Réseau PROSPER

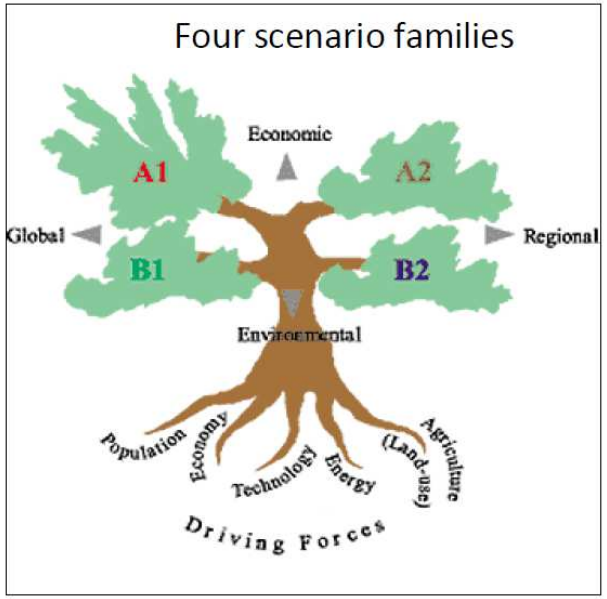
Le réseau des responsables de prospective de la recherche publique française

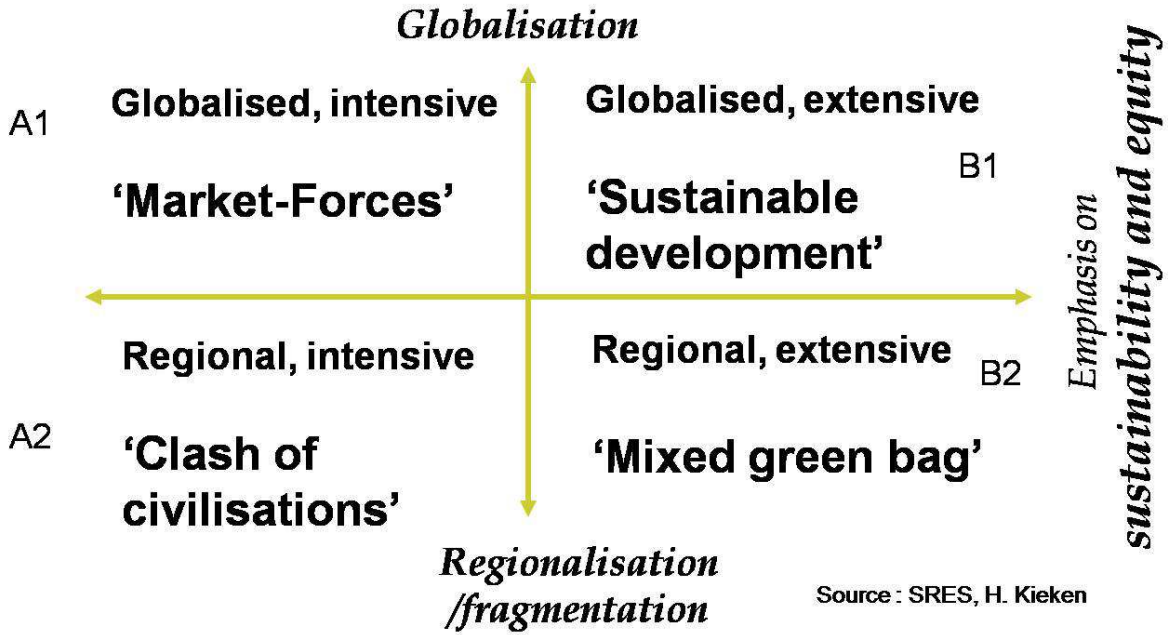
Une nouvelle approche pour les scénarios du GIEC

C.I.R.E.D.

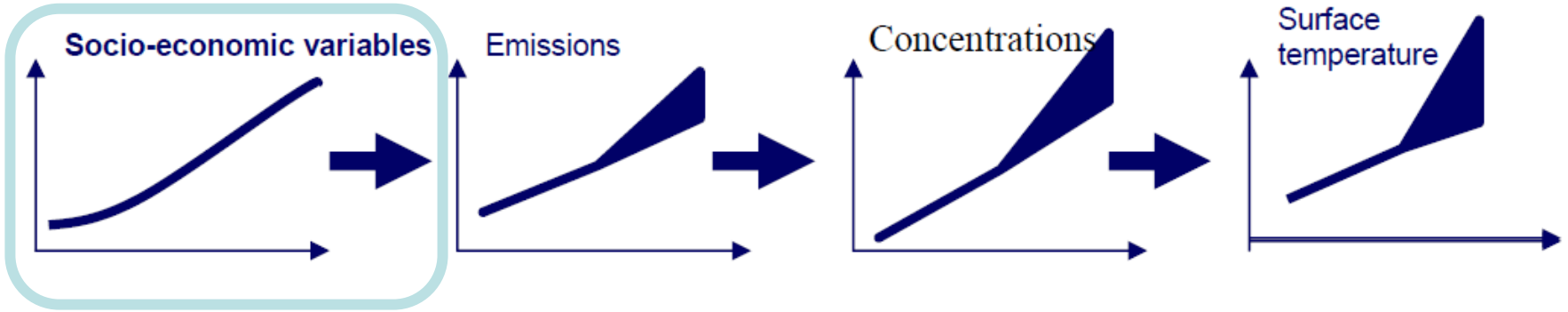
Julie Rozenberg

The SRES scenarios





Traditional/Linear/Forward Scenario Process



Meehl, Hibbard, et al. 2007, WCRP Report.

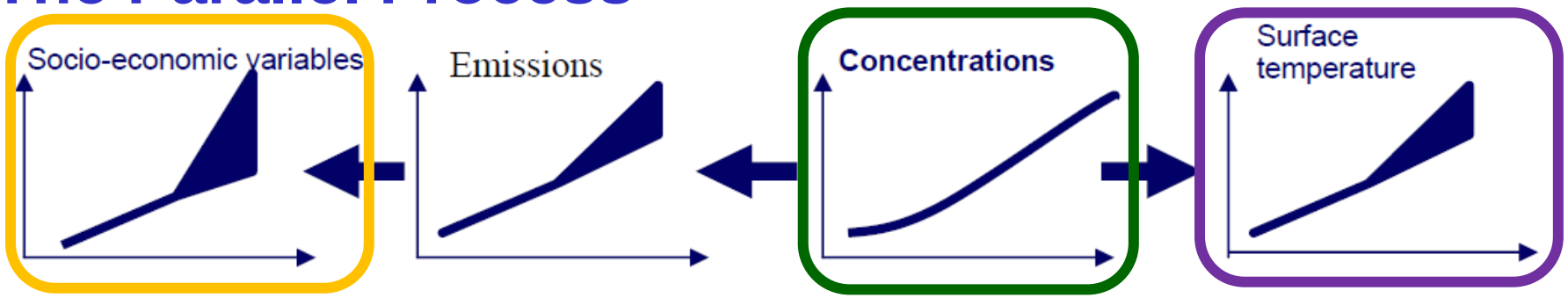
Why do we need new IPCC scenarios?

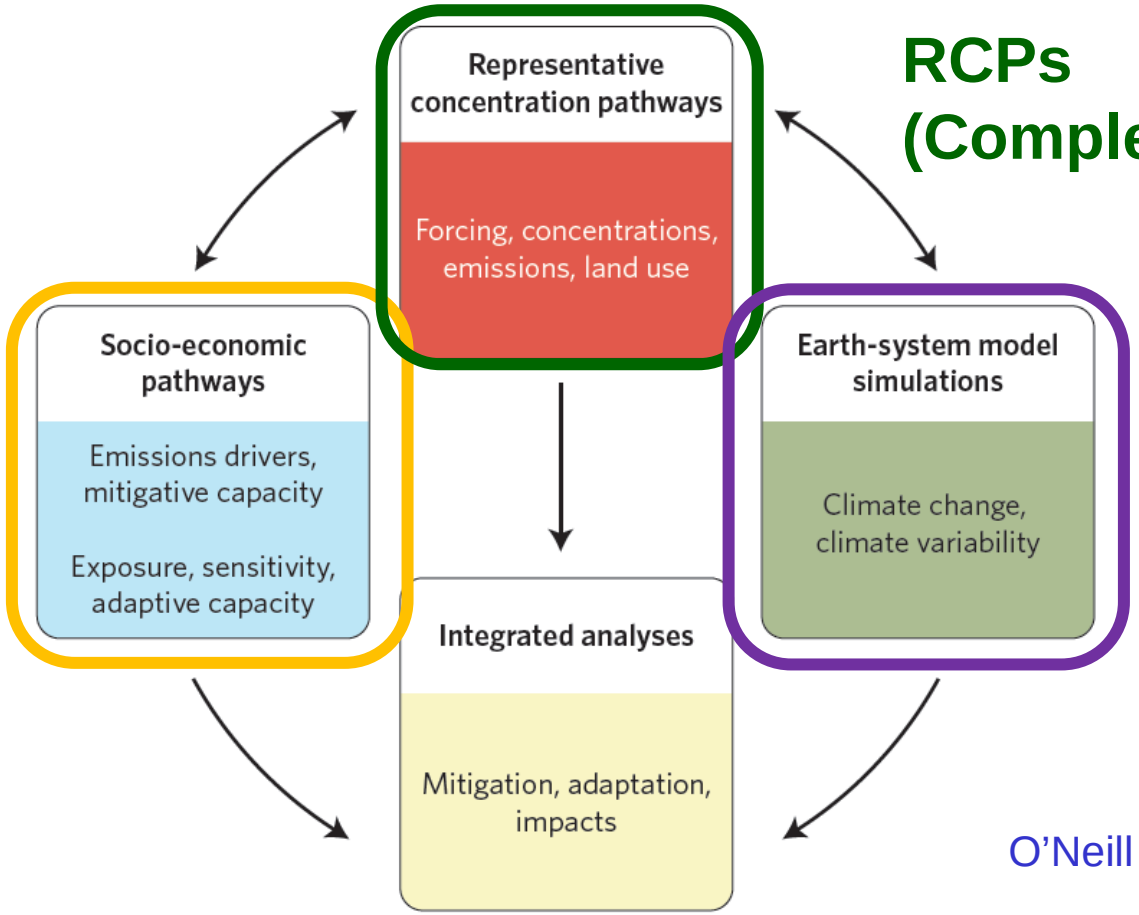
- We need to have scenarios that:
  - account for **new socio-economic evolutions**
  - are relevant for **adaptation and impact studies**

- We need **baseline** scenarios and **mitigation** scenarios

- We are building a product (scenarios), but also a **process** to organize research in this domain.

