A Guide for Describing Aspects of Justice in Climate Scenario Research [Online Poster Session 2]
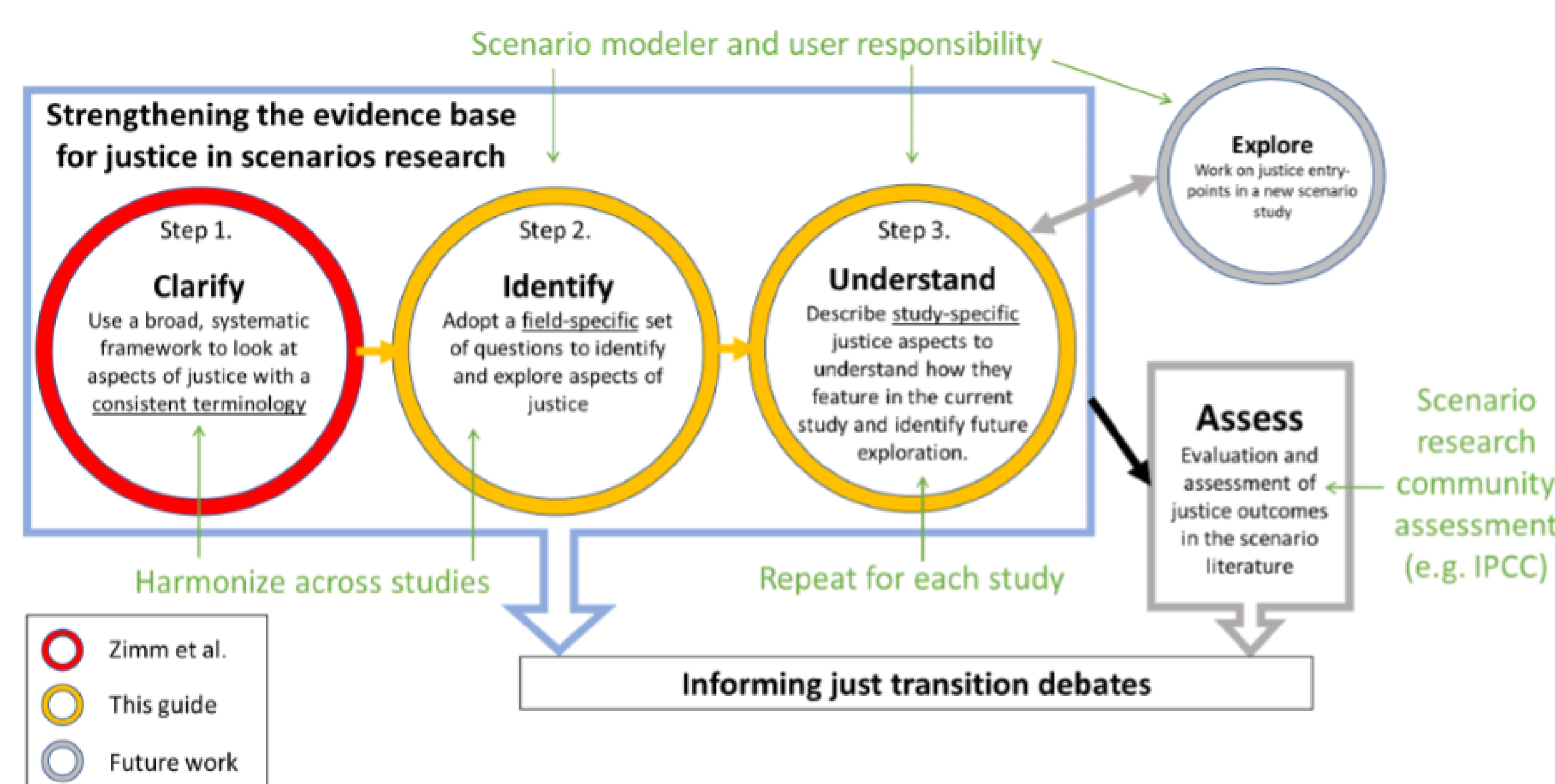
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0. Abstract

No comprehensive understanding of justice in climate scenarios exists. This gap limits the extent to which scenarios can inform global policy discussions that have just transitions as a key guiding principle. Here, we **bridge the gap between a theoretical justice framework and a study-specific applications for integrated assessment modelling**, which produce quantitative scenarios for policy and decision support.

1. Introduction

We propose a blueprint for analysing justice aspects in model-based scenario studies. We do so in three steps.

