



**INEC**

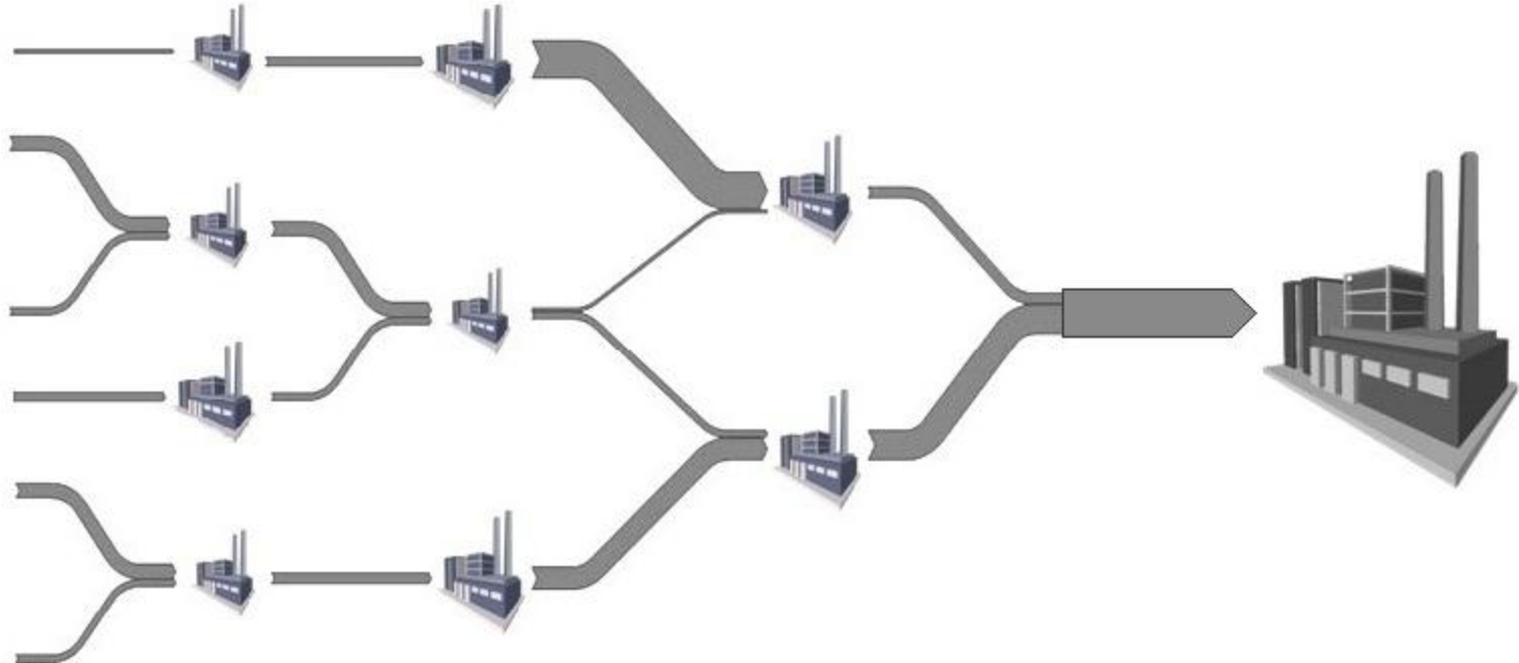
INSTITUTE FOR INDUSTRIAL  
ECOLOGY

---

**Bettina Joa**