The Parallel Process





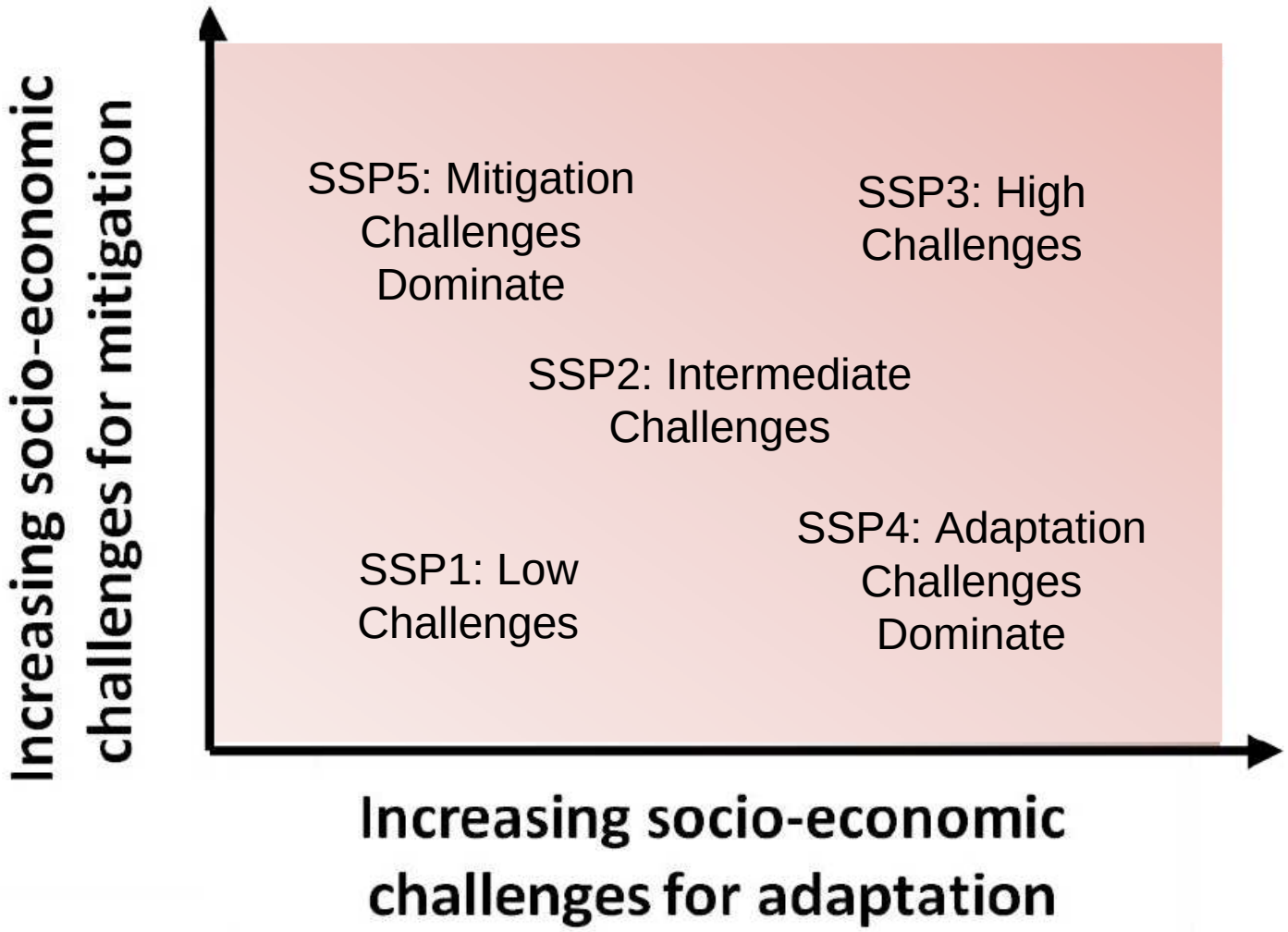
RCPs (Complete)

In progress

Ongoing

O'Neill &Schweizer, 2011.

Shared Socioeconomic Pathway (SSP) Logic

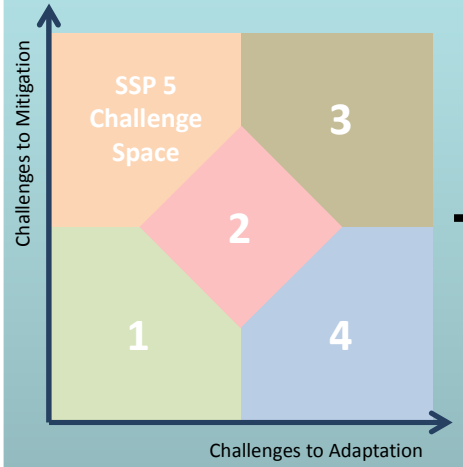


How are new scenarios to be used?

- Foundation for climate change research
- Scientific assessment (e.g. IPCC, governmental or non-governmental organization reports)

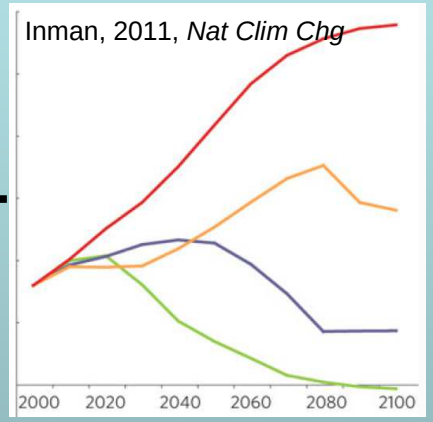
Use 1: Climate change research

Reference scenario



(SSP)

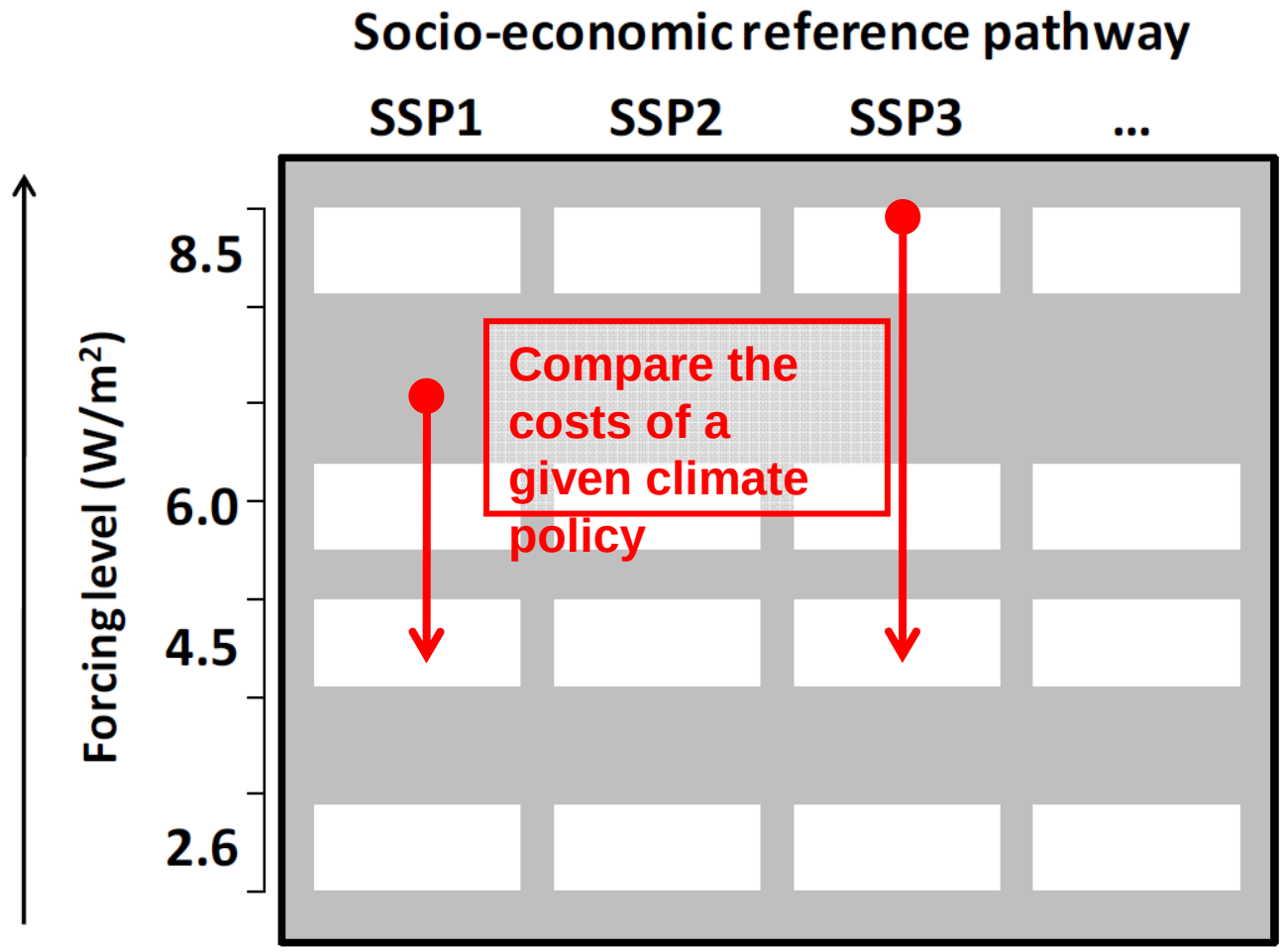
+



(RCP)

+ Policy assumption(s) ⇨ Integrated benefit-cost analysis, risk analysis, etc.

