Scenario systems for addressing planning situations: the case of Scenario-Contextualised Analysis

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Objectives for scenarios from Wright et al. (2013) – and right now in Session7A

1. enhancing understanding
2. challenging conventional thinking
3. improving decision making

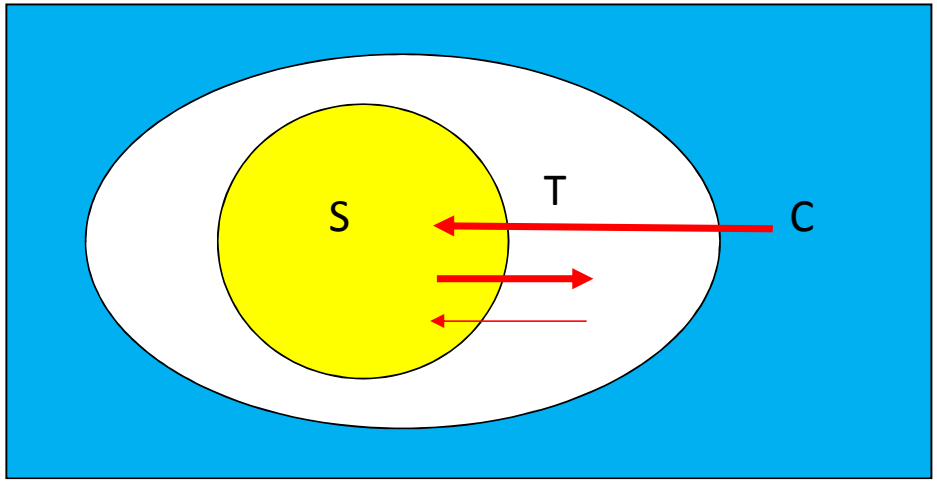
- Success at 1 and 2 – but not at 3

- Typical decision problem where scenario planning is not so helpful:
  - Choose between many options, which are all beneficial – e.g. R&D projects or defence equipment – under budget constraints

Remedies for the poor performance on decision-making

- More careful analysis of **planning situations**
- **Scenario systems** for deploying customised solutions based on planning situation analysis

One approach to planning situation analysis: a simple model based on the dual nature of the environment (Emery & Trist 1965)



We call this the **STC model**

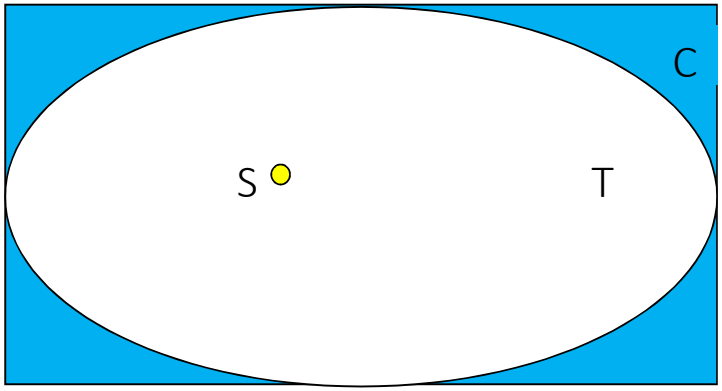
S: the organisational self (or planning entity)

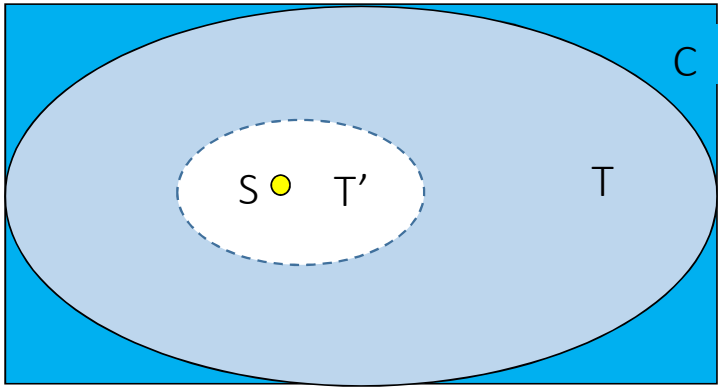
T: transactional enivornment; S and T affect each other

