

CASCADE

Catastrophic shifts in drylands



CASCADE investigates and analyse a range of dryland ecosystems in southern Europe to obtain a better understanding of sudden shifts in drylands that may lead to major losses in biodiversity and concomitant ecosystem services.

The **CASCADE** Project collects experimental data, use them in ecological models, and interpret the results to provide further knowledge on the following questions:

- Why and when do ecosystem catastrophic shifts occur in ecosystems or landscapes?
- Why are some ecosystems or landscapes more resilient (less likely to change) than others?
- What can be done to prevent catastrophic shifts?
- Can degraded ecosystems or landscapes be restored to a former state?
- Is it economically feasible to restore ecosystems or landscapes or would the effort be too high a price?

CASCADE's objectives

- To analyse the historical and current state of selected dryland ecosystems in southern Europe in relation to climate and human activities, and the role of thresholds and tipping points in the land degradation processes in these sites
- To use field microplots to investigate the spatial and temporal variation in water and nutrients and discover how that affects facilitation and competition between plants
- To use partly natural/partly controlled field mesocosm structures to study the interplay between vegetation patterns, hydrology, land use, and sudden regime shifts
- To assess vegetation composition on a landscape scale, as related to ecosystem services before and after regime shifts, as well as the potential for restoration of degraded systems
- To develop a spatially explicit ecological model to provide reliable and empirically based indicators of the proximity of the ecosystems to thresholds and sudden shifts
- To design management strategies to deal with tipping points and thresholds in the studied dryland ecosystems and improve resilience towards undesirable change
- To integrate socio-economic factors into the ecological model, undertake scenario analyses of land management strategies, and formulate policy recommendations for preventive and restorative dryland management
- To make the results accessible to interested persons, particularly using a web-based information system **CASCADiS**, see <http://www.cascadis-project.eu>

CASCADE looks at six Study Sites in southern Europe where ecosystem shifts have occurred or are likely to occur, and where there are associated consequences for biodiversity and ecosystem services.



<https://ec.europa.eu/jrc>

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