



Planbureau voor de Leefomgeving

# IAM models – contribution to SSP development process

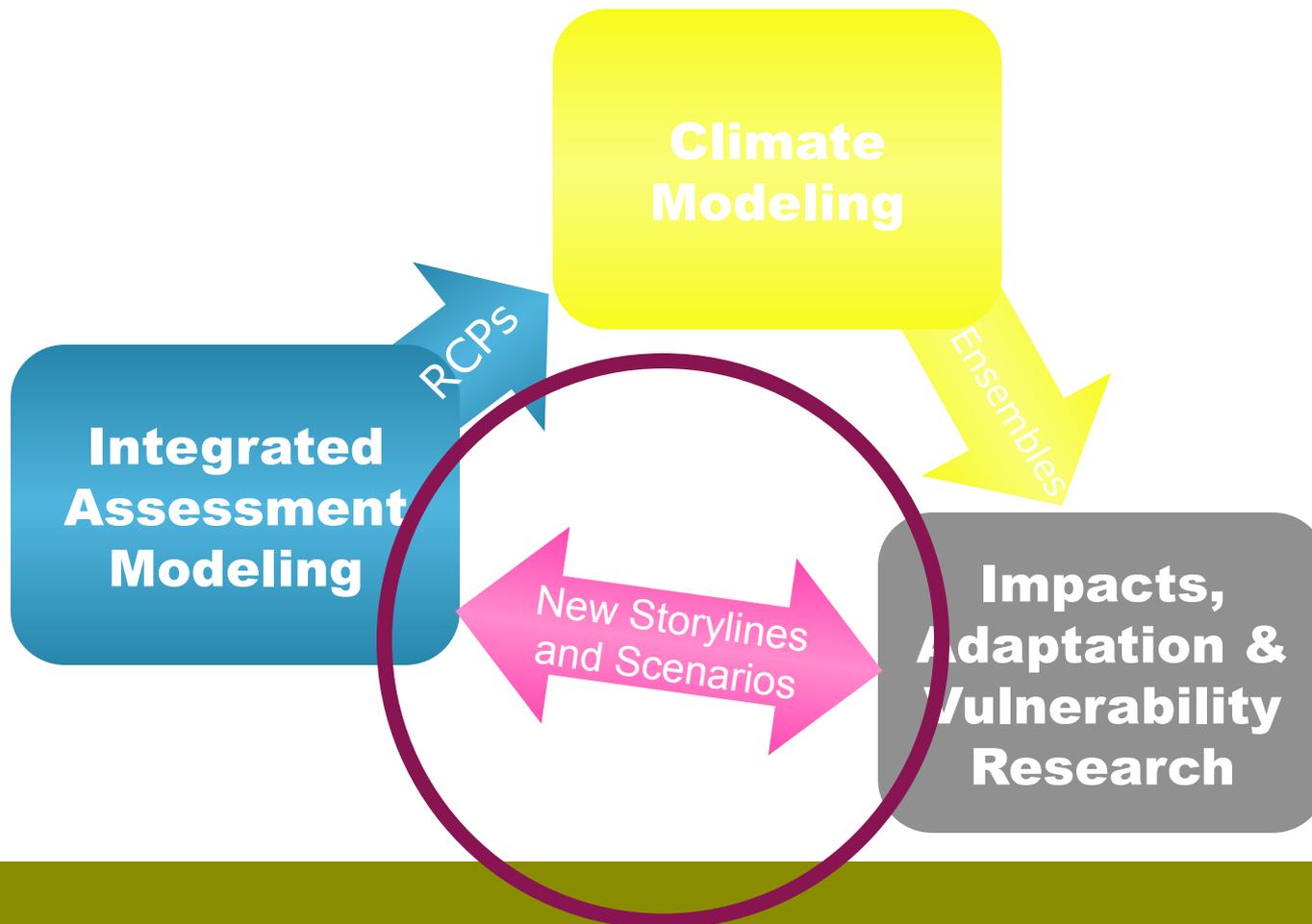


# Role of different communities



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- Better climate assessment; and better assessment in general.
- One that added a new dimension to link IAM, IAV and CM.





