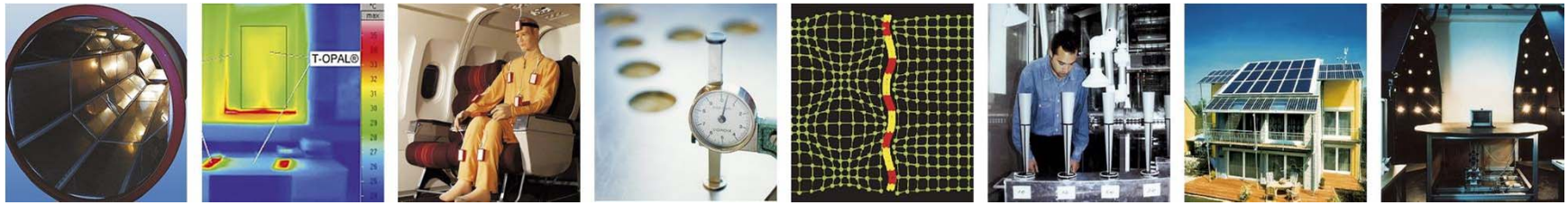
Proposal of a unified biodiversity impact assessment method

EcoBalance

Yokohama, Japan, 23 November 2012



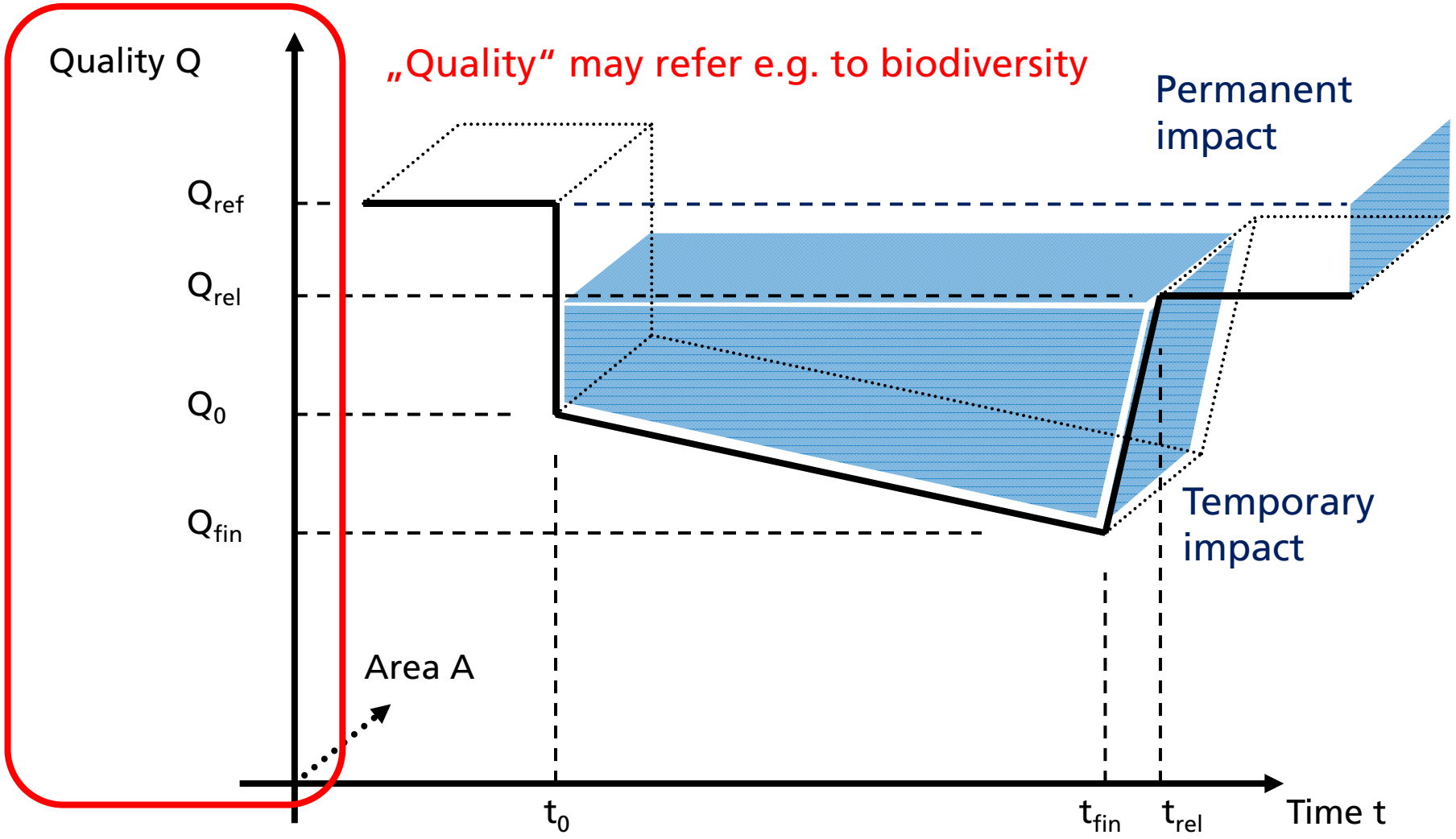
Ganzheitliche Bilanzierung

Fraunhofer IBP

Overview

- Context: land use in LCA
- Quantification of biodiversity: lack of normative conventions
- Quantification of biodiversity: approach
- Outlook

Context: land use in LCA



Quantification of biodiversity: lack of normative conventions

No globally unified definition of biodiversity

- Convention on biological diversity (CBD)
  - Diversity within species
  - Diversity between species
  - Diversity between ecosystems

Very generic high-level definition
→ need for elaboration

- Millennium Ecosystem Assessment (MEA)
  - Variability
  - Quantity and quality
  - Distribution

Various aspects of biodiversity
→ different goals

Quantification of biodiversity: lack of normative conventions

No globally unified definition of biodiversity

- Ecosystem services (according to MEA)
  - Provisioning services
  - Supporting services
  - Regulating services
  - Cultural services

Various services provided by biodiversity
→ different goals

- The Economics of Ecosystems & Biodiversity (TEEB)
  - Interpretation for economic decision processes
  - Tangible values: substitution of technical solutions
  - Intangible value: e.g. willingness to pay

