Environmental impacts of national diets: Comparison of land use and water deprivation impacts in France and Tunisia

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Background and Objectives:

- Environmental **impacts of national diets** are often analyzed through Carbon emissions.
- Other impacts are to be considered and new methods and data are available to compute **water deprivation and land use impacts (**including **biodiversity)**.
- The objective was to use an **hybrid method** combining economical statistics data to production ones to compute and compare environmental potential impacts due to water and land use for the French and Tunisian diets with **a life cycle vision**.

Methods:

•National nutritional enquiries were merged with the international custom data base UNComtrade and the FAOstat one **to quantify the net incoming percentage per country**.

•Yield per crop and per country were used to compute occupied **surfaces** while **blue water consumptions** were extracted from the Water Footprint Network datasets.

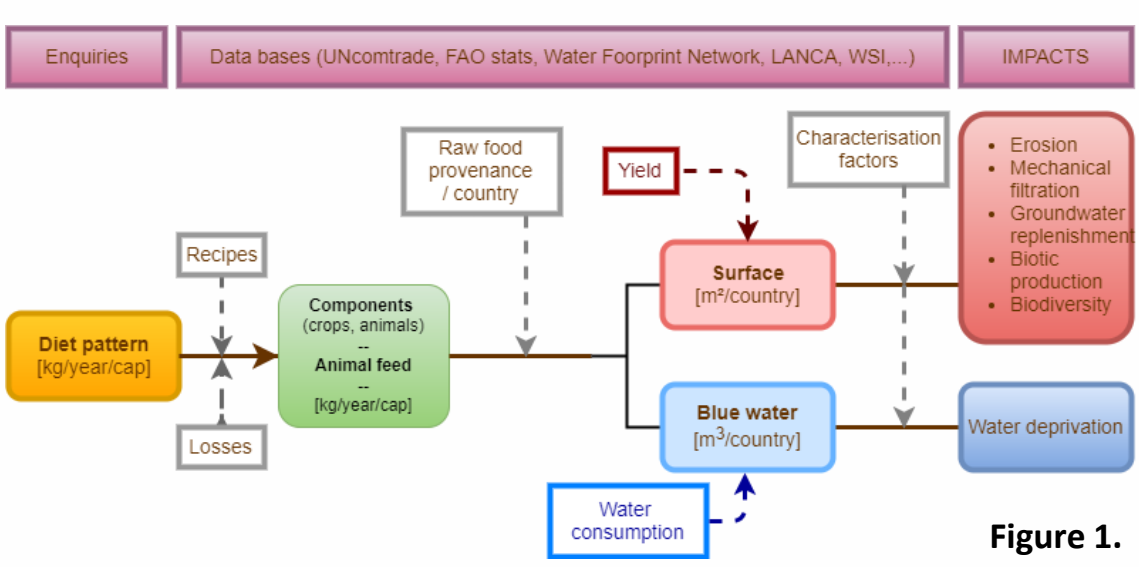

Figure 1. Methodology for impact computation

•**Characterization factor** for the water deprivation impacts was the Water Stress Indicator from Pfister et al. (2009). Land use impacts were computed from the occupied surface (including land occupied by animal feed crops), from land use types and from the main biome of the production country. Then LANCA characterization factors (Beck et al., 2011; Bos et al., 2016) were applied to compute land use potential impacts. Biodiversity impacts from land use were obtained from Chaudhary et al. (2015).