## Shared socio-economic reference pathway

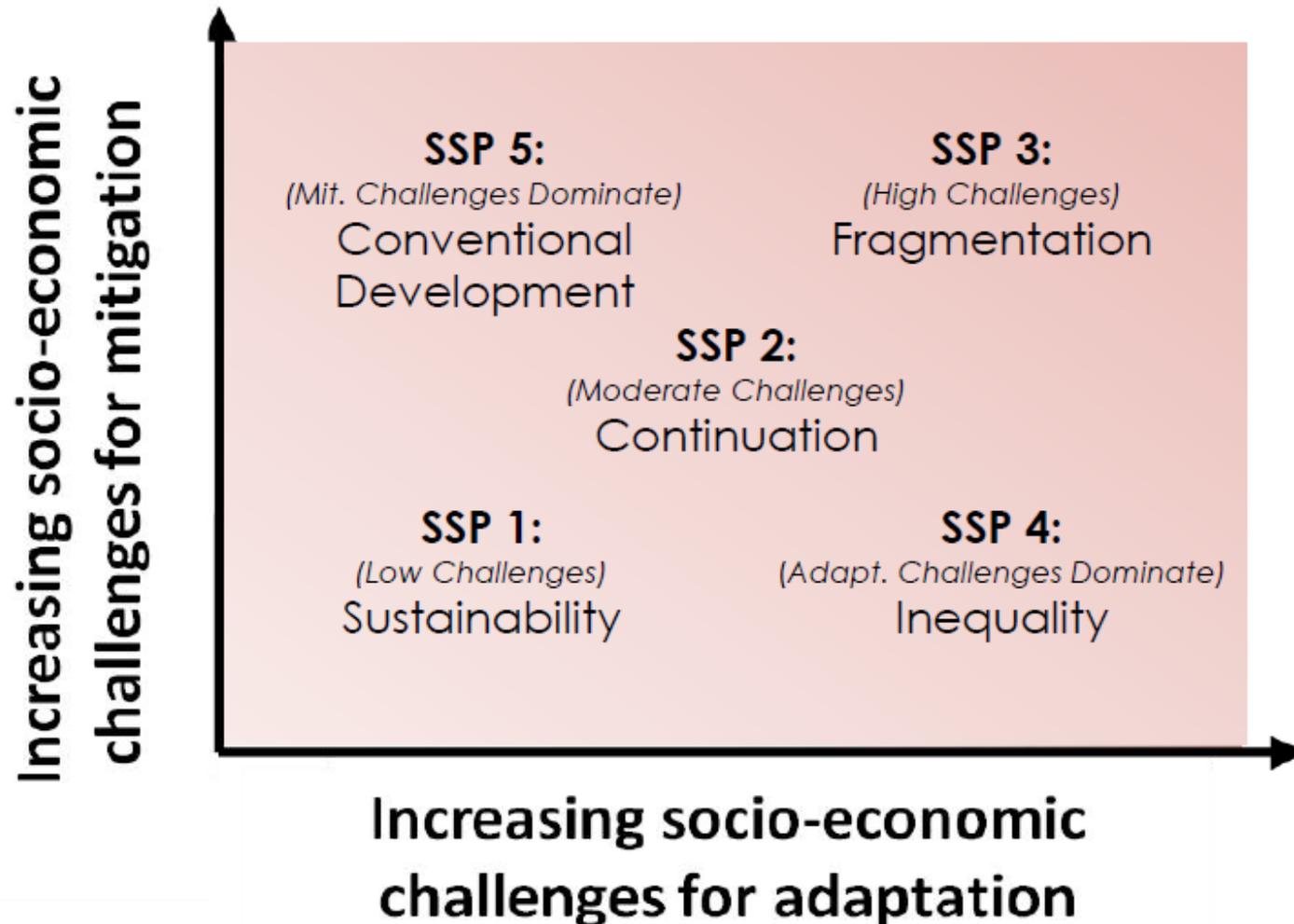
**Forcing level (W/m<sup>2</sup>)**



	SSP1	SSP2	SSP3	....
8.5				
6.0				
4.5				
3.7				
2.6				

- Provide a framework for organizing scenarios in terms of their socioeconomic challenges to adaptation and mitigation.
- Are a finite set of reference, no climate policy scenarios consisting of
  - 1. Storylines,
  - 2. IAM output, and