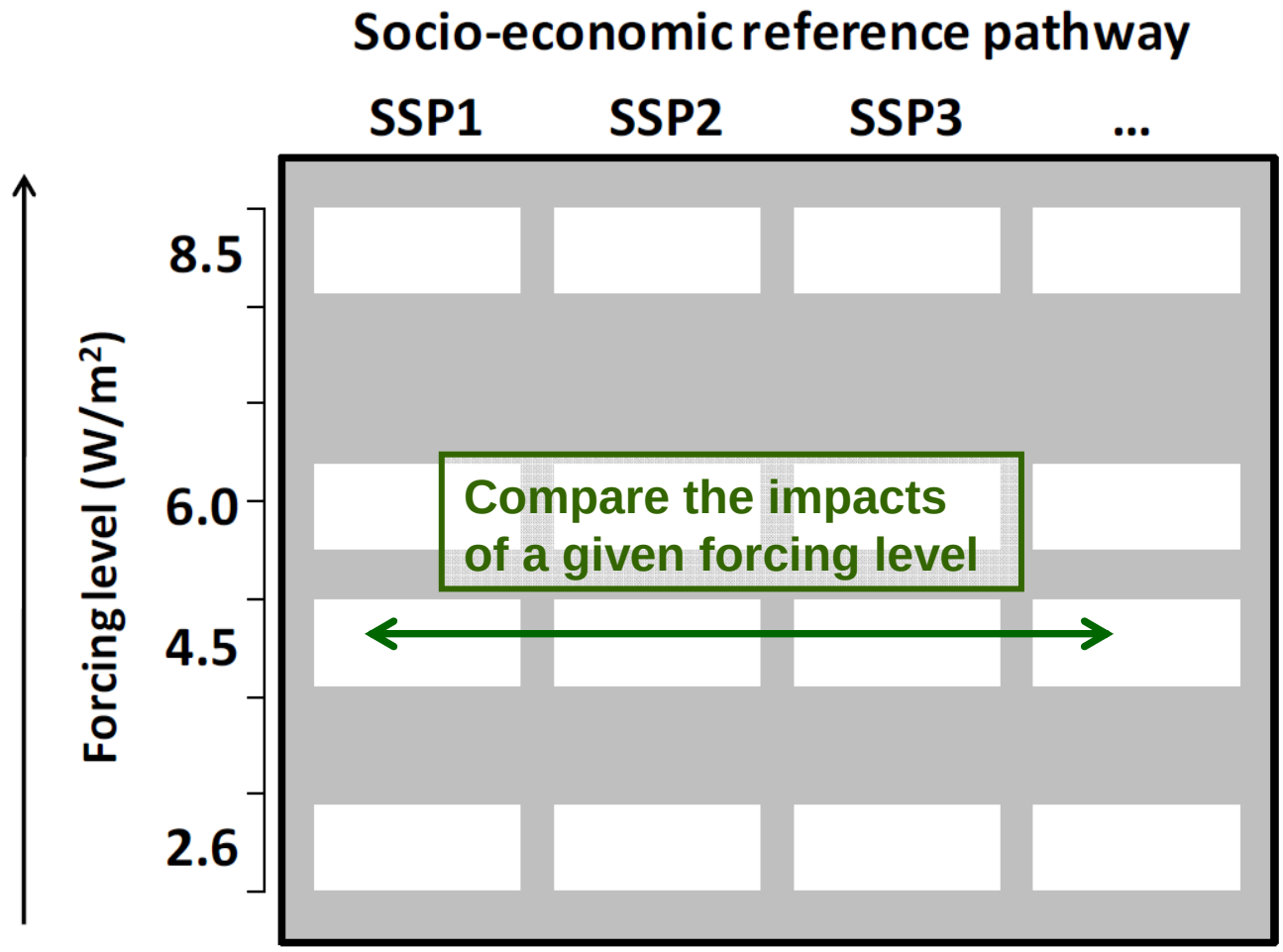
Use 2: A tool for integrated analysis, the scenario matrix



Source:
Brian O'Neill

Framework paper posted on NCAR website: http://www.isp.ucar.edu/socio-economic-pathways

Use 2: A tool for integrated analysis, the scenario matrix



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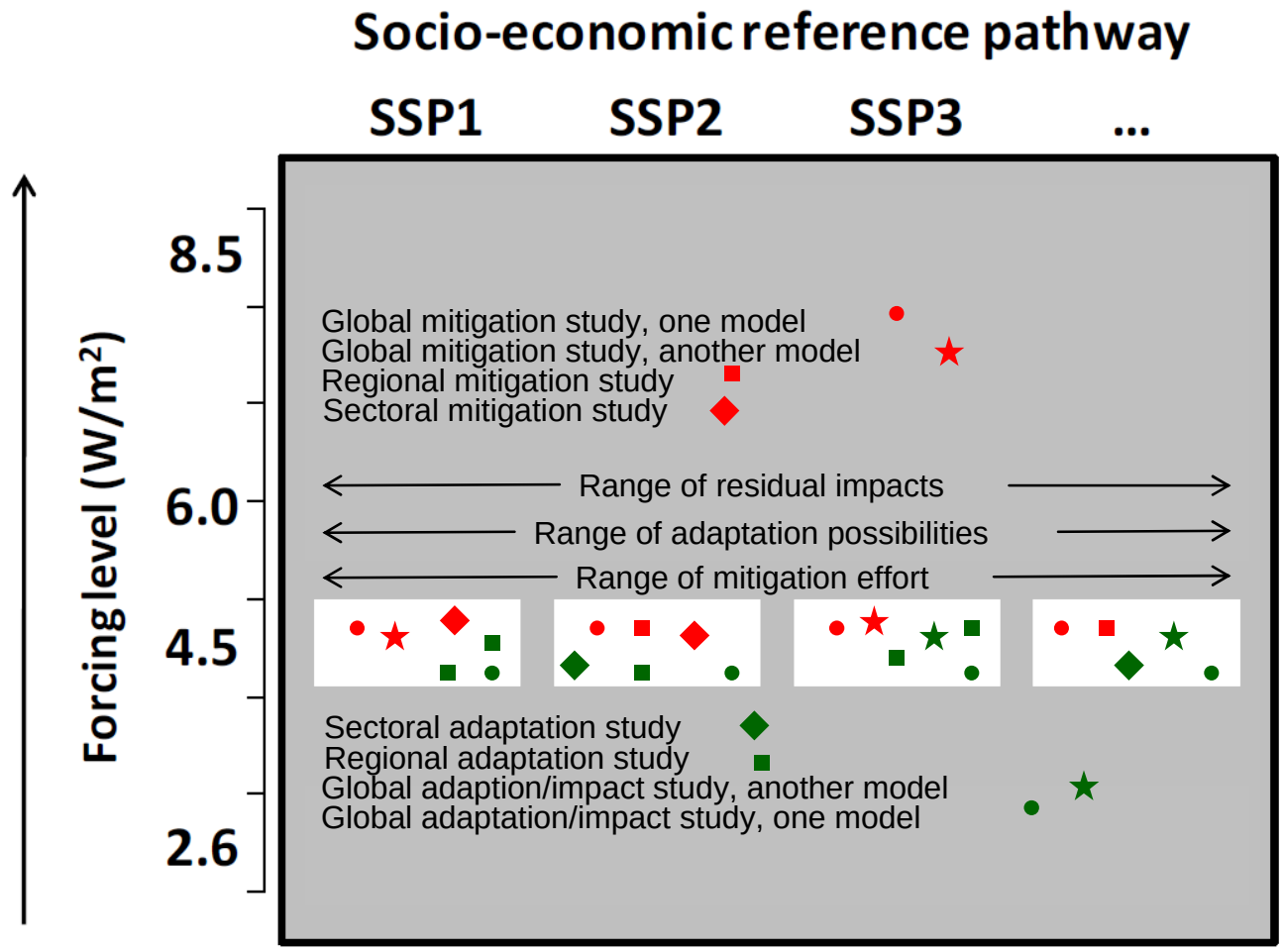
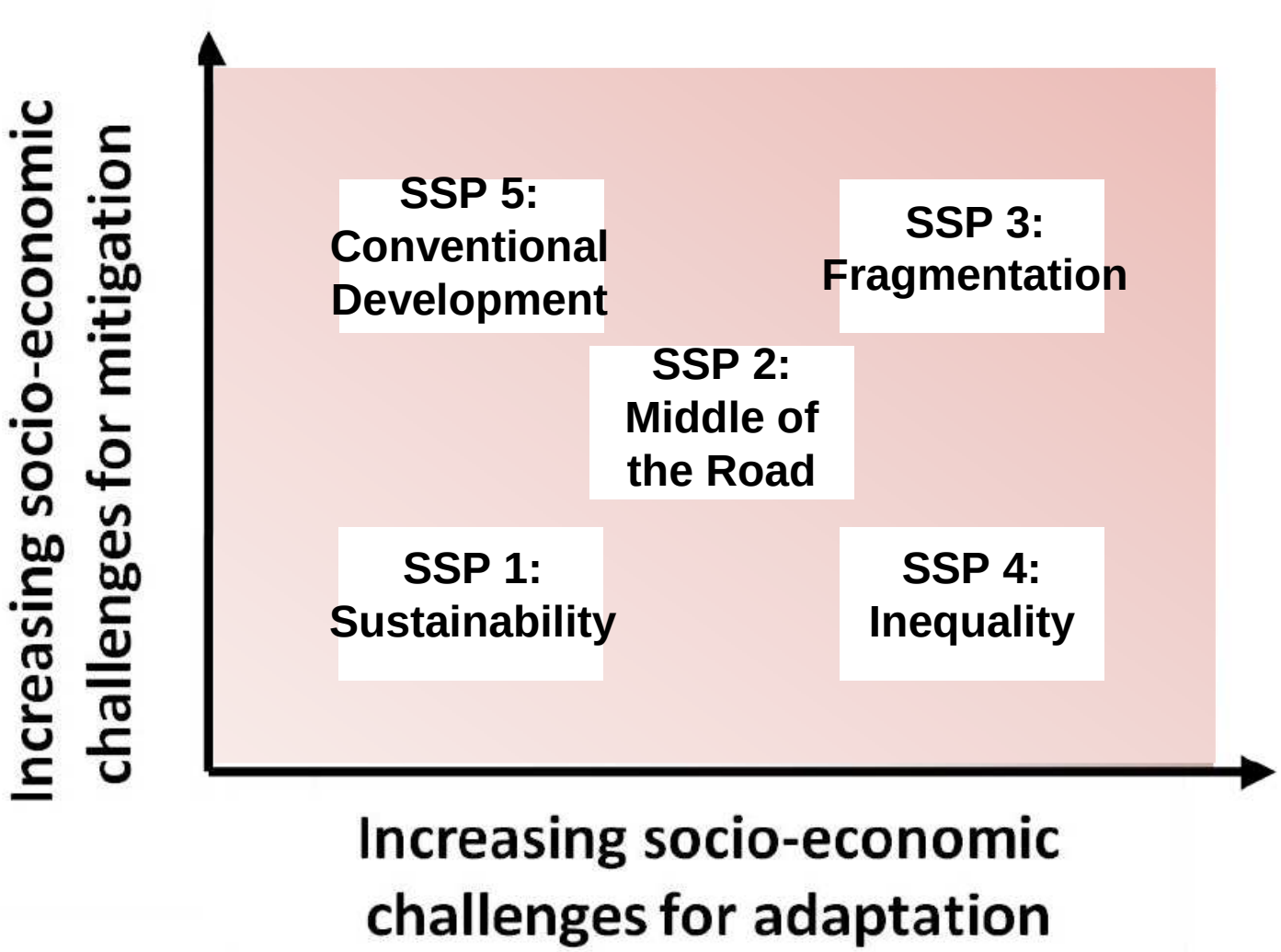


