



WULCA
A LIFE CYCLE
INITIATIVE PROJECT



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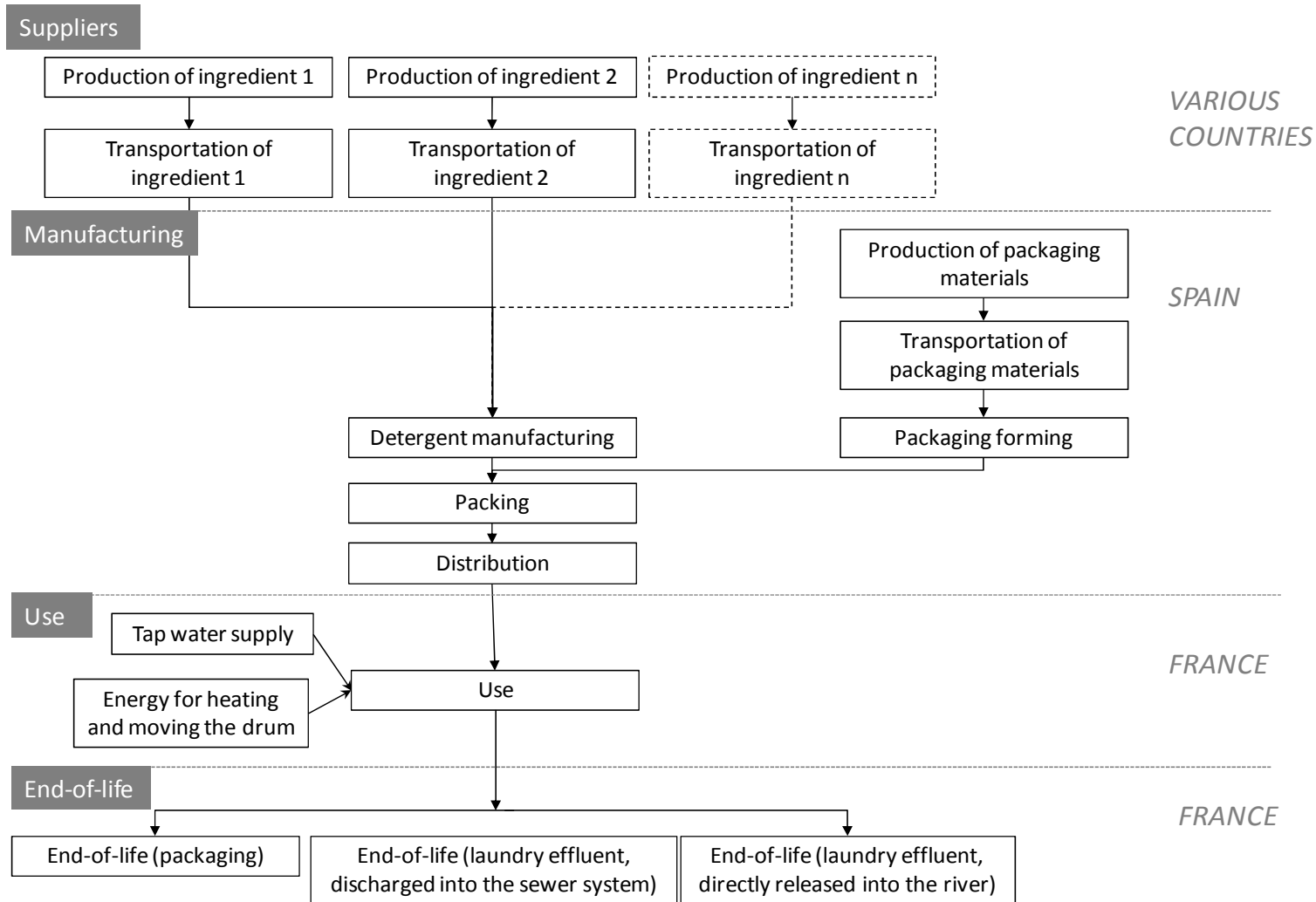
Water Footprint Case Study: One load of laundry



