

## **General comments:**

The manuscript '*Integrated ecological monitoring in Wales: the Glastir Monitoring and Evaluation Programme field survey*' describes the set-up and survey protocols of the Glastir Monitoring and Evaluation Programme (GMEP). The surveys are carried out at 300 stratified-random sampled 1 km square test sites across Wales. For assessing the impact of agri-environmental interventions, representative indicators are surveyed which are vegetation, land cover and land use, soil parameters, freshwater, birds and insect pollinators.

This paper mainly focuses on the **survey instructions and the key raw data sets** gained during the performed field surveys. It only provides a rough overview on the already performed data analyses and the results within that programme.

Comprehensive monitoring programmes such as GMEP are extremely valuable and welcome in order to *identify as well as quantify changes in biodiversity of farmland*. In general, for interested external researchers, it is difficult or even impossible to get access to the data sets obtained from nationally conducted research programmes for further data analyses. In this context, I very much appreciate providing open access data sets such as the GMEP data. The GMEP data are presented online in a user-friendly and well-organised way including all key information - field manuals included - required by the user. For a suggestion on data presentation see technical comments below.

Valid modelling of data can only be carried out, if data sets in high quality are available. In this context, comprehensive field data collection is of main priority in biodiversity research although in most cases, there are only tight budgets provided for this issue. I consider the obligation for data users to register and to cite the original data source a valuable step for traceability of data use. I appreciate the idea of a rolling monitoring in the programme which enables studying a maximum number of test sites, while keeping the costs for the monitoring scheme low. Moreover, I consider the splitting into 'Wider Wales component' (baseline estimation) and 'Target Component' (priority areas and aims) to be a useful approach.

Unfortunately, I am not familiar with the specific challenges of monitoring in the UK. In general, monitoring programmes are challenging to be set up, as only limited components/parameters can be investigated and therefore, monitoring programmes can never be complete. In my opinion, the selection of indicators in GMEP is well targeted to reflect biodiversity at different levels. If possible, also grasshoppers could be included in the survey in future as they have already proven to be a useful indicator for farmland connectivity and quality. Dealing with monitoring issues we unfortunately have to accept incompleteness and limitations in the surveys procedure. Maybe the application of classical monitoring tools and approaches in combination with new supporting techniques could help to provide a broader data spectrum in future.

Trend analyses are in general difficult to interpret, as the data of the annual survey rounds are also influenced by non-standardised parameters such as the prevailing weather conditions, natural population fluctuations, etc. In any case, utmost caution is required when interpreting ecological/species trends. Consequently, we always face uncertainties when dealing with the issue. However, it is important to include and consider all parameters that could have an impact on biodiversity (including sheep grazing and other farmland practices) in the analyses. To improve the present state of biodiversity, the main drivers in the monitored region need to be identified.

In several passages, the manuscript reads like *a detailed survey protocol*. I would suggest shortening the detailed descriptions of the fieldwork, and better refer to already existing published protocols/manuals – which are already made available online with GMEP data sets.

The GMEP programme is very comprehensive and as I am not familiar with it, it is not possible for me to comment on and evaluate the significance/suitability/value of the data presented here throughout the programme. Therefore, I have focused my review mainly on the data collection protocols and procedures presented in the manuscript.

### **Specific comments:**

The survey procedures on the whole are well conceptualized. In my opinion, the following aspects should be specified and clarified.

- 1) *Figure 1*: There are no test sites in some areas of the land classes (e.g. light green). What is the reason for this? Is that mentioned area not used as a farmland?
- 2) *Figure 2*: Were the data collection plots e.g. hedges selected randomly?
- 3) *Page 6*: It is stated that linear features may contain gaps of up to 20 m (page 6). In this case, should they not better be considered as two linear elements?
- 4) I think that a size of point features of 20x20 m is too large. Most of single trees will not be considered in that case.
- 5) I wonder about the rough categorisation of some landscape elements, e.g. urban. In this category also streets are included. Does this category only include sealed roads or also gravelled roads, or do the latter fall within the category 'boundaries', since they have to be evaluated differently from an ecological point of view?
- 6) How was plant cover estimated? According to an estimation scale, e.g. Braun-Blanquet (1964)?
- 7) I also think that eDNA samples for soil analyses may serve as a supporting tool in biodiversity monitoring. In which way were the DNA metabarcoding analyses carried out in detail?
- 8) *Table 2*: Text passages could also be presented in a separate methods chapter or *via* reference to applied soil analyses protocols. Maybe only variations/adaptations should be addressed in the manuscript in detail.
- 9) Concerning the transect route of butterflies: Does a standardised transect route through each 1 km square mean that the location and direction of the transect were the same in all surveyed test squares?
- 10) Weather conditions were recorded at the end of the transect walk. Are there any predefined conditions that must be followed when starting the surveys, as in general, it is the case with butterfly surveys?
- 11) Pollinators, page 18: I would start the last text passage of this chapter with 'For the timed searches, surveyors identified...' In my opinion, this is more logical, because it is not clear to the reader whether there are no preconditions in the butterfly survey that should be considered before starting the survey (see 10).
- 12) page 19/363: According to which aspects did the plant species improve or be stable? Please specify the statement.

The manuscript mainly focuses on the data collection procedure and the broadness of available data sets in GMEP. An overview of the monitoring results is given, but it does not go into much detail regarding the analyses that could be/were carried out using these data sets. **Yes, there is major**

**potential for further analyses.** I for example, miss analyses calculating biodiversity indices, patch size, landscape complexity, connectivity, corridor effects, etc., which are all essential for the assessment of biodiversity status and change in farmland. Also aspects such as land management (e.g. farmland practice) including conventional and organics farming also considering soil components are not addressed in the manuscript.

**Technical errors:**

Data presentation: I have checked some of the online provided species lists. I think the lists would be more user-friendly, if all the information was not summarized in one column, but in separate ones with own column headings.