**Review of JRC/EEA EU-level HNV Farmland methodology**

***Draft minutes for feedback***

**Expert workshop to review options for improving the JRC/EEA HNV farmland methodology**

14 October 2019 at Environment Agency Austria; Spittelauer Lände 5, 1090 Vienna

**KEY POINTS:**

* The workshop built on 3 years of analysis to discuss option for improving the JRC/EEA HNV farmland methodology.
* The workshop covered three different aspects:
	+ Comparison of EU-level approach with national work on HNV farmland / farming indicators
	+ Utilizing High Resolution Copernicus data sets for better spatial and thematic precision
	+ Including a farming intensity dimension into the JRC / EEA approach
* The JRC/EEA approach focuses on developing an EU-level overview, hence comparability with national data sets and approaches is often limited. However, in general the selection of CLC classes in the EU-level approach was confirmed and could be refined further.
* It was proposed to exclude Natura 2000 data and other protected area data from the EU-level approach to focus on biodiversity monitoring as such. This would also facilitate policy evaluation as it would become analytically meaningful to compare HNV farmland trends inside and outside Natura 2000 areas.
* The proposed exclusion of areas under the HRL for Imperviousness and the HRL components for permanent water and wetness from the current HNV layer generally were agreed on.
* The threshold of a tree cover density (TCD) of 30% for pastures was discussed, inter alia to take into account forest grazing that is going on in south-eastern Europe. The proposed exclusions based on CLC classes will be checked to consider whether adding additional rules or thresholds would be useful.
* For the countries discussed (e.g. Germany, France), the calculated amount of HNV area after the proposed adjustment on the basis of the HRL data layers is closer to the HNV area estimated in national approaches.
* The potential combination of Nitrogen input per ha and life stock offer the potential to use agricultural intensity estimates for refining the land cover approach for estimating likely presence of HNV farmland.
* The introduction of farming intensity data provides an opportunity for refining the current JRC/EEA approach at EU level, but it also introduces new uncertainty elements.
* Given the uncertainty in the farming intensity data, it was suggested to distinguish between high and medium nature value farmland. This would probably be useful to pinpoint HNV priority areas and enable a differentiated analysis to support policy advice in other contexts.

**INTRODUCTION**

The expert workshop reviewed concrete proposals for improving the current JRC/EEA approach for estimating the distribution of High Nature Value (HNV) farmland at European level. This focused on three different aspects:

a) How to use national HNV estimates and biodiversity data that are comparable to the EU approach for improving the HNV Corine Land Cover (CLC) selection rules per environmental zone or in individual countries.

b) Comparison of analysis of Copernicus High Resolution Layers (e.g. the Grassland HRL) with the current EEA/JRC HNV distribution estimate, plus review of other satellite data opportunities

c) Whether EU level data sets on agricultural land use intensity (e.g. livestock density, N-Balance) could be used for refining CLC rules for locating EU HNV farmland in a probabilistic approach.

For the workshop agenda and list of participants please consult annex 1.

**SESSION 1: identifying hNV farmland in france***Philippe Pointereau (Solagro)*

In the first part of Session 1 the methodology to identify HNV farmland in France was presented. Detailed data from the farm structure survey allows identifying HNV and non-HNV farmland shares at municipality level. In 2000, 25% of UAA were identified as HNV (2000). Three indicators are used to identify HNV farmland:

* Crop diversity
* Extensiveness of farmland practices
* Landscape elements

The farms are then categorized in 3 categories according to intensity. The earlier approach was replicated in 2017 based on LPIS data sets.

Combined with other data sets, several observations can be made. For example, HNV farmland shows a higher bird diversity index, as well as a low input of nitrogen and pesticides. As it is part of a long-term survey, it is also possible to show that compared to 1970, 68% of HNV farmland was lost.

As the French approach is very detailed, it provides an important opportunity for comparison of national data with the European HNV-approach.

**SESSION 1 OUTCOME OF REVIEW OF AVAILABLE NATIONAL DATA FOR REFINING RULES ON FOR SELECTION OF CLC CLASSES BY BIOGEOGRAPHIC REGION***Michael Weiss (UBA Vienna)*

The second part of Session 1 reviewed the outcome of comparing available national data sets for refining rules at the EU-level. Starting with a general build up of the current HNV farmland map, the limitations of the current approach and how to tackle them were discussed.

For example, Corine land cover was chosen as base layer as it is the only comprehensive spatial dataset available with coherent quality and reliability across Europe, including times series for 2000, 2006, 2012 and 2018. However, the limitations of the CLC minimum mapping unit and a binary approach (HNV or not) are potential issues. This needs to be addressed with a focus on geometric enhancement by excluding non-agricultural areas and adding intensity dimensions and Copernicus data.