Introduction

- Case study performed in collaboration with Quantis, Unilever, CIRAIK and ETH Zurich
- Presented as part B of the method comparison project
- Goal: illustrate how different water-related methods can be applied within a water footprint study of a laundry detergent and discuss their applicability

Load of laundry WF: system boundaries



Methodology overview - Midpoint

Water Footprint profile at midpoint: Water availability and water degradation

	Indicator	Units	Reference
Water Availability			
1	Scarcity: M-PfisterSc	m ³ equivalent	Pfister et al.
1	Scarcity: M-BoulaySc	m ³ equivalent	Boulay et al.
1	Scarcity: M-SwissSc	ecopoints	Swiss Eco-Scarcity
1	Scarcity: M-BWSSc	m ³ equivalent	WFN, Hoekstra et al.
1a	Stress: M-BoulaySs	m ³ equivalent	Boulay et al.
1a	Stress: M-WIIXSs	m ³ equivalent	Veolia Impact Index, Bayart et al.
Water Degradation			
2	Eutrophication	Kg P equiv.	ReCIPE
3	Acidification	Kg equiv. SO ₂	Impact 2002+
4	Ecotoxicity	CTUe equiv.	Usetox
5	Human Toxicity	CTUh equiv.	Usetox

Methodology overview - Endpoint

Water Footprint profile at endpoint: Ecosystems and human health impacts

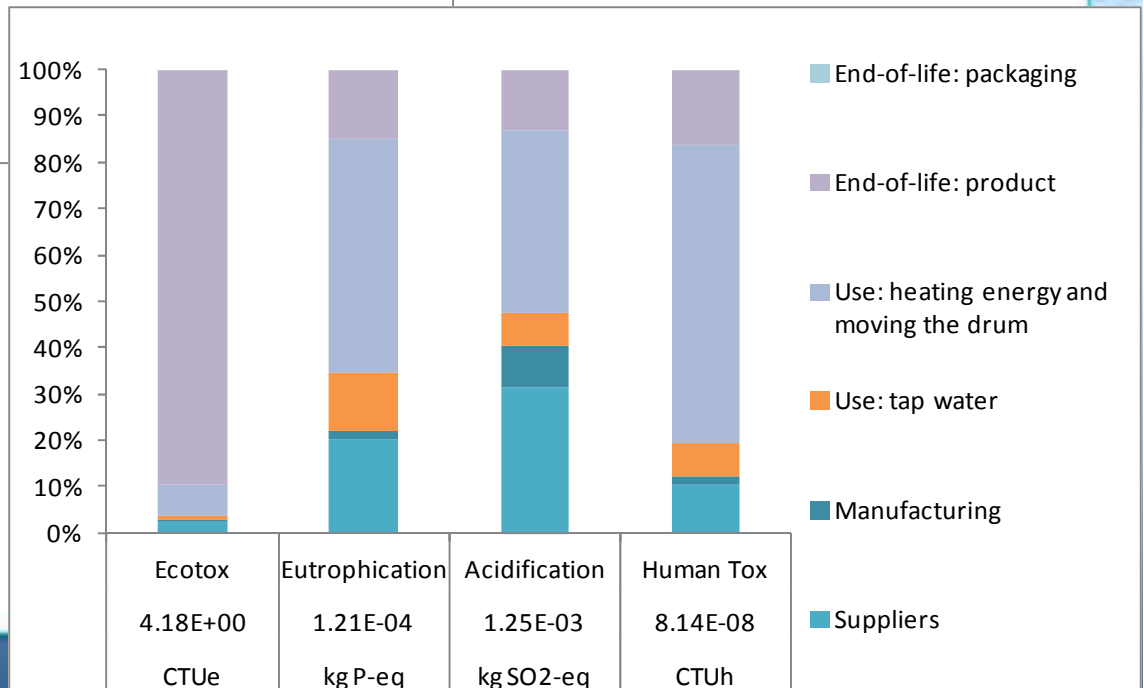
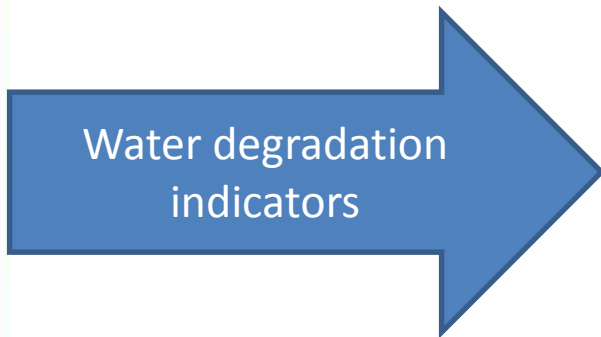
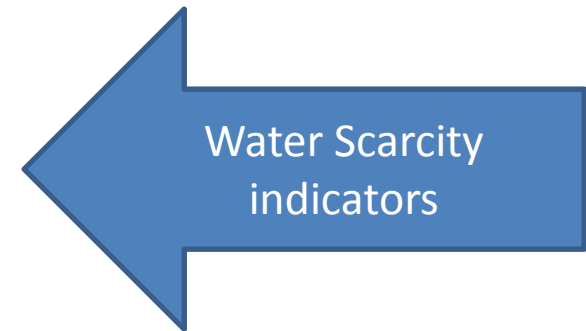
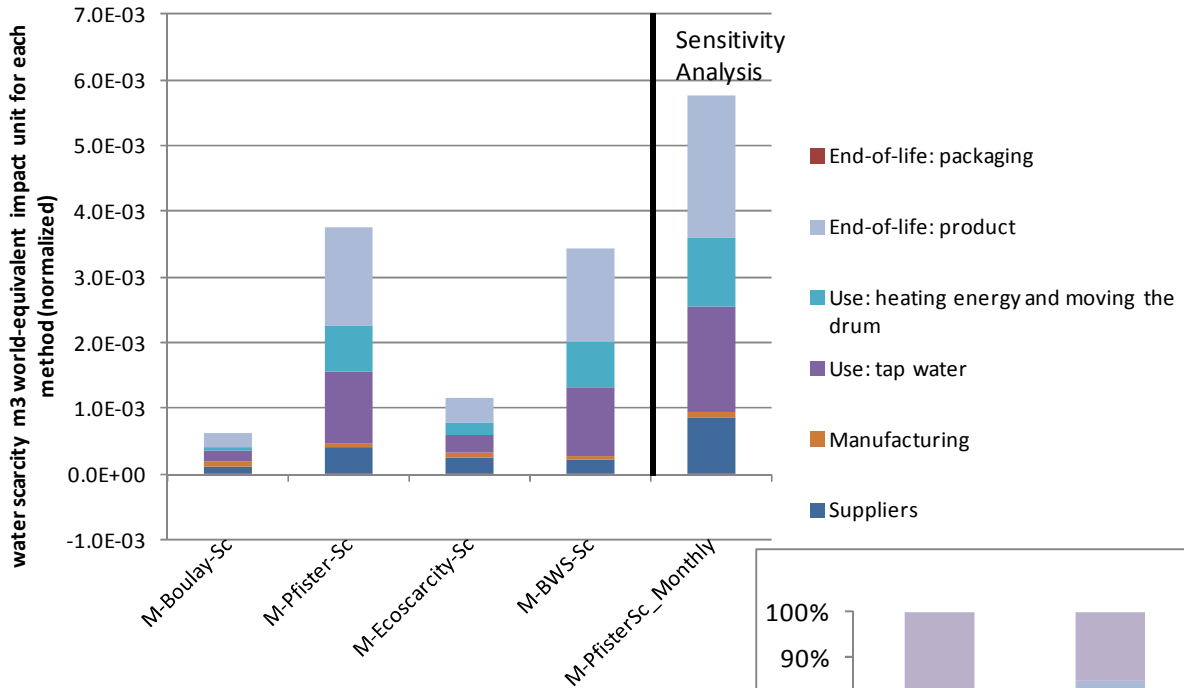
	Indicator	Units	Reference
	Water Availability		
6	HH : E-Pfister	DALY/m ³	Pfister et al.
6	HH: E-Motoshita	DALY/m ³	Motoshita et al.
6	HH : E_boulay_marg	DALY/m ³	Boulay et al
6	HH :E-Boulay_distri	DALY/m ³	Boulay et al.
7	ES : Terrestrial species deprivation	PDF*m ² *yr	Pfister et al.
8	ES : Aquatic species deprivation	PDF*m ³ *yr	Hannafiah et al.
9	ES : Ground-water table lowering	PDF*m ² *yr	Van Zelm et al.
	Water Degradation		
10	ES:Thermal pollution	PDF*m ² *yr	Verones et al.
11	ES: Eutrophication	PDF*m ² *yr	Goedkoop et al.
12	ES: Acidification	PDF*m ² *yr	Impact 2002+
13	ES: Ecotoxicity	PDF*m ² *yr	Usetox
14	HH: Human Toxicity	DALY/m ³	Usetox

