

Nanoparticle Risk Assessment

A Probabilistic Approach

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Background

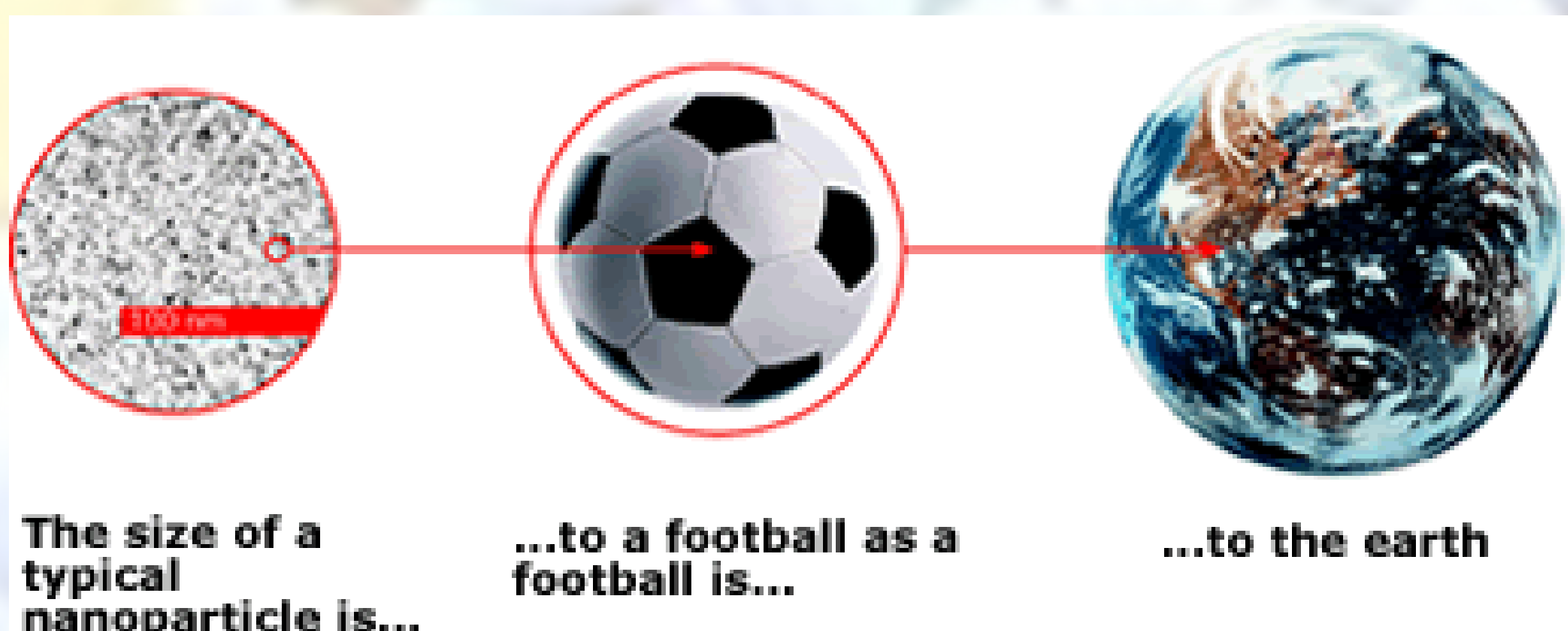
- Insight into and **understanding of the potential environmental risks of manufactured nanoparticles (MNPs)** is a **crucial constraint for the societal acceptance** of its applications and essential for safe use of products on these materials.
- MNPs, as all novel materials, **have no history of safe use**.
- Since very little is still known about MNPs, this project will incorporate various techniques and methods to **investigate the suitability of current risk assessment methods to MNPs**.