C: contextual environment – C affects S but not the opposite

- Segment relative size proportional to influence **on planning situation at issue**
- 'S does not affect C' interpreted as applying to the 'rules of the game' – i.e. T is about human agency, C essentially fixed laws
  - Nature is part of C – even under anthropocene

Doing some math with the model: T →1





- Does this make any sense at all?
- Yes – by requesting development of the model
- New C = old C +(T-T')
- New C consists of two qualitatively distinct part
  - T-T' is human agency aggregated to macro-phenomena
  - Old C is non-human agency, e.g. laws of Nature

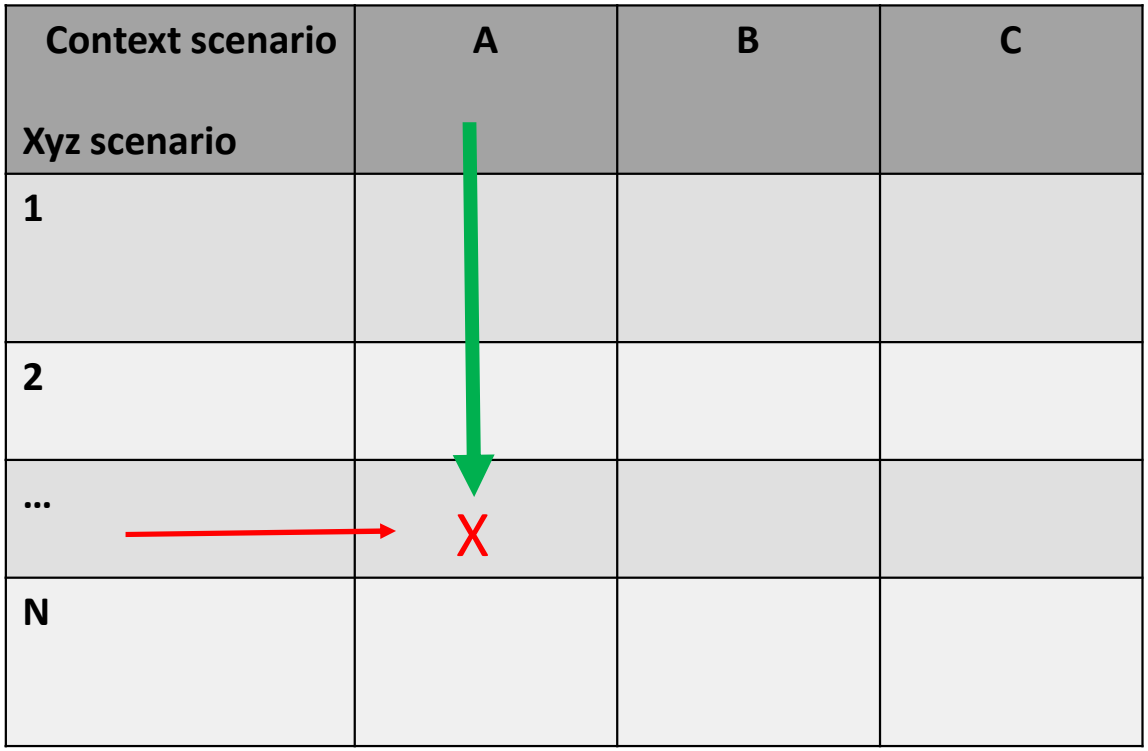
Introducing: Scenario-Contextualised Analysis - SCA

- Starting point: (Context) scenario * option matrix (e.g., van der Heijden 2005)
- Generalisation: <some type of scenario> * <anything>
- If <anything> = some other type of scenario → a **scenario system**
- We will consider mainly
  - Vision
  - Sector
  - Region
  - Event/situation

