

Review of life-cycle based methods for absolute environmental sustainability assessment



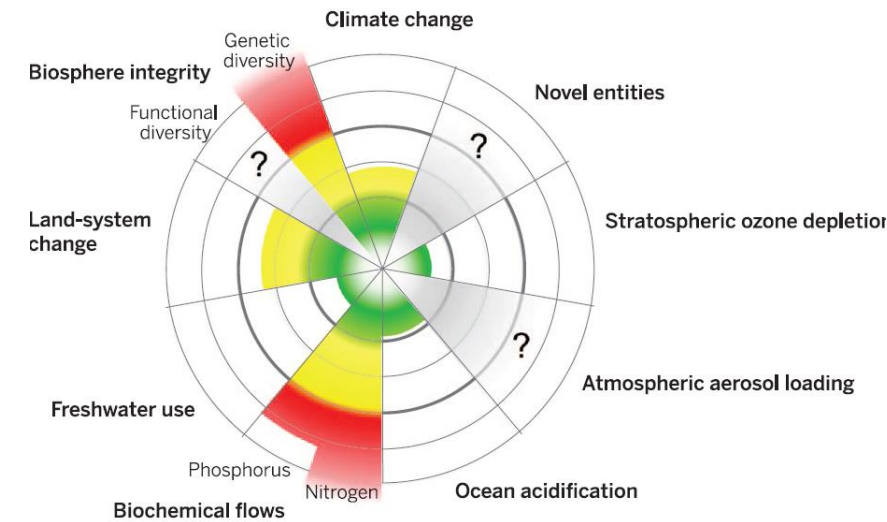
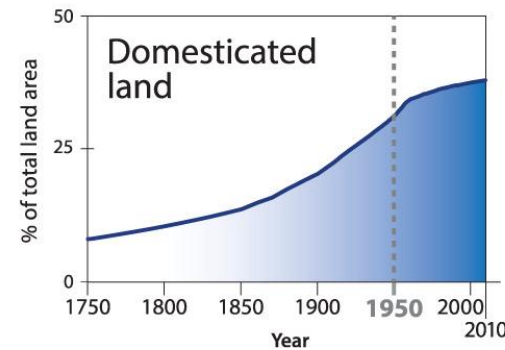
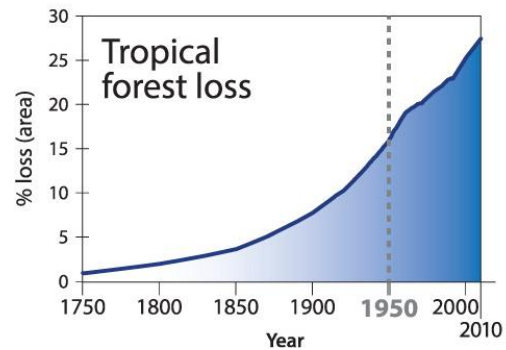
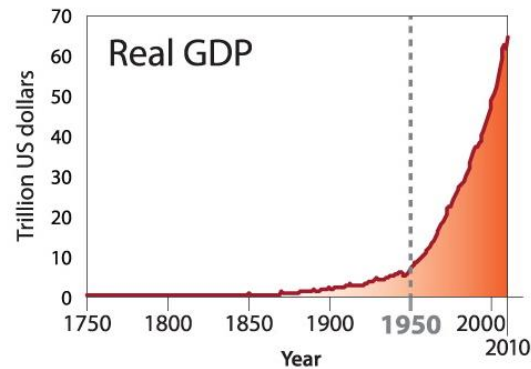
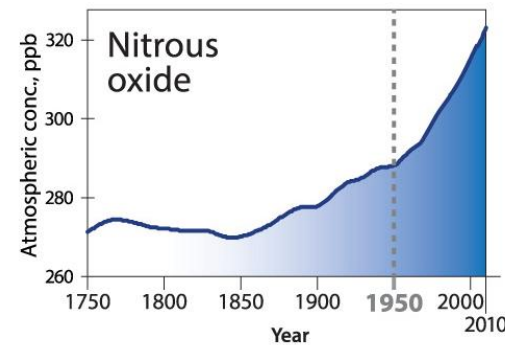
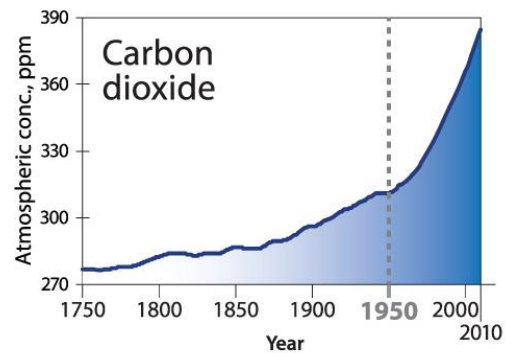
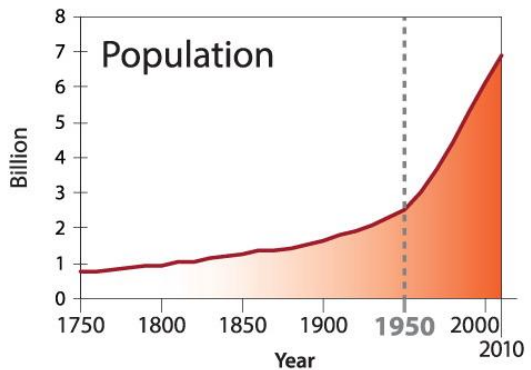
Anders Bjørn, Chanjief Chandrakumar, Anne-Marie Boulay, Gabor Doka, Kai Fang, Natacha Gondran, Michael Hauschild, Annemarie Kerkhof, Henry King, Manuele Margni, Sarah McLaren, Carina Mueller, Mikołaj Owsianiak, Greg Peters, Sandra Roos, Serenella Sala, Gustav Sandin, Sarah Sim, Marcial Vargas-Gonzalez, Morten Ryberg*