Introduction

- Some risk assessment has been done on MNPs (Dekkers et al., 2011; Mueller & Nowack, 2008). However, these risk assessments generally tend to be deterministic.
- The **purpose** of this study is to **approach risk assessment from a probabilistic point of view**.
- Central **theme** of project: **quantification of uncertainty**
- 3 parts:
 1. risks associated with food and food products
 2. environmental risk
 3. expert elicitation (in the case of lack of data)

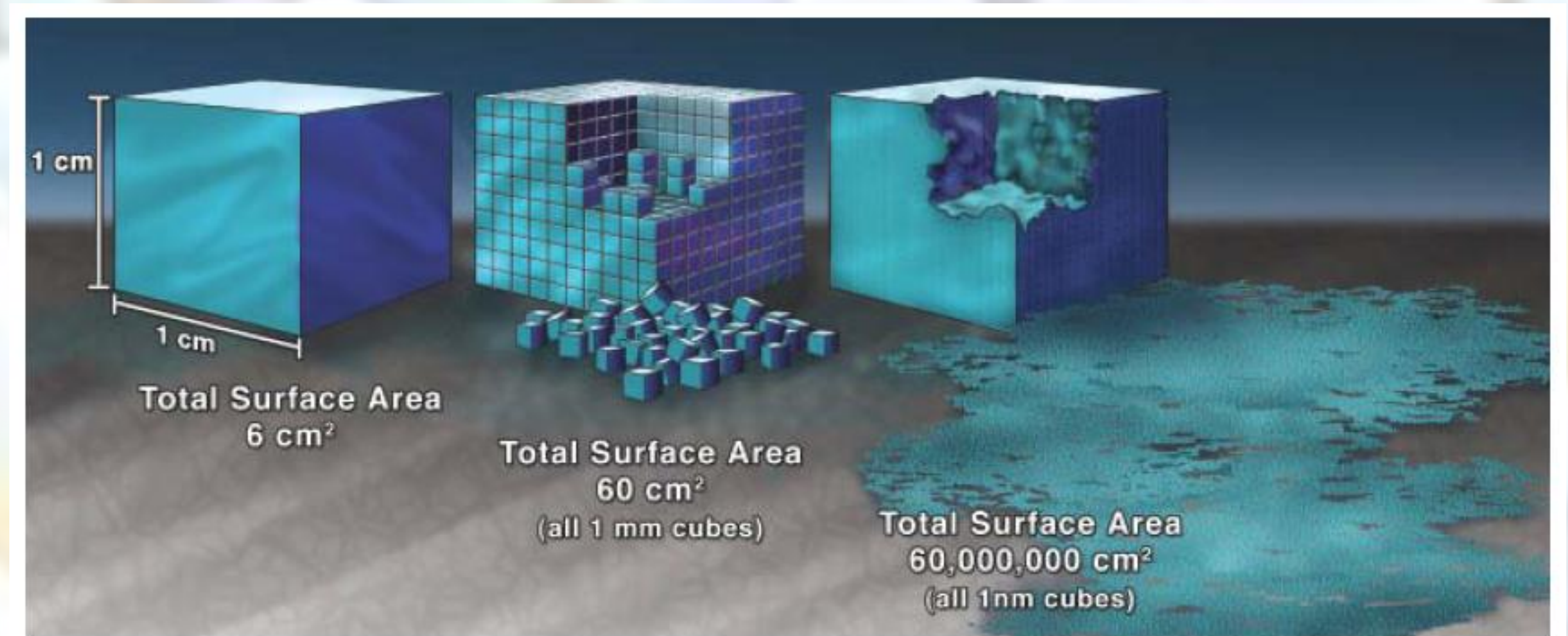
Methods

1. Using **Integrated Probabilistic Risk Assessment (IPRA)** (van der Voet & Slob, 2007) on a case study of nano-silica in food (Dekkers, et al., 2011).
2. Quantification of uncertainty using **Bayesian methods, bootstrapping** ect (Verdonck et al, 2003; Aldenberg & Jaworska, 2000; Aldenberg et al., 2002).
3. Environmental exposure modelling using **material flow analysis** (Gottschalk et al., 2010)
4. Use **Expert elicitation** (Flari et al., 2011) to use as prior information for a Bayesian analysis or to fill the data gaps.



Conclusions

- Uncertainty in risk assessment needs to be quantified to give a **more realistic picture**.
- Quantifying uncertainty can point out the **areas of highest uncertainty giving** an indication in which area research needs to be focused.



Bell, T.E. (2007)

Results

Figure 1. The distribution of the individual margin of exposure (IMoE). Illustrating the difference between a deterministic and a probabilistic approach.

