

Material Flow Analysis: cases and perspective

Ma, Hwong-wen
Graduate Institute of Environmental Engineering
National Taiwan University

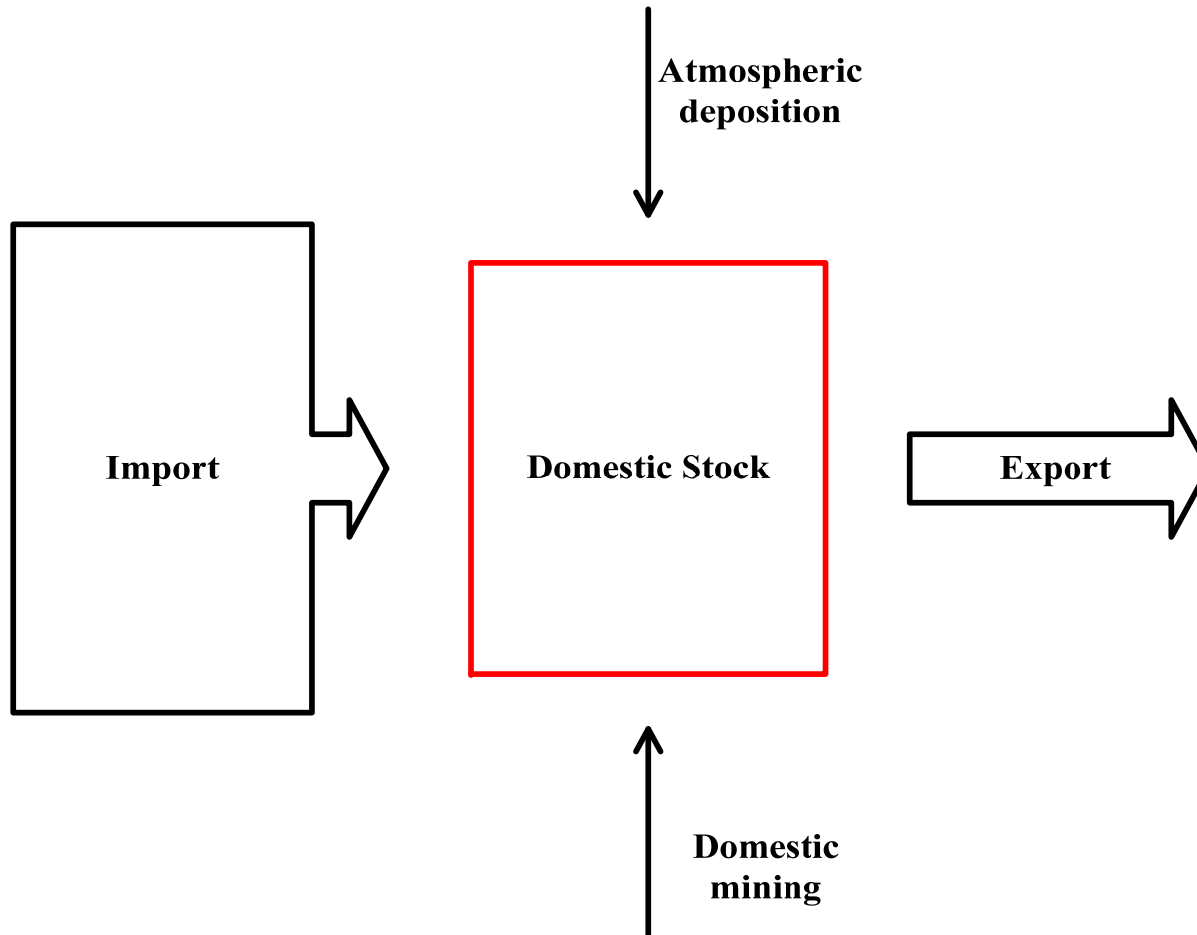
MFA Perspective

- Consumption of resources lead to
 - decreasing availability of resources
 - deteriorating environmental quality due to impact associated with the material and energy flows moved by the resource use activities
- The management of materials and energy is essential for a society to be sustainable
- MFA analyzes the flow of materials within the human society and between the anthroposphere and the environment