Methodology overview

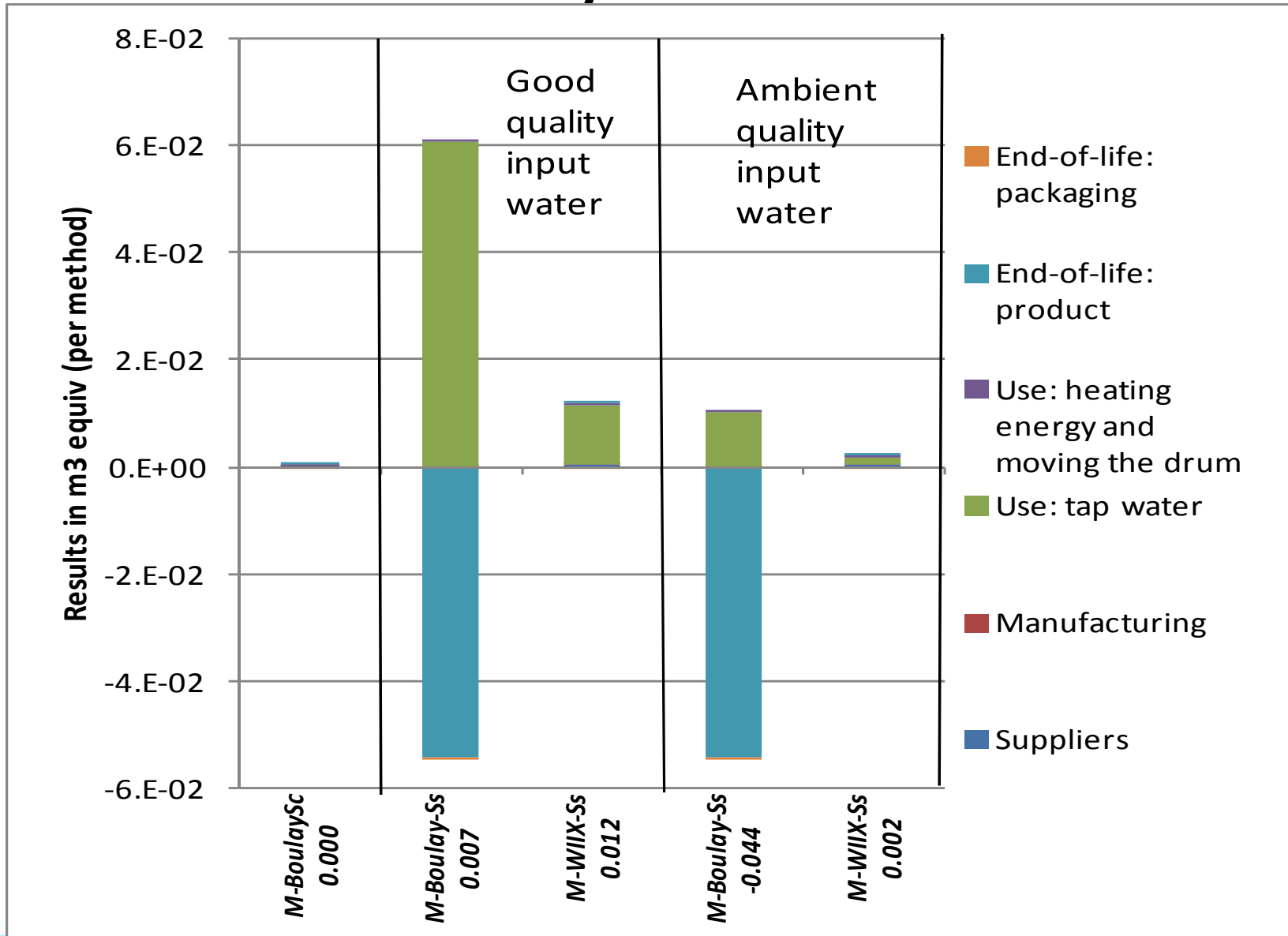
Sensitivity Analysis – based on part A results:

- Inclusion of quality in availability assessment
- Monthly temporal resolution at the midpoint
- Inclusion/exclusion of trade effect at the endpoint
- Inclusion/exclusion of quality aspect in water deprivation for human health
- Including or excluding domestic users
- Regional effect : use and end-of-life stages moved from France to Spain and India (two countries that present different hydrological and socio-economic conditions)

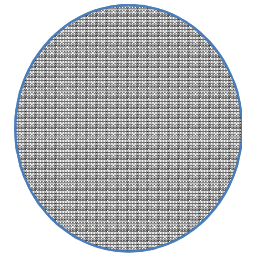
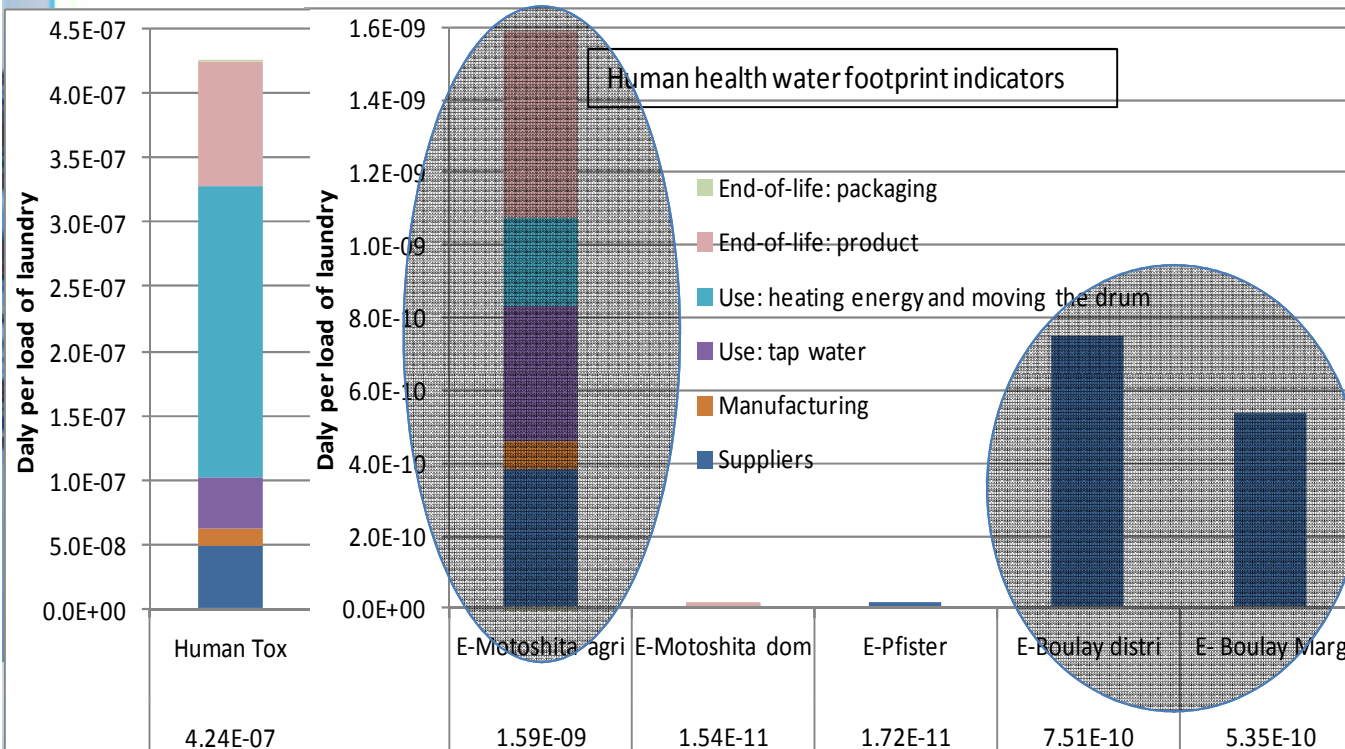
Midpoint WF profile