  - 3. non-IAM quantitative variables,usable as reference points for new IAM and IAV research.
- A set of points of reference for creating RCP replications—and therefore of linking a variety of socioeconomic scenarios with the ensemble calculations created by the climate modelers for CMIP5 from 4 original RCPs.

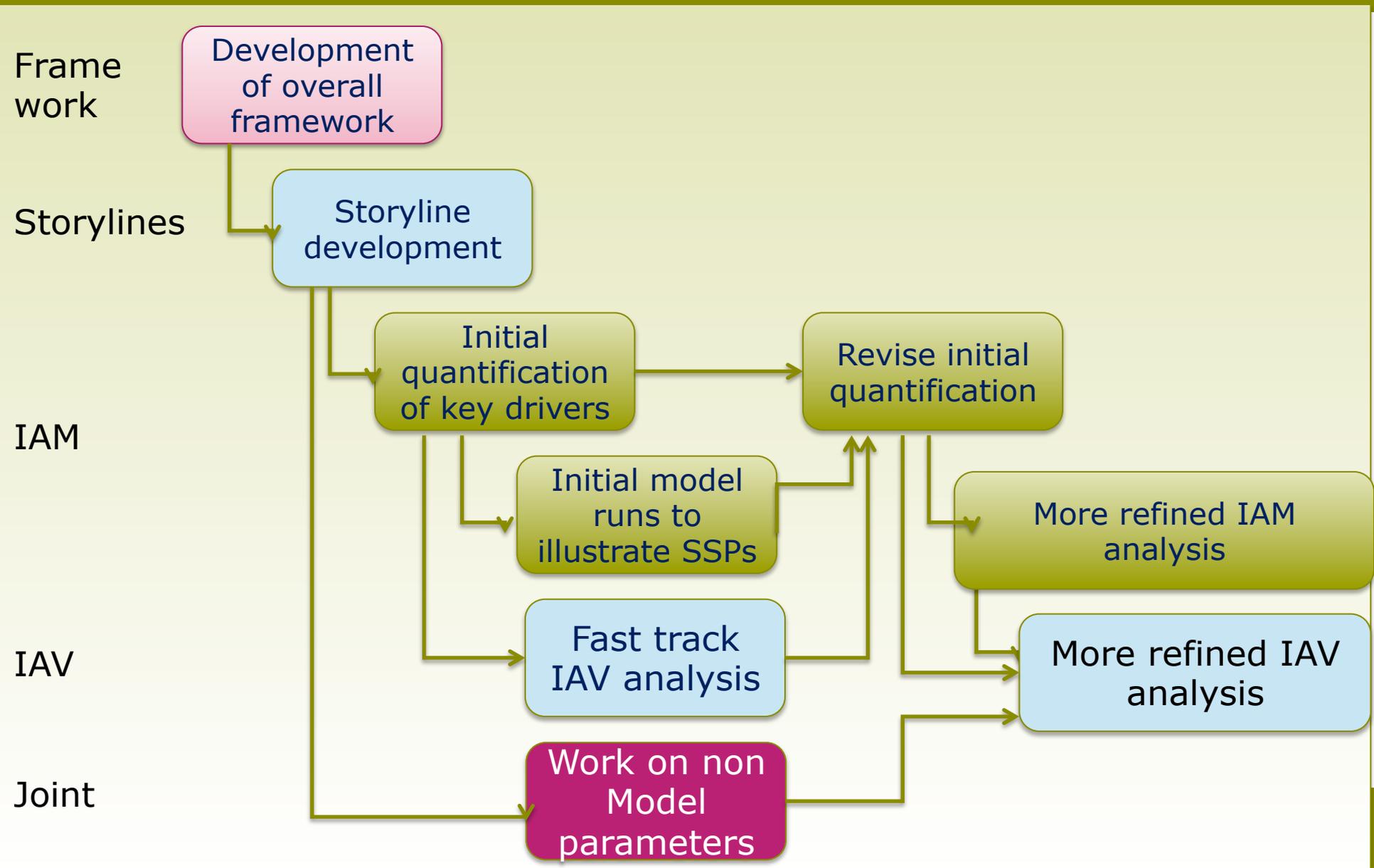
## SSP Logic



# The SSP Process



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## Key-drivers (Population / GDP)