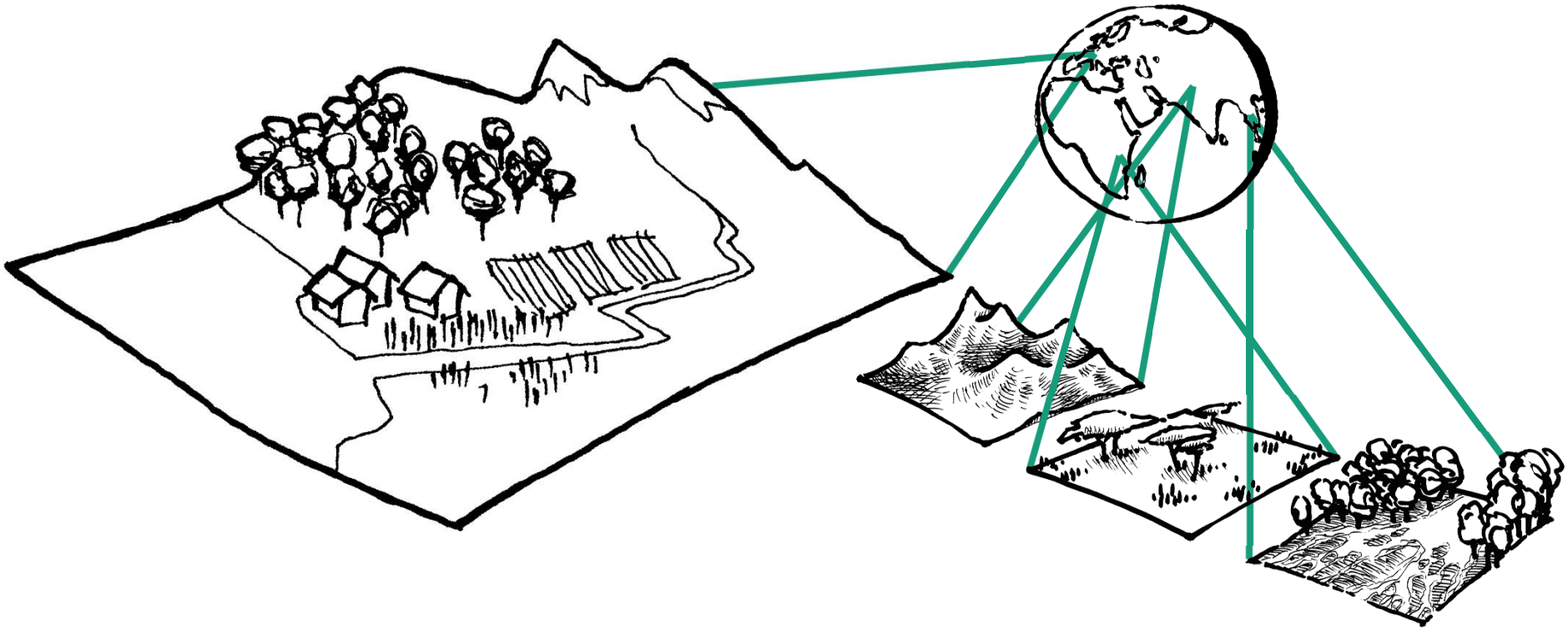
Pragmatic context-dependant valuation
→ Problem: choice of valuation methods

Quantification of biodiversity: lack of normative conventions

No recommendation for handling trade-offs between goals

- Few rare species vs many ubiquitous species
- Carriers of ecosystem services vs rarity
  - Which ecosystem services?
  - What does „rare“ mean?
- Naturalness = value in itself?
- Monetization
  - Discounting
  - Willingness to pay/accept
  - Price elasticity

Quantification of biodiversity: approach



Quantification of biodiversity: approach

Combination of the best aspects of existing methods + original development

- Biodiversity = global weighting × local constitution
- Weighting factor based on aspects of biodiversity with globally accepted relevance; locally specific aspects used to describe constitution
- Weighting factor can be interpreted as potential,
  local constitution as realization of potential

Result: dimensionless index number, but points in the right direction

- High impact = not preferred
- Integration of various aspects and influences
- Enables aggregation and trade-off calculation

