

BASIL: Landscape-scale biodiversity and the balancing of provisioning, regulating and supporting ecosystem services

Context

Global change may endanger agricultural landscape functioning in the future. Biodiversity has the potential to buffer agro-ecosystems against change and stabilize ecosystem functions and services. However, the suitable level of biodiversity to maximize ecosystem services in agricultural landscapes is not yet known and quantified.

Main objectives

BASIL aims at understanding the importance of diversity from the field to the agricultural landscape scale, evaluating the mosaic of extensively and intensively managed sites and natural habitats for ecosystem services (ESS) and a sustainable agriculture.

BASIL will cover the following specific objectives:

- To understand differences between extensively and intensively managed agricultural landscapes in terms of biodiversity and provisioning, regulating and supporting ESS (e.g. water quality, soil conservation, preservation of soil structure and biodiversity, C and N storage, weed and pest control);
- To determine the contribution of plant and microbial diversity to the closure of nutrient cycles, the synchronization of plant nitrogen (N) requirement and N delivery by soil, and the coupling of carbon (C) and N cycles;
- To determine the necessary level of integration of biodiversity that is required to improve the economic and environmental sustainability of agriculture by performing landscape trait-based analyses;
- To identify particular landscape structures and cropping systems promoting biodiversity and its contribution to targeted ESS;
- To assess the importance of different policies and governance systems having an impact on environmental and economic sustainability via agricultural landscape management.

Main activities

To achieve its objectives, BASIL will:

- Assess the N availability and N cycling, i.e. the temporal and spatial distribution of N across studied landscapes (i.e. France, Germany, Spain and Switzerland) including bordering zones of intensively managed agricultural fields and natural ecosystems;
- Assess management impact on soil microbial communities and their regulation of C and N cycles;
- Test whether forests, semi-natural areas or natural patches in agricultural fields (e.g. in-field ponds) are stepping stones for belowground microbial re-colonization of intensively used areas after disturbance;
- Investigate whether subsoils of agricultural fields are reservoirs for mycorrhizal fungi that may re-colonize topsoils of intensively used areas after disturbance;
- Conduct surveys, stakeholder workshops and expert interviews, and use the research results to perform a socio-economic analysis to understand the impact of regional/national agricultural and conservationist policies on management practices.

The BASIL project is being developed in contact with networks of farmers who promote the use of different plant species and reduced soil tillage in order to 1) benefit from their field observations and 2) transfer to them the scientific knowledge. BASIL will set up contacts with national, international and global environmental agencies that have an overlapping interest in the goals of the project. BASIL will also engage with policy makers and administration to conduct interviews, keep them informed about the project's schedule and results and develop a policy brief. BASIL plans to organize visits for the general public to the different study sites and, thus, give visibility to the project and its goals to a broader audience.



Poppy flower in a wheat field

Partners:

**University of Potsdam, GERMANY
(Coordinator)**

French National Institute for Agricultural Research (INRA), Clermont Ferrand, FRANCE

Freie Universität Berlin, GERMANY

Georg-August-University Göttingen, GERMANY

Leibniz Center for Agricultural Landscape Research (ZALF), GERMANY

Estacion Experimental de Aula Dei, Spanish National Research Council (CSIC), Zaragoza, SPAIN

Universitat de Lleida, SPAIN

WSL Swiss Federal Research Institute, Birmensdorf, SWITZERLAND

Duration:

05-2015 to 04-2018

Total grant:

€ 978 015

Further information:

Jasmin Joshi

jjoshi@uni-potsdam.de