Population scenarios:

Demographics (IIASA)

Urbanisation (NCAR)

Economy

GDP per capita (ppp) (**OECD**, IIASA, PIK)

Currently under review. Available from open website.

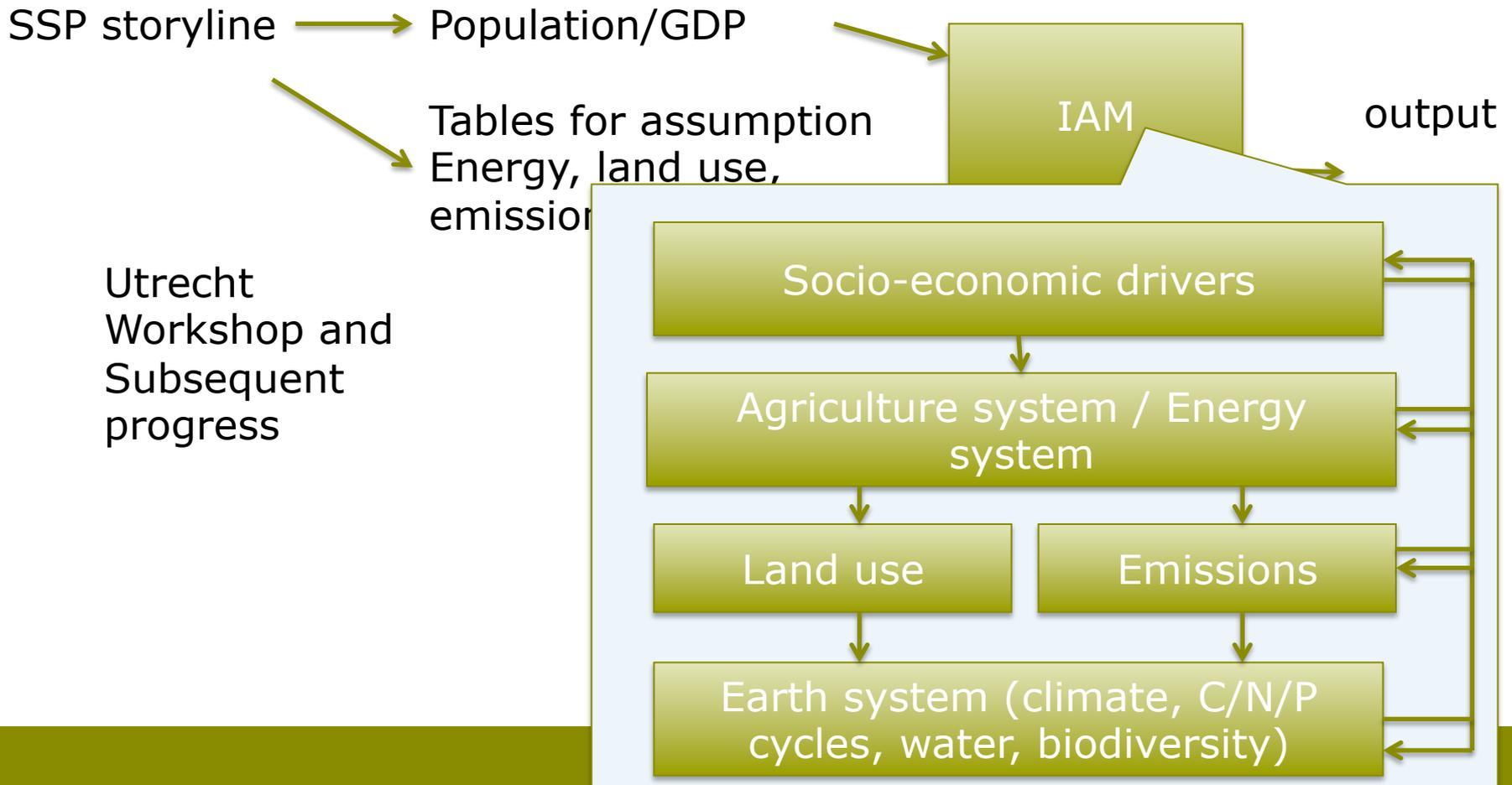


## IAM contribution

- Illustrate the consequences of various SSPs
- Contribute to the testing of SSP storylines
- Contribute to analysis of adaptation and mitigation consequences of RCP/SSP combinations
- Provide additional information to the IAV community on variables like land use, emissions, energy use etc.



# IAM contribution





## Possible IAM output

### **Core set**

Energy use  
Land use  
Emissions  
Water use



Standard  
Set (comparable  
Across SSPs)

### **Extended set**

Energy prices  
Trade flows  
Carbon prices



Available from  
Individual modeling team?

*Criteria determining position of IAM output variables: 1) relevance for describing storyline; 2) relevance for IAV research; 3) uncertainty / model specific*



# Tables for energy demand

SSP Element	SSP 1			SSP 2			SSP 3			SSP 4			SSP 5		
	<i>Country Income Groupings</i>														
	Low	Med	High	Low	Med	High	Low	Med	High	Low	Med	High	Low	Med	High
<b>Non-climate Policies</b>															
<b>Traditional Fuel Use</b>	fast phase-out, driven by policies and economic development			intermediate phase-out, regionally diverse speed			continued reliance on traditional fuels						fast phase-out, driven by development priority		
<b>Energy Demand Side</b>															
<b>Lifestyles</b>	modest service demands (less material intensive)			medium service demands (generally material intensive)			medium service demands (material intensive)			low service demands	modest service demands		high service demands (very material intensive)		