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Introduction

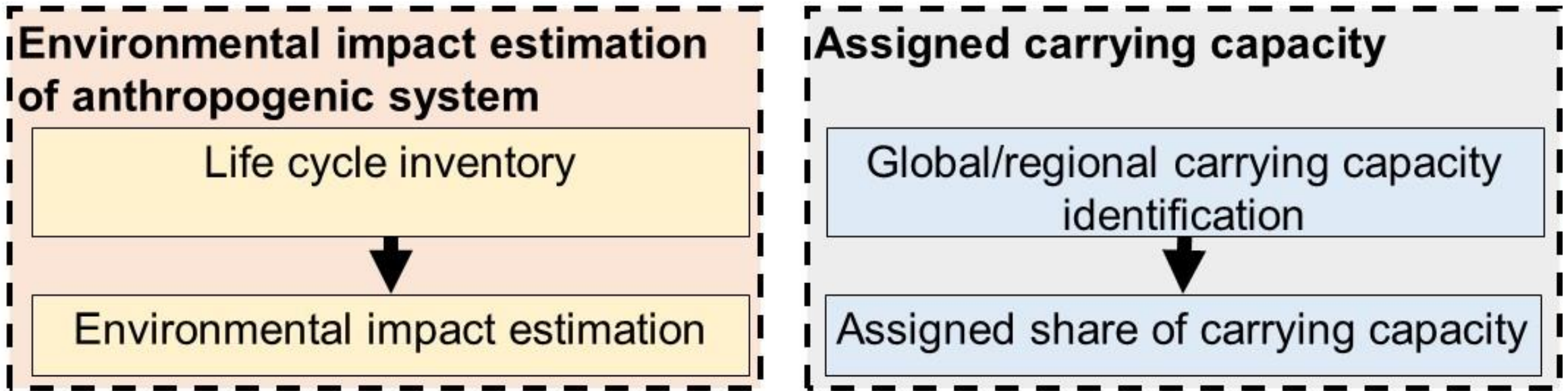
- Human driven pressures are starting to exceed the Earth's environmental carrying capacities.
- Need for assessment approaches that address absolute sustainability based on Planetary Boundary thresholds.