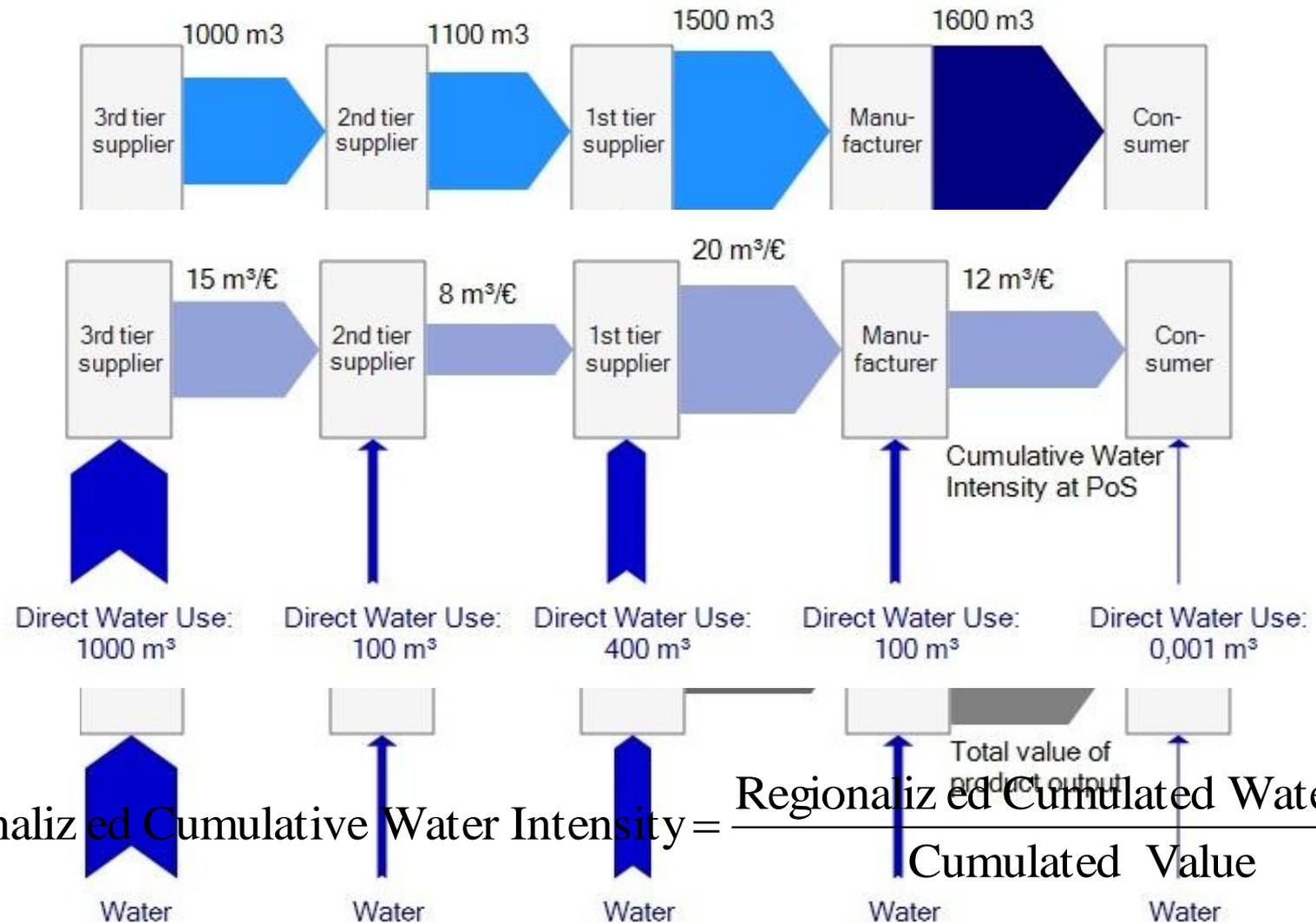
# **A low-effort approach to determine water use from cradle-to-grave**

