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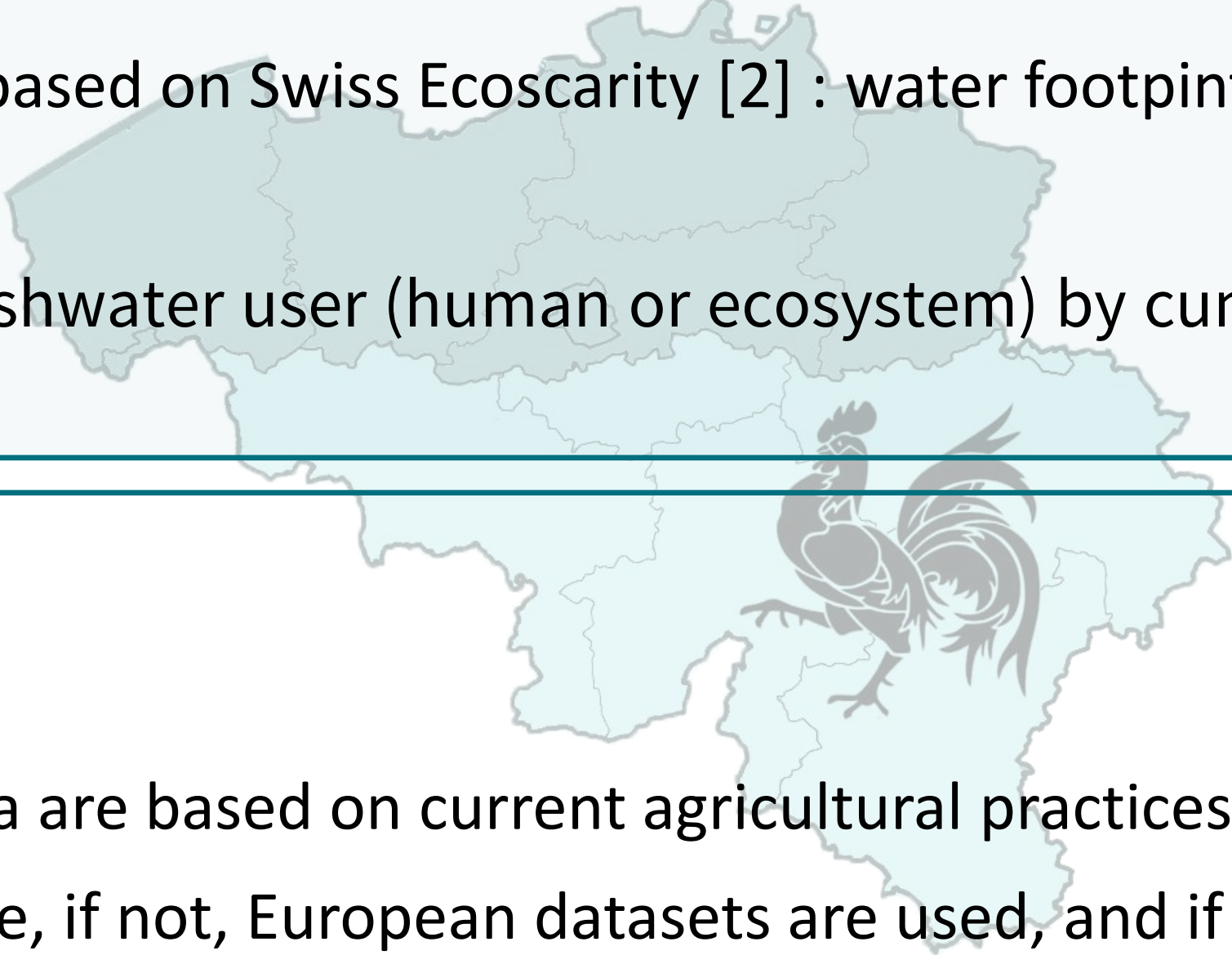