Steffen et al., 2015.
 10.1177/2053019614564785
 10.1126/science.1259855

Absolute Environmental Sustainability Assessment (AESA)

- A number of LCA-based methods for absolute environmental sustainability assessment have been developed



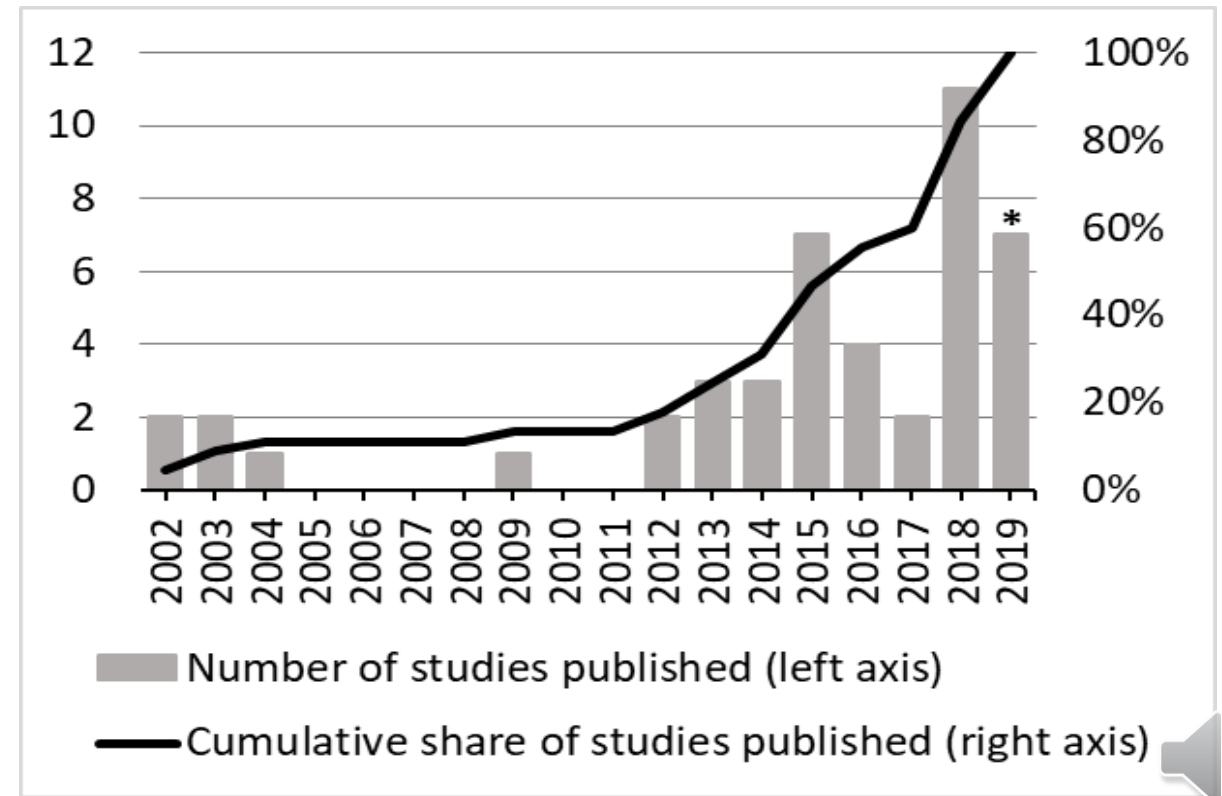
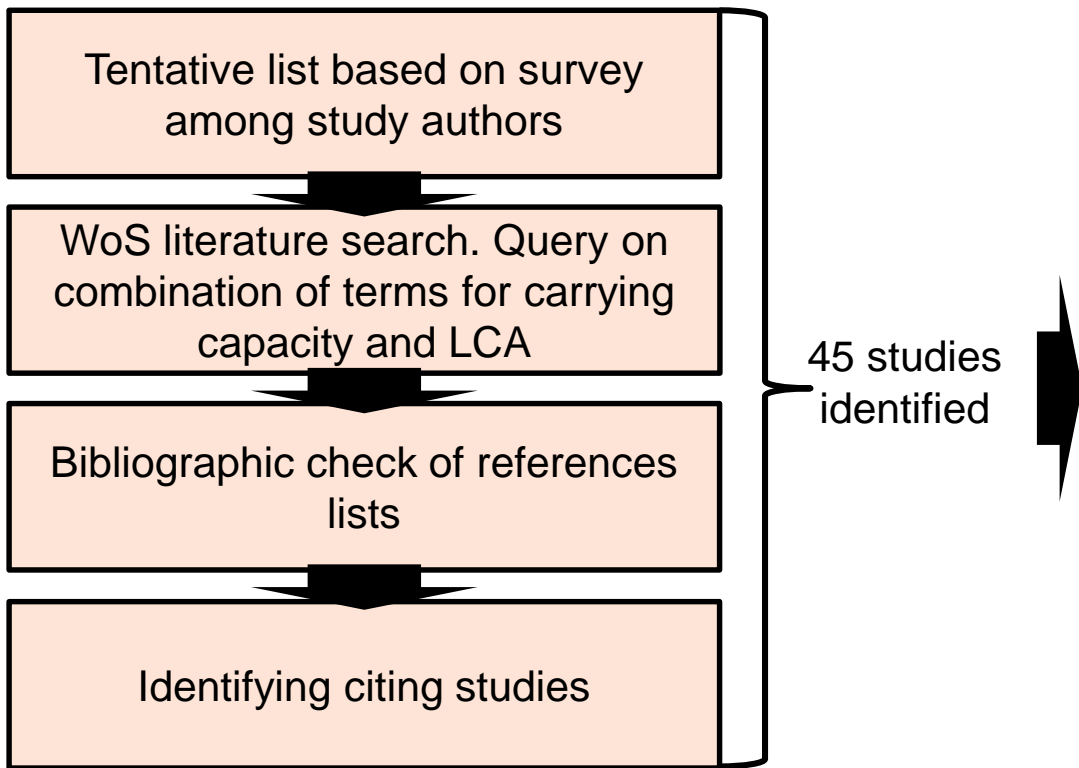
Objectives