Comparing European with national datasets did not bring many new insights as the national datasets are generally different in methodological approach and spatial configuration. Thus, it is not possible to use the comparison for a full validation of the EU-level approach. However, in general the selection of CLC classes in the EU-level approach was confirmed and the CLC selection for some countries could be refined further, e.g. for the Netherlands and Croatia.

Further outcomes included a proposal to no longer integrate more national biodiversity sets, due to various reasons, including irregular updates, different spatial resolutions and low comparability. In addition, for policy evaluation it would be important to discontinue the use the of spatial data on Natura 2000 areas (and other protected areas) as input to the HNV map as that would allow for a comparison between HNV farmland trends inside and outside of the Natura 2000 network. In terms of presentation of results it is important to state that it is only possible to determine the likelihood of occurrence and not the actual appearance.

Participants considered that for future updates it is important to move the methodology forward while reducing complexity where feasible. If new datasets are integrated, they really need to add value and insight; and current elements that only act as proxies should be left out from the update approach.

**SESSION 2: COMPARISON OF ANALYSIS OF HRL GRASSLAND DATA WITH CURRENT HNV ‘MAP‘; REVIEW OF SATELLITE DATA OPPORTUNITIES***Tomas Bartalos (GISAT)*

This presentation was about the possible utilization of the new High-Resolution Layers from Copernicus for an update of the JRC/EEA HNV estimate. This is summarised in brief word document. A longer working document with detailed analysis is also available on request.

Tomas Bartalos began by explaining the options for refining the HNV layer via HRL data sets (geometric inclusion or exclusion, thematic refinement) and introduced the HRLs utilized:

* HRL Imperviousness (IMP): sealed surfaces (continuous measure)
* HRL Tree cover density (TCD): tree canopy (continuous measure)
* HRL water and wetness (WAW): permanent and temporary water (time series)
* HRL grassland(GRA): binary (grassland or non-grassland).

Given that the HRL layers have been established fairly recently, only the HRL time points 2012 and 2015 were used in current analysis. As they are updated every 3 years, they will be available in the future as well on a regular basis.

Secondly, possible alterations were shown and discussed; key conclusions are:

1. The exclusion of HRL IMP with a threshold of 30% and permanent water WAW was generally accepted, as they are obviously not used as farmland.
2. By combining temporary WAW with GRA, areas outside the current HNV map possibly being HNV are shown. The size of area to be included, however, is very small.
3. However, GRA outside HNV is not suitable for inclusion to HNV directly as it does not provide any information about grassland composition or intensity of use and also include thematically inconsistent grassland not relevant for HNV (e.g. golf courses). Grassland patches outside HNV have to be carefully selected due to the dominance rule. The Minimum mapping unit of 25 ha often only allows for a mixed land cover inside a polygon and the entire polygon is classified according to its dominant land cover type. Thus, grassland patches inside arable areas are possibly not included in CLC but detected by HRL GRA (however, these patches are likely to be intensively used for silage or grazing).
4. For the TCD HRL it was necessary to decide upon a threshold, as tree formations can be part of HNV landscapes. Different thresholds were chosen to be tested. Steps of 10% were tested to select a proper threshold for each CLC class. The lower 30% is suitable for agriculture classes that are assumed to be under 100% agricultural use, but not for CLC classes that represent mixed uses and/or diverse landscapes. Concerns were expressed, that areas of grazing (e.g. under forest cover), which are commonly used in south-eastern Europe, could be excluded due to this threshold. As grazing is different in various altitudes, it was suggested that adding an altitude rule or different thresholds for countries or regions could help resolve this problem. In any case, a further detailed examination of current results by country experts is necessary to compare them with on-the-ground evidence of grazing practices.

A future development that might be of importance for the HNV map is the forthcoming HRL phenology and productivity (VPP) product, which could enable the detection of grassland mowing cycles, for example. It can therefore potentially be used as indicator for intensive and extensive use (parts) of the grassland area in the future. Similarly, the upcoming Small Woody Features HRL may be of relevance, providing details on landscape elements (complementary to TCD). In addition, CLC+, which should be available by 2021, will cover the entire surface of Europe with wall to wall coverage and replace the current CLC with greater thematic and spatial detail.

**SESSION 3: OPTIONS FOR INCLUDING A LAND USE INTENSITY DIMENSION INTO THE SPATIAL REPRESENTATION OF HNV FARMLAND***Michael Weiss (UBA Vienna), Jan-Erik Petersen (EEA)*

This session discussed the use of newly available land use intensity data in revising the JRC/EEA HNV approach. Via application of intensity parameters, it would be possible to differentiate the selection of CLC classes with the help of spatial data sets that could represent different levels of farming intensity. The currently available intensity data sets from CAPRI are total Nitrogen use (kg/ha) and livestock density (bovine, sheep, goats).