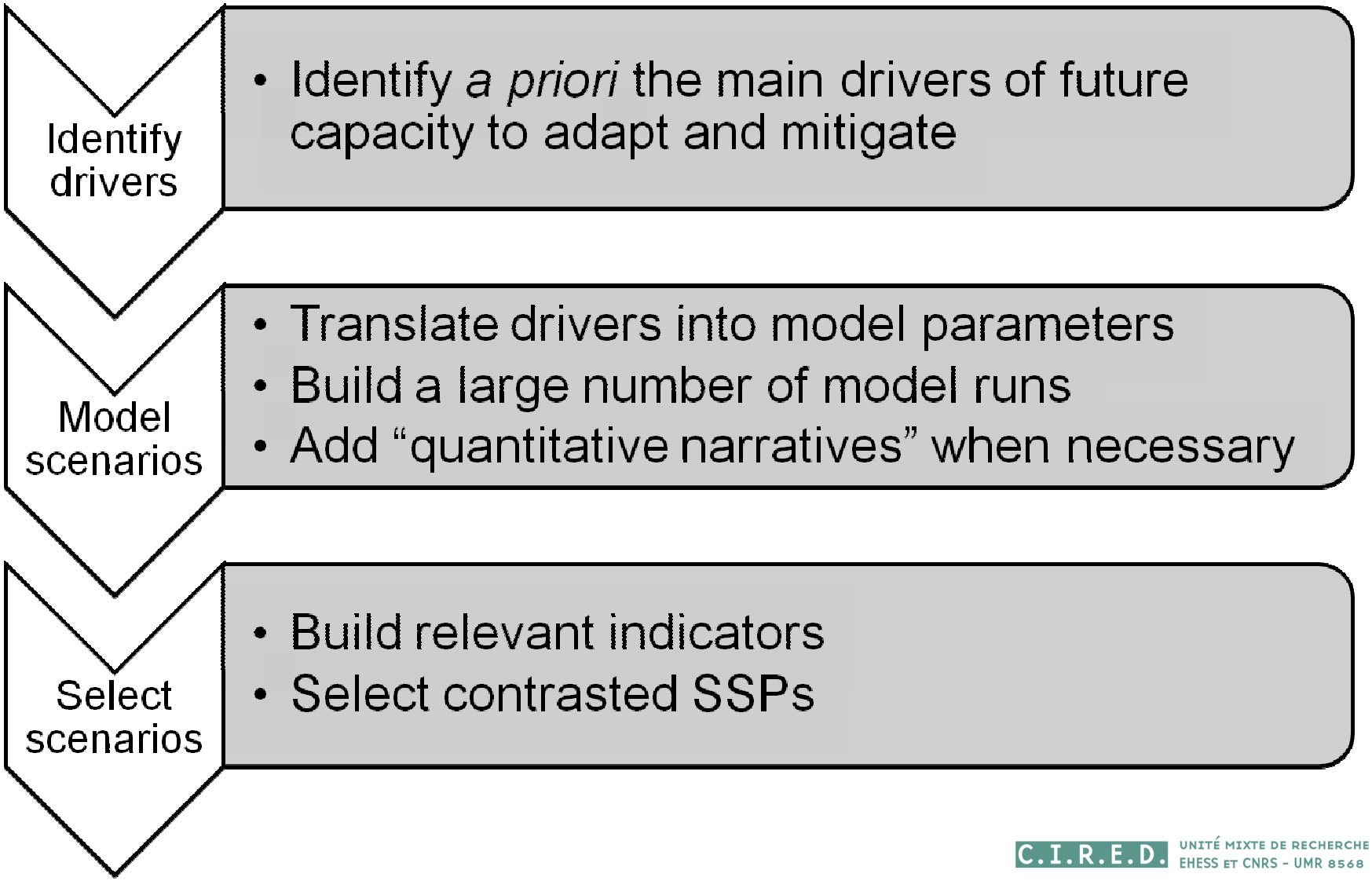
Source:
Brian O'Neill

The Boulder narratives

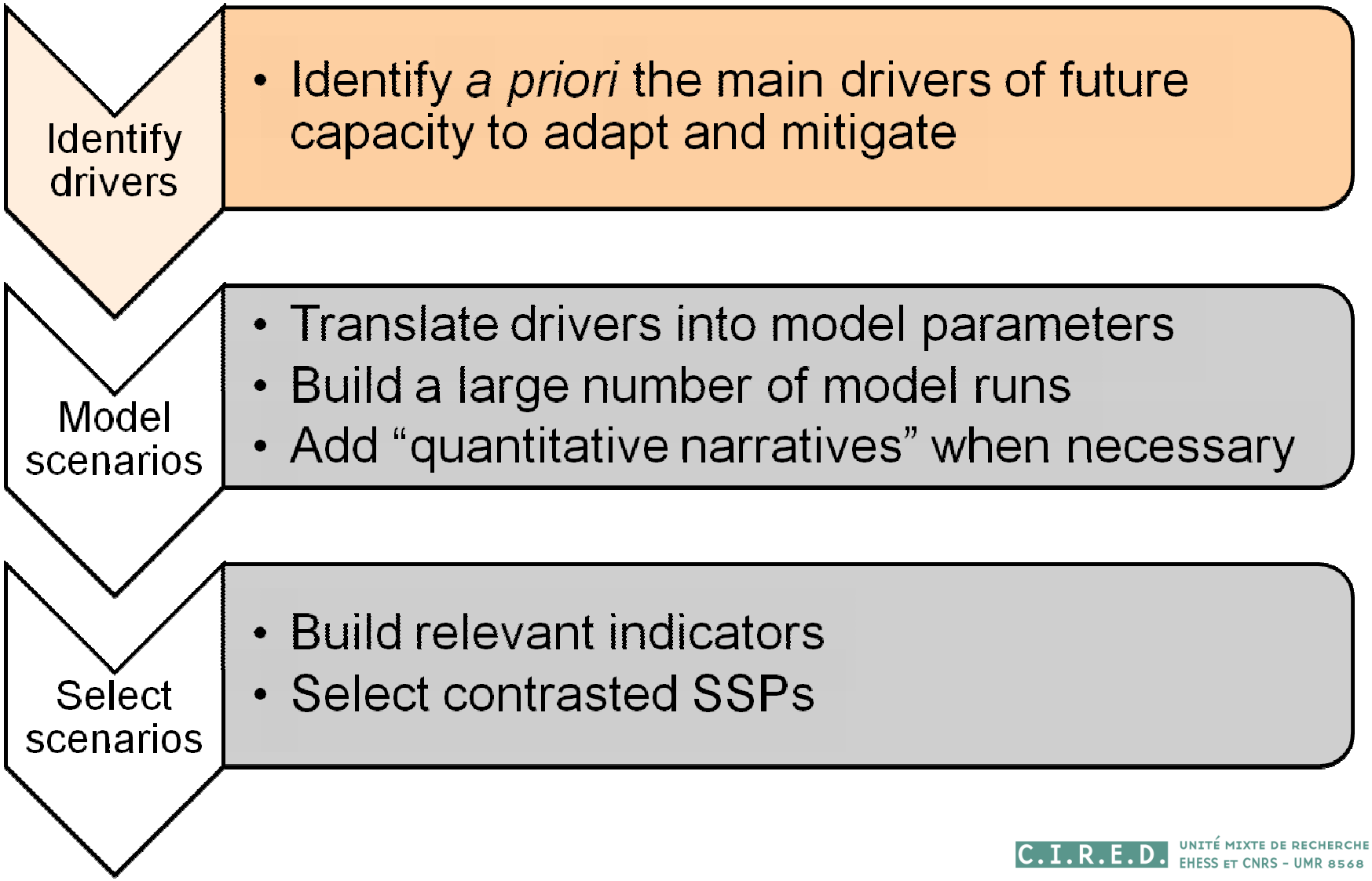


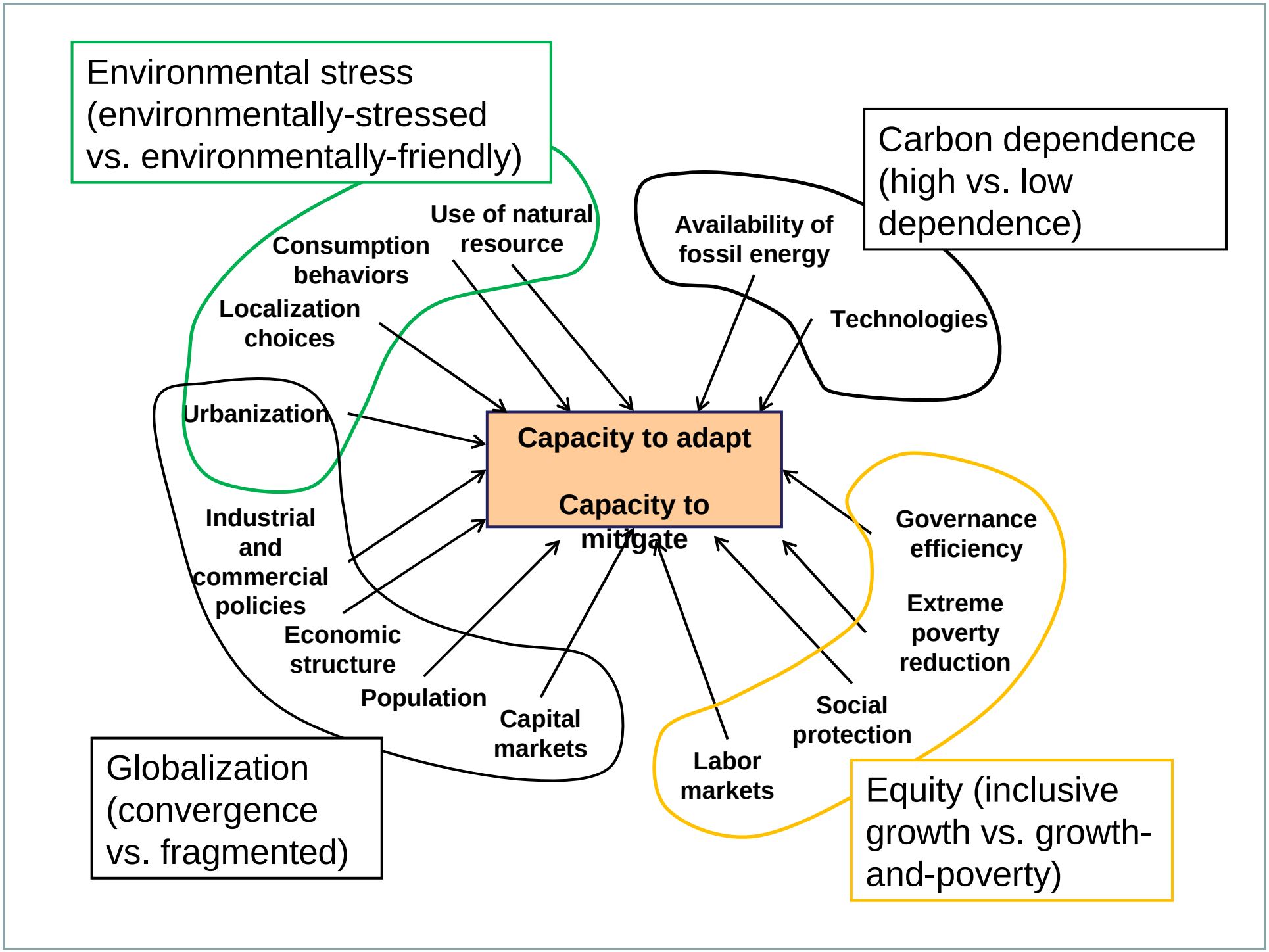
O'Neill et al. 2012,
Meeting Report: http://www.isp.ucar.edu/socio-economic-pathways

Scenario elicitation methodology

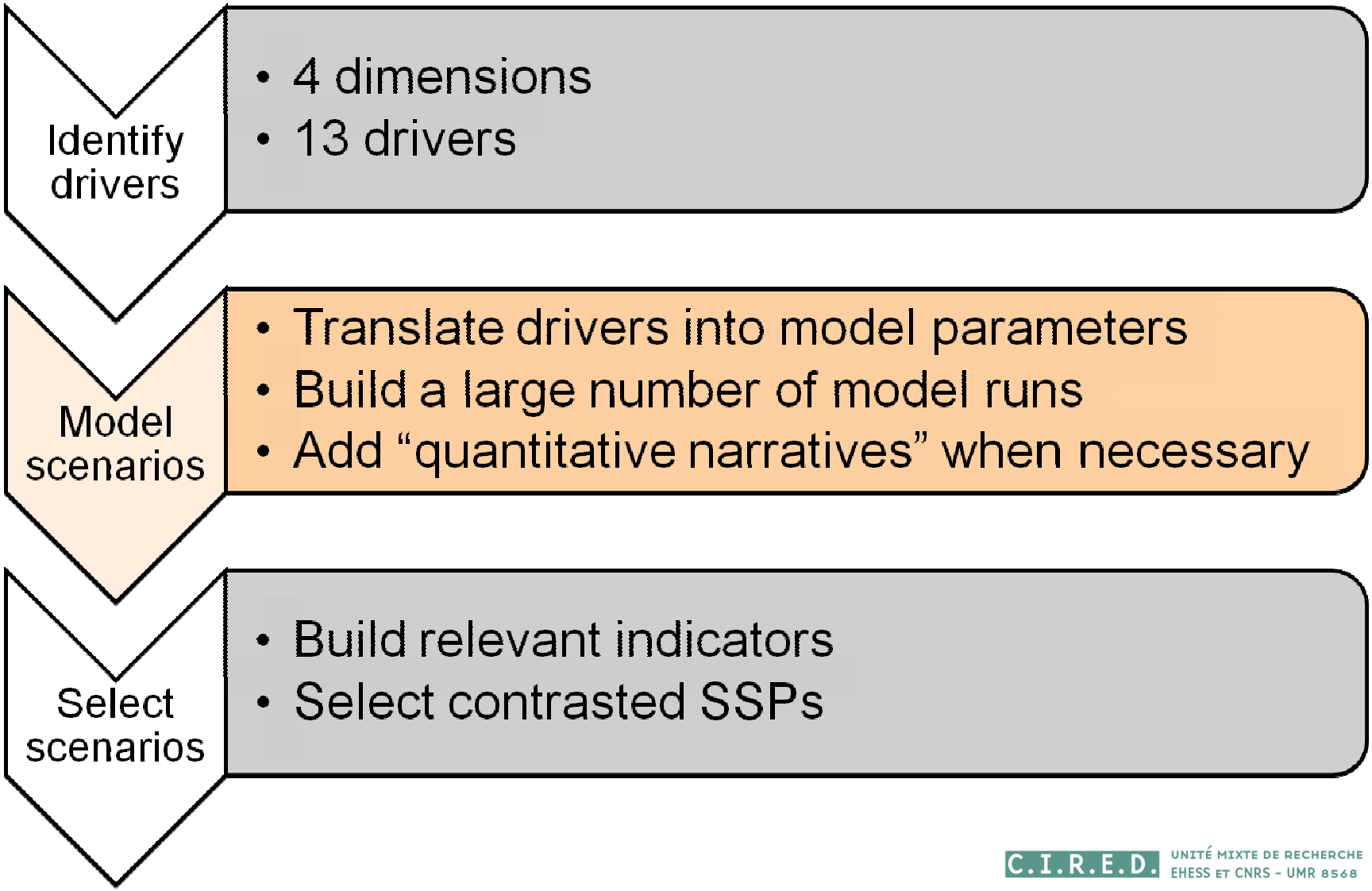