1.1 Clarify justice framework

First, we clarify how we look at justice using a specific terminology and framework.

1.2 Identify justice elements

We use a set of broader guiding questions related to each element of this framework to develop a set of specific questions that enable identification of aspects of justice in model-based scenario studies. [This step is the focus of this current work.]

1.3 Understand justice implications

Third, we answer these questions for scenarios from the recent model intercomparison project ENGAGE[1,2] to understand the research entry-points for analysing justice in scenarios. This step should be repeated for a much broader set of scenarios to highlight justice entry-points to enable a robust, research community-driven effort to understand justice across scenario ensembles.

2. Describing justice using matrices

Table 1: Set of guiding questions related to each element of this framework (Table 1) to develop a set of specific questions that enable the identification of aspects of justice in model-based scenarios. This table expands the elements of the justice framework in ref.[1] with common steps in any research project. For a more detailed, field-specific version of this table, see Methods Table 1.

Element of Justice Framework	Research question	Research methods	Results
Area of justice	For each element of the justice framework, how is justice are addressed in your research question?	For each element of the justice framework, what components of the used research design and operationalization have justice implications? How are elements of justice represented in the research and what might be associated limitations?	What research results and scenario quantifications are reported, with what detail, and what are the justice implications?
Scope of justice			
Form of justice			
Metric			
Pattern of justice			
Procedural justice	Is the research reflective of, and relevant to, relevant stakeholders?	Does the research incorporate the viewpoints of various stakeholders? Is research and views from vulnerable or marginalized groups considered, and present in the research team itself?	Are the results communicated appropriately to the public as well as policymakers?

This is a schematic matrix for identifying justice elements in climate research.

To provide guidance for describing the aspects of justice in model-based scenario studies including IAM-based studies, we create a **matrix of questions along these different stages**. The goal of this exercise is not to specify which metrics or patterns are the most fit-for-purpose. Rather, the aim is to enable an explicit and informed scientific discussion about specific aspects of justice in scenario development and in scenario analysis.

*Note on scope of matrices

Separate elements of the justice framework can be applied not only to each **area of justice** (e.g., mitigation efforts, impacts, adaptation, or decent living services), but to each **stage of the research process** itself. For IAM studies, the research design generally includes both research questions and the scenario design. The research methods stretch across key model assumptions, the selection of input data, and the post-processing applied. These various elements are reflected in the sample table.

3. Application to extant projects

We use this schematic matrix for a **variety of extant projects**, such as **DLE, ENGAGE and LED**. The purpose is to see which justice elements have been adopted and map these projects onto the overall space of justice.

The matrices for these other projects are not included on this poster, but are in progress

3.1 Sample: ENGAGE

In the research design, it is clear that the ENGAGE scenarios[2,3] focused on mitigation and long-term impacts, of alternative emissions pathways with the same carbon budget. Development (or access to decent living services) and adaptation received less attention, with all scenarios following one socioeconomic pathway (SSP2).

3.2 Some justice issues

Different **forms of justice—including procedural, distributional, and recognitional**—can be identified in the scenario quantifications (across input data, IAM variables, and post-processing tools). For example, the choice of cost-minimisation and global carbon prices can be discussed as influencing distributive justice, though not with a squarely utilitarian pattern. Going beyond distributive justice, the modelled pathways allow for partially discussing transitional justice by comparing different pathway characteristics at different points until the same endpoint: a certain temperature outcome at the end of this century.

4. Discussion

The goal of this presentation is to help indicate what justice aspects are addressed by the scenarios and by the study process itself. A **future justice model intercomparison project (JustMIP)**, could use a similar approach to the one presented here, but comparability across studies still needs to be demonstrated and would benefit from a standardized approach. In other work, we suggest a potential framework that could be used for justice in Step 1.

4. Conclusion

A useful **tool to identify justice aspects needs to be simple and intuitive**, enable comparability across applications, while also being sufficiently comprehensive. By introducing this matrix approach to breaking down elements, modellers and scenario builders can systematically examine justice elements, allowing the research needed to understand justice more deeply.

Works Cited

[1] Mace, M., & Verheyen, R. (2016). Loss, Damage and Responsibility after COP21: All Options Open for the Paris Agreement. *Review of European, Comparative & International Environmental Law*, 25(2), 197-214. doi:10.1111/reel.12172

[2] Mechler, R., & Schinko, T. (2016). Identifying the policy space for climate loss and damage. *Science*, 354(6310), 290-292. doi:10.1126/science.aag2514