Examples of MFA in Taiwan

- Cadmium
- Chromium

Cadmium MFA in Taiwan

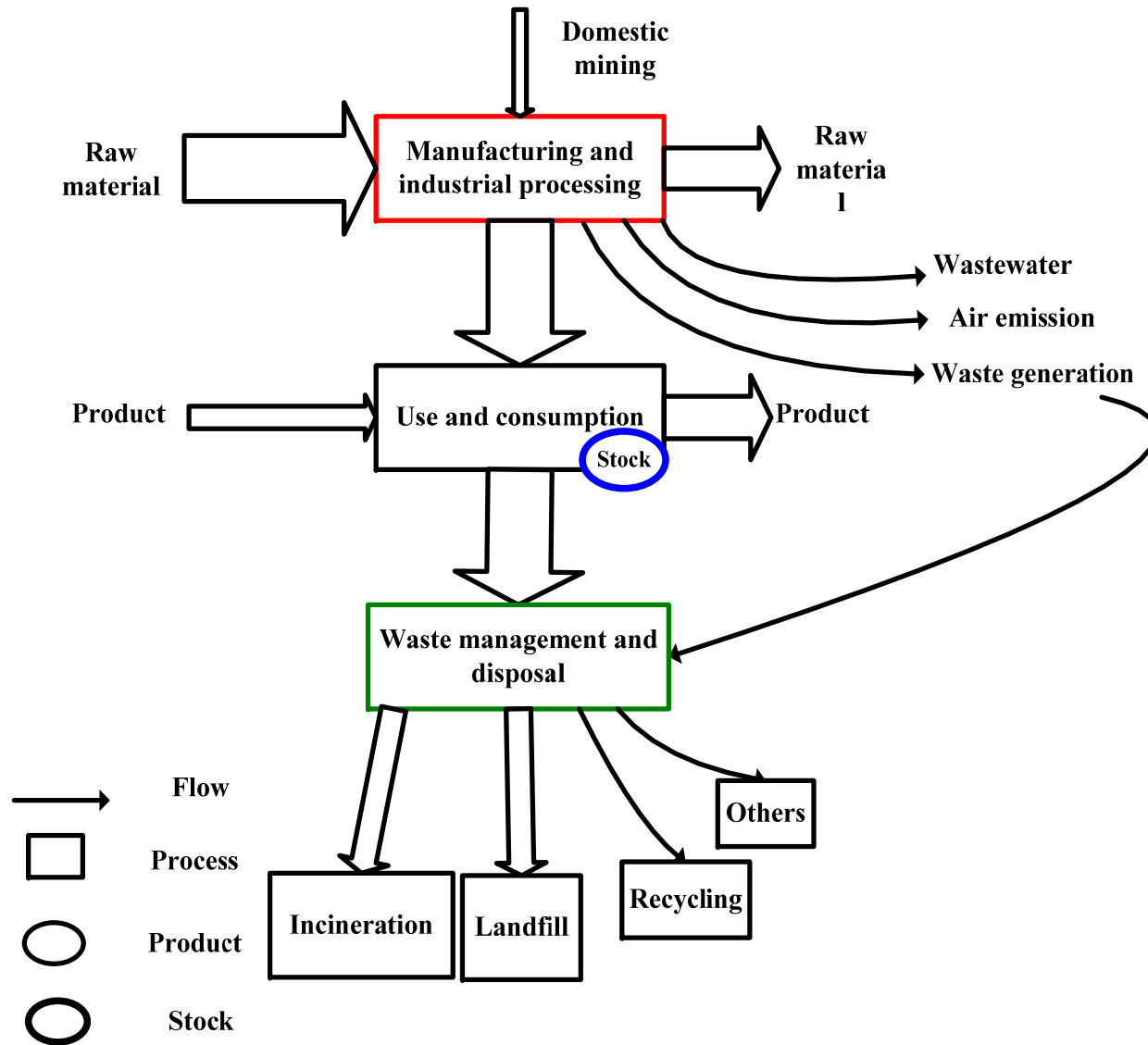


The system of
Taiwan



Cd flow

Cd flow in the anthroposphere of Taiwan

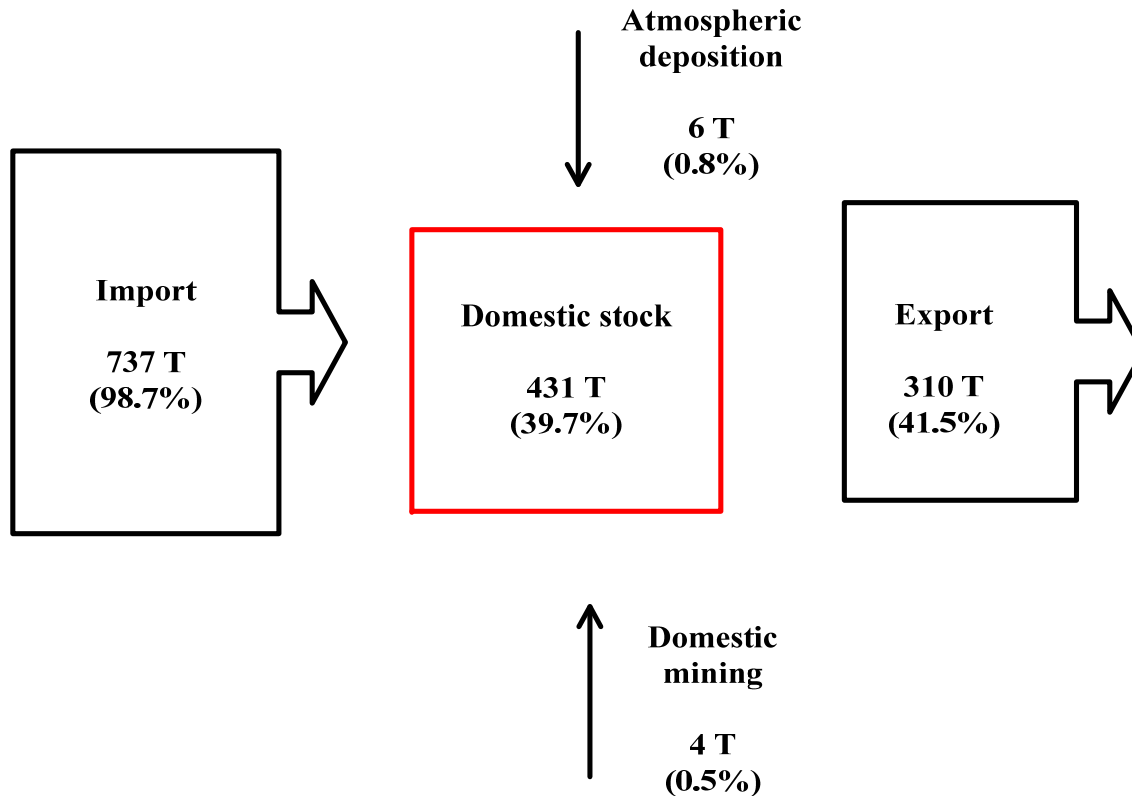