1. Systematic review of existing methods and their application
2. Recommendations on the use of AESA methods
3. Identification of methodological research needs.



Review of LCA-based AESA methods

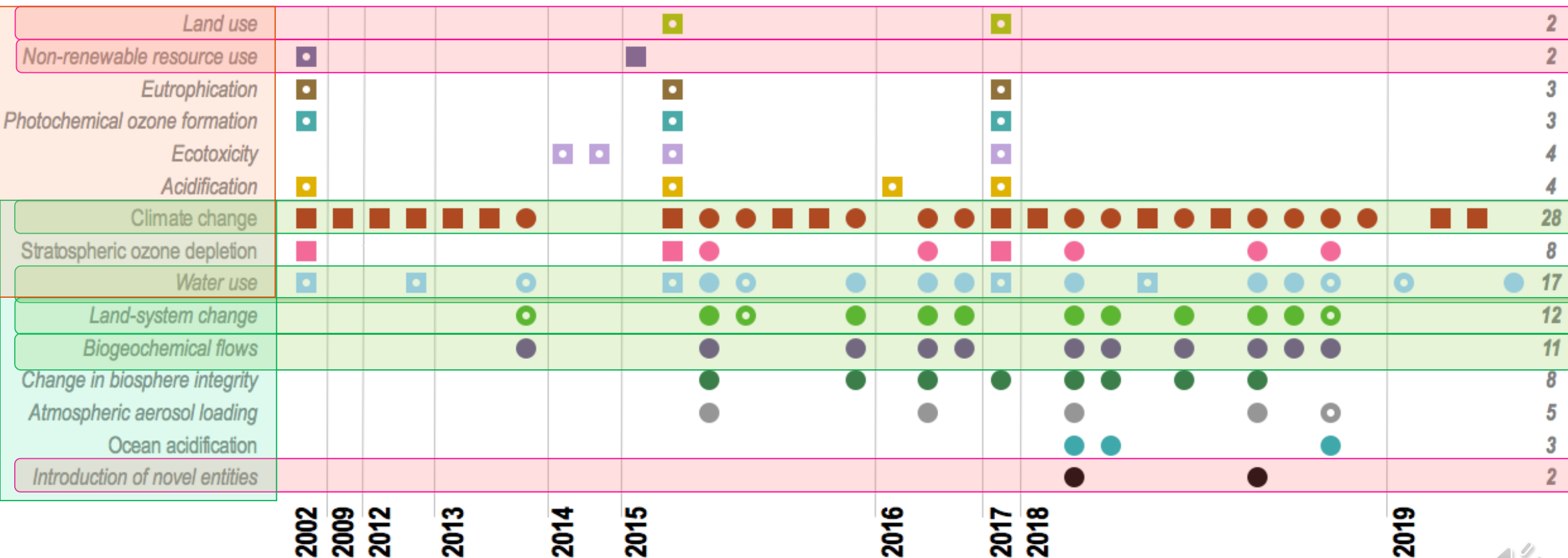
- Focus on studies that present new LCA-based AESA methods and/or case studies applying existing methods
- Applied a four-step sequence to identify relevant studies