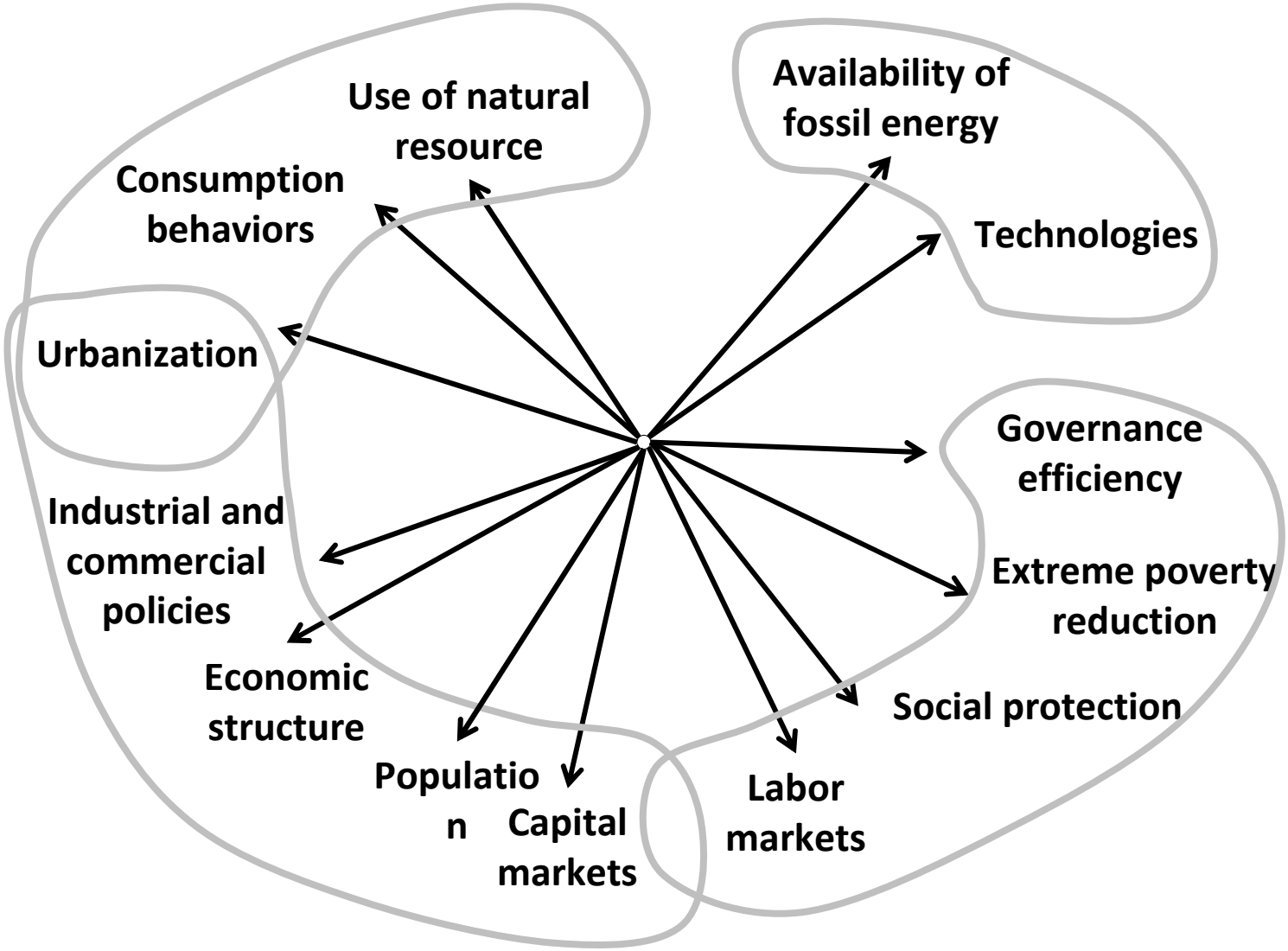
Phase 1


Identify drivers
• Identify *a priori* the main drivers of future capacity to adapt and mitigate
Model scenarios
• Translate drivers into model parameters
• Build a large number of model runs
• Add "quantitative narratives" when necessary
Select scenarios
• Build relevant indicators
• Select contrasted SSPs