Cd quantity in Taiwan in year 2000

Unit: metric ton

Total quantity : 746T

= Atmospheric deposition +
Import + Domestic mining
= Domestic stock + Export

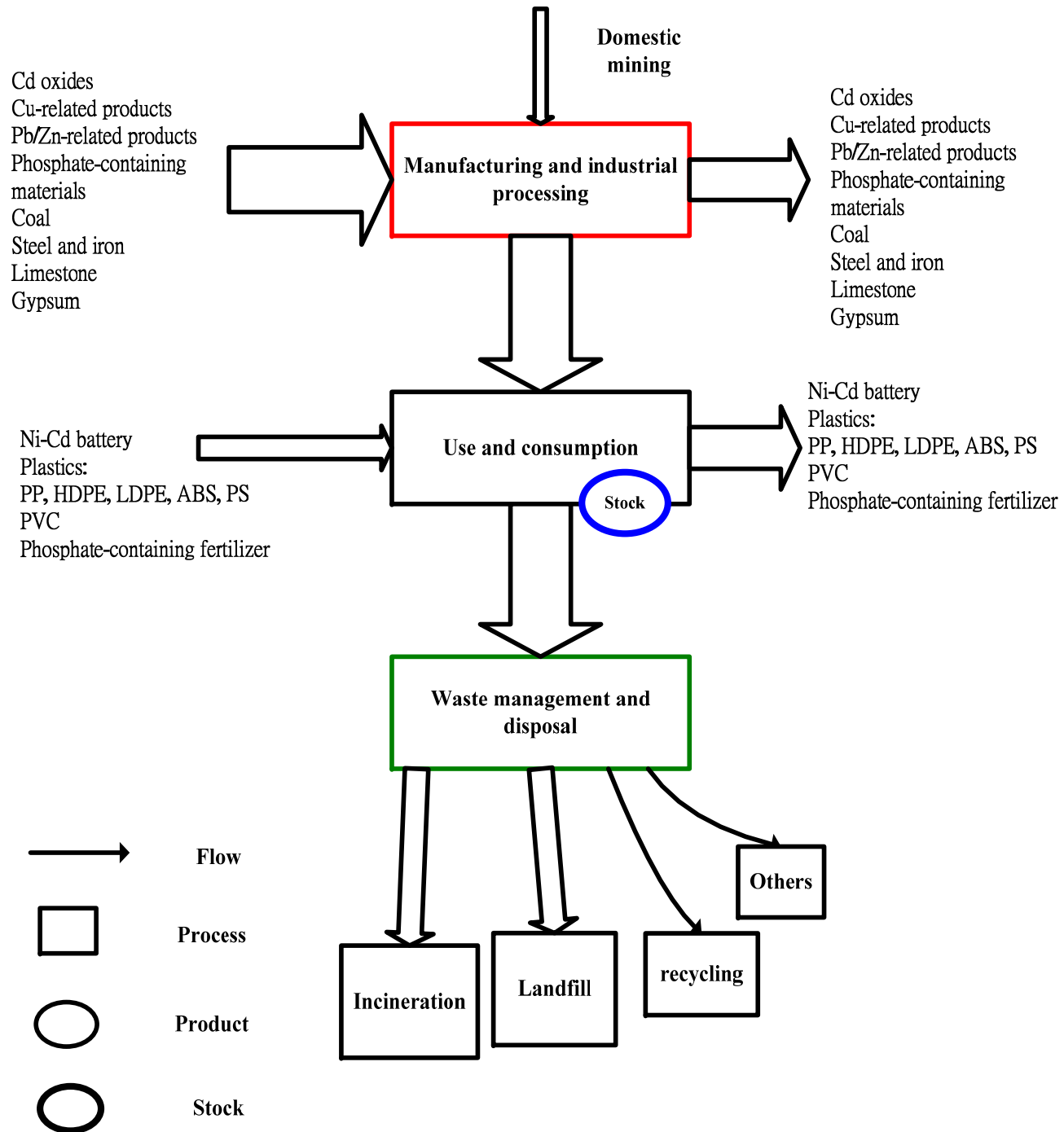


The system of Taiwan

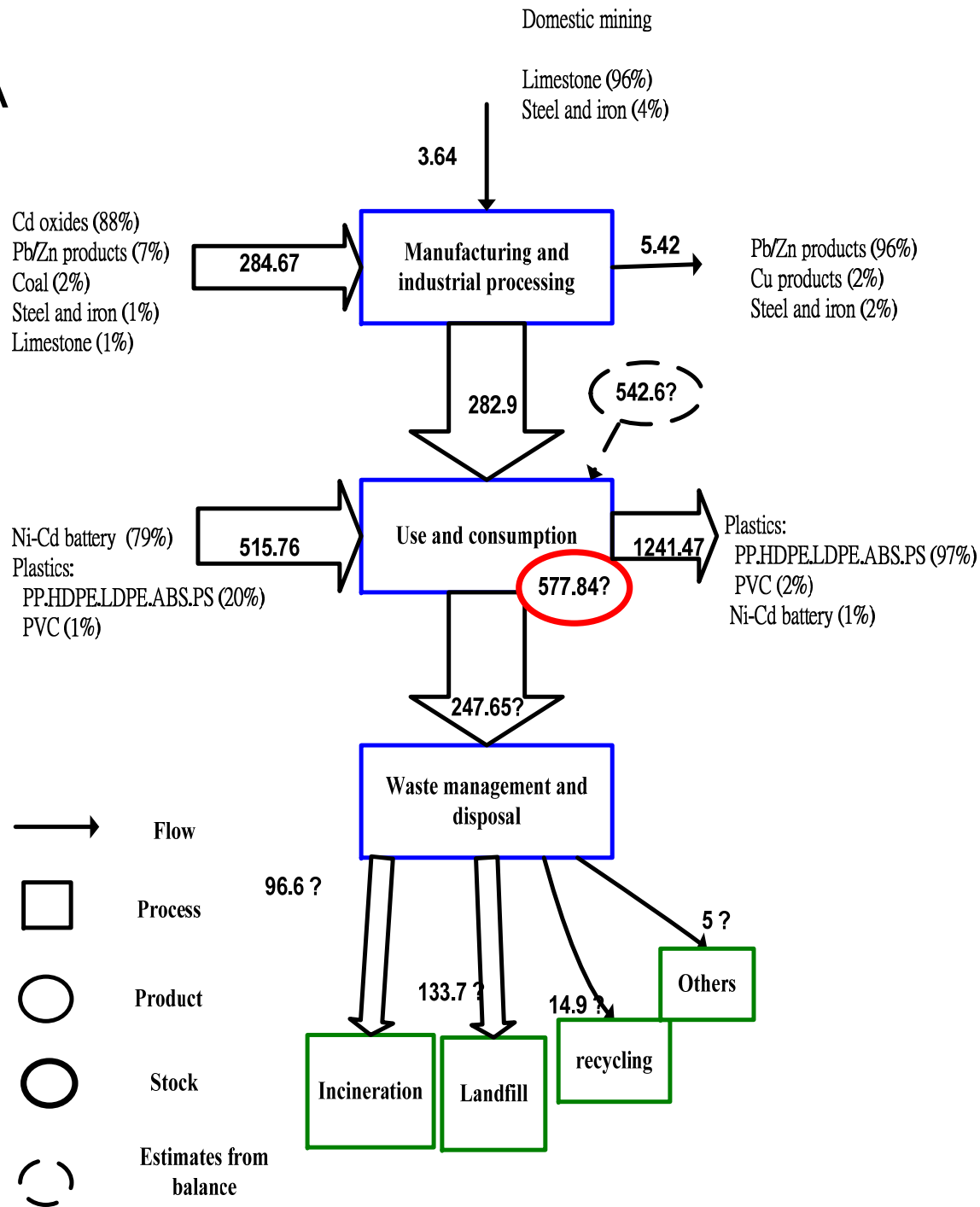