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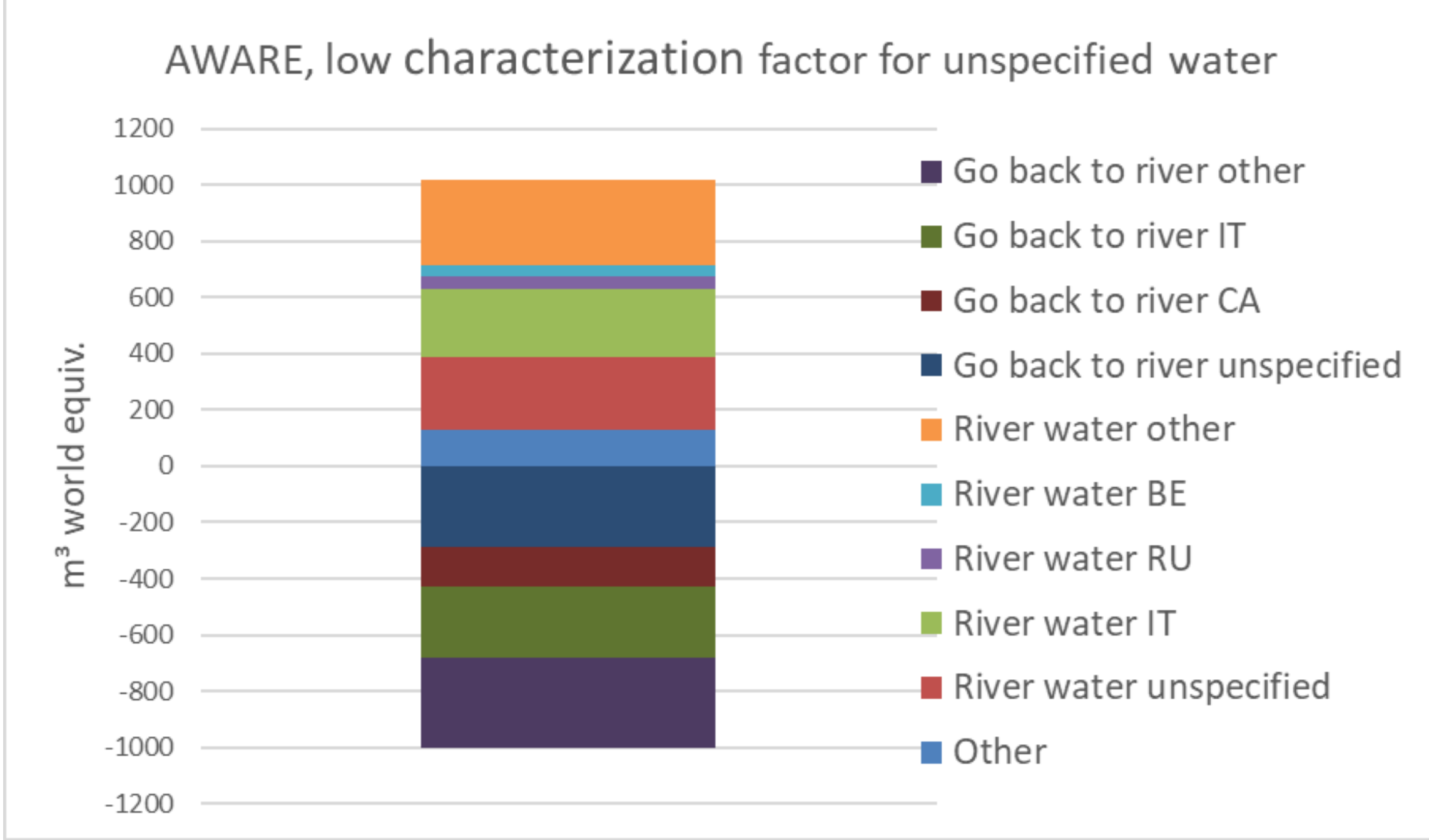