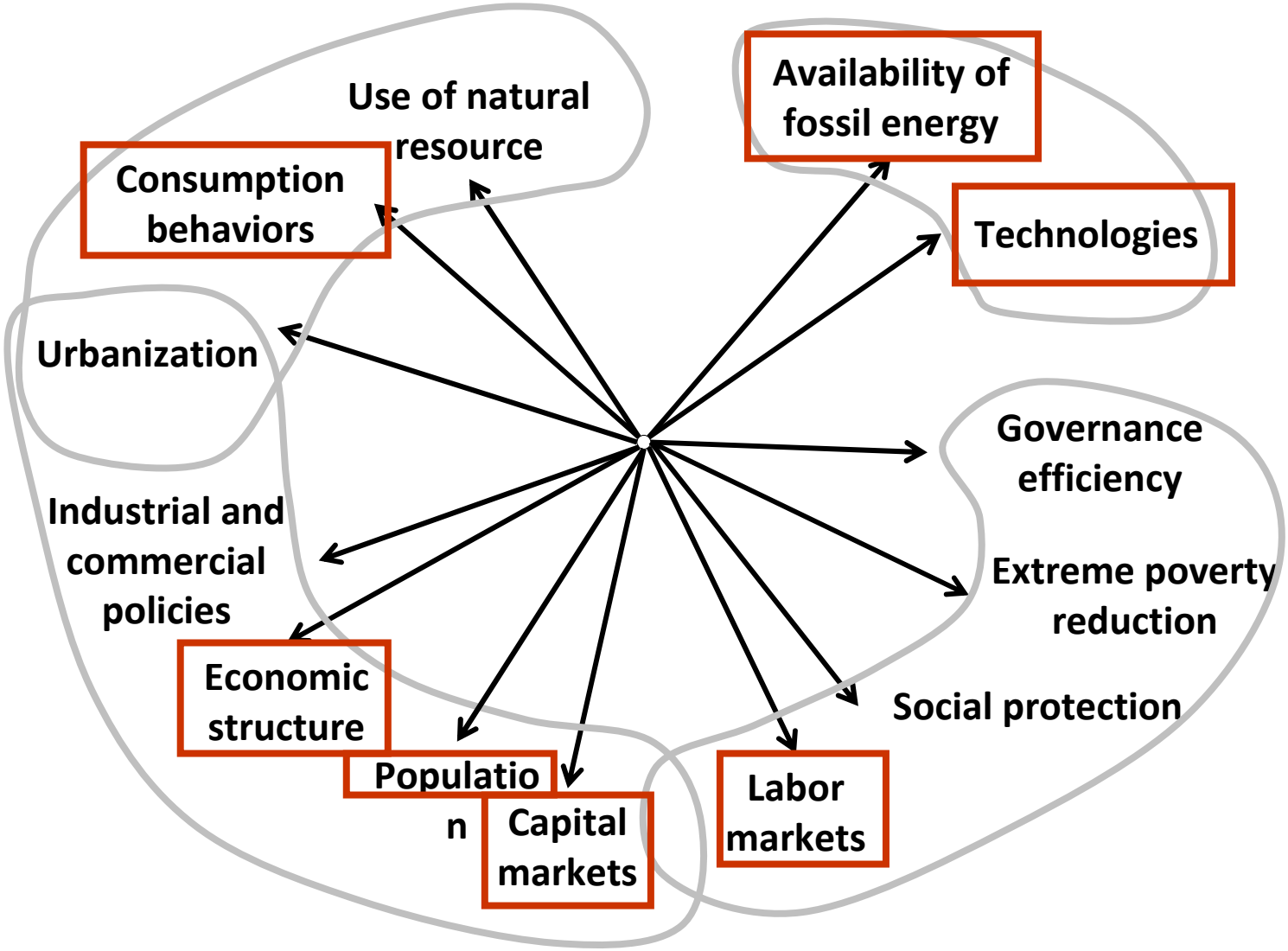

Environmental stress (environmentally-stressed vs. environmentally-friendly)
Carbon dependence (high vs. low dependence)
Use of natural resource
Consumption behaviors
Localization choices
Availability of fossil energy
Technologies
Urbanization
Capacity to adapt
Capacity to mitigate
Industrial and commercial policies
Economic structure
Population
Capital markets
Governance efficiency
Extreme poverty reduction
Social protection
Labor markets
Globalization (convergence vs. fragmented)
Equity (inclusive growth vs. growth-and-poverty)

Phase 2

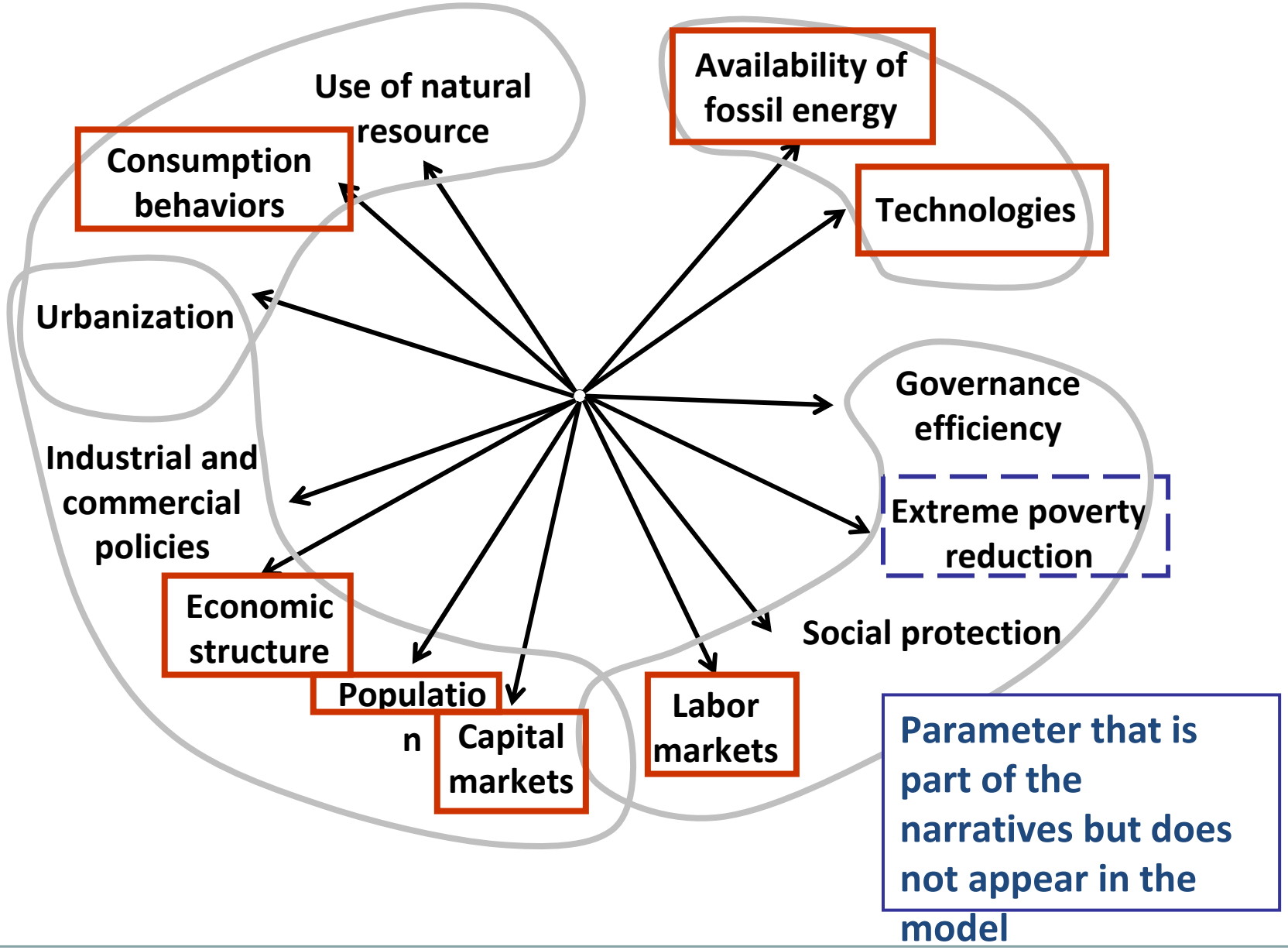

Identify drivers
• 4 dimensions
• 13 drivers
Model scenarios
• Translate drivers into model parameters
• Build a large number of model runs
• Add “quantitative narratives” when necessary
Select scenarios
• Build relevant indicators
• Select contrasted SSPs


Use of natural resource
Consumption behaviors
Availability of fossil energy
Technologies
Urbanization
Governance efficiency
Industrial and commercial policies
Extreme poverty reduction
Economic structure
Social protection
Populatio n
Capital markets
Labor markets