<b>Environmental Awareness</b>	high			medium			low			low	high		medium (low for global level/high for local level)		
<b>Energy Intensity of Services</b>										high	low		medium		
<b>Industry</b>	low			medium			high			high	low		medium		
<b>Buildings</b>	low			medium			high			medium	low/medium		medium		
<b>Transportation</b>	low			medium			medium	high		low/medium	low		high		
<b>General Comments</b>				regional diversity											
	<b>Affluent &amp; efficient</b>			<b>Medium</b>			<b>High Energy demand</b>			<b>Mixed</b>			<b>High Energy demand</b>		



## Table for energy supply (technologies)

SSP Element	SSP 1			SSP 2			SSP 3			SSP 4			SSP 5		
	<i>Country Income Groupings</i>														
	Low	Med	High	Low	Med	High	Low	Med	High	Low	Med	High	Low	Med	High
<b>Fossil Technologies</b>															
Technology Development		Med			Med			Low			Low	Med	Med		Med (High)
Social Acceptance		Low			Med			High			High	Low	Low		High
<b>Commercial Biomass</b>															
Technology Development		High			Med			Low			High	High	High		Med
Social Acceptance		Low			Med			High			High	High	High		Med
<b>Other Renewables</b>															
Technology Development		High			Med			Low			High	High	High		Med
Social Acceptance		High			Med			Med			High	High	High		Low
<b>Nuclear Power</b>															
Technology Development		Med			Med			Low	Low	Med	High	High	High		Med
Social Acceptance		Low			Med			High	High	High	High	Med	Med		Med
<b>CCS (under climate policy only)</b>															
Technology Development		Med			Med			Med			High	High	High		High
Social Acceptance		Low			Med			Med			High	Med	Med		Med