Quantification of biodiversity: approach

Global weighting of regions

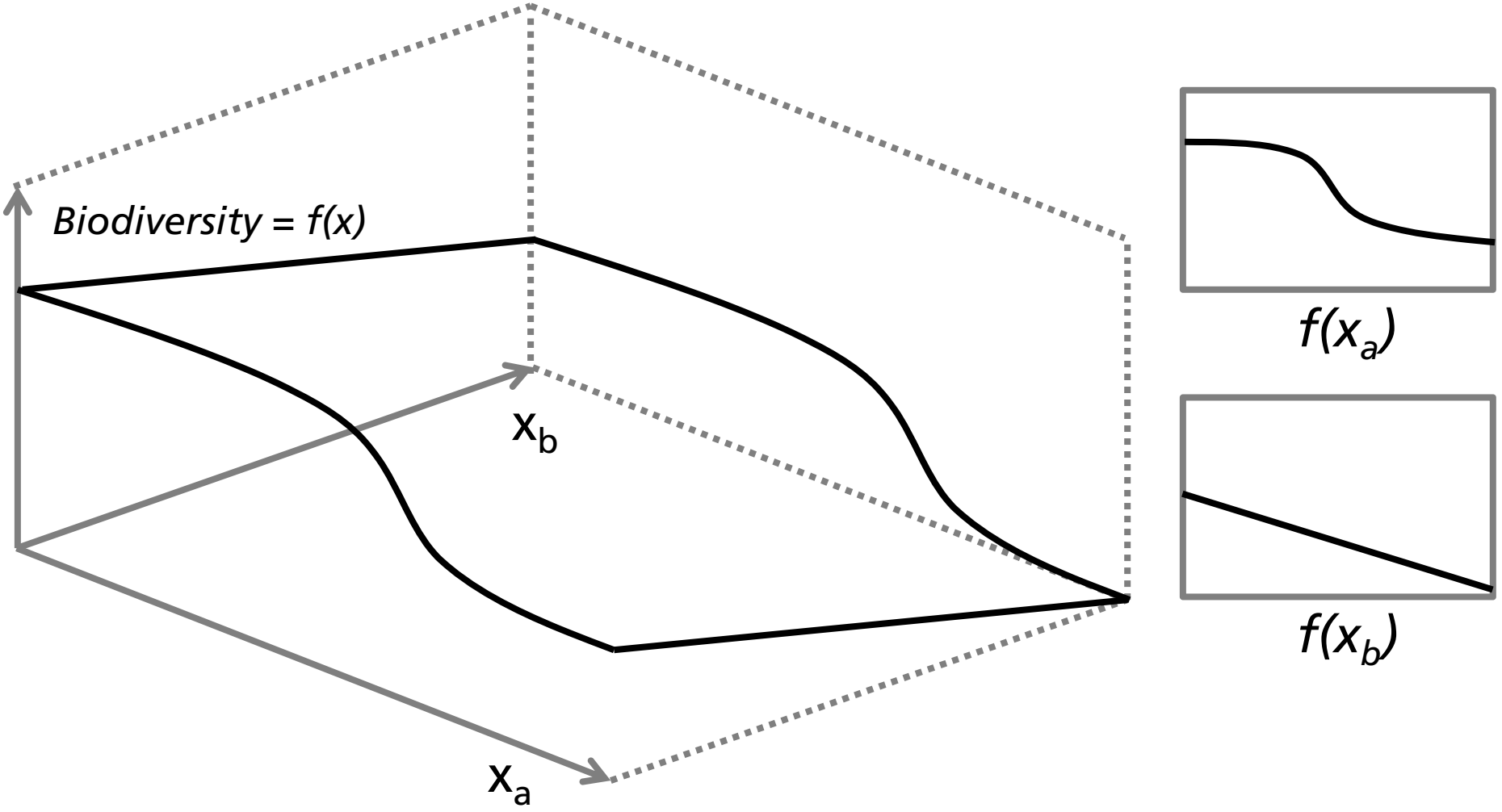
- Delineation: e.g. ecoregions, biomes, anthromes…
- Strong normative component
  - Inclusion of relevant stakeholders
  - Normative competence needed (e.g. authorities) or widely accepted (e.g. NGOs, experts)
- Potentially useful approaches, e.g.
  - Relative species density (Koellner)
  - Species numbers and rarity (Lindner)
  - Species number, endemism, vulnerability of ecosystem (Brethauer)
  - Biodiversity hotspots (Olson)

Quantification of biodiversity: approach

Local description of constitution of biodiversity
in the context of a regionally specific representation

- Literature research, expert interviews etc.
  - What does biodiversity mean in that region?
  - Which parameters constitute biodiversiy in that region?
- Literature research
  - Laws
  - Strategy documents
  - Documentation of EIA processes
  - Reports from conservation NGOs
  - Scientific publications