The total Nitrogen input (mineral fertilizer + manure) is proposed to be classified in 3 categories of low, medium and high intensity. The low threshold is most important, due to the assumption that HNV farmland is not intensively used and fertilized (minus HNV Type 3 in some cases). The option of adding a fourth class (>200kg/ha) was discussed, as it would possibly show “intensity” hotspots to illustrate very high intensity areas as well. Participants considered that information about pesticide use would be good to have as well to get a wider picture (but it is currently not available in a spatial manner).

For the livestock data different thresholds for the Alpine and the Mediterranean zone and the rest of Europe were chosen, to compensate for the lower productivity in the former area. Pigs were not taken into account, because they are usually not relevant for HNV management (except in Iberia). However, it was noted that pig numbers are included in the Nitrogen input data set.

The data gives a good approximation of the livestock numbers at the scale of municipalities in general. Nevertheless, the reliability of the livestock data needs to be further improved as it is influenced by two major uncertainty factors: the base area estimated for the distribution of grazing livestock and the share of grazing livestock that is assumed per country / region. Thus, the data needs to be compared with countries where certain data is available (e.g. France), to get a better understanding of data reliability and accuracy.

By combining the livestock and the nitrogen data into a combined spatial data set, it is possible to develop a representation of likely agricultural intensity over space. When overlapping it with the current HNV map, it allows refining the estimate of likelihood of presence of HNV farmland, which currently relies mainly on land cover data. First visual checks indicate that the resulting map of farming intensity likely reflects the current agronomic situation well but further review of the recently delivered data is required.

 A factor to be considered is that the revised methodology and input data sets are likely to only show larger-scale HNV systems where farming has generally remained extensive at landscape level. Remnants of traditional HNV landscapes or individual biodiversity-rich pastures, for example, are left out (as they are too fine-grained to be picked up with current European data sets). Such small HNV parcels surrounded by intensively farmed land are therefore likely to be under-represented in the EU-level approach (but are potentially identified by national level approaches).

In this context, it could be useful to reflect on options for using the different farming intensity thresholds to differentiate between likely medium nature value and high nature value farmland. This could enable a better representation of HNV data sets from some countries (as their HNV concept is often wider than the one used at EU-level). From a policy perspective it could also be helpful, as it allows identifying areas where different types of support are needed (e.g. medium-to-large scale HNV landscapes versus pockets of HNV farmland remnants). Thus, it reflects an interest of preserving biodiversity at all levels of intensity. The possible combination of medium and high nature value farmland data sets in the JRC/EEA approach will therefore be considered.

The current methodological tests need to be further completed and validated before publication of a revised JRC/EEA HNV farmland data set. This is expected to proceed in four steps:

1. Completion by ETC/ULS and EEA of current methodological tests by November 2019
2. 2nd round of expert consultation on basis of final test results (Nov. / Dec 2019)
3. Production of final updated EU-level HNV farmland data sets based on revised methodology (Q1 2020)
4. Publication of JRC report on revised EU-level HNV farmland estimate of JRC & EEA, including full documentation of revised methodology (Q2 2020)

**ANNEX 1: WORKSHOP AGENDA AND LIST OF PARTICIPANTS**

09.30 Welcome and introduction (Chair: J-E Petersen, EEA)

09.45 Session 1: Review of country level work on HNV farming / farmland

*09.45* Presentation by P. Pointereau, Solagro, on identifying HNV farmland in France

*10.10* Presentation by UBA Vienna (M. Weiss) on outcome of review of available national data for refining rules on for selection of CLC classes by biogeographic region, followed by discussion (Rapporteur: Yanka Kazakova, Bulgaria)

11.20 Brief coffee break

11.30 Session 2: Comparison of analysis of HRL grassland data with current HNV ‘map‘; review of satellite data opportunities - presentation by GISAT (Tomas Bartalos) followed by discussion (Rapporteur: Gebhard Banko, UBA Vienna

12.45 Lunch break

13.45 Session 3: Options for including a land use intensity dimension into the spatial representation of HNV farmland

Review of results based on JRC CAPRI model (n.n., UBA Vienna + EEA), followed by discussion (Rapporteur: Clunie Keenleyside, UK))

15. 40 Coffee break

16.00 Summing up by organisers and concluding discussion

16.45 End of workshop

Participants from EU level organisations:

European Environment Agency: Jan-Erik Petersen

EU Joint Research Centre: by remote connection only

ETC ULS staff (at Environment Agency Austria): Elisabeth Schwaiger, Gebhard Banko, Michael Weiss, Andreas Littkopf

GISAT, Czech Republic: Tomas Bartalos

Country experts:

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