Renewable  
focused

Medium

Low  
Tech  
Fossil

Mixed

High  
Tech  
Fossil



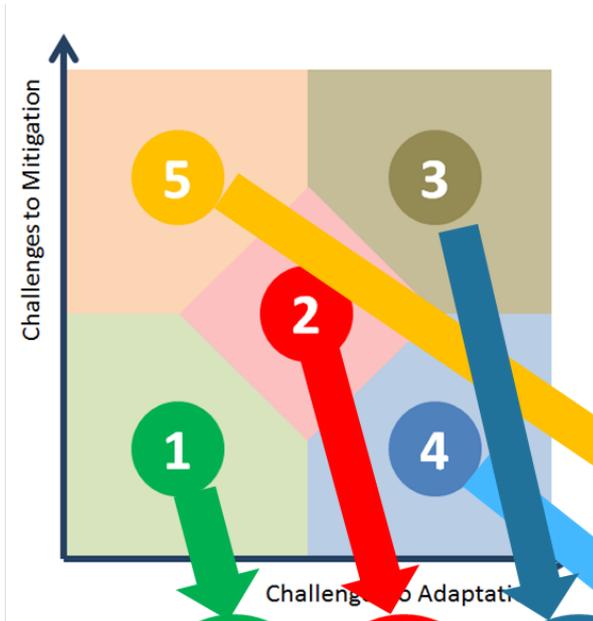
## Table for energy supply (technologies)

SSP Element	SSP 1			SSP 2			SSP 3			SSP 4			SSP 5		
	Low	Med	High	Low	Med	High	Low	Med	High	Low	Med	High	Low	Med	High
							<i>Country Income Groupings</i>								
<b>Coal</b>															
<b>Macro-economy</b>	cost driver			neutral			cost reducing			cost driver			cost driver neutral		
<b>Technology</b>	medium			medium			high			medium			very high		
<b>National &amp; environmental policy</b>	very restrictive			supportive			very supportive			supportive			supportive restrictive		
<b>Conv. Hydrocarbons</b>															
<b>Macro-economy</b>	neutral			neutral			neutral			cost driver neutral			cost reducing		
<b>Technology</b>	medium			medium			medium			fast			very high		
<b>National &amp; environmental policy</b>	restrictive			supportive			mixed (not supported in MEA/FSU)			supportive			supportive restrictive		
<b>Non-conv. Hydrocarbons</b>															
<b>Macro-economy</b>	neutral			neutral			neutral			cost driver neutral			cost reducing		
<b>Technology</b>	slow			medium			medium			medium			very high		
<b>National &amp; environmental policy</b>	very restrictive			supportive			very supportive			supportive			supportive restrictive		
<b>General</b>															
<b>Trade barriers</b>	Free			Barriers			High Barriers			Barriers			Free		



