

Practice abstract n°13: Estimating and mapping of Agricultural Plastic Waste (APW) in Europe: PAPILLONS project's ATLAS



The pan-European ATLAS describing the use of agricultural plastics use and associated waste generation is an investigative, geolocating tool for the assessment of agricultural plastic waste (APW) across the European countries. It identifies where APW is generated and the quantity produced by agricultural activities, both overall and by specific plastic types. This detailed assessment supports targeted management and action by farmers, stakeholders, and waste managers aiming to implement sustainable solutions such as recycling plans and waste collection centres.

Methodology

For the completion of the ATLAS, two sets of data were gathered:

- **data concerning the utilized agricultural area (UAA)**, which also identifies the surface area covered per crop types, from national agricultural censuses of the countries under study for a specific year;
- **data concerning the plastic applications (PAs)** by the farmers and their related properties.

Data collected were merged with statistical regional maps using geographic information system (GIS) technology to create maps showing the distribution of APW at a regional level across different countries.

Moreover, to ensure accuracy, the APW **estimates obtained have been validated by Universities' databases**, expert companies, and surveys on the use of plastics in agriculture. The entities that contributed to the validation process

were: University of Bari (IT), University of Almería (ES), University of Évora (PT), University of Athens (EL), Norwegian Institute for Water Research (NO), Finnish Environment Institute (FI), le Comité de la Plasticulture et de l'Agroenvironnement (FR) and Adivalor (FR). Maps were prepared for clusters of countries based on agricultural regions roughly coinciding with Southern, Central and Northern Europe, selecting representative countries for each cluster. The estimation model calibrated in the reference countries was then applied to all remaining countries within their region, covering all European countries that are present in the NUTS classification system.

Results

The ATLAS provides a clear picture of APW of different PAs in European regions, highlighting areas where plastic waste is mostly concentrated.

Europe's APW generation is regionally specific and unevenly distributed, with Southern European countries producing far more APW than Central or Northern Europe. This happens for various reasons, including climate, APs use, cultivation techniques, and UAA.



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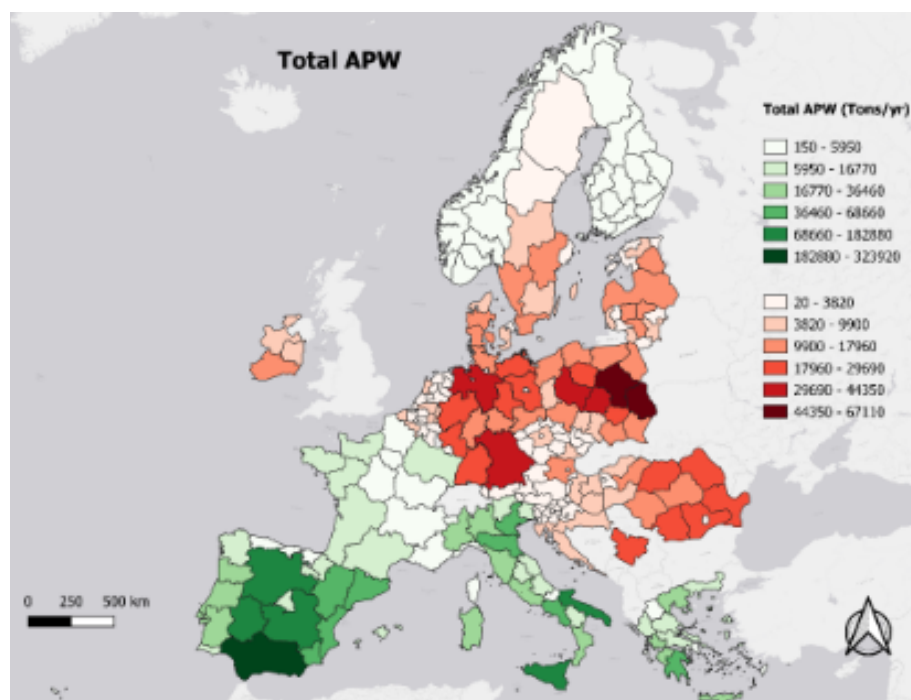


Figure 1: Total agricultural plastic waste (APW) in validated (green) and not validated (red) countries

Southern Europe exhibits warmer and drier climates and thus there is a more **extensive use of plastic** protection materials to help protect and cultivate crops. Countries that excessively adopt plastic film practices have extremely high APW generation.

In contrast, in **Northern Europe**, the cool, wet climate and shorter growing season supports different types of agriculture. Farming is less about crops and more about livestock; therefore, in the Northern climate, APW is more related to silage plastics for animal feed and not greenhouse films or mulching materials. This is why **APW generation is typically lower than in Southern Europe**.

Central Europe presents a balanced profile. The amount of APW generated in the region reflects an average between what is typically expected from silage-based systems and general crop production. However, overall APW levels remain lower than those projected in Southern Europe, where agricultural activity is more intensive and expanding at a faster pace.

Conclusions

Geographic distinctions are a crucial factor in determining APW generation by region. Any type of APW management system would have to be geographically specific in order to be effective.

The ATLAS of APW, available on the [PAPILLONS website](https://www.papillons-h2020.eu), offers a detailed view of how the APW of each PA is distributed across different agricultural regions. This tool serves as a valuable resource for informing policies and practices aimed at reducing environmental impact.

Reference:

[PAPILLONS Atlas](https://www.papillons-h2020.eu), developed by UNIBA (Evelia Schettini, Ali Hachem, Fabiana Covertino, Giuliano Vox)



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