

European environmental stratifications: an overview

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Introduction

Different environmental stratifications of Europe are developed within different European projects. All stratifications aim to divide environmental gradients into convenient units and to use these units as areas in which objects and variables might have relatively consistent characteristics (Jongman *et al.*, 2006). The stratifications can be used as basis for up-scaling and as a sampling framework. However, as the objectives of the projects are different also the characteristics of the stratifications will be distinct from each other.

This paper presents an overview of the Environmental Stratification (EnS/EnZ), the Agri-Environmental Zonation (AEnZ), the Spatial Regional Reference Framework (SRRF), the European Landscape Classification (LANMAP) and the FARO typology. The objectives, similarities and differences between these typologies will be described.

Methods

The different environmental stratifications are reviewed regarding their objectives and applications. Robustness of the classifications, spatial extent and the different thematic domains are considered. Some stratifications are not purely environmental classifications as they incorporate also administrative or socio-economic data to suit the user's needs. The stratifications are described and compared regarding (i) the themes and number of dimensions (represented by the so-called basic datasets); (ii) the spatial and temporal scales of their dimensions; and (iii) the modes of processing the basic data (e.g., statistical methods and expert judgment).

Results and discussion

The Environmental Stratification of Europe (EnS) consists of 84 strata, which have been aggregated into 13 Environmental Zones (EnZ) (Metzger *et al.*, 2005). The stratification has a 1km² resolution. The EnS has been constructed using tried and tested statistical procedures. Climate data, data on geomorphology, oceanity and northing (latitude) are data used in the statistical approach. It forms an appropriate stratification for stratified random sampling of ecological resources, the selection of sites for representative studies across the continent and for the provision of strata for modelling exercises and reporting at European scale.

The Agri-Environmental Zonation (AEnZ) is meant to stratify Europe on main biophysical factors that determine the agronomic production capacity in Europe. It is an agri-environmental framework used for modelling within the SEAMLESS project (Van Ittersum *et al.*, 2008). The environmental zones (EnZ) are combined with organic carbon topsoil data (OCTOP) to cover the wide range of agri-environmental diversity of Europe. Furthermore the EnZs/OCTOP land units are combined with 270 administrative NUTS2 regions into 3513 so-called Seamzones (Hazeu *et al.*, 2006).

The aim of the European Landscape Map (LANMAP2) is to distinguish different landscape types, their geographical distribution and their key characteristics. It is used as a tool to overarch fragmented and yet integrate relevant regional and national approaches. LANMAP2 was produced on basis of state of the art technology and four core data layers with a high spatial resolution: (i) climate, (ii) altitude, (iii) parent material and (iv) land use. The European Landscape Classification is a hierarchical classification. Level one is based on climate only and has eight classes. Level two is based on climate and altitude and has 31

classes. Level three is based on climate, altitude and parent material and has 76 classes. Level four is based on all four data layers and is the most detailed level and has 350 landscape types (Mücher *et al.*, 2006).

The Spatial Regional Reference Framework (SRRF) was developed in the FP6 IP SENSOR project (Renetzeder *et al.*, 2008). The framework stratifies European territory into 27 relatively homogeneous clusters, integrating biophysical (climate, elevation and parent material), socio-economic (land cover and ESPON/EUROSTAT data) and regional administrative (NUTS-X¹) aspects. It supports the regional assessment of the impact of European policies affecting the sustainability of the land.

The FP6 FARO-EU project has developed a new typology to describe the different ruralities of EU27 (Van Eupen *et al.*, in prep.). It has three dimensions, i.e. one biophysical (13 EnZ described above) and two socio-economic (economic density and accessibility). It is the first rural typology with a high spatial resolution (1 km²) that can be aggregated to any administrative level. The FARO-EU typology provides European rural policies with a flexible framework to analyse current trends as well as future projections, and to support flex policy rural development.

The classifications have the climate dimension in common. Furthermore, data on geomorphology (altitude, slope), soil data or parent material and sometimes land cover data are important to refine the stratifications. Spatial and thematic detail of the stratifications is determined by the datasets. The stratifications serve the need to have a spatial framework that describes systematically the variation in environment and socio-economic issues. Such spatial frameworks are needed to assess impacts of policies and monitor changes. The different stratifications serve different objectives and the usefulness of a stratification depends on the user needs.

References

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¹ NUTS (Nomenclature of Units for Territorial Statistics) is a hierarchical classification of areas that provides a breakdown of the EU's economic territory. NUTS-X is a combination of NUTS-2 and NUTS-3. The NUTS-X coverage has been prepared following an initial approach by EEA within the IRENA project framework, and extended to EU-25 + Bulgaria and Rumania + Norway and Switzerland by the M3 Alterra team. The result is a NUTS-X map with 475 units.