# Table for land use

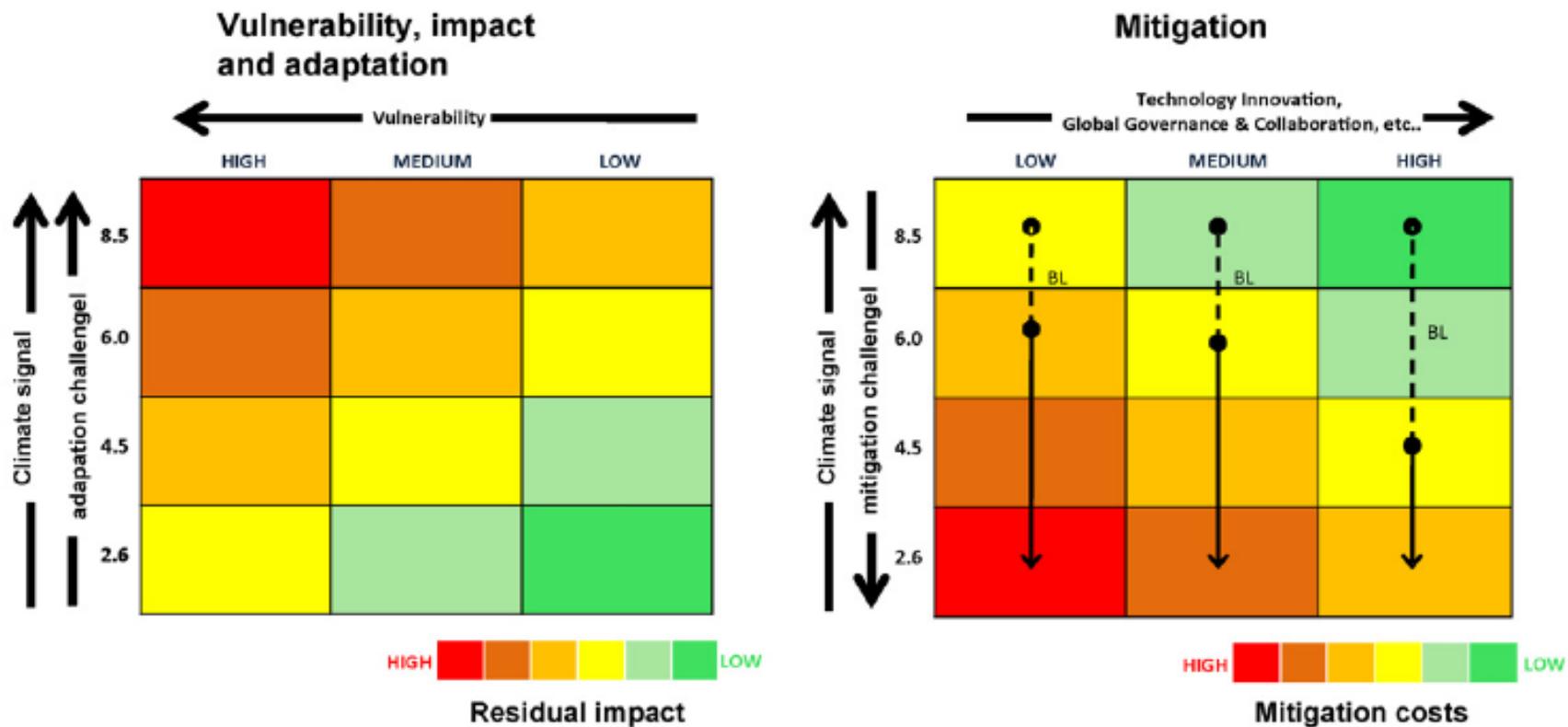
SSP Element	SSP 1			SSP 2			SSP 3			SSP 4			SSP 5		
	<i>Country Income Groupings</i>														
	Low	Med	High	Low	Med	High	Low	Med	High	Low	Med	High	Low	Med	High
<b>Land use change regulation</b>	strong			medium			weak			weak	medium	strong	medium		
<b>Agriculture</b>															
<b>Land productivity growth</b>	rapid	rapid	medium	medium			slow			slow	medium	rapid	rapid		
<b>Environmental Impact of food consumption</b>	low			medium			high			medium			high		
<b>International Trade</b>	globalized			regionalized			regionalized			limited access	globalized	globalized	globalized		



Provide a framework for organizing scenarios in terms of their socioeconomic challenges to adaptation and mitigation.

SPAS

		SSP 1	SSP 2	SSP 3	SSP 4	SSP 5
	Reference	X	X	X	X	X
Replication RCP	8.5 Wm <sup>-2</sup>			X		
	6.0 Wm <sup>-2</sup>		X	X	X	X
	4.5 Wm <sup>-2</sup>	X	X	X	X	X
	2.6 Wm <sup>-2</sup>	X	X		X	



A proposal for a new scenario framework to support research and assessment in different climate research communities

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Global Environmental Change 22 (2012) 21–35