Quantification of biodiversity: approach

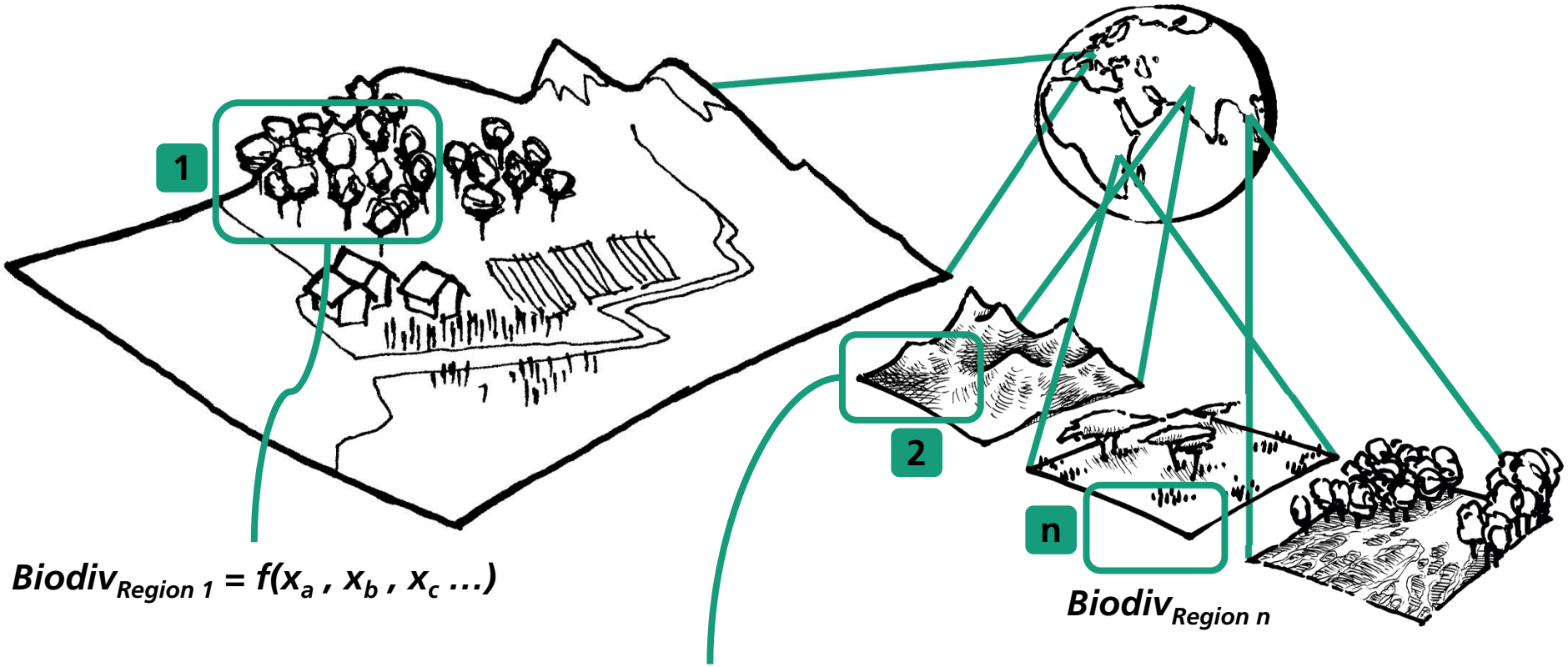


Quantification of biodiversity: approach

Local description of constitution of biodiversity
in the context of a regionally specific representation

- Regionally specific biodiversity potential function
  - State = absolute level
  - Change over parameter = (partial) deviation
- Inclusion of soft, semi-quantitative data through fuzzy modeling
  - Transfer of qualitative data into quantitative contexts, enabling of use of calculation models
  - Added information, not strictly scientifically verifiable, but with common sense and transparent documentation