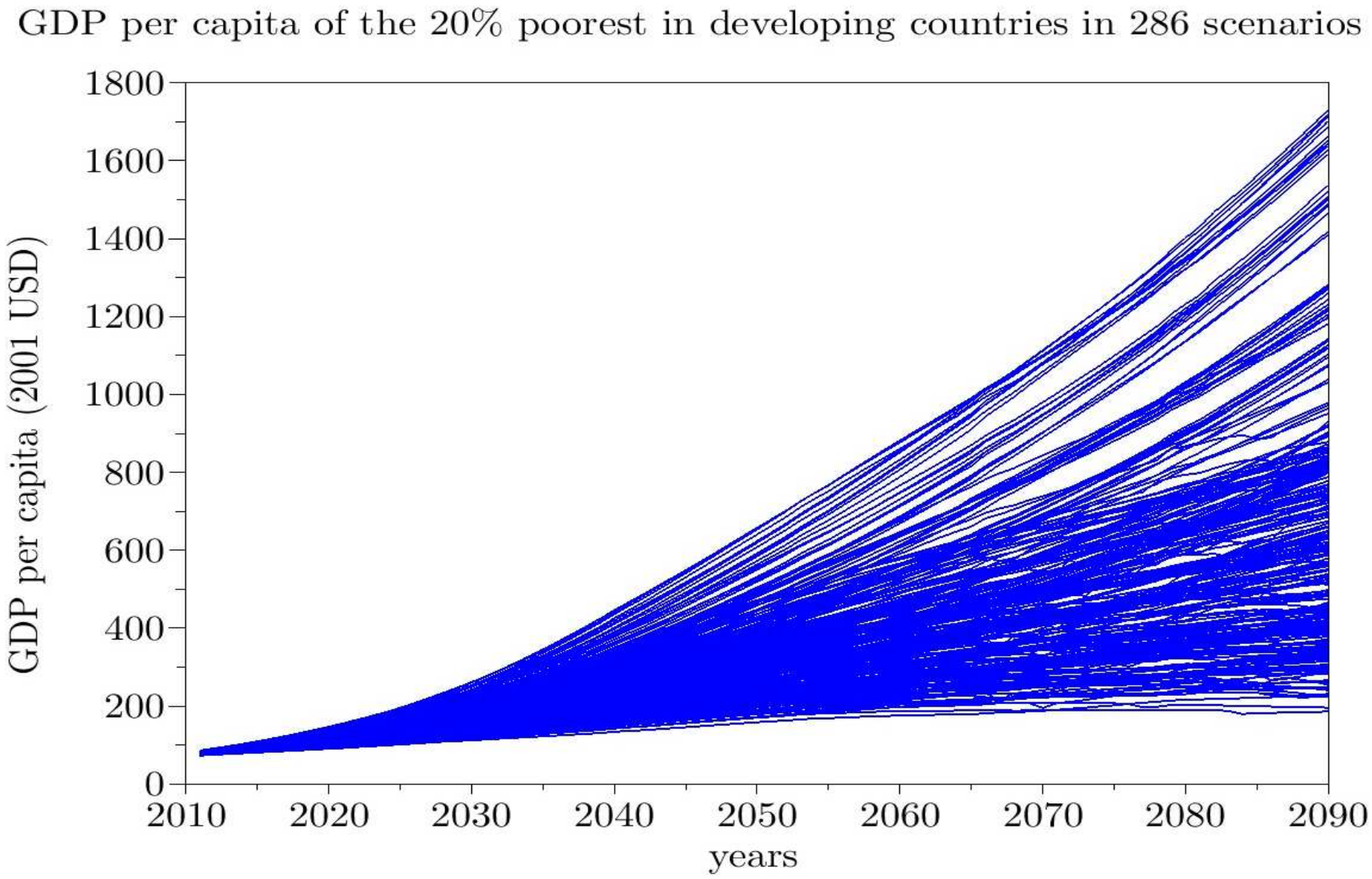
Drivers translated into input parameters of the IMACLIM-R model



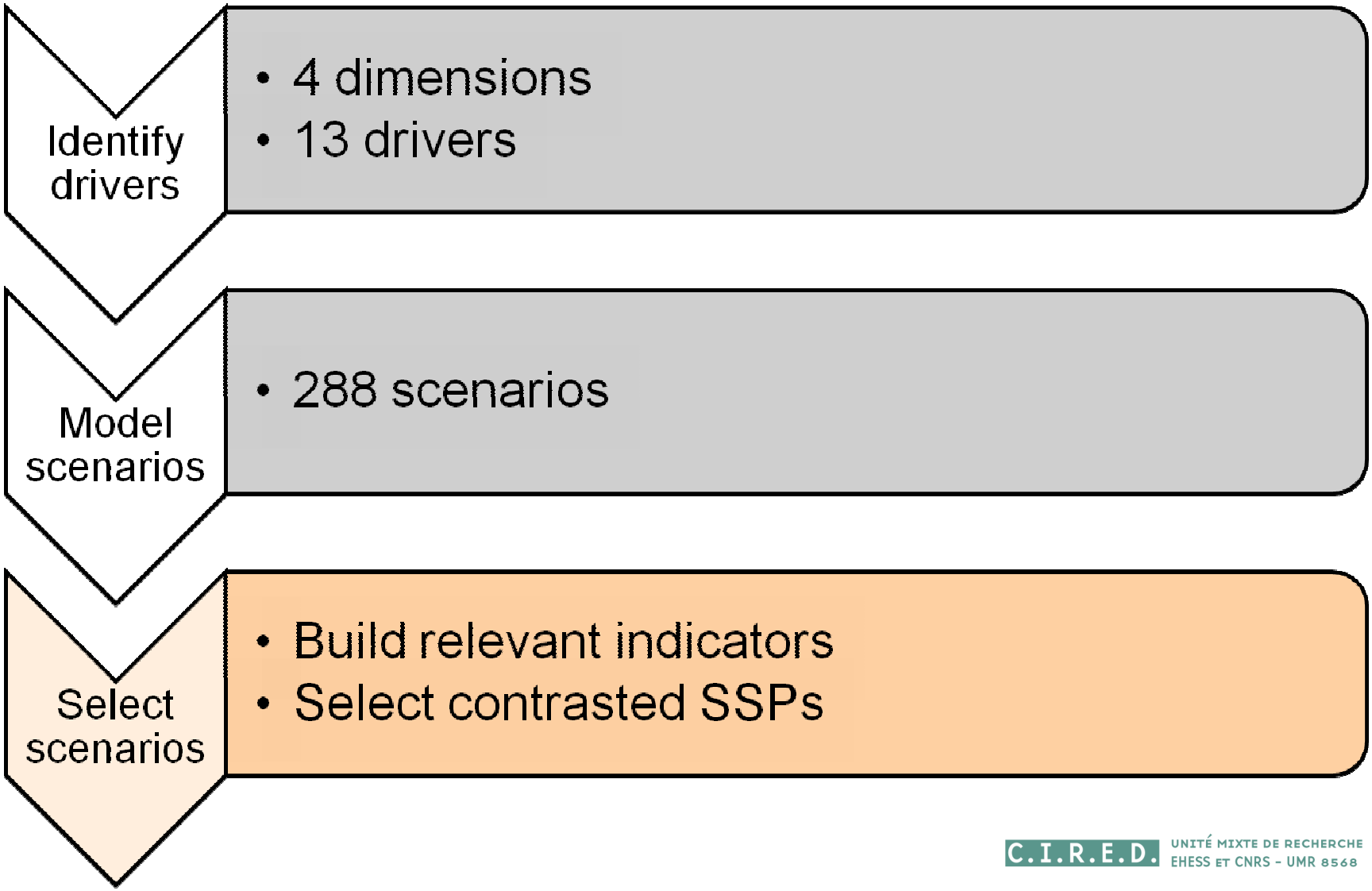
Drivers translated into input parameters of the IMACLIM-R model