AESA methods and impact category coverage

LCIA-based method
 PB-based method

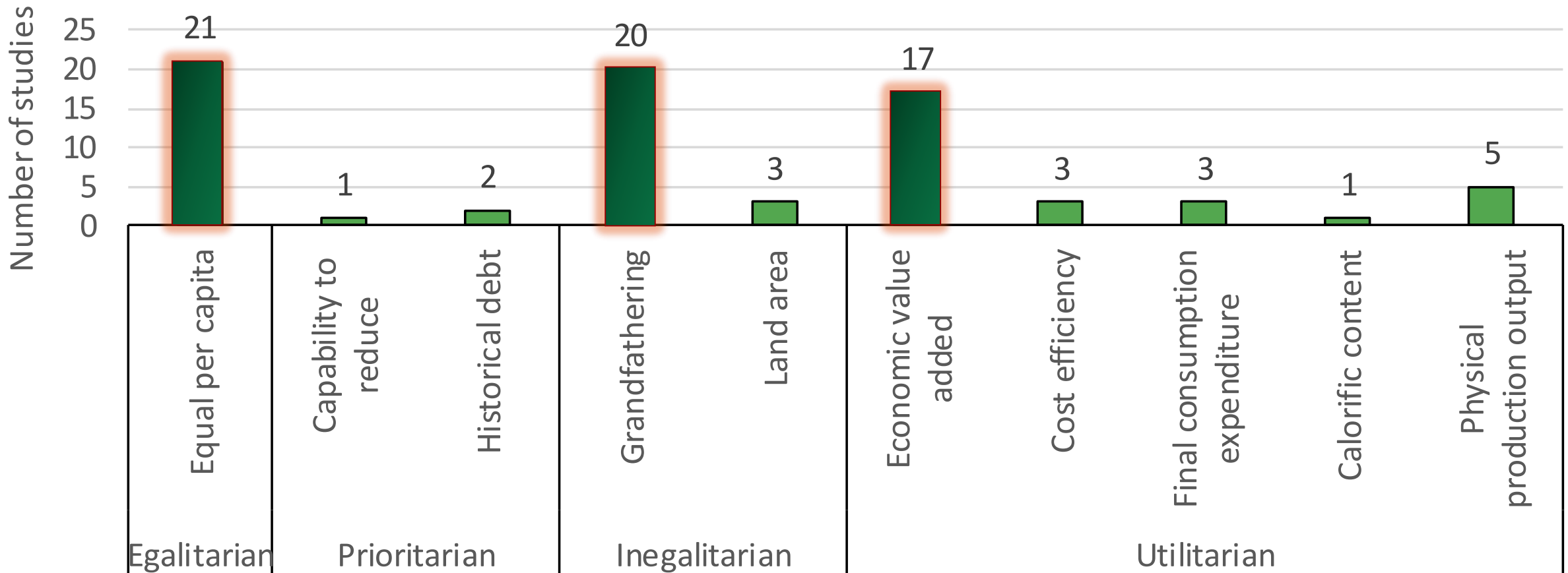
Generic
 Regionalised





Assigning carrying capacity

- Majority of studies apply “Equal per capita”, “Grandfathering”, or “Economic value added”



Bjørn et al. 2020

Recommendations for practitioners

- Selection of impact categories and carrying capacities based on goal of study
- Transparency in the assignment of carrying capacity and other normative choices and critical assumptions
- Use of common AESA terminology



Research needs

- Improve impact category coverage and increase quality of models
- Regionalization of impact assessment models
- Investigation of approaches for assigning carrying capacity
- Implementation in LCA software



Conclusions

- Conducted review of AESA studies
- Showed current trends and tendencies in development of AESA methods and application of AESA methods in case studies
- Provide recommendation for future research and AESA practitioners



Thank you

For more information

- Read background article :
 - Bjørn, A., Chandrakumar, C., Boulay, A.-M., Doka, G., Fang, K., Gondran, N., Hauschild, M.Z., Kerkhof, A., King, H., Margni, M., McLaren, S., Mueller, C., Owsianiak, M., Peters, G., Roos, S., Sala, S., Sandin, G., Sim, S., Vargas-Gonzalez, M., Ryberg, M., 2020. *Review of life-cycle based methods for absolute environmental sustainability assessment and their applications*. Environmental Research Letters. <https://doi.org/10.1088/1748-9326/ab89d7>
- Visit our LCAbsolute website on www.LCAbsolute.com
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