Quantification of biodiversity: approach

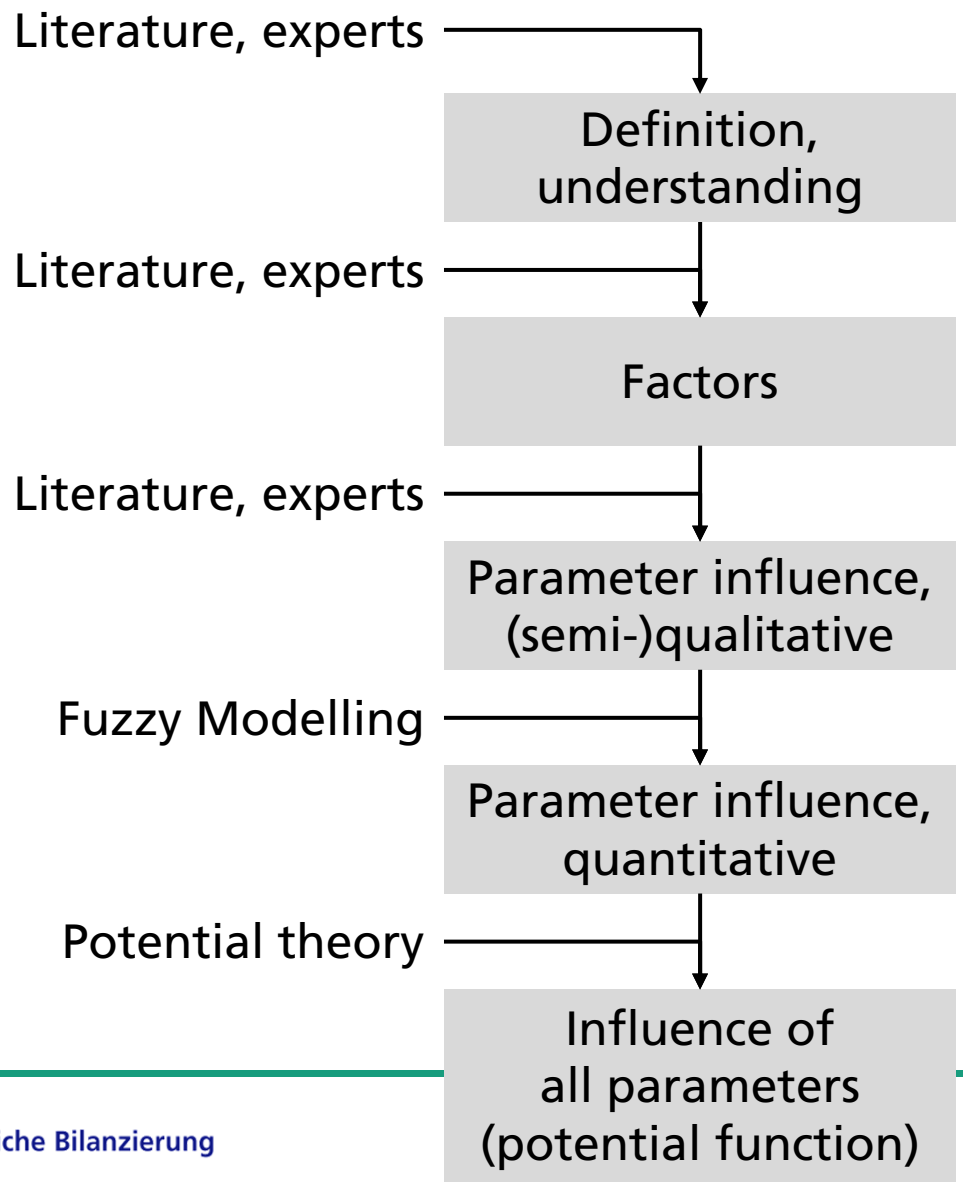


Quantification of biodiversity: approach

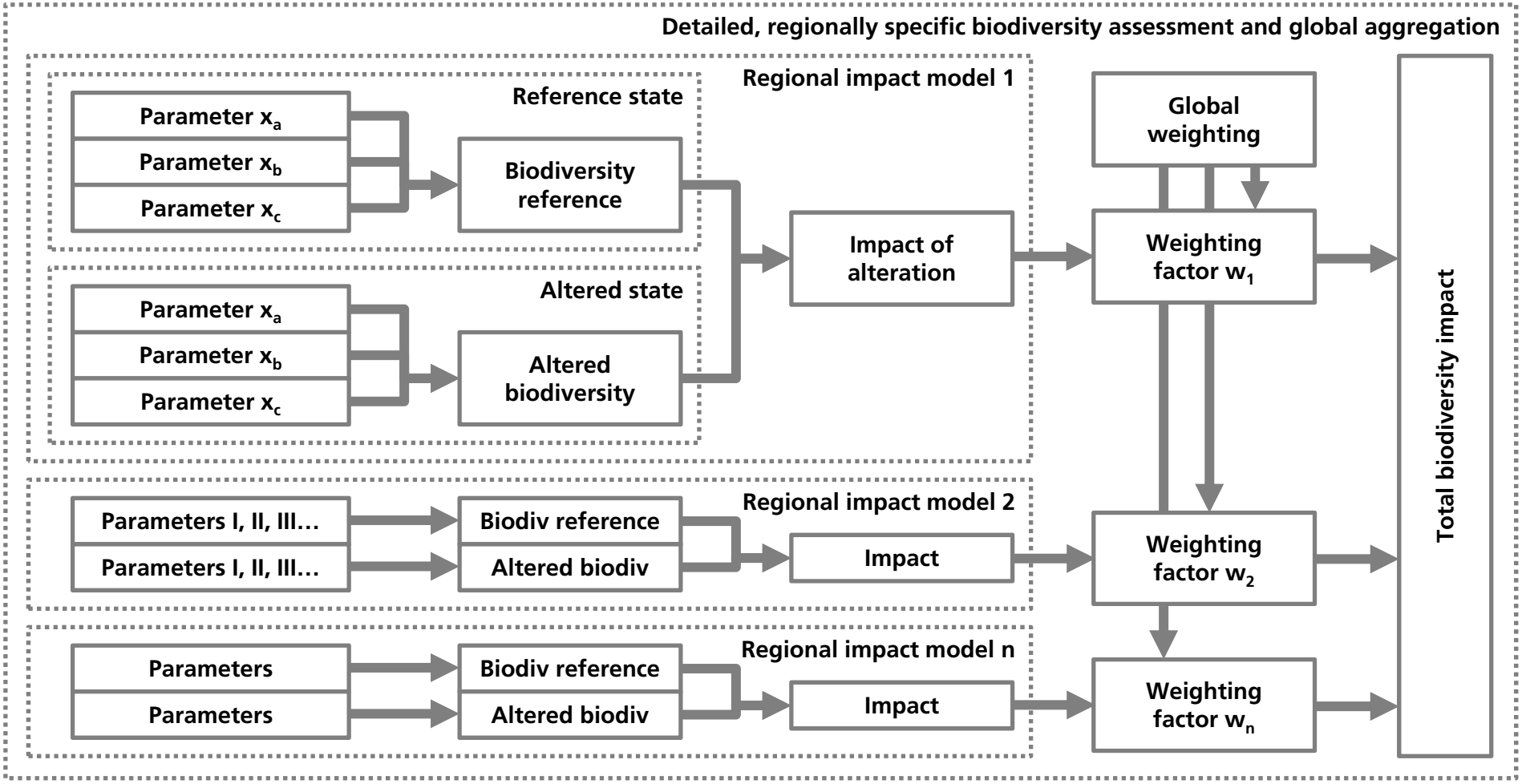
Guideline for expert interviews

- Preparation
  - Literature research
  - Choice of interview partners
- Questioning
  - Relevance of ecosystems and species
  - Transform fuzzy data into crisp data, get confirmation
- Topic matrix: e.g. diversity of ecological niches
  - Physical/chemical, structural
  - Space, time
  - Conquest by neozoa/neophytes

Quantification of biodiversity: approach



Quantification of biodiversity: approach



Outlook

Project concludes in 2014

- Methodology to be explicitly spelled out
- Calculation rules to be defined
- Quick test for efficient application of method
- Case studies with various land using companies

Constructive criticism welcome!

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