

87th LCA Discussion Forum: Biodiversity in LCA:
how far have we come?



INSTITUT FÜR ENERGIE-
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Pri-o-biodiv

**Determining the ecological footprint of
biodiversity-relevant products and services**

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Project commissioned by the German Federal
Agency for Nature Conservation (BfN)

Who we are:

ifeu - independent environmental research since 1978

- non-profit limited company, over 40 years of experience.
- inter- and transdisciplinary environmental research and consultancy.
- **goal: drive social and ecological transformation processes forward.**
- headquarters in Heidelberg, branches in Berlin and Hamburg.
- around 120 employees in five major topics.



Energy
More than saving electricity



Mobility
More than a green wave



Industry + Products
More than consumption



Biomass + Nutrition
More than a footprint



Resources
More than one way of thinking

Background of the Pri-o-biodiv project

- The loss of biodiversity is increasing in scale.
- Human intervention affecting biodiversity is usually due to the production and provision of goods and services.
- Instruments are therefore needed to **a) analyze the links** between production and consumption on the one hand and the associated impacts on ecosystems and **b) justify decisions** in favor of or against one or other product or preference.

Background of the Pri-o-biodiv project

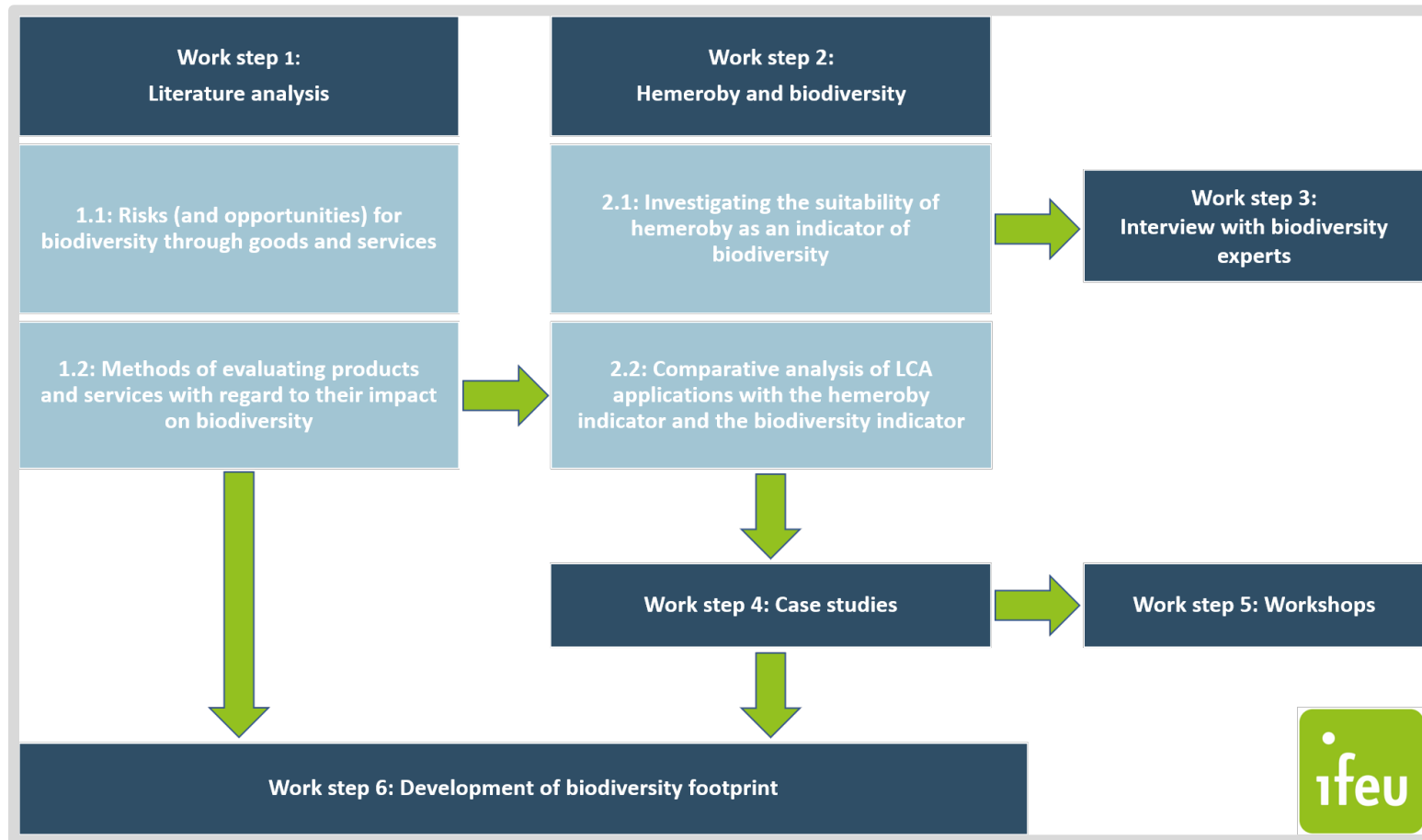
- The most widely used tool for assessing the impact of products or services on the environment is the life cycle assessment (LCA).
- There are numerous approaches regarding biodiversity assessment in LCA.
- In addition, there exist many non-standardized proposals for footprints.
- Central questions:
 - 1. Which methodology should be used?**
 - 2. Should a new concept be developed?**



