Insights into preliminary procedures for estimation of soil pesticide risks in Irish grasslands using HAIR2014 tool

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● Introduction & background

This study aims to contribute to the modelling of risks for pesticide use in Irish agriculture under the larger PROTECTS research project[1]. The procedures for estimating pesticide terrestrial risks (i.e. earthworm terrestrial risk-indicators[2]; Fig. 1b) in Irish grassland soils using the HAIR2014 (HArmonized environmental Indicators for pesticide Risk) tool[3] for Glyphosate active ingredient (AI) usage are assessed. The aim is to generate outputs that will inform an area-based risk assessment [based on plant protection products (PPPs) usage inputs, land-use (LU) and other conditions], as well as developing recommendations for potential future soil-monitoring and sampling needs in Ireland.

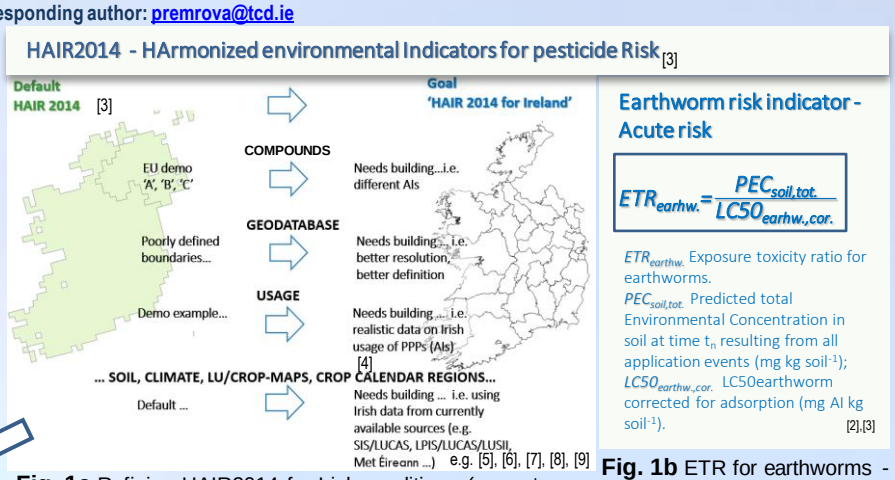


Fig. 1a Refining HAIR2014 for Irish conditions (current progress & future-plans)

Fig. 1b ETR for earthworms - HAIR2014 built-in risk indicator

Introducing refinements to HAIR2014 for Ireland

GEO database

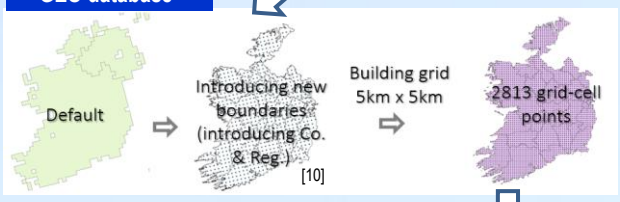


Fig. 2a Upgrading the spatial (GEO) database

Climate

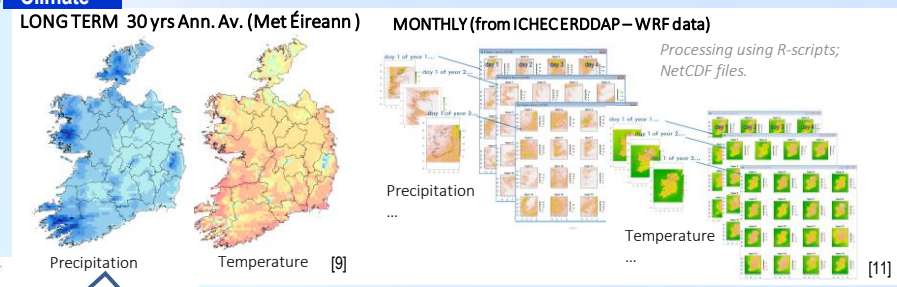


Fig. 2b Obtaining and processing climate data

'Crop-regions'

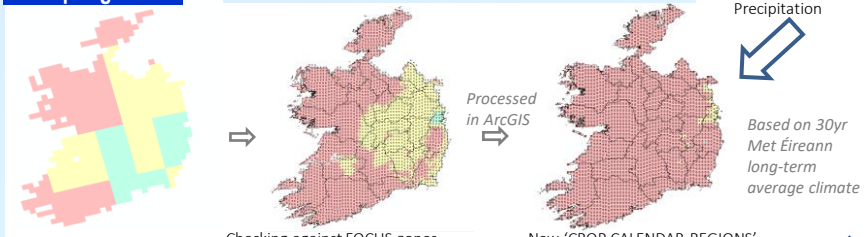


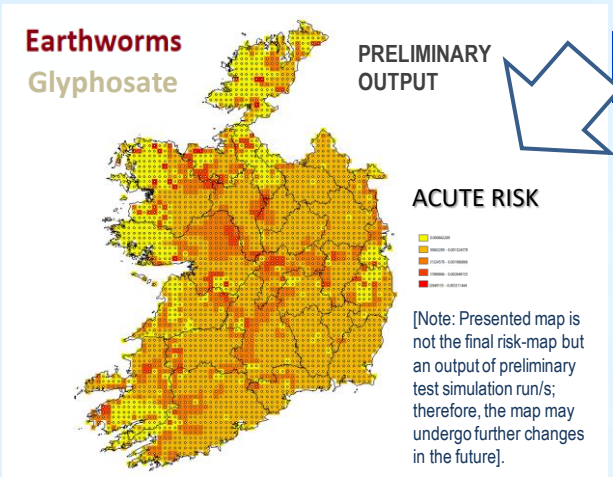
Fig. 2c Assigning HAIR2014 'crop calendar regions' for Ireland

Application rate [kg AI / ha] = 1.07		Glyphosate
LU: Permanent grassland		
Assumed Area grown = Area treated [ha]		
IE01	IE02	IE03
East	South	North-West
377356	1072359	1185031
Application timing		
Date 1: 15/03/2017		
Date 2: 15/08/2017		

[Note: inputs for IE01, IE02, IE03 estimated from source [4]]

Table 1 Current AI inputs for grasslands in Ireland

Test simulation runs



● Current work and future-plans to refine HAIR2014 for Irish conditions

The current work to refine HAIR2014 for Irish conditions (Fig.1a) includes (among others) upgrading the spatial (GEO) database (Fig. 2a), climate data inputs (Fig. 2b) and 'crop regions' (Fig. 2c) for Ireland. After introducing these refinements, the simulation test-runs were performed by applying the inputs on usage of Glyphosate for Irish grasslands as presented in Table 1. The grassland map was obtained from PERSAM data/maps[12], and the remining inputs/databases (i.e. soil inputs) were used from HAIR2014 default databases (assigned to the new grid). The test-simulations generated initial output for Glyphosate acute $ETR_{eathrw.}$ indicator (Fig. 3). Future developments include refinements on soil- and land-use (LU) inputs, as well as on the AI usage/application data-inputs derived from national-survey data of PPPs usage for Ireland. A compound-database for the selected AIs will also be developed.

[NOTE: All figures are provided for illustrative purpose, scales may be distorted]

● Acknowledgements

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