Implementation of ecological mitigation installations of wind turbines in farming landscape : a win-win project for farmers and a wind farm developer

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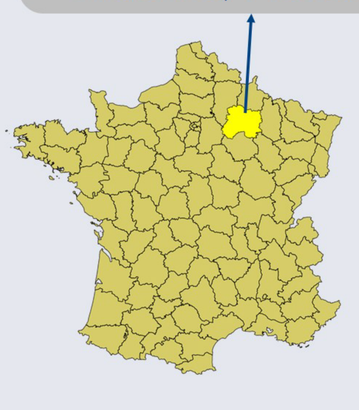
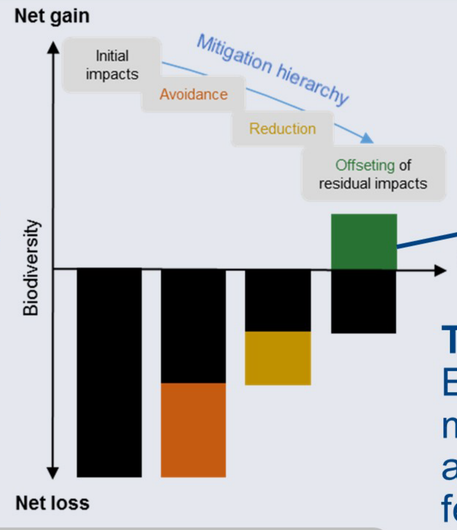
Introduction

Study area : Marne in Champagne-Ardenne, France



Wind farms setting up

Impacts on biodiversity



Wind farm developers have to mitigate impacts

On-site Offsetting

Every turbine should be offset by the creation of **2 ha of agricultural fallow** to counteract the residual loss.

This measure is socially and ecologically inappropriate : Environmental NGO are not fully satisfied with this single measure, wind farm developers failed to find enough agricultural surfaces to convert to fallow, farmers have the feeling of being penalized twice : they are already affected by the installation and they must withdraw land that was previously used for the agriculture production.

Objectives

To assess the feasibility of alternative ecological mitigation installations of wind turbines in farming landscape :

1 – A community with all the local stakeholders was constituted.

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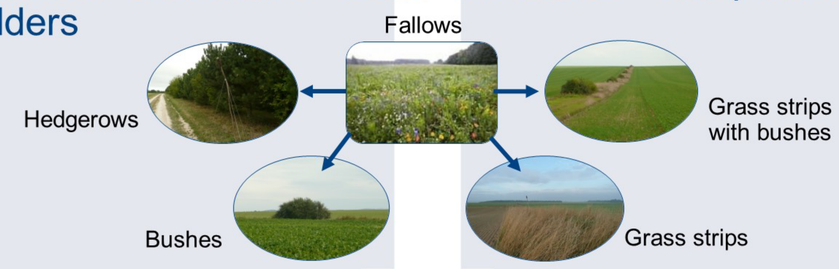
2 – Potential alternative offset measures acceptable by all stakeholders



3 - The NMNH calculated ecological equivalences between fallow and alternative offset measures.

Conclusion

This study allowed defining and quantifying alternative measures to fallow for biodiversity offsetting, effective for biodiversity, and socially and economically acceptable by local stakeholders. That is, to our knowledge, the first project of its kind in France, so it is highly innovative.

Our results showed that from the same set of field data, we can get to different ecological equivalences conclusions based on the choice of weighting.

That highlight the need of consultation with stakeholders, and this project also aid to set up a dynamic of cooperation between local actors to better offset the residual impacts of wind turbines.

Learning objectives

The interactions between agriculture practices and offset measures tested such as hedgerow, grass strip have been widely documented. Can we envisage offsetting wind turbine by favorable agricultural practices such as conservation-tillage, less pesticide quantity ?

It would also important for the offsetting operator to know where implant offset measures in a farming landscape taking into account the ecological corridors, where to place them in relation to wind turbines and how manage them, to maximize their efficiency.

Approach

Protocols for impacted taxa

Abundance	*Presence*	*Presence*	*Activity*
Count points method	Car transect for Harrier's	Observation point for Harrier's	Echolocation recordings

Step 1 : species abundance modelling among offset measures

Estimates produced for each species for each offset measures (fallows F, hedgerows H, bushes B, grass strips GS, grass strips with bushes GSWB)

Step 2 : gain per protocol according to specific weight among scenario

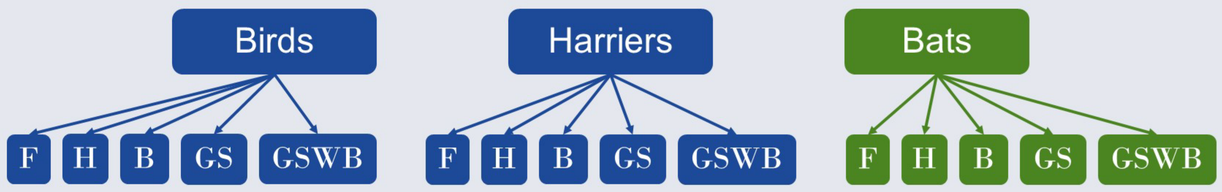
Several acceptability scenarios tested (weighting estimates)

Scenario 1 : same weight for all species

Scenario 2 : double weight for species negatively impacted for wind farms

Scenario 3 : point of view of stakeholders (less weight for woodland birds and more for bats in reproduction season)

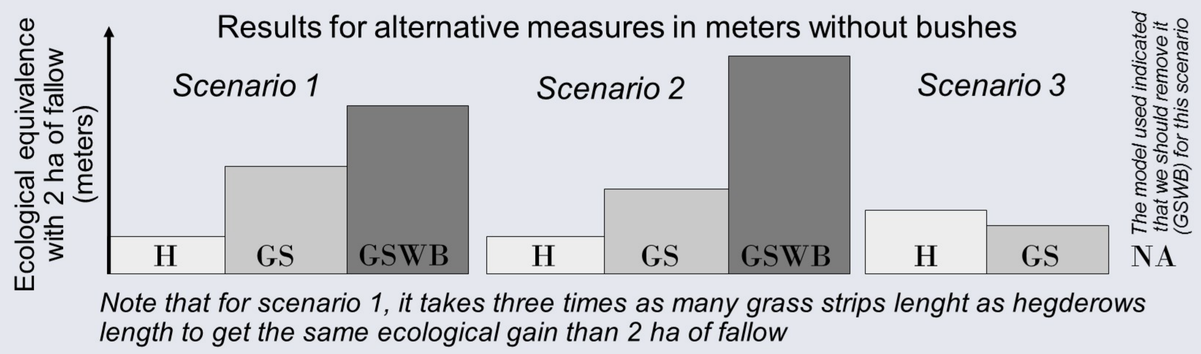
Step 3 : arithmetic mean per protocol according to selected scenario



Step 4 : Scaling the size (of last means) of the alternative offset measures to get the same gain than 2 ha of fallow

Surface scaling of the intercept (crop without offset measure) at 2 ha for each protocol (because their sampled surfaces were different, for instance 25 m radius in bats protocol) → Cross-multiplication to scale the surface of fallow at 2 ha and the lengths of offset measures at 100 m → Metric values

Step 5 : Calculation of ecological equivalences (protocols averaging)



Note that for scenario 1, it takes three times as many grass strips lenght as hegderows length to get the same ecological gain than 2 ha of fallow

Operational step : the biodiversity offsetting operator (InVivo AgroSolutions in our study) pay farmers for ecosystems services