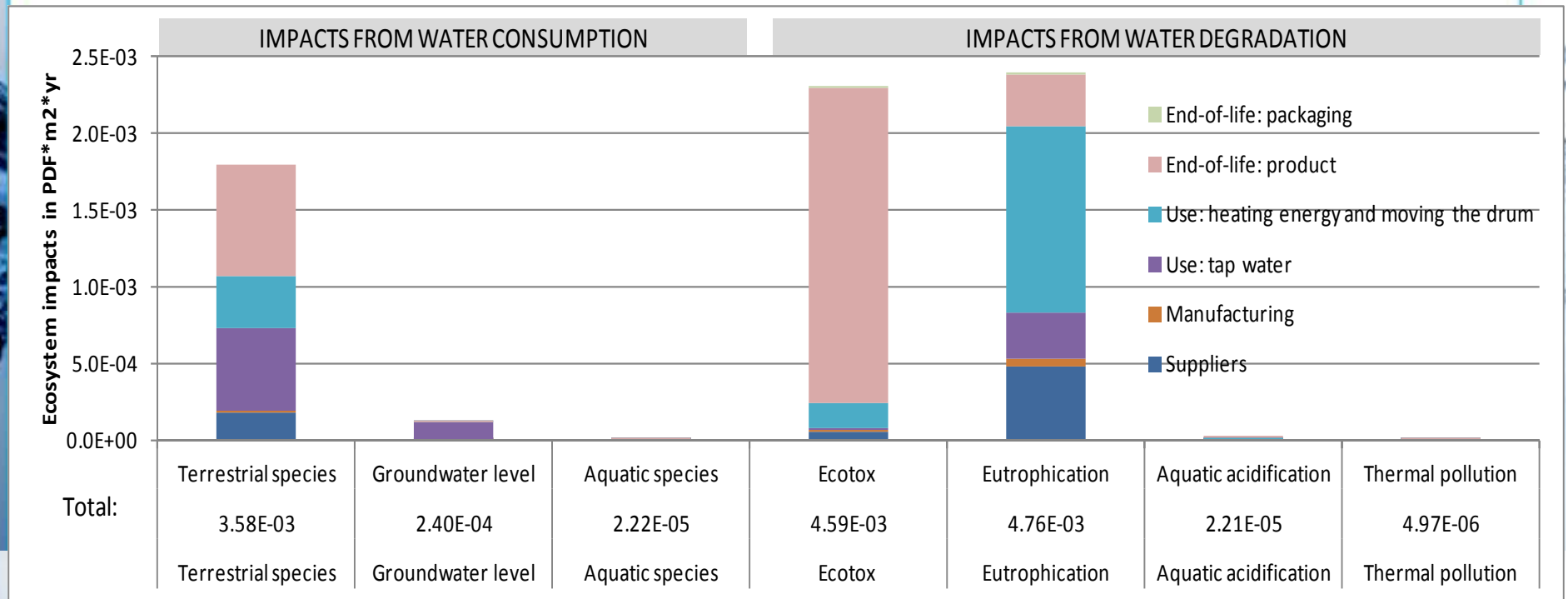
Scarcity vs stress



Endpoint WF profile Human health



Endpoint WF profile Ecosystems



Discussion

Extensive discussion on applicability covering these points:

- Scope, inventory and impact method challenges:
 - *Collecting water inventory data.*
 - *Availability of relevant process data.*
 - *Water treatment systems.*
 - *Regionalization*
 - *(Eco)toxicity*
 - *M-WIIX-Ss, Water Impact Index.*
 - *M-BoulaySs categories*
 - *Method availability and coverage*
 - *Stress indicators and double counting within a water footprint*
- Outlook and future developments
 - *Databases and softwares*
 - *Water Quality data*
 - *Water Footprint as part of a complete LCA*



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