# LIFE CYCLE ASSESSMENT FOR NANO PRODUCTS

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# Why LCA on nanomaterials and nano products?

LCA gives an opportunity for proactive action in order to prevent or minimize potential adverse effects to human health and the environment over the entire life cycles of nano products.

# LCA LIFE CYCLE ASSESSMENT

# By conducting LCA……

- In developing regulations and legislation in occupational health and safety, consumer protection and environmental protection

- When procuring goods that include the application of nano products and nanotechnology

- Through the Import Inspection scheme, highly environmentally impact and unsafe products can be controlled.

- A **restricted register**(to trace back) nano materials in case of an incident or assess an exposure
- A **publicly accessible** nano product register
- **A simple labeling** on consumer products

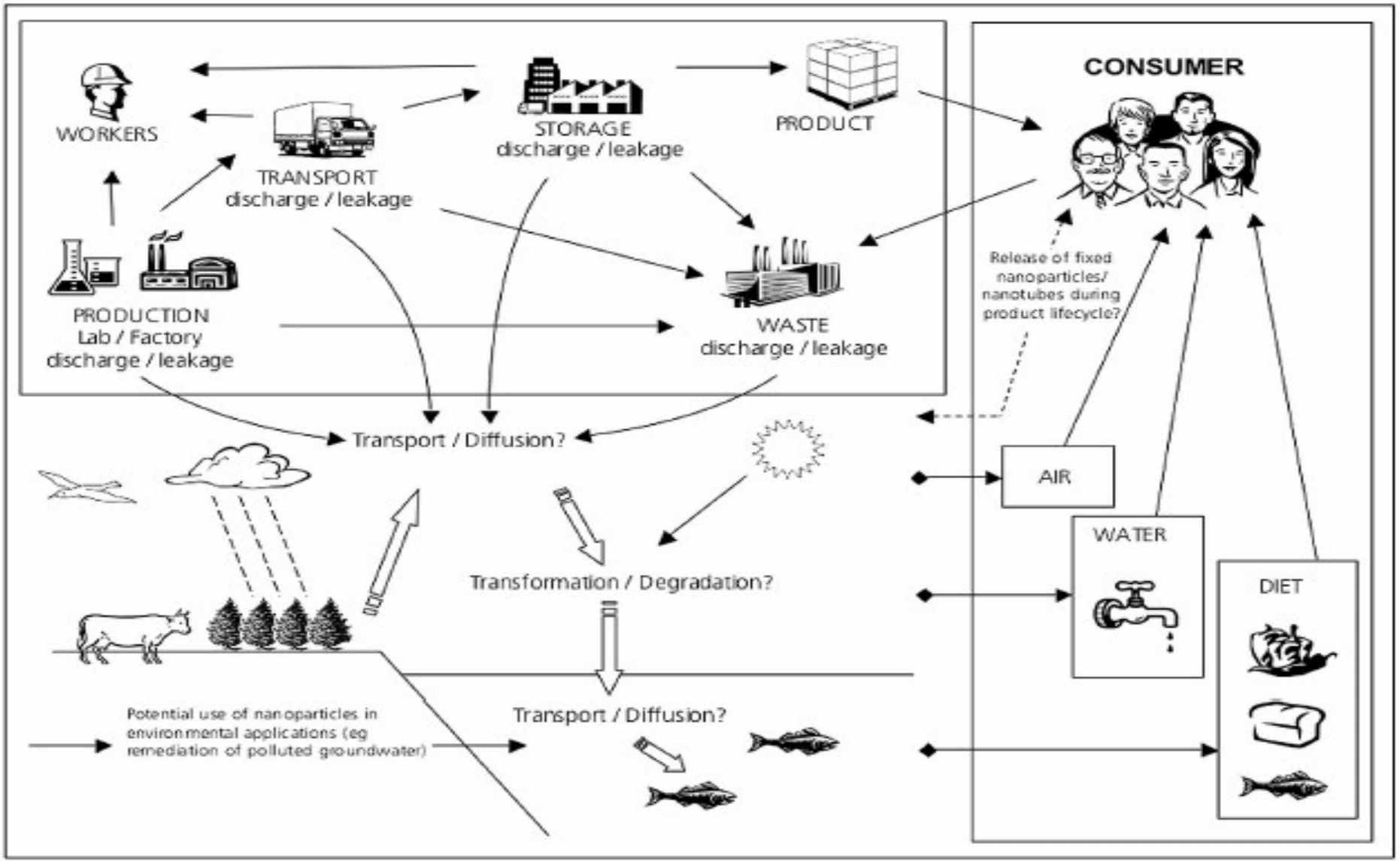
- support the safe, responsible and sustainable development of nanotechnology