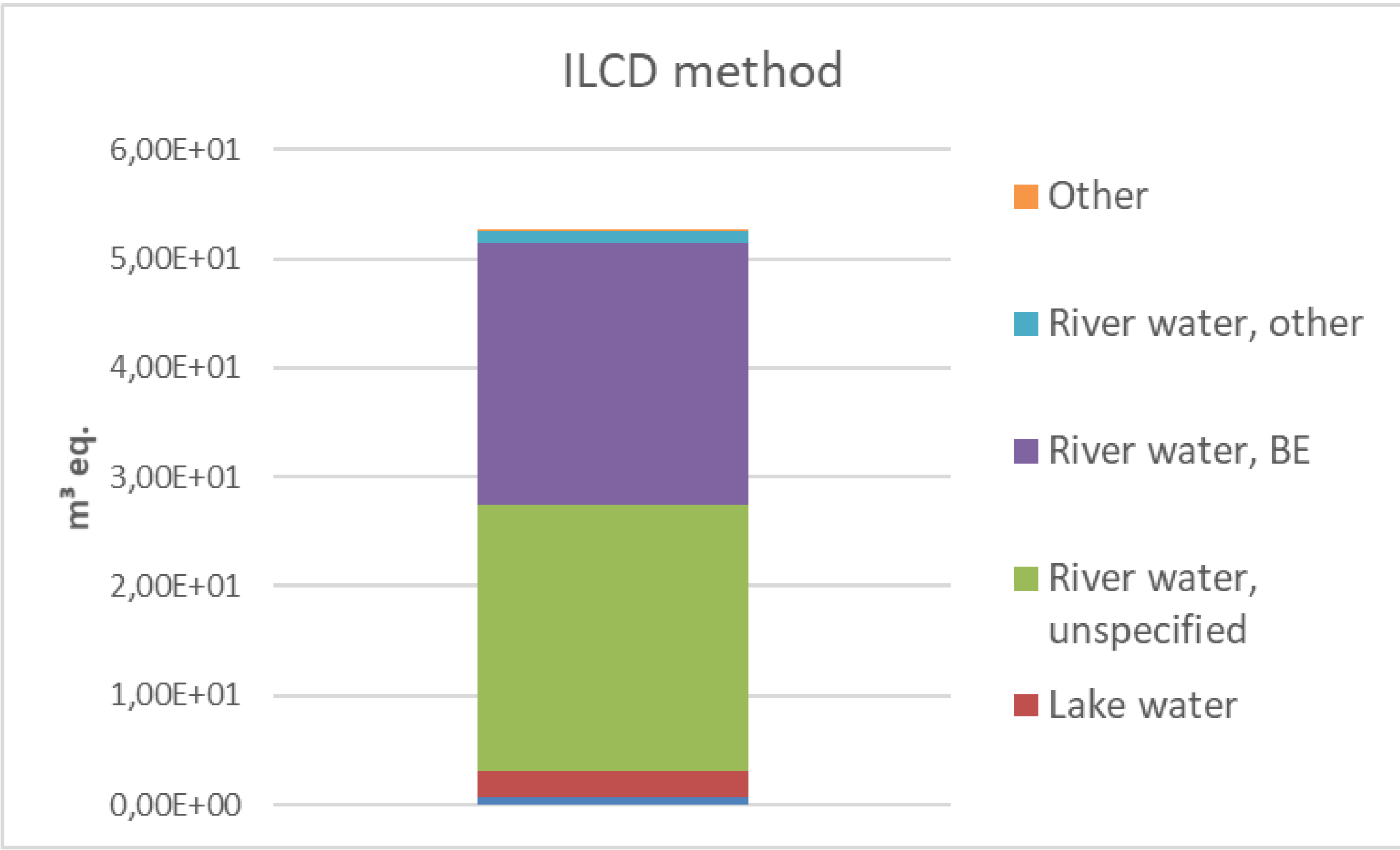
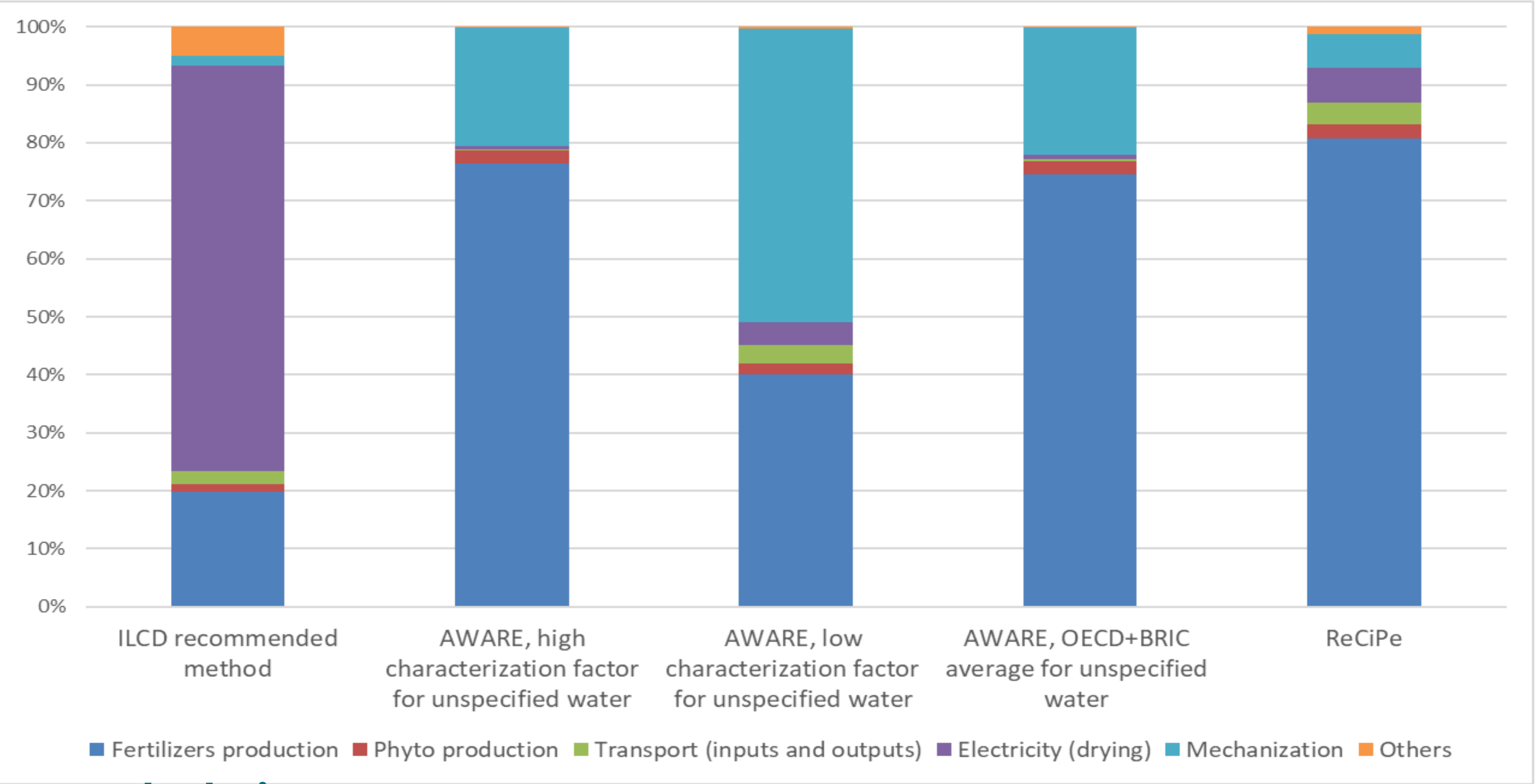
