Impact Assessment in Modified Agricultural Landscapes of Biodiversity Value

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1. Introduction

Developments should preferably occur in modified habitats, thus preserving what is left of natural and seminatural habitats. However, modified habitats can have biodiversity value that should not be ignored given the current biodiversity loss crisis.

Agricultural land can be seen as suitable for development from a biodiversity impacts perspective. Despite often exhibiting low species diversity and a high prevalence of exotic and invasive species, such landscapes may nevertheless provide habitat, refuge or steppingstones for a range of species. It is important not to overlook the potential biodiversity value of farming or grazing landscapes when assessing the impacts of conversion to other developments (e.g., solar farms), intensification, altering management practices (e.g., irrigation), or changing the commodity produced. Failing to identify appropriate mitigation can lead to a biodiversity loss that goes undetected and can be significant cumulatively or at the landscape level.

The purpose of this paper is to:

- Provide examples of biodiversity value in modified and/or seminatural agricultural areas.
- Posit that approaches and metrics used to assess impacts in areas of high biodiversity are not suitable for modified landscapes.
- Highlight how to better consider these landscapes during the key stages of the Impact Assessment (IA) process.
- Provide recommendations for addressing the current gap in methods and practice.

This paper draws on the author's operational experience, recent literature, and good practice guidance for integrating biodiversity in IA.

2. The Importance of Modified Agricultural Landscapes to Biodiversity

In an increasingly degraded natural world, modified habitats ranging from fallow land to urban landscapes are becoming increasingly important to biodiversity and Ecosystem Services (ES). The potential importance of agricultural landscapes is partly a function of their surface area. Agricultural land occupies about a third of the world's total land area (4.1 billion out of 13 billion ha, FAO, 2023). Fields and crops often connect what is left of natural habitats in a given area (Estrada-Carmona et al, 2022).

According to the IUCN (2024), 17% of species belonging to groups that have been comprehensively assessed for the Red List have agricultural land documented as a habitat. A total of eighty-six species have been found to live only in agricultural habitats. In tropical areas, some species are only found, and many others thrive in agricultural areas, particularly reptiles, amphibians, and birds (Mendenhall et al, 2016).

Traditional agricultural landscapes in Western Europe provide habitat for the Critically Endangered common hamster, *Cricetus cricetus*, as its original steppe habitat has been completely converted to agriculture (Nechay, 2000). Traditionally managed grasslands contain assemblages of species no longer present in the wild and are the most important habitat for European butterflies. These grasslands have faced extreme decline in Europe and have almost disappeared, due to modern agriculture and plantation practices, and other types of land use change (Erikson, 2021).

Densely developed agricultural landscapes can be a mosaic of fields and small areas of natural or semi-natural habitat, including isolated trees and thin linear patches. These may be important for connectivity, acting as steppingstones for species that move long distances (Tiang et al, 2021; Herrera et al, 2017) but are at particular risk of conversion, as they do not attract as much attention as larger habitat patches. The presence of areas and even fragments of natural habitat in an agricultural landscape is key to maintaining the biodiversity value and species diversity of an area (Outhwaite et al, 2022).

A high proportion of the remaining tree cover of a deforested tropical region may be embedded in agricultural landscapes, for instance, along field boundaries or rivers, or on steep terrain. Tree cover on private properties has been shown to support the larger, more diverse biological communities associated with forested areas (Mendenhall et al, 2016). In non-tropical landscapes, the presence of natural and semi-natural habitat in field edges, resulted in smaller field size areas being associated with higher biodiversity compared to landscapes in which larger field sizes occurred alongside larger patches of natural habitat (Fahrig et al, 2014). Losing small natural and semi-natural features and trees could therefore impact species movement and conservation at a wider scale than a project. Agricultural intensification (e.g., change from pasture to cropland) is also often associated with a decrease in biodiversity (Macchi et al, 2020).

3. Overview of Current Practices

IFC Performance Standard 6 requires mitigation and management of impacts in modified habitats with “significant biodiversity value”. Within IA, the conversion of modified agricultural landscapes to other land uses is often considered not significant for biodiversity. Biodiversity is often scoped out based on the absence of certain high biodiversity values (e.g., medium to large areas of natural habitat, presence of threatened species, overlap or proximity with protected areas). This partly reflects the current conservation paradigm that focusses on “wild” nature to define high biodiversity value (Erikson, 2021).

The approach of defining materiality and significance based on the presence of high value biodiversity is recommended by good practice guidance (Hardner et al, 2015; Ekstrom et al, 2015). However, the refuge or connectivity value of a small patch of habitat or scattered trees can be missed with this approach (Tiang et al, 2021). The provision of ES (e.g., pollination, erosion control, cultural values among others) can be similarly ignored. Moreover, the consideration of ES is a weak spot of many ESIAs, despite the opportunities for better assessments of cross-topic and cumulative impacts and processes that integration of ES in IA can offer (Van der Biest et al, 2023).

Given resource and time constraints associated with the IA process, there may be little, or no biodiversity baseline collected for projects in modified habitat. Collecting baseline data does not need to be a long or onerous process. There are a range of methods suitable to assessing the value of modified landscapes for biodiversity, as illustrated by the studies referenced in the previous section. These include expert opinion, remote sensing, analysis of publicly available maps and datasets, and development of models to assess connectivity.

Impacts on high-value biodiversity are often avoided through siting projects outside of protected and designated areas or areas of natural habitat. It is often assumed that any land that does not fall into those categories is suitable for development, which may not be the case. For instance, a study in Italy showed that photovoltaic projects had been developed in century-old olive groves, which led to the loss of significant ES, including cultural value. The local regulations identified a series of unsuitable areas for development (natural and protected areas, UNESCO sites) potentially opening all other areas to development (De Marco et al, 2014).