Results:

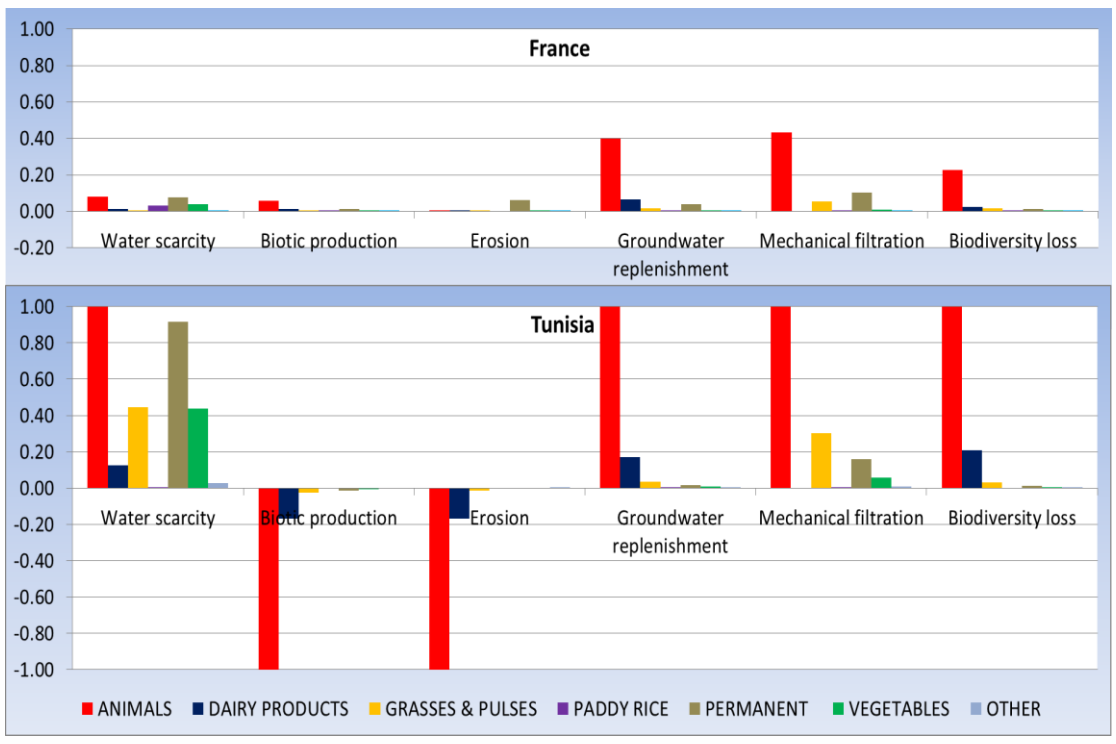

Figure 2. Normalised impacts for the food consumption per person in France and in Tunisia

- Total surfaces and blue water needed for the food of one person during one year are :

	Total surface (ha)	Blue water (m3)
France	0.53	31
Tunisia	6.77	102

- Main potential impacts are linked to **animal production i**n both countries (Fig. 2).
- The **higher impacts are observed in Tunisia** but, for erosion and biotic production, impacts are negative, i.e. beneficial (Fig. 2).
- **Water deprivation** impacts are important **for all crops in Tunisia** (Fig. 2).

Conclusions:

- While determining the origin of each food component, global impacts were obtained for the French and the Tunisian diets, for water consumption and land use
- These values, associated to climate change impacts (evaluated through Carbon footprint) provide a tool to improve diets while considering the most important environmental impacts for food production.

Keywords: national diet, life cycle assessment, land use, water deprivation

Further Collaborators: The MEDINA-Study Group includes N Achir (CIRAD), L Alouane (INNTA) J El Ati (INNTA), S Bellagha (INAT), PM Bosc (CIRAD), M Broin (Agropolis), N Darmon (INRA), C Dhuique-Meyer (CIRAD), MC Dop (IRD), S Drogué (INRA), S Dury (CIRAD), A Ferchoui (INRA), Gaillard C (CIRAD), Z Ghrabi (INAT), F Jacquet (INRA), Y Kameli (IRD), F Kefi (CIHEAM), E Kesse-Guyot (INRA), D Lairon (INSERM), Y Martin-Prevel (IRD), C Méjean (INRA), C Mouquet (IRD), S Njoumi (INAT), M Padilla (CIHEAM), C Sinfort (SupAgro), P Traissac (IRD).

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