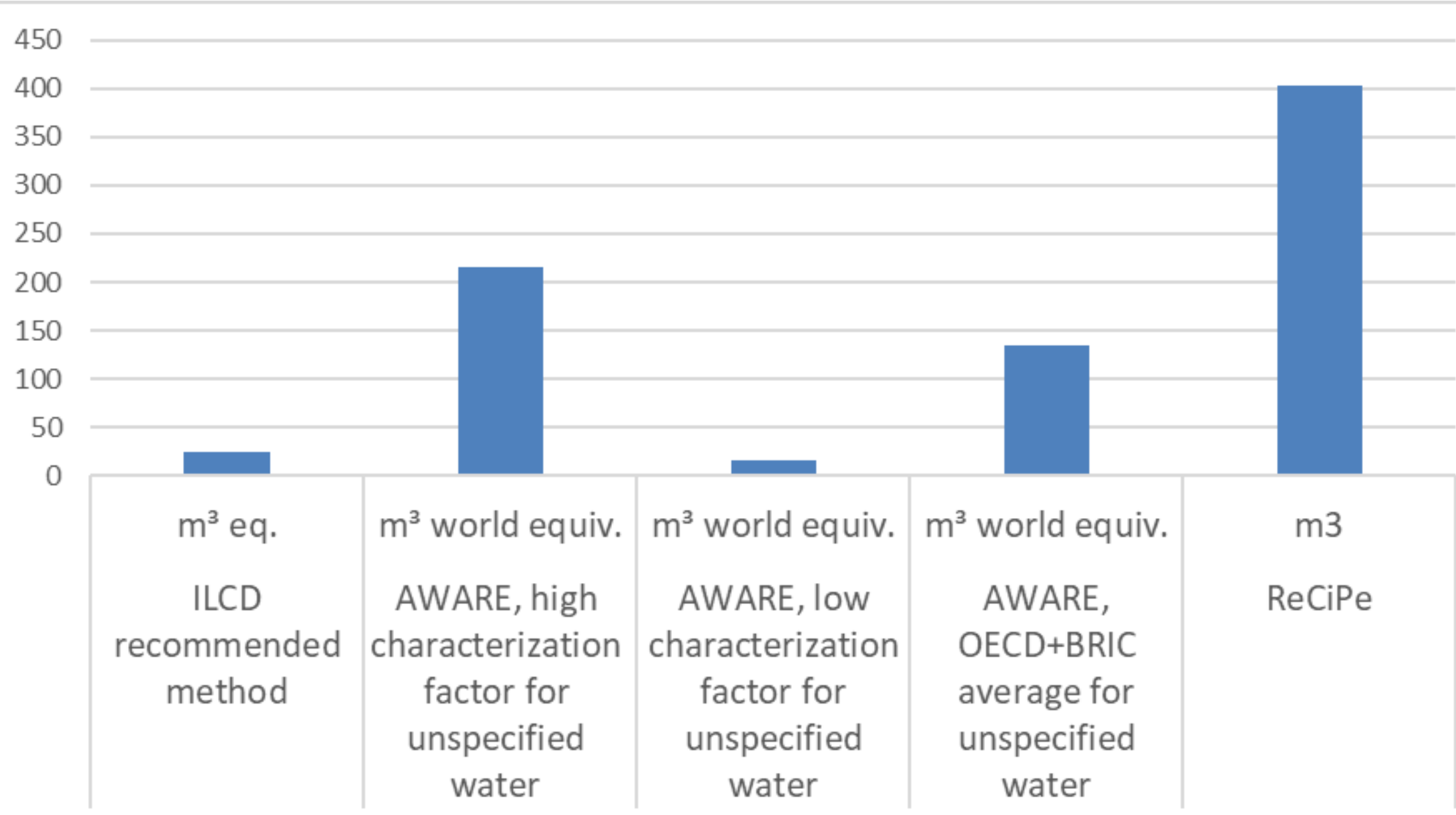
Introduction: Databases, inventories, methodologies = black boxes?