Cd flow

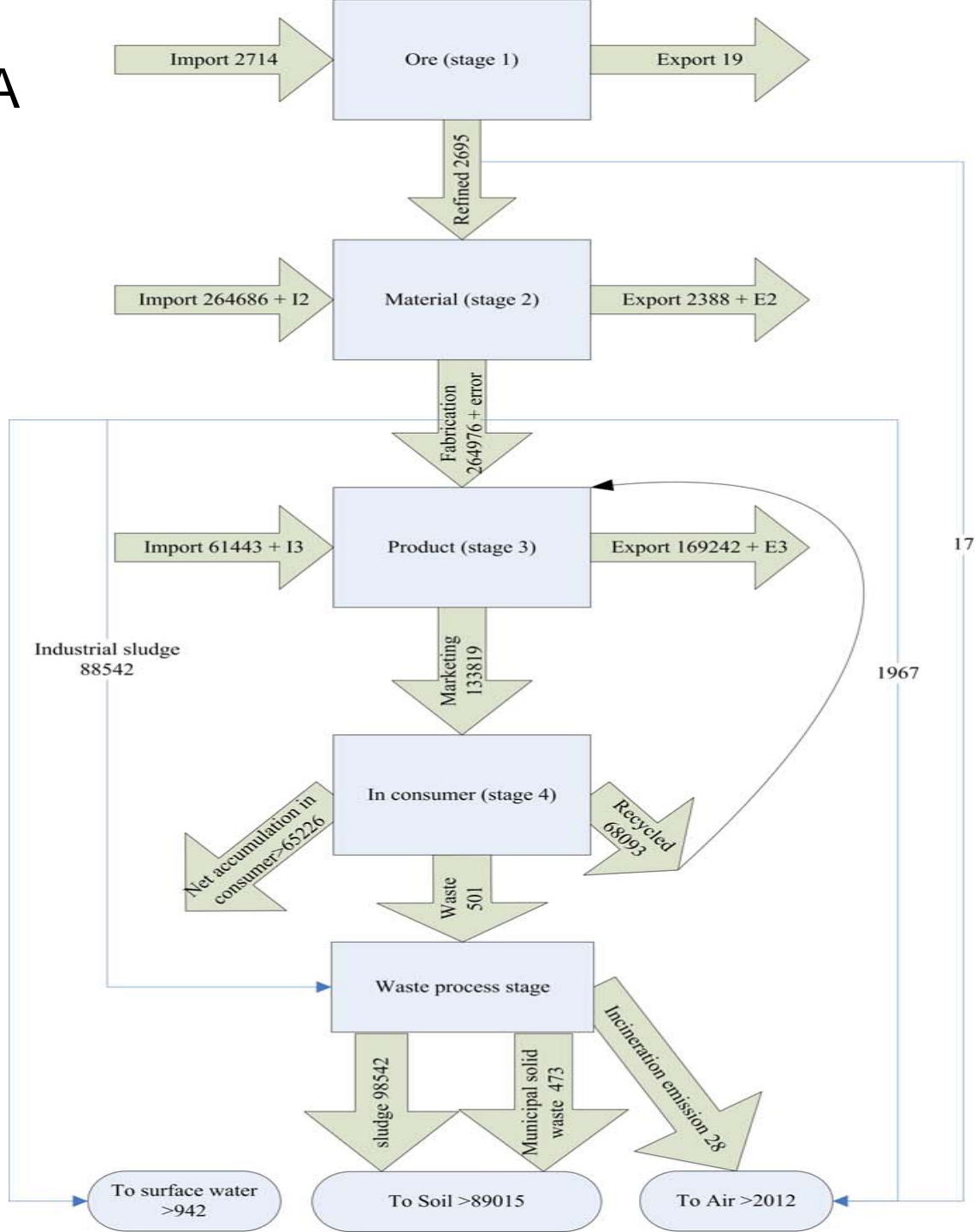
Cd MFA



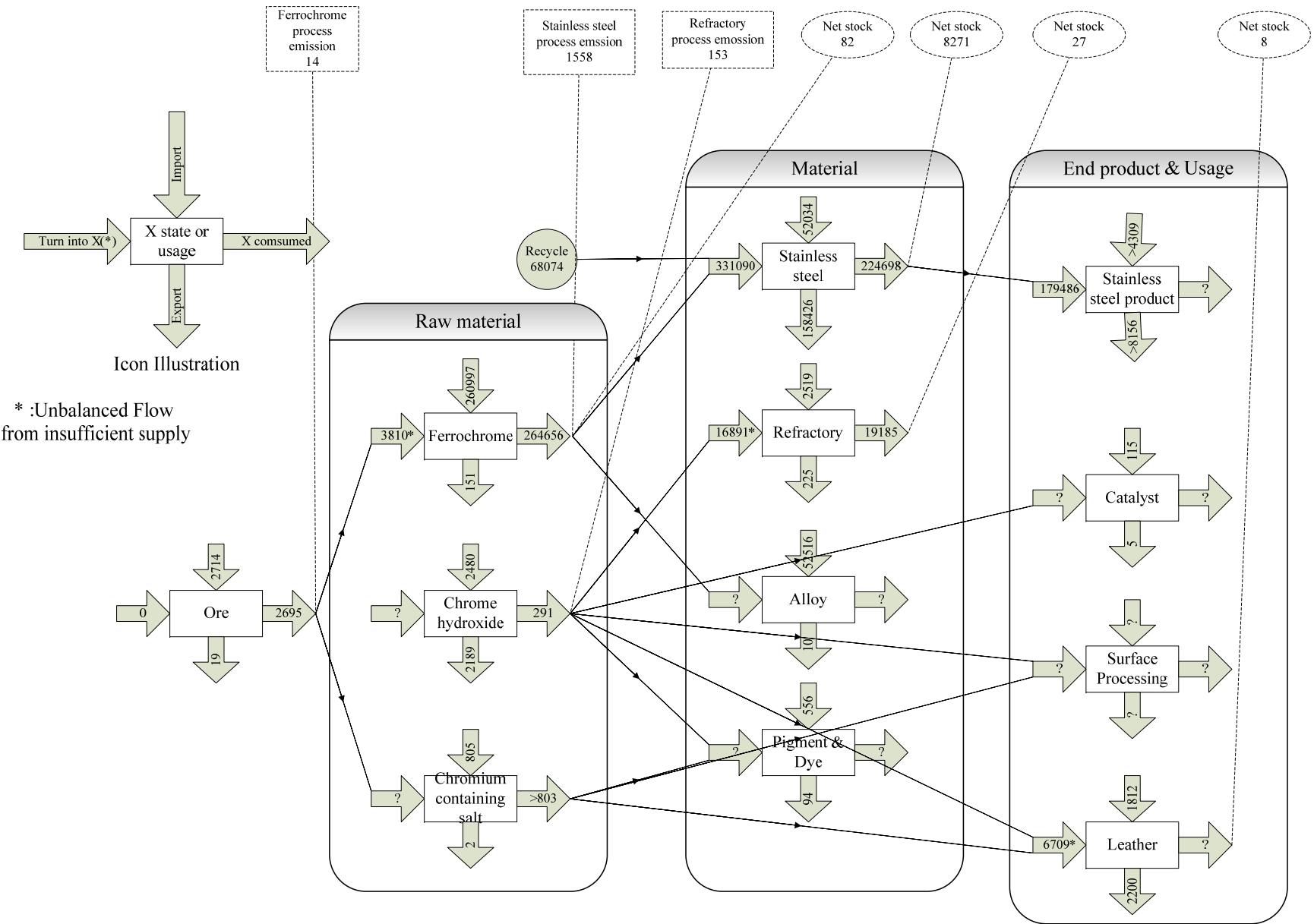
Cd MFA



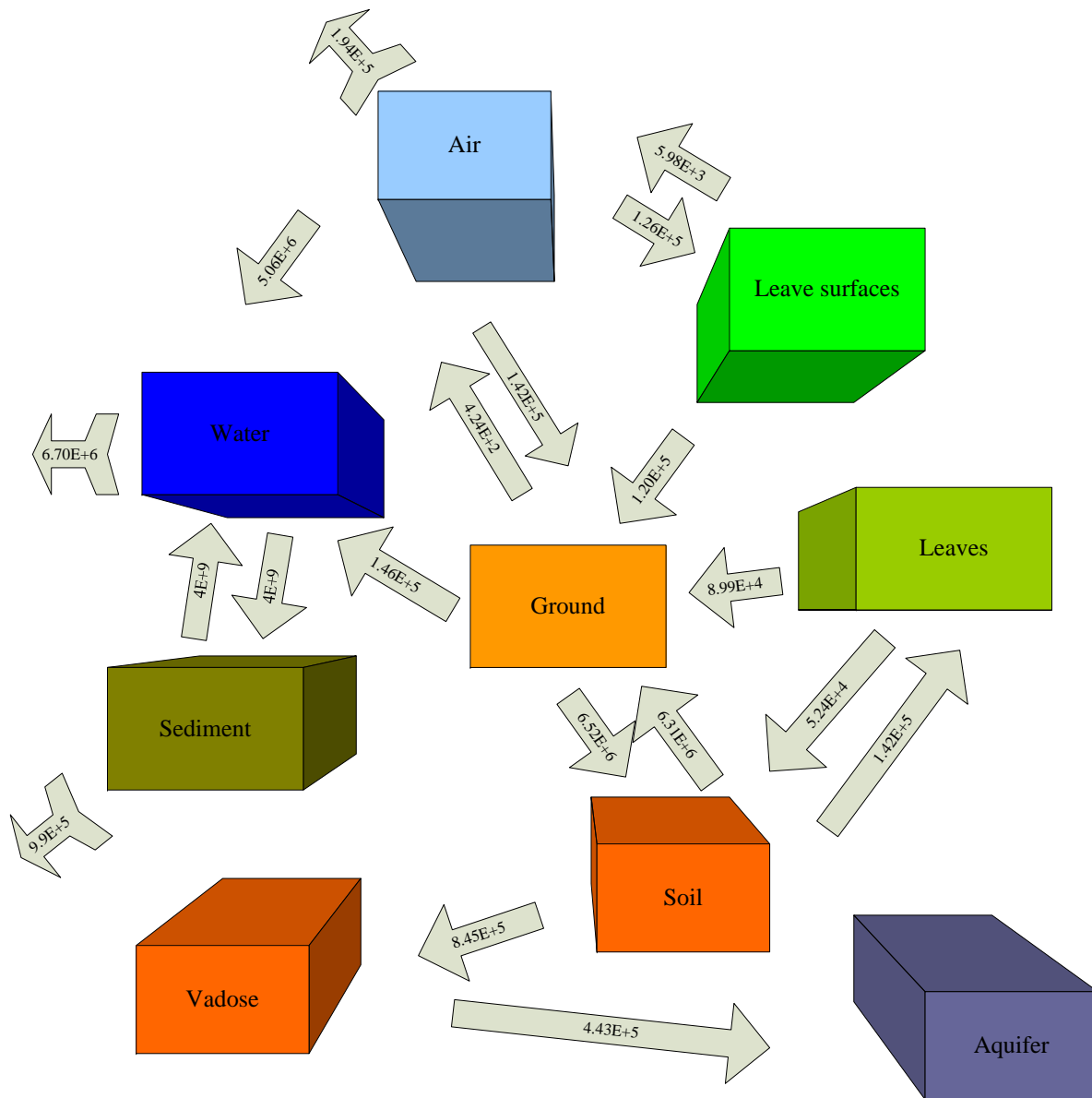
Cr MFA



Cd MFA

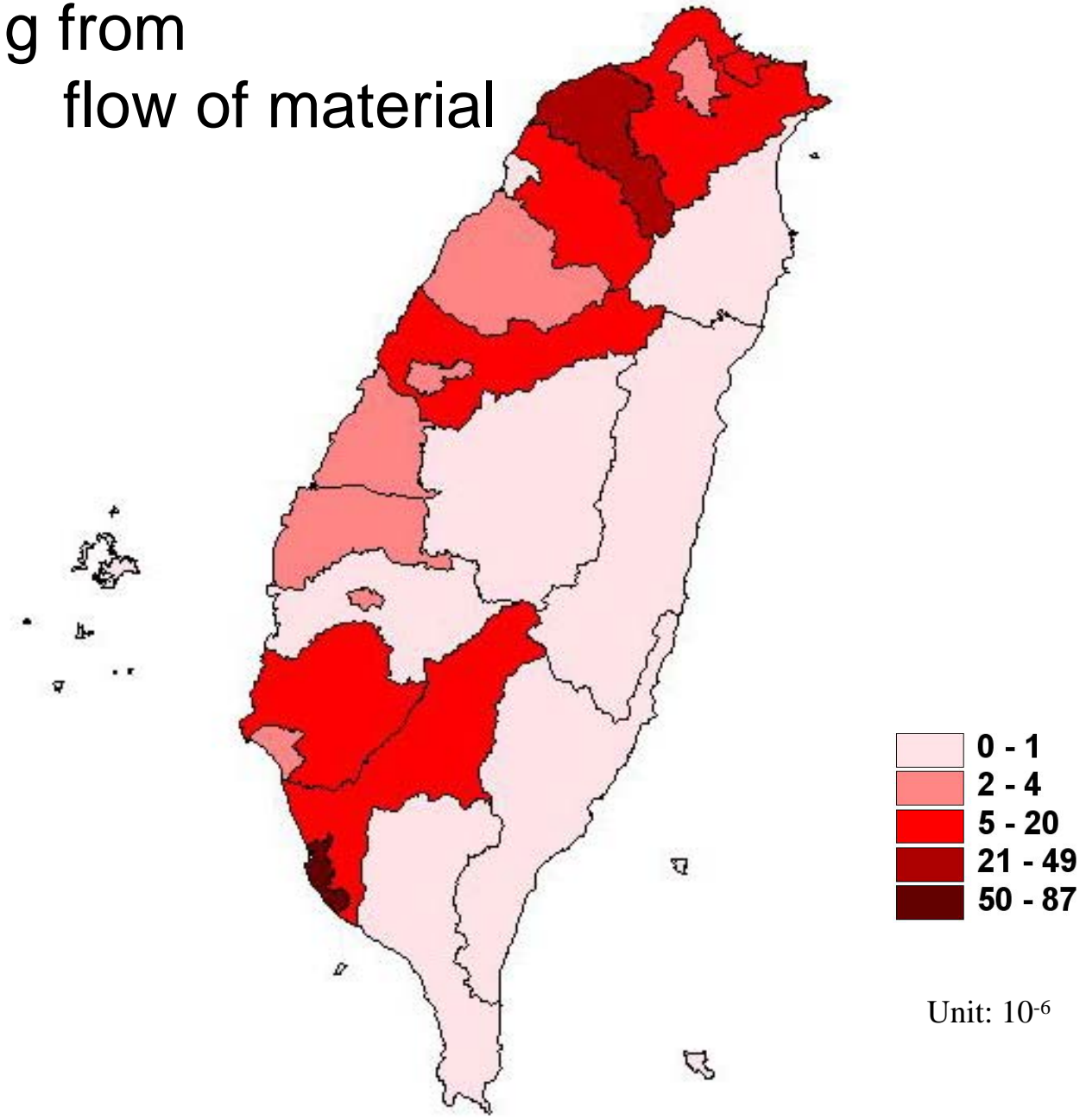


Inter-flow between environmental media

