Sub-global Scenarios that Extend the Global SSP Narratives: Literature Database, Version 1, 2014-2021

The full version of this document is included as the documentation of the Sub-global Scenarios that Extend the Global SSP Narratives: Literature Database, Version 1, 2014-2021, and describes the methodology and definitions as of December 2023. It also includes a description of the database generation, process of coding, and definitions used in the coding.

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Short summary of the Methodology of Database Generation

The Sub-global Scenarios that Extend the Global SSP Narratives: Literature Database, Version 1, 2014-2021 consists of 37 columns of bibliographic data, methodological and analytical insights, from 155 papers published from 2014 to 2021 that extended the narratives of global SSPs. The database was developed in four stages: searches, screening, data extraction and coding. The search stage incorporated three approaches: using a search string in three academic databases (Scopus, Web of Science Core Collection, ScienceDirect); a targeted search of a specific relevant database (ICONICS); and a targeted selection in Google Scholar of all papers that cited the publication of the global SSP narratives. In the screening step, we assessed criteria for full-text papers for eligibility including relevant typologies, methodologies, and other criteria. Finally, data from eligible papers was extracted and entered in a coding framework in an Excel workbook spreadsheet. The coding framework resulted in 37 columns to systematize coding of data from the 155 papers selected along several different dimensions, including categories of papers or analysis, several subcategories for SSP Applications and SSP Extensions, specific SSPs used, specific Representative Concentration Pathways (RCPs) used, typologies of extensions of qualitative and quantitative SSPs, types of models, and the nature of the extended SSPs.

Methodology

Systematic reviews offer a well-established rigorous approach to synthesizing qualitative and quantitative evidence and have been applied in a variety of fields (Walker, 2007). The approach is based upon strict guidelines for conducting literature reviews in a comprehensive and transparent way with limited bias (Collaboration for Environmental Evidence, 2013). In this document we explain how we apply lessons learned from systematic reviews (Haddaway et al., 2015) to create a simplified review process to generate the Sub-global Scenarios that Extend the Global SSP Narratives: Literature Database, Version 1, 2014-2021, incorporating four key stages: searches, screening, data extraction and coding.

1. Searches

Our search incorporated three approaches: using a search string to search academic databases, a targeted search of a specific relevant database (ICONICS) and targeted selection in Google Scholar of all papers that cited one of two foundational SSP papers.

1.1. Academic databases: Scopus and Web of Science databases

A search of the literature in two academic databases – Scopus and Web of Science Core Collection – was conducted on 7 September 2020. For our search of the literature in these databases, we developed a search string that combined search terms related to two key parameters (see Table 1): reference to global SSPs architecture and future thinking terminology (i.e., scenarios, pathways, stories). Our searches in these two databases were not updated during the conduct of the review.

Table 1. Search string

Database	**Search string** **Search refinements**	**Date**
Scopus (Title, keywords, abstract	((("SSP" AND (scenario* OR narrative* OR future* OR story OR stories OR storyline*)) OR	7 Sep 2020
Web of Science core collection (Topic search)	("shared socioeconomic" AND (pathway* OR scenario* OR narrative* OR future* OR story OR stories OR storyline*)) OR ("shared socio-economic" AND (pathway* OR scenario* OR narrative* OR future* OR story OR stories OR storyline*)))	7 Sep 2020

1.2. ICONICS database

We also included in our search all articles listed in the database of the International Committee On New Integrated Climate change assessment Scenarios (ICONICS)[1]. The list of articles curated by ICONICS is based on Google Scholar for studies that mention "Shared Socioeconomic Pathways", and for an article to be added to the list, it needs to include a minimum of two SSPs (e.g., studies based only on SSP2 are not included here). This search was undertaken on 7 September 2020.

1.3. Google Scholar

Lastly, we searched all articles in Google Scholar that cited O'Neill et al. (2014) in Climatic Change and O'Neill at al. (2017) in Global Environmental Change, both widely acknowledged as foundational papers on global SSP narratives. For both papers, different versions of the paper have been cited, but Google Scholar listed articles that cite any version, including the final versions published in Climatic Change in 2014 and Global Environmental Change in 2017. We undertook this search on 7 September 2020. The search and retrieval of citing articles was done using Publish or Perish[3], an open access software tool.

In order to include the most recent papers in our review, we did an additional search of Google Scholar using "Publish and Perish" on 9 September 2021, including only papers from 2020 and 2021.

2. Screening process and eligibility criteria

All articles gathered during the different searches were compiled together and duplicates were removed. The remaining articles were then screened for eligibility at title, abstract and then full text levels using a predefined inclusion criterion set out in Table 2. The reviewing team consisted of three researchers. In order to ensure consistency in the way reviewers applied the inclusion criteria, we compared agreement between two reviewers on a subset of records at title, abstract and full text level screening. Title and abstract screening was completed using Rayyan[3], a web-based review tool. Following abstract screening, potentially relevant articles were retrieved in full text and screened. During screening, we excluded non-English language articles due to resource constraints.

A total of 5,857 articles were identified in Scopus, Web of Science, ICONICS and Publish or Perish databases, with 3,511 remaining after removal of duplicates. We excluded 1,824 articles after title screening and 1,148 after abstract screening, leaving 539 articles to be retrieved for full-text screening. Full text screening led to the inclusion of 155 articles that explicitly contained empirical studies using extension/downscaling of SSPs.