- Corn:**
- An important cereal with a lot of applications in the feed and food industries (e.g. starch production)
 - Growing context of biobased products, a better understanding of the impact of its production is needed, using Life Cycle Analysis (LCA)
- Water depletion**
- A lot of methods possible to asses water depletion, comparison between some of them:
 - ILCD recommended method when performing an LCA [1] based on Swiss Ecoscarity [2] : water footprint based on the water withdrawal-to-availability (WTA)
 - ReCiPe (water depletion not regionalized) [3]
 - AWARE [4]: “What is the potential to deprive another freshwater user (human or ecosystem) by consuming freshwater in this region?” without including the potential deprivation from water degradation



Corn production in Wallonia (South Belgium)

- Functional unit = 1 hectare of corn crop in Wallonia
- Primary data are taken from Van Stappen et al. (2017) [5]. The LCI data are based on current agricultural practices recorded in farms’ accounting data.
- Modelled in GaBi using GaBi datasets: Belgian datasets when available, if not, European datasets are used, and if no European, German ones.



Water depletion - corn

- The share between the life cycle step are depend of the method used
- AWARE method: the characterization factor for unspecified water have large influence
- The share between water origin is depend of the used method
 - Belgian context but small contribution of Belgium water using AWARE method

Water depletion – nuclear electricity

- Special attention due to its large contribution (ILCD recommended method)

- At inventory level

1 MJ	GaBi dataset in GaBi	Ecoinvent in GaBi	Ecoinvent in Simapro
Water input (m³)	0.0319	0.0486	0.0513
Water output (m³)	-0.0314	-0.0478	-0.0504

- With ILCD recommended method

1 MJ	GaBi dataset in GaBi	Ecoinvent in GaBi	Ecoinvent in Simapro
Total	0.0886	0.00353	0.0002
Water input (m³)	0.0886	0.00353	0.0703
Water output (m³)	0	0	-0.0701

➔ Same dataset, same method but two different software: different results

Conclusions

- Water depletion: a lot of methods available. Each method answers a different question. Select the appropriate method depending of the question the LCA should asses is essential. More information are needed to allow not specialists LCA practitioners to select the appropriate method.
- Regionalization could have large influence on the results. The way to assess unspecified water flow has also large influence.
- Some methods such as the ILCD recommended method are implemented differently in GaBi and Simapro: the same dataset assessed with the same method could have different results. The method documentation should be clear enough to avoid different interpretation between software.

[1] European Commission - Joint Research Centre and Institute for Environment and Sustainability, International Reference Life Cycle Data System (ILCD) Handbook- Recommendations for Life Cycle Impact Assessment in the European context. 2011
[2] A. Rolf Frischknecht et al. 2013. Swiss Eco-Factors 2013 according to the Ecological Scarcity Method
[3] M. Goedkoop, R. Heijungs, M. Huijbegts, A. De Schryver, J. Struijs, and R. van Zelm. 2009. ReCiPe 2008 : A life cycle impact assessment method which comprises harmonised category indicators at the midpoint and the endpoint level. Ruimte en Milieu. 132 p.
[4] A. M. Boulay et al. 2018. The WULCA consensus characterization model for water scarcity footprints: assessing impacts of water consumption based on available water remaining (AWARE). Int J Life Cycle Assess 23 2:368–378.
[5] Walloon Agricultural Research Centre (CRA-W), ALT4CER project. 2014.