005062v1>

Submitted on 6 Jun 2020

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Life Expectancy of Soils to Evaluate their Sustainability to Water Erosion

F. Darboux¹, J.-B. Paroissien¹, A. Couturier¹, B. Devillers¹, J. Daroussin¹., Y. Le Bissonnais², D. Raclot³

¹ INRA, UR 0272 Science du sol, Centre de recherche d'Orléans, CS 40001, F-45075 Orléans Cedex 2, France. Frederic.Darboux@orleans.inra.fr

² INRA, LISAH, Campus AGRO, Bât. 24, 2 place Viala, F-34060 Montpellier Cedex 1, France

³ IRD, LISAH, Centre IRD TUNIS, 5 impasse Chehrazade, Menzah 4, BP 434, 1004 Tunis, Tunisia

Water erosion is a major threat to soil sustainability. In the context of global change, erosion intensity could be dramatically increased, hence decreasing the capability of soils to sustain agriculture.

We evaluated soil sustainability to water erosion in two watersheds (about 100 km² each) located in Southern France and Northern Tunisia. Erosion both at present time and in the future (about 100 years) was assessed using the STREAM model. The ARPEGE model was used to simulate climate change scenarios and the CLUE model for land-use change scenarios. Life expectancy of soils was used as an indicator to estimate their sustainability.

Results show that land-use change is the main factor controlling soil sustainability, which means that soil sustainability can be dramatically affected by decisions about watershed management. Results also show a large spatial variability of soil sustainability inside the watersheds, with small areas of low sustainability. As a consequence, targeted decisions should be more efficient than general policies.

Usually, soil sustainability to water erosion is gauged through erosion rates or changes in soil thickness. However, because life expectancy is a familiar concept, it can be understood easily by non-specialists, such as decision-makers. Life expectancy of soils thus appears to be a valuable indicator of soil sustainability.

This study was part of the project Mesoeros21, funded by ANR VMCS 2006.