- When formulating national product standards, their impacts can be considered and accordingly special requirements can be included.

- to inform the public of the potential benefits of nano products as well as of their potential impacts

- a sound basis for marketing of nano products
- Benefits by using nano materials are really much larger than the resource use conventionally and environment impacts associated with producing nano materials
- can provide the services on LCA to private/ public organizations

# Possible exposure routes for nanoparticles based on current and potential future applications (adopted from The Royal Society & Royal Academy of Engineering 2004)

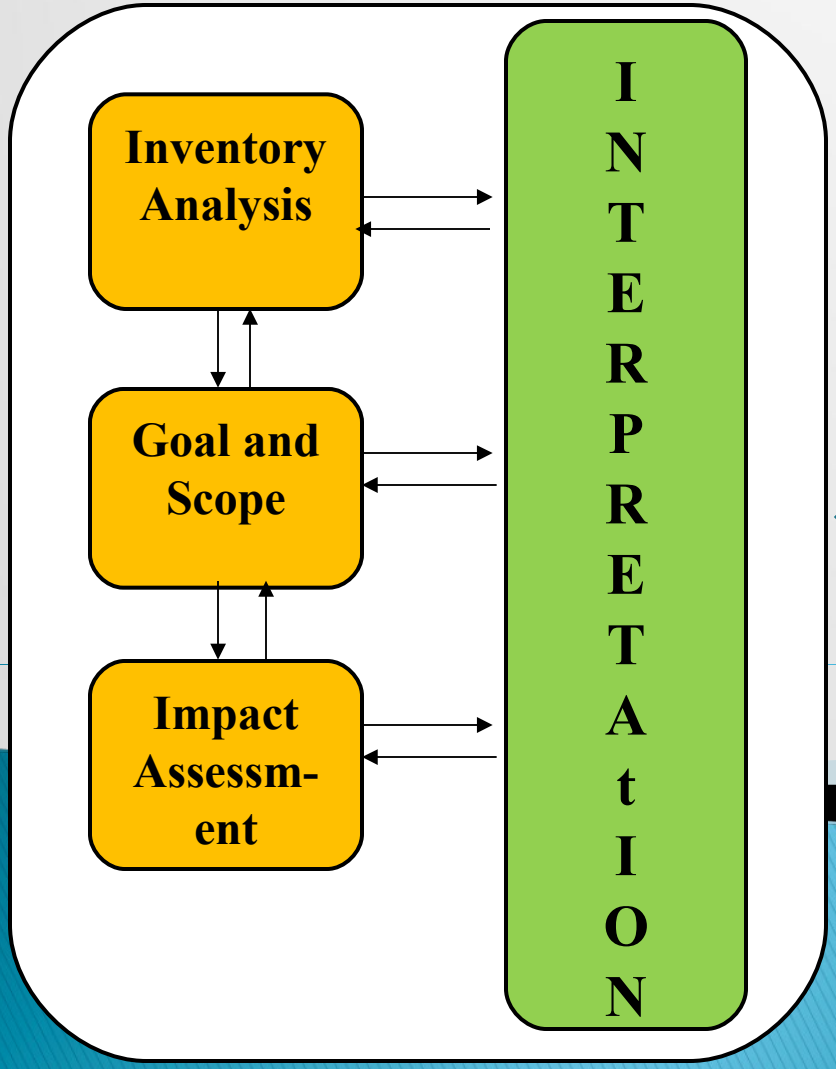


# Methodology for LCA

**Life cycle analysis of nano products/ nano materials consists of four stages;**

1. Defining the goal and scope of study
2. Making a product life cycle with all environmental inflows and out flows. This data collection is referred as "Life Cycle Inventory".
3. Understanding the environmental relevance of all the inflows and out flows
4. The interpretation of the study.

# Stages of life cycle assessment




**Direct Applications:**

- development and improvement
- Strategic planning
- Public policy making
- Marketing
- Other
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# Stage 1: Goal and scope