# Challenge

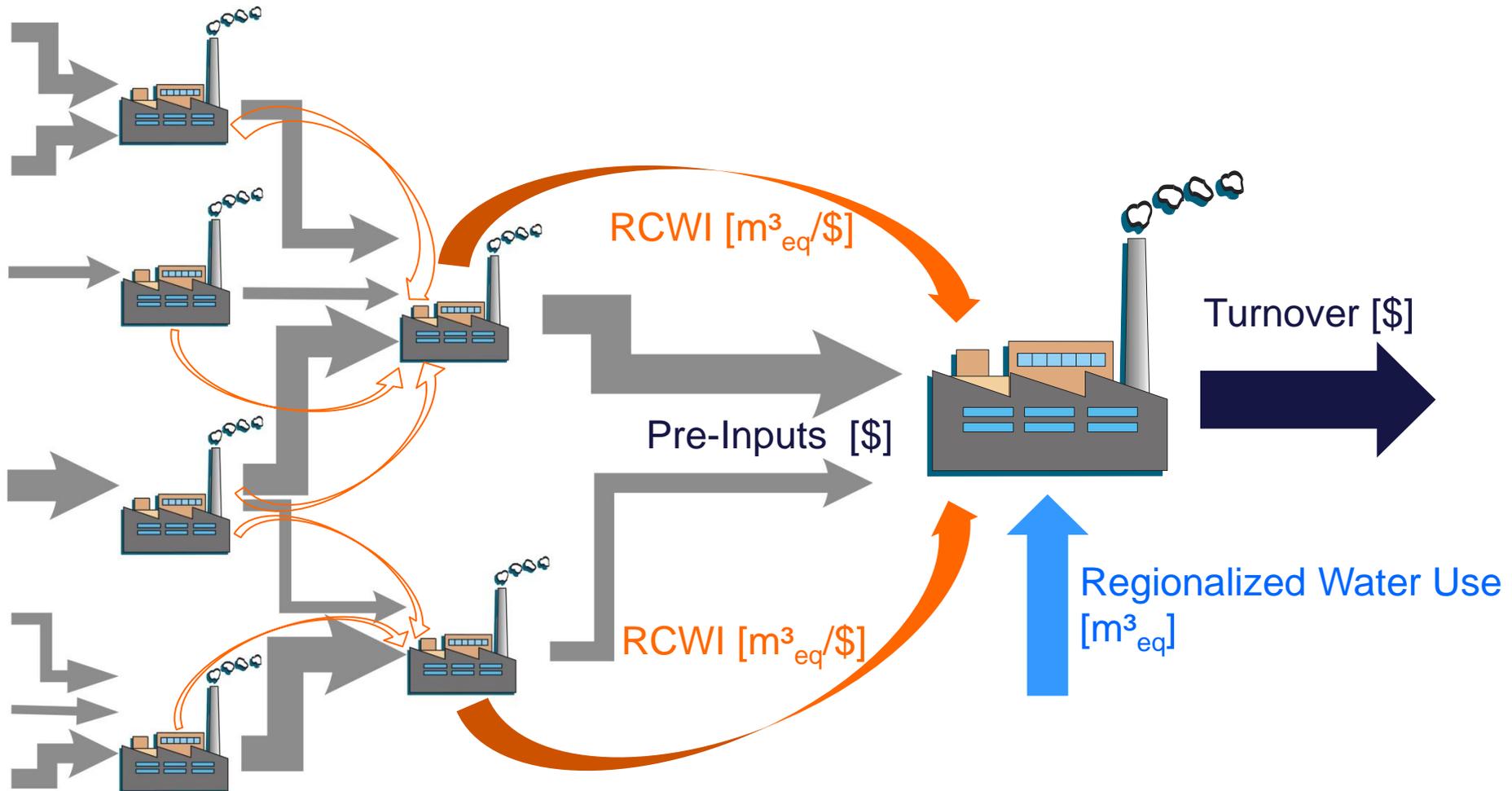


Collection of Data?