Aim of the project

1. Generate recommendations for the development of an **independent Biodiversity Footprint (BF)** to measure the impact of the consumption of products and services on biodiversity and to shape a biodiversity footprinting approach.
2. Compile the current state of knowledge on interactions between consumption and biodiversity.
3. Collect existing methods of LCA and footprinting in the context of biodiversity and compare these methods in case studies.
4. Explore the suitability of the hemeroby concept (extent of human impact on ecosystems) as a biodiversity metric.

Structure



- 6 work packages
- Literature analysis
- Method comparison
- Case studies

Lessons learned I:

Literature review of sectors and drivers of loss of biodiversity,

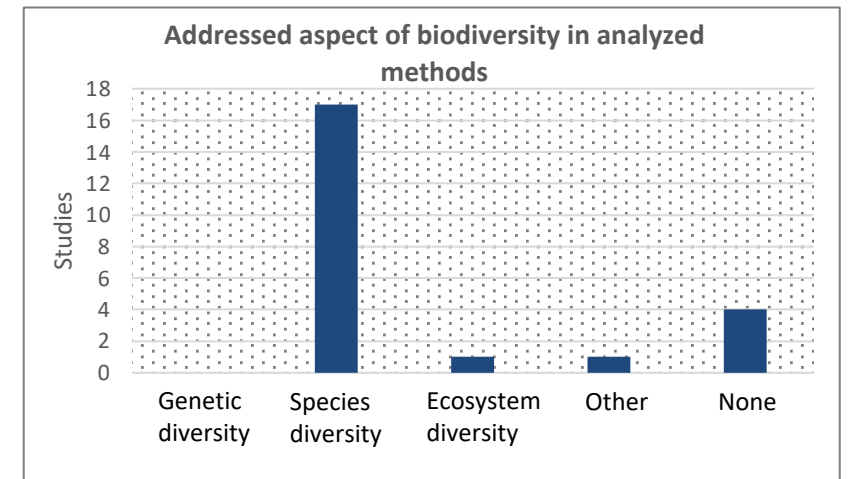
Analysis of assessment method

Literature review

- 90 papers were reviewed
- Focus lies on direct drivers land-use change and pollution
- Agriculture and forestry dominant sector by far

Method analysis

- 23 method-studies were analysed so far
- More to come



Lessons learned II:

Interviews with the biodiversity community

- All interviewed experts quantified biodiversity by measuring species diversity via different methods
- The level of intervention in an ecosystem is generally approved as a basis for impact assessment

Lessons learned II:

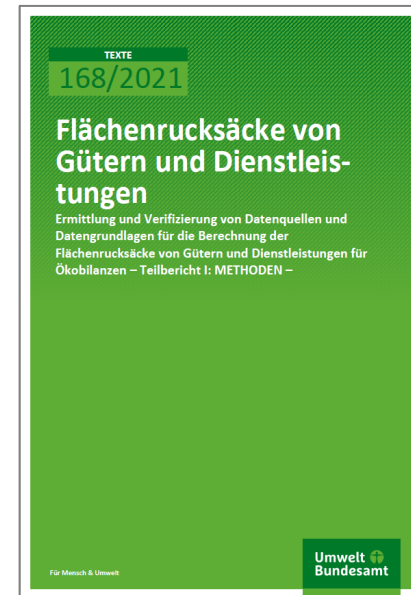
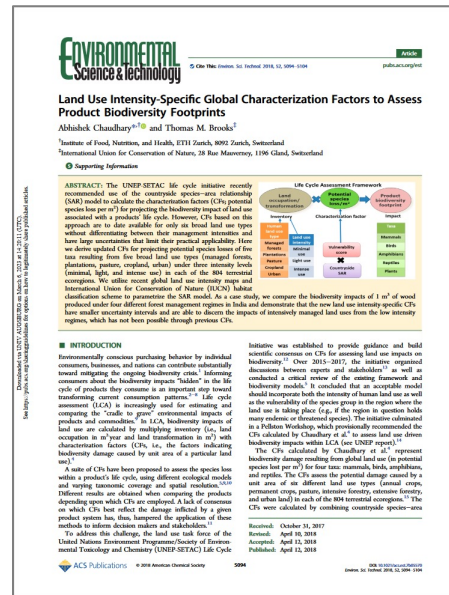
Interviews with the biodiversity community