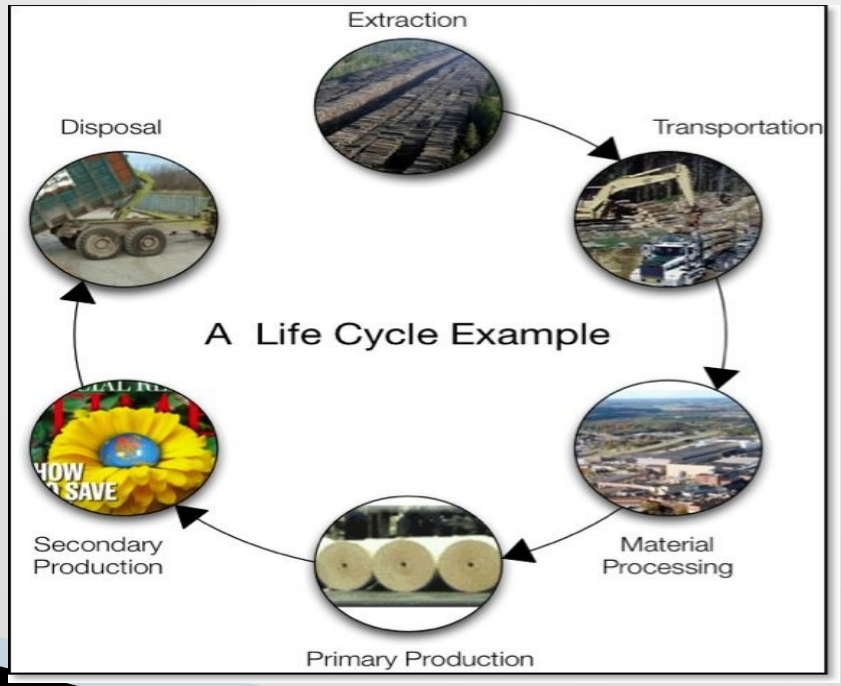
1.Formation of a LCA Core Group
2.Identify nano products/materials available in the country
3.Modeling of the nano product/ material manufacturing processes
4.Application of LCA methodology rules

# Stage 2: Inventory Analysis

1. Procurement of reliable software
2. Installation and the software
3. Data collection on energy inputs, material inputs, ancillary inputs and other physical inputs
4. Feeding to the software

# Stage 3: Impact assessment

- Results of LCA in graphical representation/tabular formats



# Stage 4: Interpretation

1. **Validation** of Results
2. **Report** Preparation
3. **Assumptions** made

# Barriers in implementing LCA

- **Limited data** is available today on material and energy input, and on environmental releases in manufacturing and transportation, or end of life cycle activities of nano components and nano products.
- **Lack of awareness** on application of LCA concept
- **Proprietary data** and information on manufacturing processes

- The absence of toxicological test results of nano products and materials
- Wide variation in manufacturing process(process-to process variation)
- Financial constrains
- Lack of experts and demand for LCA is low

# CONCLUSION

- Develop a data inventory for LCA of nano products
- Issue a special label for nano products/materials based on LCA results

*Thank you*