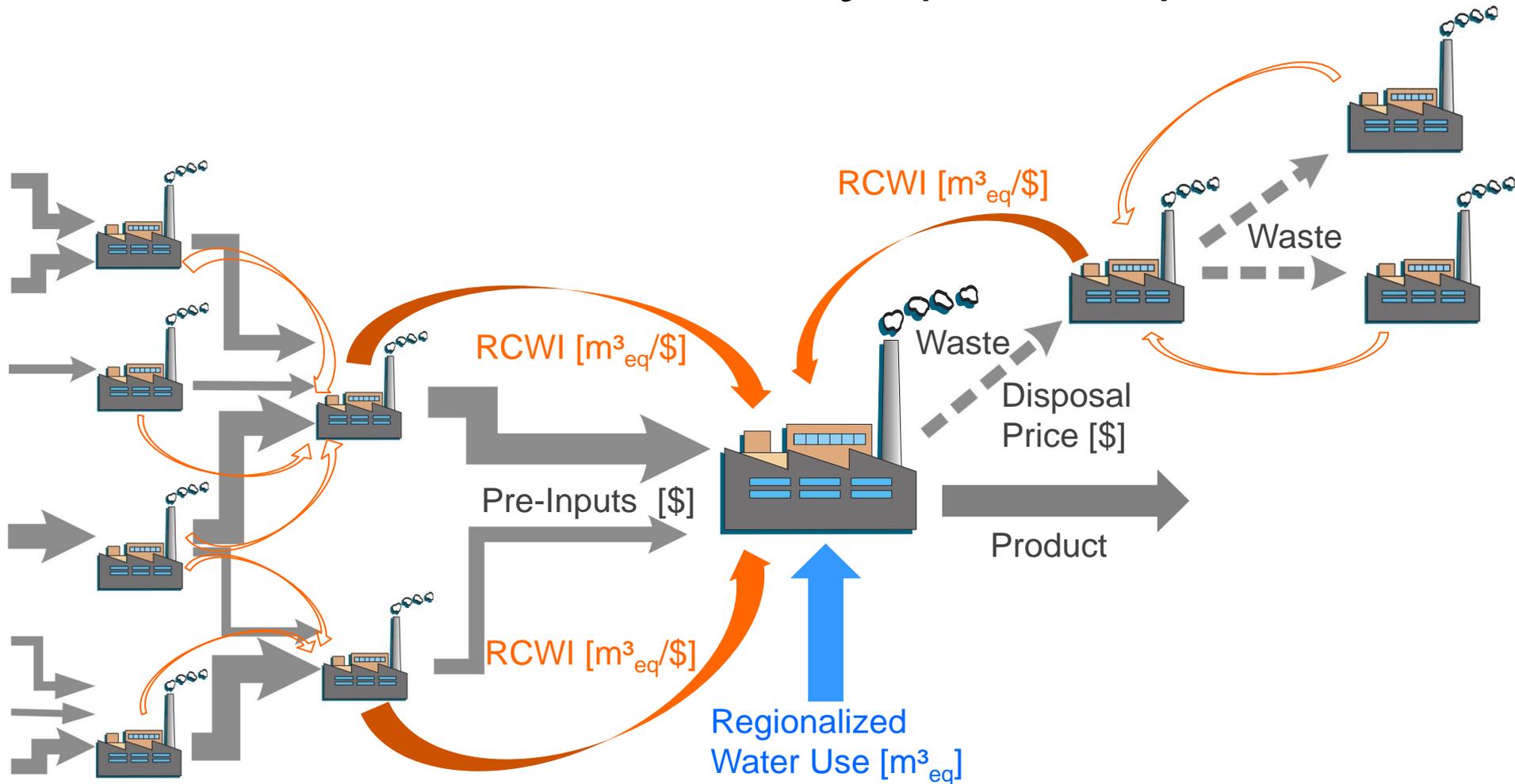
# Idea



# Regionalized Cumulative Water Intensity (RCWI)



# Regionalized Cumulative Water Intensity (RCWI)



# Calculation

$$\theta_{ri} = \frac{1}{T_i} \cdot \left[ r_i \cdot W_i + \underbrace{\left[ \sum_{j \in \{Supplier(i)\}} \theta_{rj} \cdot \sum_{k \in \{Supplier(j \rightarrow i)\}} p_{jik}^G \cdot q_{jik}^G + \sum_{j \in \{Disposer(i)\}} \theta_{rj} \cdot \sum_{k \in \{Disposal(j \rightarrow i)\}} p_{jik}^B \cdot q_{jik}^B \right]}_{\text{Indirect Water Use}} \right]$$

Supply Chain  
Disposal Chain

$\theta_{ri}$ : RCWI of Company i

$T_i$ : Turnover of Company i

$r_i$ : Regionalization Factor for location of Company i

$W_i$ : Water use of Company i

$\theta_{rj}$ : RCWI of Company j

$q_{jik}^G$ : quantity of product k ("good") that Company i purchases from supplier j

$p_{jik}^G$ : price of product k ("good") that Company i purchases from supplier j

$q_{jik}^B$ : quantity of waste k ("bad") that Company i delivers to disposer j

$p_{jik}^B$ : disposal price of waste k ("bad") that Company i delivers to disposer j



**INEC**

INSTITUTE FOR INDUSTRIAL  
ECOLOGY

---

**Contact person:** Bettina Joa  
bettina.joa@hs-pforzheim.de  
<http://umwelt.hs-pforzheim.de>

**Thank you for your kind attention!**

**Acknowledgement:** We gratefully thank the German Federal Ministry of Education and Research (BMBF) for funding this work under the "FHprofUnt" funding line (grant no. 1769X09)