# Binning and prioritisation

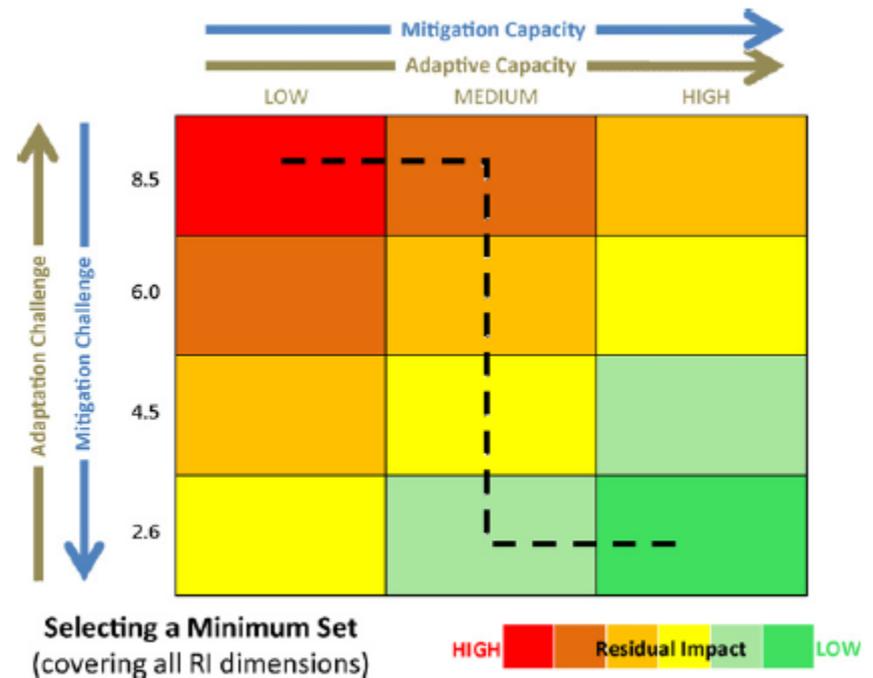
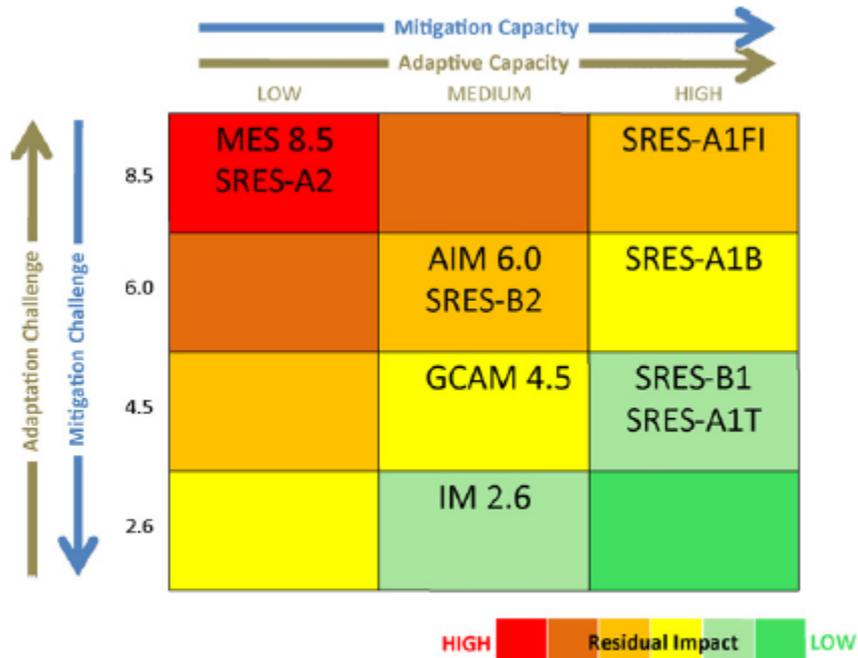


Fig. 8. The proposed framework compared to the SRES scenarios. The 4 scenarios underlying the RCPs and the IPCC scenarios have been added to the scheme to indicate how it can be used as heuristic to category scenarios.

Fig. 9. The use of the proposed scenario framework to prioritize scenario analysis.



## Time line

- Review of population/GDP (August 2012)
- New IAM model runs for review (Autumn 2012)
- Review/vetting process
- Submission of Special Issue with description framework, main drivers, IAM model quantification (January 2012)
- Release of final data (March 2013)



## Ongoing IAM work

- GCAM, AIM, MESSAGE, REMIND, IMAGE
- Other teams that are interested in participating at some level?
- Overall process?

# The SSP Process



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