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## What direct and indirect consequences of dam removal on flora biodiversity at a landscape level?

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## Study design.

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### Dams removal on the Selune river (Manche, France) : context and issues

Scheduled to begin in 2015, the removal of two dams on the Selune River will be one of the largest dam removal and river restoration projects undertaken in Europe.

Environmental consequences of dam removal include benefits from restoring more natural flow regimes but include also impacts on farmland biodiversity and associated ecosystem services due to changes in landscape and agricultural dynamics (e.g. new lands exposed).



We hypothesize that dam removal by influencing the logics of farmers' decisions, could modify farmers' management practices and land use allocation on each side of the valley, from the river up to the plateaus.

**What are the consequences of such changes on vegetation communities in surrounding agricultural landscapes ?**

Our objective is two-fold : i) performing an inventory of flora biodiversity before dam removal  
 ii) following the evolution trajectories of flora biodiversity after dam removal

### An innovative design to evaluate and follow vegetation communities across spatial scales

- Identifying three homogeneous zones along the Selune river with GIS



**downstream** Changes in the flow regime and retention of organic and inorganic materials after dam removal. Probable evolution of the allocation rules of land covers and land uses in the valley but also on watersheds.

**zone of lakes** Lowering of the water level. Rapid revegetation of exposed substrates from i) the seedbank, ii) the seed rain from the watersheds, iii) hydrochory (seeds transported by the river from upstream)

**upstream** No or minor change of the flow regime expected after dam removal. Control area.

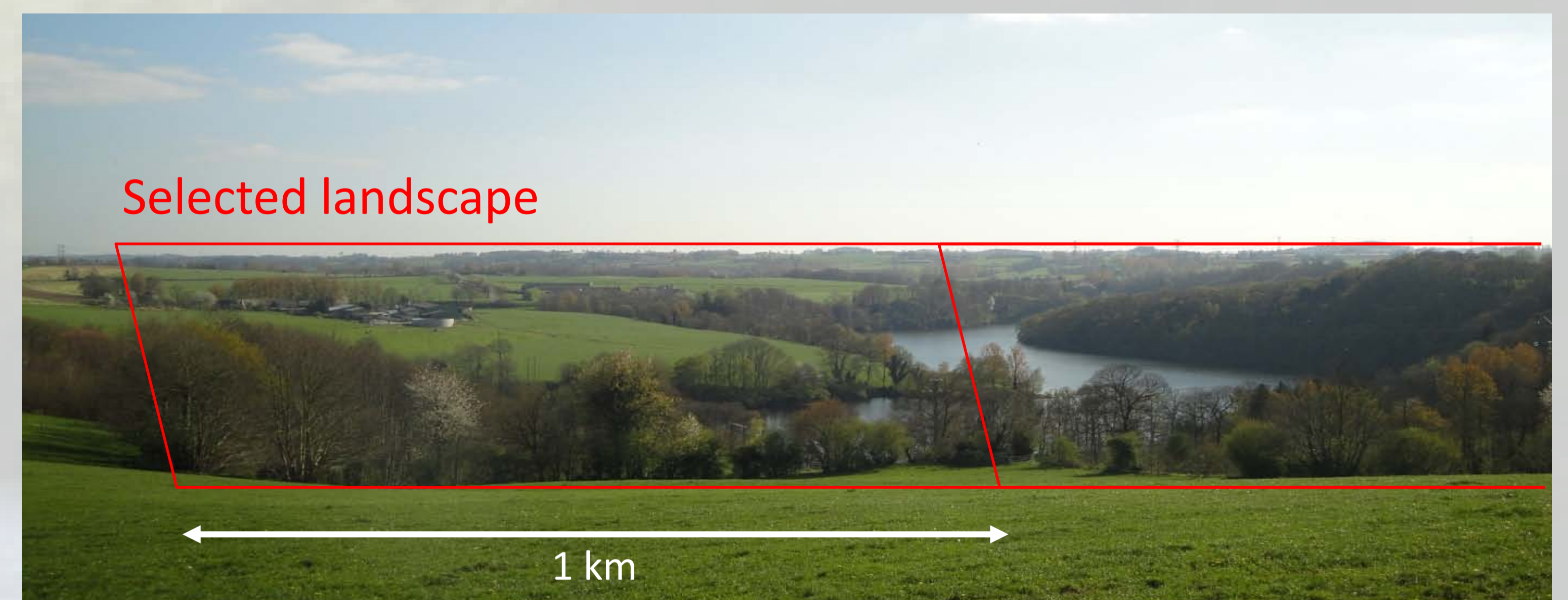
The three delimited zones are homogeneous according to topography and landscape composition.