- All interviewed experts quantified biodiversity by measuring species diversity via different methods
- The level of intervention in an ecosystem is generally approved as a basis for impact assessment
- But:
- Hemeroby as a proxy too uncertain
- The mathematical relationship between intensity and biodiversity is still unknown
- There is no data for valid general statements across all locations and systems
- Ground truthing needs to be conducted to validate a method
- Using proxies can risk promoting incorrect recommendations and, in worst cases, harm biodiversity

Lessons learned III:

A closer look at three methods – method comparison

- Lindner et al. (2019): Valuing Biodiversity in Life Cycle Assessment
- Chaudhary et al. (2018): Land Use Intensity-Specific Global Characterization Factors to Assess Product Biodiversity Footprints
- Fehrenbach et al. (2021): Land rucksack



Lessons learned III:

A closer look at three methods – method comparison

- 8 components comprised of 54 criteria
- Similarities: 16/54
 - e.g. land-use as a starting point, multiple land use types and intensity levels, only terrestrial biodiversity covered
- Differences: 38/54
 - e.g. impact indicator, direct vs. indirect reference to biodiversity, aspect of biodiversity,

Kriterienkategorie	Nr. Kriterien	Kriterienname	Methodenvergleich	Methodenvergleich	Methodenvergleich
I. Methoden	1.1	Methodenvergleich	+	+	+
	1.2	Methodenvergleich	+	+	+
	1.3	Methodenvergleich	+	+	+
	1.4	Methodenvergleich	+	+	+
II. Kriterien	2.1	Methodenvergleich	+	+	+
	2.2	Methodenvergleich	+	+	+
	2.3	Methodenvergleich	+	+	+
	2.4	Methodenvergleich	+	+	+
III. Komponenten	3.1	Methodenvergleich	+	+	+
	3.2	Methodenvergleich	+	+	+
	3.3	Methodenvergleich	+	+	+
	3.4	Methodenvergleich	+	+	+
IV. Kriterienkategorie	4.1	Methodenvergleich	+	+	+
	4.2	Methodenvergleich	+	+	+
	4.3	Methodenvergleich	+	+	+
	4.4	Methodenvergleich	+	+	+
V. Kriterienkategorie	5.1	Methodenvergleich	+	+	+
	5.2	Methodenvergleich	+	+	+
	5.3	Methodenvergleich	+	+	+
	5.4	Methodenvergleich	+	+	+
VI. Kriterienkategorie	6.1	Methodenvergleich	+	+	+
	6.2	Methodenvergleich	+	+	+
	6.3	Methodenvergleich	+	+	+
	6.4	Methodenvergleich	+	+	+
VII. Kriterienkategorie	7.1	Methodenvergleich	+	+	+
	7.2	Methodenvergleich	+	+	+
	7.3	Methodenvergleich	+	+	+
	7.4	Methodenvergleich	+	+	+
VIII. Kriterienkategorie	8.1	Methodenvergleich	+	+	+
	8.2	Methodenvergleich	+	+	+
	8.3	Methodenvergleich	+	+	+
	8.4	Methodenvergleich	+	+	+

Lessons learned IV:

Three case studies

- Case study I: wood fibre insulation boards vs. alternative, Case study II: solar vs. wind power, Case study III: meat vs lentil vs tofu patty
- Extending existing LCA-studies by results of aforementioned biodiversity methods
- Evaluating overall LCA results and how recommendations might change due to chosen biodiversity method



Outlook:

- Finalization of the case studies
- Derivation of recommendations for an independent biodiversity footprint
- Workshop with LCA experts in November to discuss the results of the case studies/method comparison and especially the recommendations
- Preparation of final project report
- International publication

Thank you very much



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