Table 2. Eligibility/inclusion criteria for screening		
Relevant populations	**Relevant methodology/approach**	**Other criteria**
Region, national and sub-national geographical point of departure in study Exclude: Global studies	Application of global SSPs narratives Scenario-building activity OR Linking existing local/national scenarios to global SSPs Exclude: Papers that only use SSP quantifications Review papers	English language From 2013 onwards only

3. Data extraction and coding

Data was extracted from each of the 155 articles included in the review and put into a coding framework. Data extraction was undertaken by a small team of researchers, who coded data in an Excel file. The coding framework is presented in this database and comprises 37 columns of data from the final 155 papers. The data covers several different dimensions, such as categories of papers or analysis, several subcategories for SSP Applications and SSP Extensions, specific SSPs used, specific Representative Concentration Pathways (RCPs) used, typologies of extensions of qualitative and quantitative SSPs, types of models and nature of the extended SSPs.

4. Definitions

All columns have the purpose to inform the users about the bibliographic data, nature of the study and its methods and an overview of the nature of results, intended as extended SSPs. All columns can be further classified and analyzed by the users of the database. A selection of columns have been specifically designed and pre-classified for analysis purposes. These are marked with a "yes" in the rightmost column of Table 3.

Table 3. List of columns, with their definition and whether they have been pre-classified for the analysis			
Columns		**Definition**	**Pre-classified for the analysis**
Bibliographic data	A. Year	Year of publication	Yes
	B. Authors	List of authors	
	C. Title	Title of the study	
	D. Journal	Name of the journal. When not applicable, name of the report	
	E. Abstract	Full abstract text	
	F. URL	Link to online version of study	
	G. Affiliation first author (country)	Country of affiliation of the first author, including multiple affiliations if reported in the study	Yes
	H. Case study area	Description of the case study area	

	I. Case study countries	Classification of case study countries. Countries are included if, as minimum, some form of country scale data is explicitly presented in the study	Yes
	J. Theme	Classification of the thematic focus. The theme can be sectoral or multi sectoral. If the theme broadens beyond clear sectoral application, the alternative thematic focus is reported	Yes
	K. Main objective of the paper	A summary of the main objective of the study	
	L. IAV/other focus	Classification of Impacts, Adaptation and Vulnerability or other focus	Yes
	M. SSPs (How many?)	Number of SSPs used in the study (1-5)	Yes
	N. SSP1	An "x" indicates that SSP1 has been used	Yes
	O. SSP2	An "x" indicates that SSP2 has been used	Yes
	P. SSP3	An "x" indicates that SSP3 has been used	Yes
	Q. SSP4	An "x" indicates that SSP4 has been used	Yes
	R. SSP5	An "x" indicates that SSP5 has been used	Yes
	S. RCPs	RCPs reported in the study indicating which ones. If RCPs are not reported, then "NA"	Yes
	T. Climate Scenarios	Classification of whether RCPs or other sources have been reported (e.g., SRES)	Yes
Nature of Methods	U. Main method of the studies	Classification of whether the main method is quantitative, qualitative, or mixed	Yes
	V. Main method for developing extended SSPs	Description of the main method or approach used to extend SSPs	
	W. Derived from extended SSPs? [Which one / N]	Classification of whether the study applies extended SSPs. If so, the source of the extended SSPs is indicated	Yes
	X. Top-down, bottom-up, combined	Classification of whether the study is top-down, bottom-up, or combined	Yes
	Y. Were variables from IIASA SSP used? [Y/N] - If so, what variables of the IIASA SSP database where used?	Classification of application of SSP IIASA database variables [Y=yes; N=no]	Yes
	Z. Direct stakeholder involvement for the study [Y/N]	Classification of whether stakeholder involvement is applicable to the study [Y=yes; N=no]	Yes
	AA. Stakeholder involvement method in the study [Which one / N]	Classification of type of stakeholder involvement method	Yes
	AB. Main model type [Y - Which type /None]	Description of main model type, with its detailing depending on the emphasis in the in the study. Where models were not explicitly applied, then "None"	
	AC. Main model name [Which model or "No name" / NA]	Main model name, with its detailing depending on the emphasis in the in the study. Where models were applied but had no name, these are classified	
		"no name". Where models were not explicitly applied in column AB, then "NA"	

	AD. Climate model	Name or description of climate model applied. Where forms of climate data are mentioned but a climate model name not specified, then "Not Specified". Where no forms of modelled climate data are mentioned, then "None"	
	AE. Source of climate data	Source of the climate data. Columns AD and AE are linked as follows: when column AD is "None", AE is "NA". When column AD is "Not Specified", then AE is also "Not Specified", unless the source or use of climate data is mentioned	
Nature of results (Extended SSPs)	AF. Qualitative [N = Narratives; E = Elements / None]	Classification of SSP extensions, in the form of fully developed extended SSP narratives "N" or less extensive qualitative elements "E". A description accompanies the classification, where available. Where no narrative elements were developed or elaborated at the minimum "E" level, then "None"	Yes
	AG. Notes on quantitative aspects	Description of quantitative aspects of SSP extensions. Where no quantitative elements were developed or elaborated at a minimum level, then "None"	
	AH. Notes on Spatial resolution	Description of elements pertaining the spatial resolution underlying directly or indirectly the extended SSPs. Where such information is too ambiguous or lacking, then "Not specified"	
	AI. Notes on Spatial extent	Description of elements pertaining the spatial extent underlying directly or indirectly the extended SSPs. Where such information is too ambiguous or lacking, information consistent with Column H is provided	
	AJ. Notes on Temporal resolution	Description of elements pertaining the temporal resolution underlying directly or indirectly the extended SSPs. Where such information is too ambiguous or lacking, then "Not specified"	
	AK. Temporal extent	Year of the temporal extent of the extended SSPs. Where such information is too ambiguous or lacking, then "Not specified"	Yes

References

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