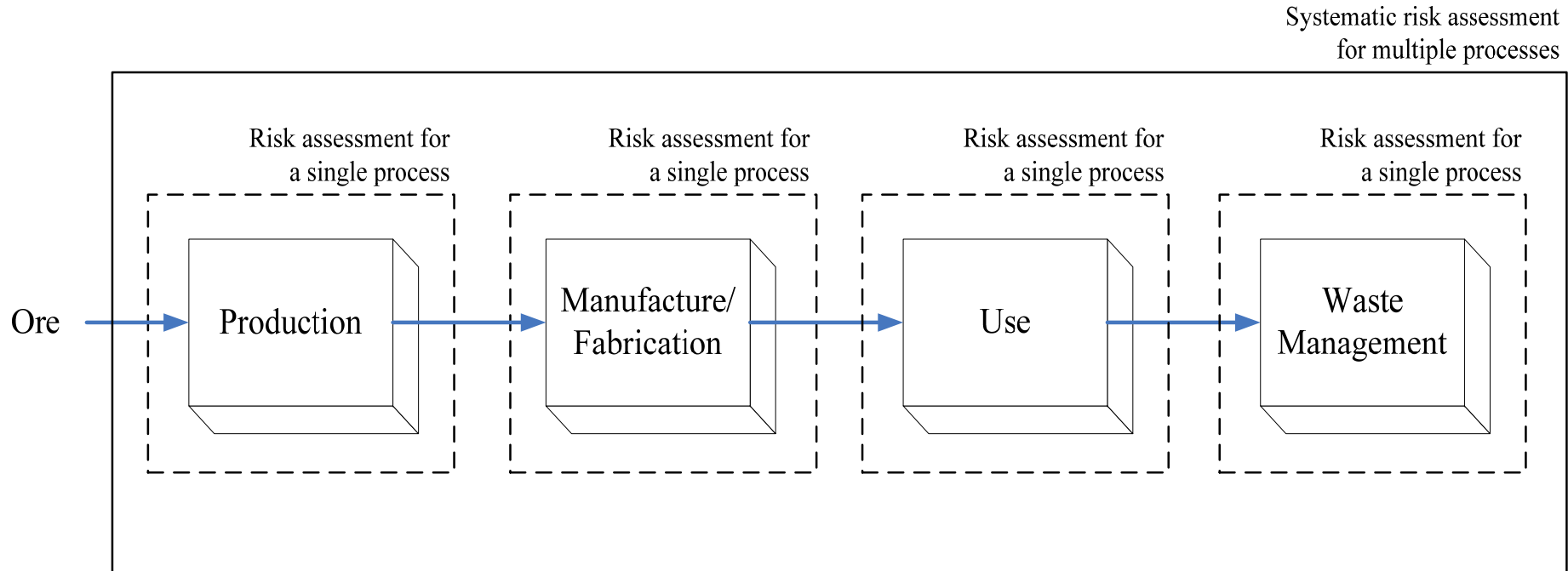


Unit : g/day

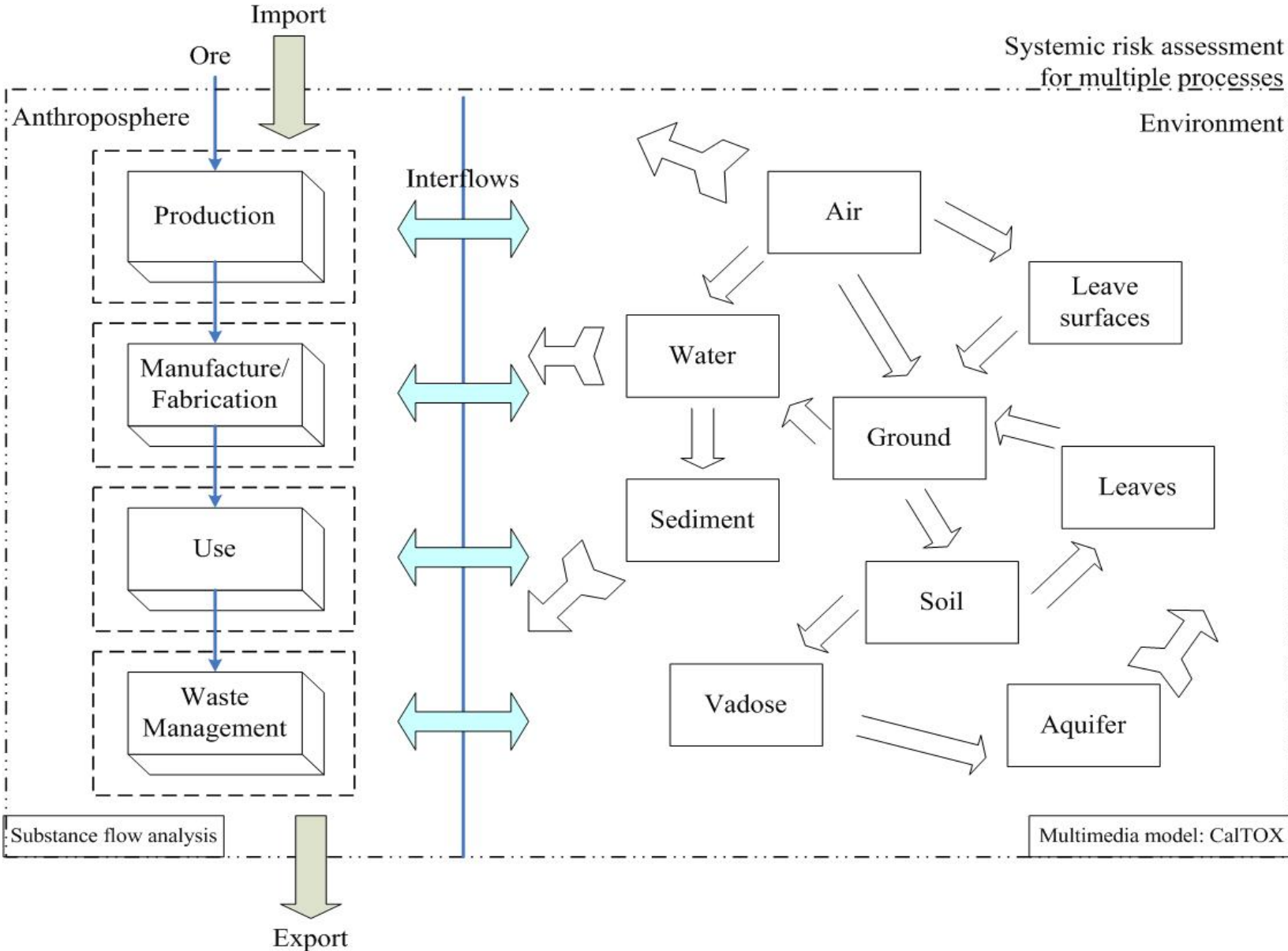
Risk resulting from flow of material



The traditional risk assessment often focuses on examination of individual processes



Systemic examination of risk resulting from material flow moved by human activities



Material Flow Management

- Faced with limited availability of resources and environmental problems due to material flow directed by resource-utilizing activities, the efficient management of material and energy to conserve resources and protect the environment becomes a key to sustainability
- Independent assessment of individual risk sources may not lead to efficient management strategies and may even result in risk transfer between problems.
- The integration of analyses of material flow and environmental impact (risk) under the framework of sustainable society would facilitate design of effective and efficient strategies to redirect and manage material flow