# FERTILIZER DISTRIBUTION MECHANISM

## Downscaling mechanism

Two data sources from Statistics Portugal are available:

* AG\_census years (1989,1999,2009) where data are collated at a finer resolution (Municipality) and with more detailed data (e.g., fraction of manure stored applied to soils).
* Historical years (1987-2017) where data are collated at the agrarian region level for most crops (areas, yields) and animal population.

Because the data of these sources is incoherent when aggregated at the same spatial scale (Agrarian region), with missing parameters (e.g., poultry, rabbits, tomatoes not existing in industry crops at the AG\_census), some extrapolation and correction had to be made.

1 – The AG\_census data corrected based on the sum of the AR\_years is available at “Correct\_data\_Municipality”

2 – Additionally, “Correct\_data\_Municipality” also has data interpolated at the municipality scale based on the historical years:

New\_muni = AG\_census\_muniCORRECTED \* AR\_AG\_censusCORRECTED / AR\_historical

## Linear downscaling

- By downscaling data from the agrarian region to the municipality scale using a linear approach, we disregard sub-regional heterogeneity and agricultural intensification where the acreage may follow a declining trend, decreasing in absolute values, while it increases locally due to intensive production.

## Current distribution assumptions

* The remaining manure and biosolids following nutrient distribution by the different crops is NOT distributed.
* However, this is calculated. In a subsequent version of the nutrient allocation, this surplus can help to fulfill the crop nutrient demand of a given municipality and year.
  + For this, the crop allocation hierarchy can be followed.