In conclusion, the assessment approaches valid for natural and high value habitats are not generally appropriate when dealing with modified or fragmented landscapes.

The good news is that there appear to be significant synergies between conserving or enhancing the biodiversity of productive areas and achieving other benefits. A recent analysis by IUCN (2024) concluded that biodiversity protection gains in agricultural landscapes do not have to come at a cost to food production or economic returns. Better land use and management are required. Including biodiversity-enhancing mitigation or introducing nature-based solutions (NbS) in the design of a project can provide social and financial benefits, for instance through improvements in agricultural productivity (Estrada-Carmona et al, 2022), additional sources of income, and lowering maintenance needs (Semeraro et al, 2022). Mixed-species systems such as agroforestry are considered good examples of NbS, where crops combined with trees, provide ES, including carbon sequestration and cultural services (Kumar & Kunhamu, 2022). Habitat enhancing and creation as part of an agricultural landscape such as planting of native trees for cover, addition of hedges or tree lines can increase diversity (Mendenhall et al, 2016) while not impacting or even increasing productivity.

4. How to Adapt the IA Process for Modified Agricultural Landscapes

Given limitations of current guidance and approaches, a range of suggestions to improve consideration of the biodiversity value of modified agricultural landscapes in the IA process are provided in Table 1 below. These could be adapted to biodiversity due diligences and audits if an IA is not required. The assessment should be precautionary. There is an assumption that these types of habitats have low biodiversity value and that the focus should be on high-value habitats and species, which tends to be perpetuated in IA practice.

In addition to the Table 1 recommendations below, ES should be integrated in the IA process as detailed in good practice guidance[1].

TABLE 1: Recommendations for considering the biodiversity value of agricultural landscapes in IA.

SCOPING STAGE
• Do not automatically exclude biodiversity consideration. • Define a study area beyond the project boundaries that includes the surrounding landscape. • Review site information to identify the presence of features indicating potential biodiversity value (examples of these are discussed in Sections 2 and 3 of this paper). • Identify opportunities for biodiversity aligned design and mitigation.
BASELINE CHARACTERIZATION
• Conduct desktop data collection, stakeholder consultation or expert opinion, and site visit if resources permit. • Use remote sensing tools (e.g., to measure tree cover), existing datasets and maps, conduct literature review. • Collect landscape information: connectivity, presence/absence of natural habitat in the wider landscape, proximity of the project to natural habitat that is protected or conversely at risk of conversion. • Collect site information: presence of small patches of natural or semi-natural habitat, trees, tree curtains, hedges, water bodies/wetland areas. • Give particular attention to traditionally managed agricultural areas (e.g., grasslands) as they are often rich in species and provide ES. • Visit by a specialist to assess factors such as connectivity and presence of patches of natural or semi-natural habitats.
ALTERNATIVES ASSESSMENT
• Favor project designs that integrate and retain natural and semi-natural features and align with sustainable agricultural practices (see Demozzi et al, 2024 p. 5-6 for a list of these)

[1]For example WRI's guidance on Weaving Ecosystem Services into Impact Assessment (available: https://www.wri.org/research/weaving-ecosystem-services-impact-assessment)

IMPACT EVALUATION

- Develop impact characterization and assessment methodology appropriate to the expected types of impact (loss of connectivity, impacts to the wider landscape and to including natural habitats).
- Consider indirect and cumulative impacts and impacts beyond the project boundary.

MITIGATION

- Avoid conversion of natural or semi-natural patches, trees, and other features – integrate into project design, no matter how small.
- Identify Good International Industry Practice (GIIP) measures to avoid and minimize environmental impacts and resource use (water use, chemicals, invasive species).
- Identify opportunities to increase biodiversity value through:
  - Sustainable agricultural practice (see Demozzi et al, 2024 p. 5-6).
  - Nature-based Solutions.
  - Habitat restoration and enhancement – increase the areas of natural/semi-natural habitat, planting of native trees for cover, hedges, tree lines.

MONITORING & EVALUATION

- Biodiversity monitoring not limited to verifying implementation mitigation measures.
- Use remote sensing and desktop methods, evaluate both impacts and opportunities.

5. Conclusions and Future Avenues

Given the current biodiversity crisis, the potential loss of biodiversity and ES associated with the conversion of agricultural landscapes or agricultural intensification cannot be ignored.

Current approaches to integrating biodiversity into IA are not suitable to assess the impacts of conversion of modified habitats or loss of small areas of natural or semi-natural habitat. Therefore, it is likely that there is an ongoing loss of biodiversity that is not currently being detected.

Recent literature provides a range of methods to assess the biodiversity value of modified agricultural landscapes. Work needs to be conducted to adapt and mainstream similar approaches in IA. Training on desktop baseline data collection and modelling approaches for this type of landscape needs to be developed. Examples and case studies should be shared among practitioners.

There is a need to prepare guidance on the integration of biodiversity value of modified areas into IA. Until then, a precautionary approach is recommended to avoid this additional loss of biodiversity and ES for lack of appropriate identification and mitigation.

There are important synergies between biodiversity conservation and higher productivity and resilience, for instance through sustainable agriculture approaches and NbS.

An approach that focuses on impacts may not be appropriate for modified landscapes. While we should avoid any further losses through better consideration of the biodiversity value of modified habitats and an emphasis on avoidance, we also need a new paradigm that focuses on the opportunities for biodiversity that could be created in modified landscapes.

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