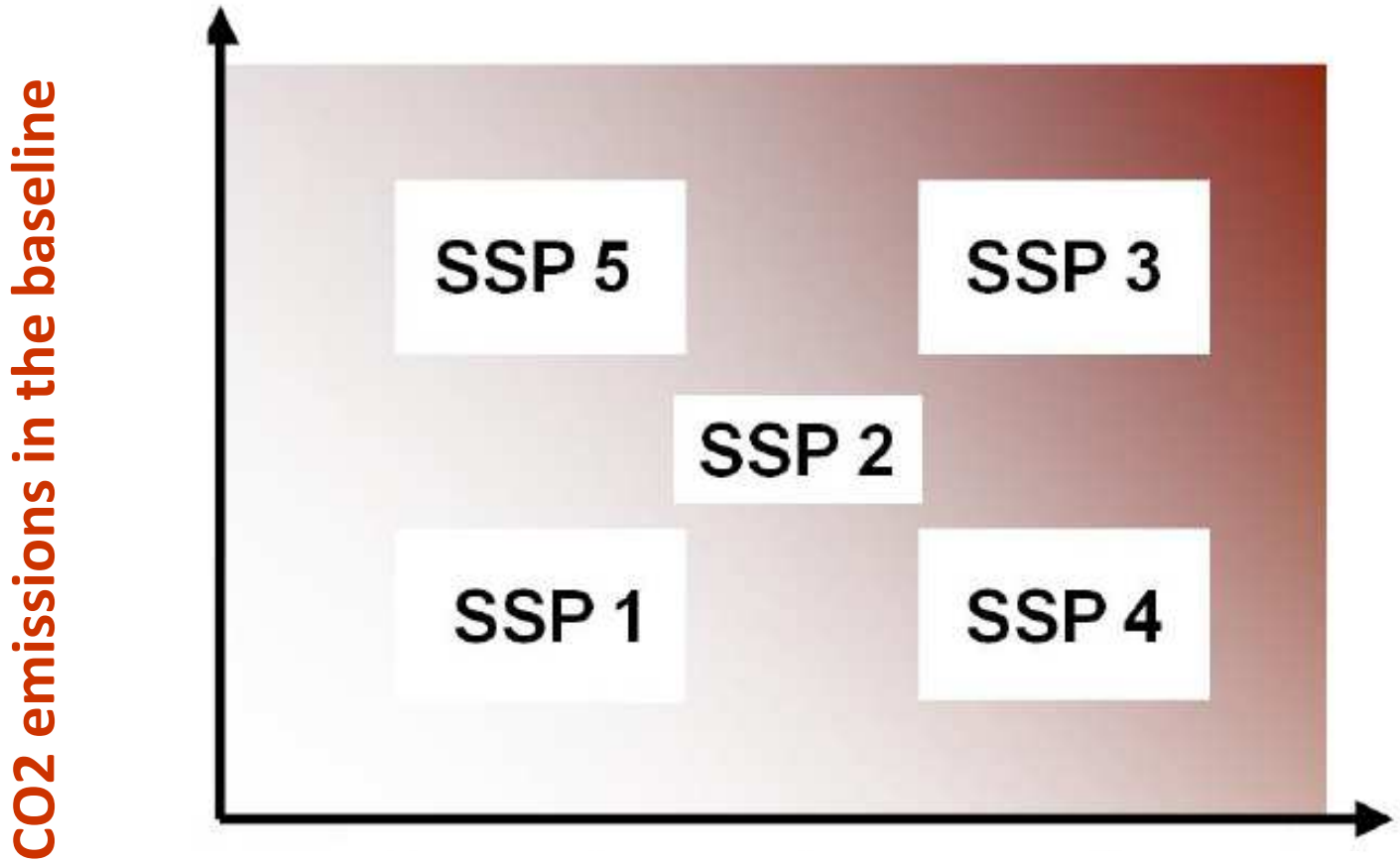
288 scenarios with ImaclimR



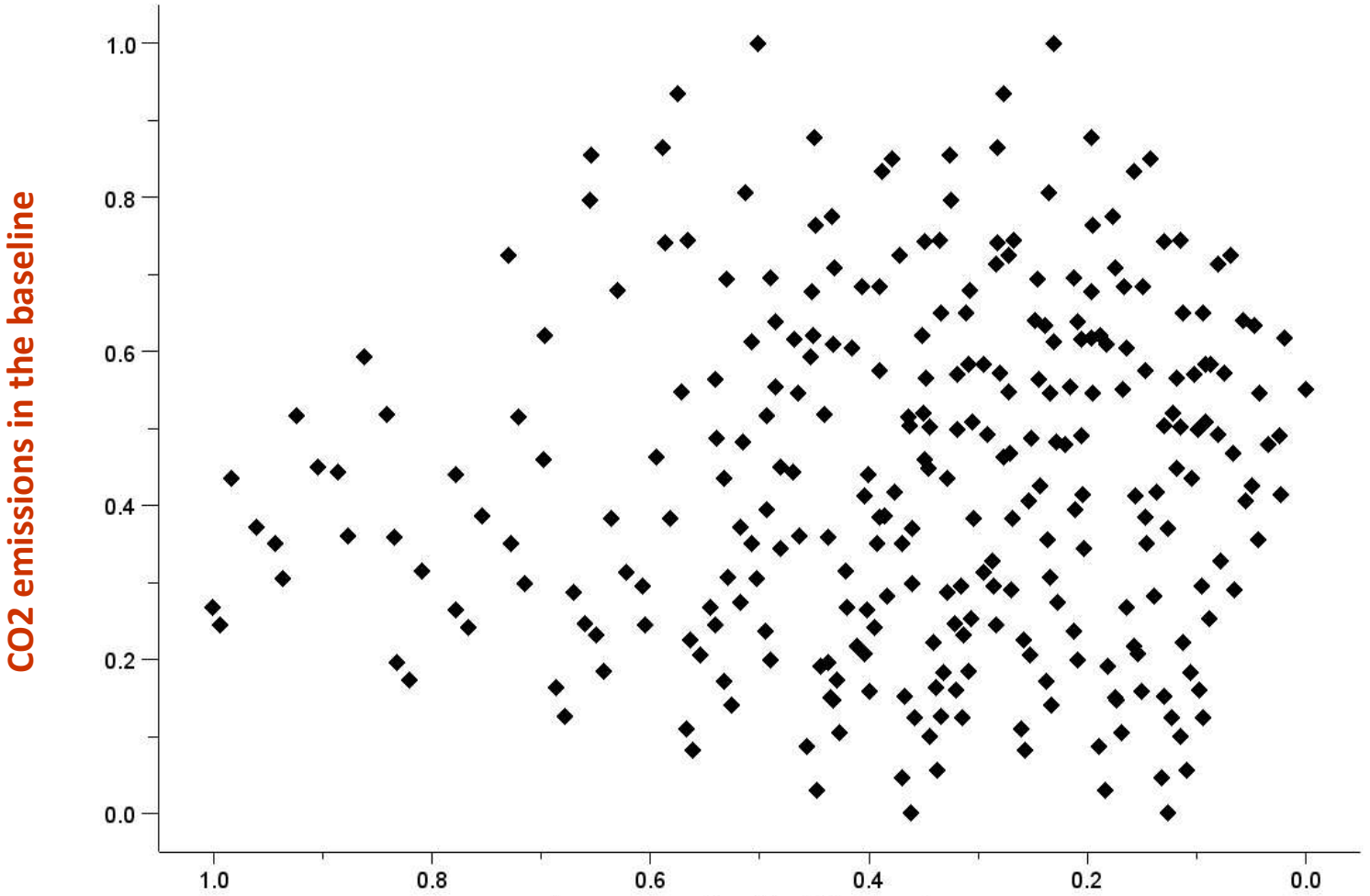
Phase 3


Identify drivers
• 4 dimensions
• 13 drivers
Model scenarios
• 288 scenarios
Select scenarios
• Build relevant indicators
• Select contrasted SSPs

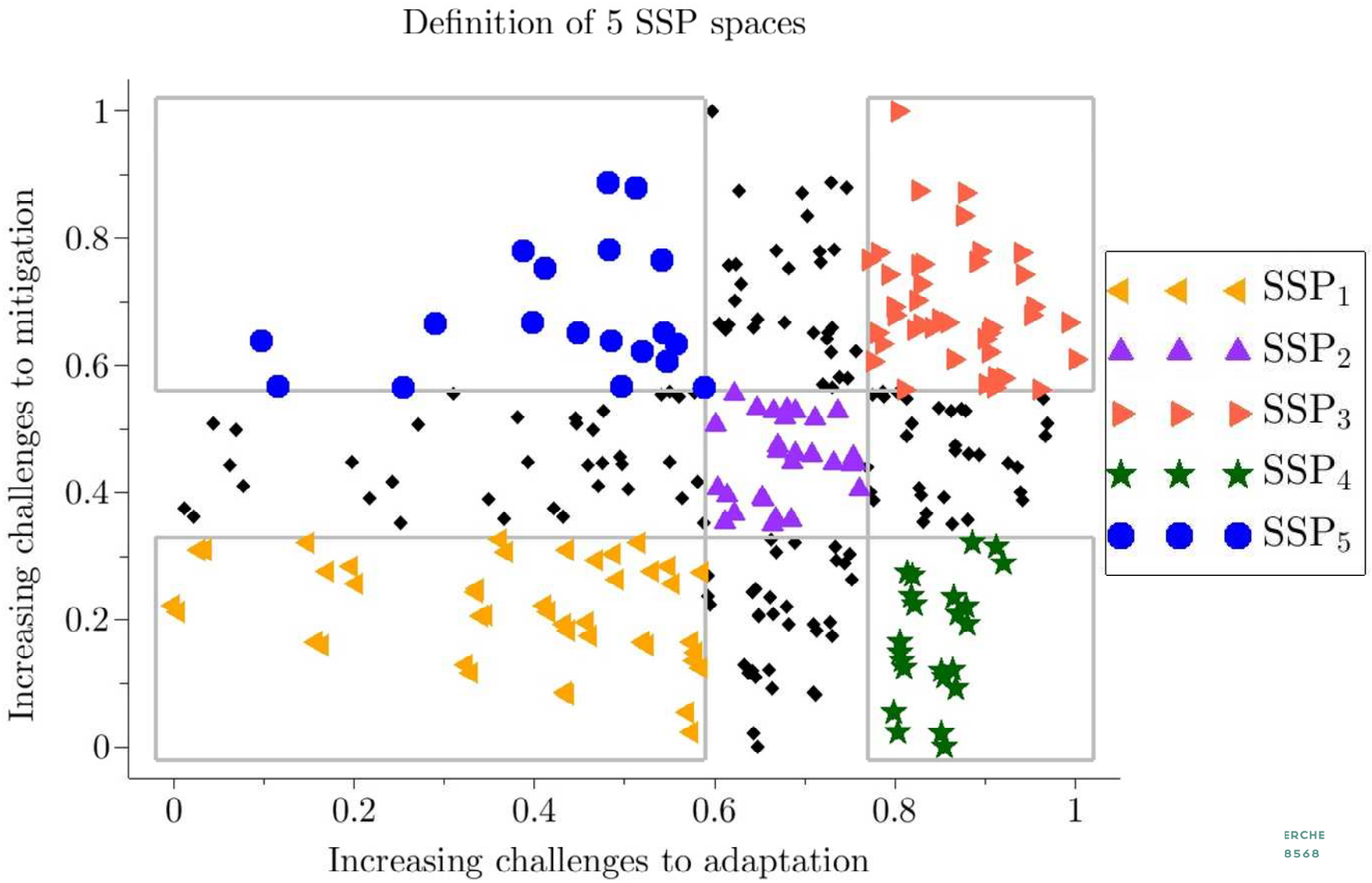
The difficult choice of indicators



288 scenarios & 2 indicators



Definition of 5 SSP spaces with 4 thresholds



Main drivers explaining the 5 SSP groups

	Equity (2 options)	Conver-gence (3 options)	Energy sobriety (2 options)	Availability of low C technologies (2 options)	Availability of fossil fuels (2 options)	Population (3 options)	Capital markets (2 options)	Coverage/ Density
SSP1 (15% of cases)	improved	Fast or medium	high	high		Medium or low		50% / 80%
SSP2 (10% of cases)	improved	Medium or slow	low			low		30% / 60%
SSP3 (14% of cases)	worsen		low	low		High or medium		55% / 90%
SSP4 (8% of cases)	worsen	slow	high					90% / 85%
SSP5 (6% of cases)	improved	fast	low				Reduced imbalances	60% / 45%

Conclusions

- Un ensemble de scénarios est pertinent pour une question donnée.
  - →Local vs global
  - →Adaptation vs atténuation

- On applique cette méthodologie à des questions très larges (les challenges pour l'adaptation et l'atténuation) pour créer des SSPs

- Mais l'idée est de créer des outils de recherche/prise de décision
  - →Plus de scénarios avec plus de modèles
  - →Mise en place d'une plateforme qui permet aux utilisateurs de scénarios de choisir les plus pertinents pour un problème donné