



Published on *IALE 2013 European Congress* (<http://www.iale2013.eu>)

[Home](#) > Mapping and assessing soil retention through an integrative ecosystem service framework

# Mapping and assessing soil retention through an integrative ecosystem service framework

## Authors and Affiliations:

Carlos Guerra <sup>1,2</sup>, Teresa Pinto-Correia <sup>1</sup>, Joaquim Alonso <sup>2</sup> and Marc Metzger <sup>3</sup>

<sup>1</sup> Institute of Mediterranean Agricultural and Environmental Sciences, Universidade de Évora - Pólo da Mitra, Apartado 94, 7002-554 Évora, PORTUGAL

<sup>2</sup> Instituto Politécnico de Viana do Castelo, Praça General Barbosa, 4900-347 Viana do Castelo, PORTUGAL

<sup>3</sup> School of GeoSciences, The University of Edinburgh, Drummond Street, EH8 9XP, Edinburgh, UK

## Email:

[cguerra@uevora.pt](mailto:cguerra@uevora.pt) <sup>[1]</sup>

## Abstract:

Recent studies show that introducing the ecosystem service concept into policy and decision-making requires spatially explicit information on the state and trends of ecosystems and their services (Maes et al., 2012). Current spatially explicit approaches are often based on land cover assessments (Burkhard et al., 2009; Nelson et al., 2009), assigning values of ecosystem service provision to each land cover class. This approach fails to make a distinction between the actual service provision and the underlying ecosystem potential to provide a specific service. By focusing on actual ecosystem service provision (e.g. tonnes of soil that are fixated by vegetation) the potential of a given ecosystem or community under alternative management options is ignored (e.g. afforestation on a marginal grassland will increase soil fixation when comparing a grassland to a mature forest). The full potential value that the ecosystem service can provide (in this example to mitigate soil erosion) is therefore not taken into account.

We present an integrative ecosystem service vulnerability framework that can identify thresholds of management change and vulnerability hotspots of soil retention services. These services are of particular importance in Mediterranean silvo-pastoral systems, which are prone to desertification and soil degradation (Van-Camp et al., 2004). These social-ecological systems are in a continuous state of entropy, and are affected by a wide variety of societal

and policy drivers. The framework, which was tested in the Portel region in southern Portugal, evaluates the provision of soil retention services based on the spatial and temporal arrangement of potential impacts (i.e. tonnes of soil eroded without the influence of any type of mitigation) and its relation to the potential ecosystem service of the land. We compared three alternative land management strategies within a single land cover type (i.e. montado systems) and found that there is a significant difference between the temporal variation of the ecosystem service potential and the actual ecosystem service provision. We will present vulnerability maps based on the different land management strategies, highlight policy implications and discuss how the presented framework can be adapted for other ecosystem services.

## References:

Burkhard, B., Kroll, F., Müller, F., 2009. Landscapes' Capacities to Provide Ecosystem Services – a Concept for Land-Cover Based Assessments. *Landscape Online* 15, 1–22.

Maes, J., Egoh, B., Willemen, L., Liqueste, C., Vihervaara, P., Schägner, J.P., Grizzetti, B., Drakou, E.G., Notte, A. La, Zulian, G., Bouraoui, F., Luisa Paracchini, M., Braat, L., Bidoglio, G., 2012. Mapping ecosystem services for policy support and decision making in the European Union. *Ecosystem Services* 1, 31–39.

Nelson, E., Mendoza, G., Regetz, J., Polasky, S., Tallis, H., Cameron, Dr., Chan, K.M., Daily, G.C., Goldstein, J., Kareiva, P.M., Lonsdorf, E., Naidoo, R., Ricketts, T.H., Shaw, Mr., 2009. Modeling multiple ecosystem services, biodiversity conservation, commodity production, and tradeoffs at landscape scales. *Frontiers in Ecology and the Environment* 7, 4–11.

Van-Camp, L., Bujarrabal, B., Gentile, A.R., Jones, R.J.A., Montanarella, L., Olazabal, C., Selvaradjou, S., 2004. Reports of the Technical Working Groups Established under the Thematic Strategy for Soil Protection. Luxembourg.

## Date and time:

Thursday, 12th September 2013 - 10:35 to 10:50



The IALE 2013 European Congress is hosted by ialeUK in partnership with IALE Europe and organised by Countryscape.



**Source URL:** <http://www.iale2013.eu/mapping-and-assessing-soil-retention-through-integrative-ecosystem-service-framework>

## Links:

[1] <mailto:cguerra@uevora.pt>