- Locating three 2 km x 1 km landscapes per zone (N = 9)



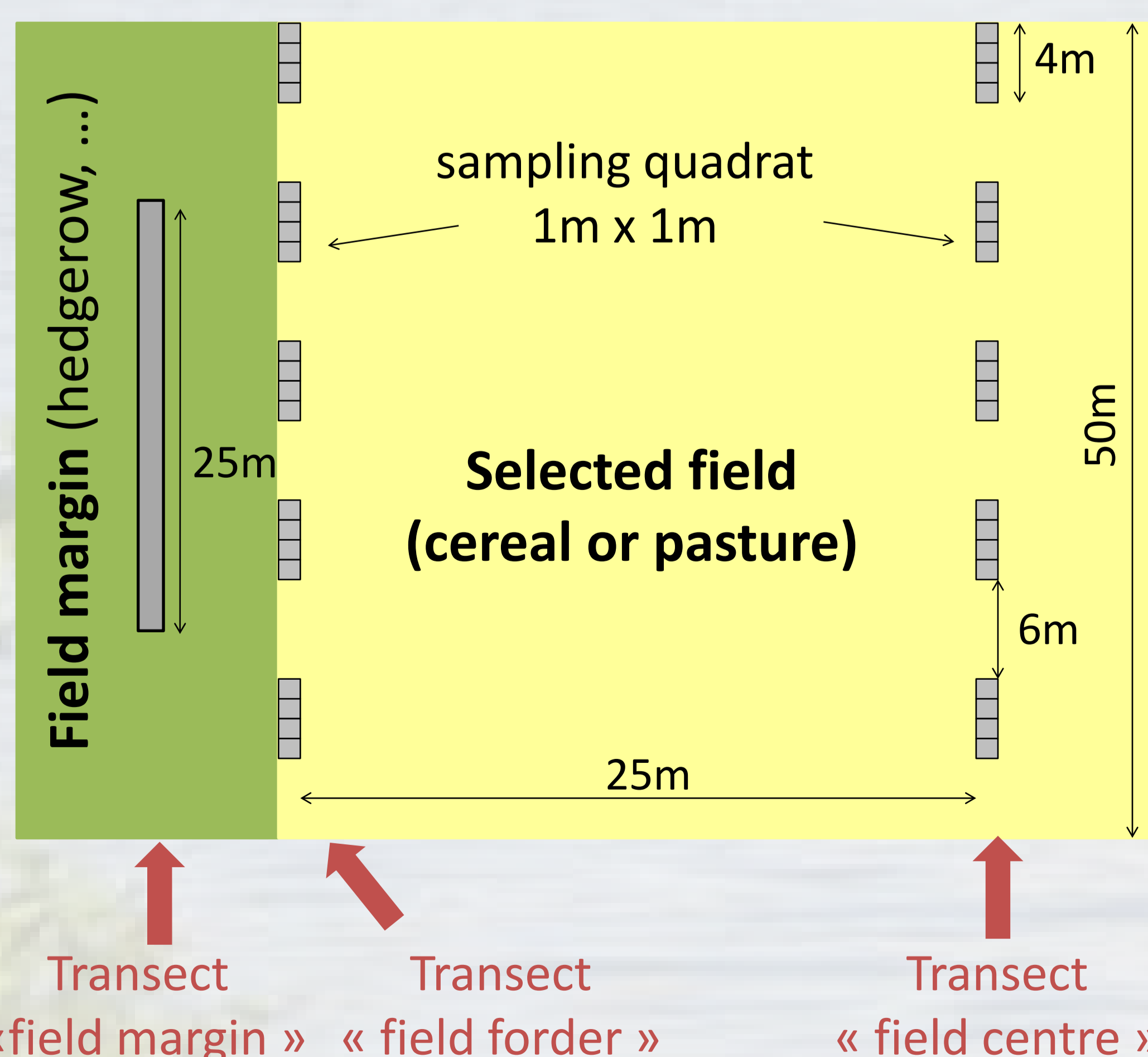
The three landscapes are replicates. They are centered on the Sélune river.

- Selecting 3 fields for agricultural and flora surveys in each half-landscape



Selected fields are representative of the main crops (mainly cereals and temporary pasture).

- Sampling flora biodiversity (exhaustive surveys) in fields (N = 54)



- Sampling flora biodiversity overall the hedgerow/field margin network

Use of Ecobordure, an indicator designed to describe the agroecological state of field margins, from the relative percentages of 31 reference species classified into three groups, i.e. forest-edge, grassland and weed species.



This approach should enable us to i) evaluate the relative weight of agricultural landscape changes in observed vegetation changes, ii) identify the conditions for retention or recovery (resilience) of flora biodiversity and associated ecosystem services (i.e. pollination) in agricultural landscapes surrounding the Sélune river.