

**Form of presentation** (assign one „x“):

Oral presentation

Poster

**Main theme** (assign one „x“):

Abiotic Environment

Biodiversity and ecosystems

Human Dimensions

**Indicative assignment to the Data-Knowledge-Action cycle** (assign one or more „x“ marks):

Data ----- to --- Knowledge -- to ---- Action --- to Research Planning

## **Identification of Ecosystem Services in the Subcarpathians of Buzău County in Romania**

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Our activities are diverse, with complex consequences that are sometimes hard to explain. Applying the ecosystem services concept to describe the interactions in the human–environment system, helps us to identify human dependence on ecosystems, and also the role humans play in altering the environment. We depend on ecosystems for their services: benefits we obtain from them; like food, fuel and materials, but also a choice of other not so obvious services, such as formation of soils and water supply (MEA 2005).

Ecosystems may deliver more than one service, so their manipulation to maximise one particular service can lead to unsustainable management and risks reducing other services. It reduces their value for other uses and leads to conflicts between different stakeholders and converting traditional multi-function landscapes into single-function land use types and eroded or polluted wastelands (De Groot 2006).

We hypothesise that ecosystem services management could lead to more successful maintenance of biodiversity levels and coping with hydro-meteorological hazards. Identification of ecosystem services in the Buzău Subcarpathians will lead to improved knowledge about the human-environment system in the area, and is a predisposition for sustainable management.

The Buzău Subcarpathians are a suitable case study area for the application of the ecosystem services concept owing to its complex physiogeographic characteristics and hydro-meteorological hazards occurrence on one side, and recent socio-economic changes on the other. In addition, it is an area of high biodiversity, which together with the rest of the Romanian Carpathians acts as a refuge for important European species, especially large carnivores, e.g. the brown bear (*Ursus arctos*) (van Maanen et al. 2006). Buzău County lies in south-eastern Romania, and extends from the Romanian plain to the Carpathians. Our case study is a rural area near the town Pătărlagele situated in the Subcarpathians. Although the ecosystems in the area are in well preserved state, they are vulnerable to anthropogenic

change due to severe natural conditions (altitude, slopes, soils, precipitation, etc.) (Kuemmerle et al. 2008).

We hypothesise that key local ecosystem services are related to natural hazards regulation, as 30-40% of agricultural land is subject to them (Micu and Bălteanu 2011). These services allow the area to be habitable and are vital to the safety of villages in smaller catchments affected by mudflows and flash floods. They maintain access through the main Buzău River valley, as important transport routes like the national road 10 and the railroad to Nehoiu are threatened by landslides and rockfall. These services are regulated by the interplay of abiotic (climate) with biotic factors (vegetation). Ecosystems, especially forests and riverine vegetation, have an important effect on regulating surface flows and buffering of extremes in discharge of rivers (EASAC 2009).

Main environmental change drivers are connected with the collapse of socialism; following Romania's entry into the European Union and the implementation of new agricultural and environmental policies. Bălteanu and Popovici (2010) state, that one of the major changes in the period of transition was the extension of private property over agricultural and forest lands, that followed decollectivisation. It resulted in numerous small holdings (over 4,25 million nationwide) with an average size of 2,15 ha (MARDR 2010). This has led to land abandonment, forest and agricultural land fragmentation, and large deforested areas (Bălteanu and Popovici 2010; Niculae and Pătroescu 2011). Together with the expected climate changes an increase of hydro-meteorological hazards occurrence in the area is likely (Micu and Bălteanu 2011).

Land abandonment has a negative effect on habitat provision, as it threatens the maintenance of high value grasslands. They are important habitats for European-wide acknowledged bird species, like the corncrake (*Crex crex*) and are already being managed through payments for habitat maintenance (TRINET 2010; MARDR 2010).

A study made by Niculae and Pătroescu (2011) in the near Subcarpathians showed that the area experienced around 10% deforestation between the years 1990 and 2006, and the number of forest patches increased by 11%, with a 14% decrease in their size. Together with the emergence of small plots, the land-use pattern has become more fragmented. This affects hazard regulation and can lead to habitat loss.

Large deforested areas in intensely populated and managed areas as in our case study areas, can lead to slope instability and rapid water runoff (Glade 2003). This has resulted in increased landslide activities, mudflows, and flash floods (Micu 2011). It also affects water cycling and can cause siltation, for example in the nearby Siriu water reservoir.

Identification of ecosystem services and drivers of change at the case study area are the first steps in analysing environmental change regarding ecosystem services provision. The next steps are spatial quantification of ecosystem services, environmental change modeling (with the focus on land-use change) and assessing the new human-environment state.

(The CHANGES project (Changing hydro-meteorological risks as Analysed by a New Generation of European Scientists) is part of the Marie Curie Initial Training Network, funded by the Seventh Framework Programme. The objective of the CHANGES Work Package 2 is to analyse the changes in exposed elements at risk, i.a. ecosystem services.)

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