Context scenario **Option**	**A**	**B**	**C**	**D**
Sell out	0	0	0	0
Keep ticking over		+	+	++
Short-term investments	-	+	+++	+++
Long-term investments	---	-	+	++++

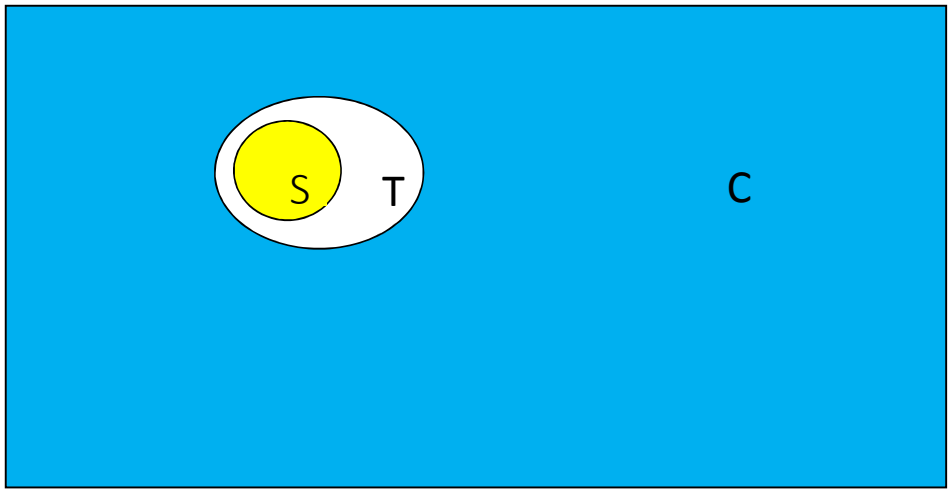
A precondition for SCA – but not for scenario systems in general

- The contextualising dimension must ‘dominate’ the contextualised
- Yet a contextualised scenario can render a contextualising scenario untenable – ‘suspensive veto power’

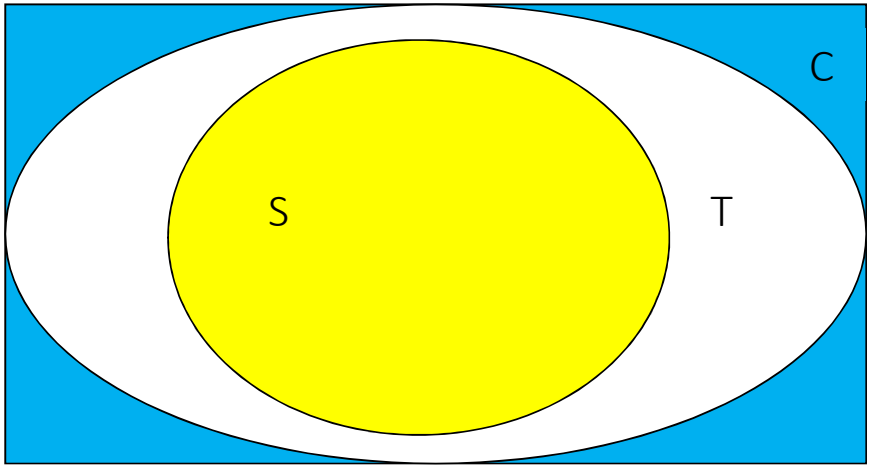


Example: Nordic H_2 Energy Foresight (ca 2003)

Context scenario **Nordic vision**	**A**	**B**	**C**
Maximal role for H2 Energy in the Nordic countries under the prevailing context	Amax	Bmax	Cmax



Examples:
Göteborg region long term sustainability (ca 2007) – BAD
South Swedish municipalities climate adaptation (ca 2013) – GOOD



Vision scenario **Contextual disturbances**	**A**	**B**	**C**
Undisturbed context	Ideal adap-tation A	Ideal adap-tation B	Ideal adap-tation C
Contextual disturbance 1	OK	Requires amendment	OK
…	…	…	…
Contextual disturbance n	Requires amendment	Untenable	OK

A scenario system with context * sectoral scenarios

STEEDS – SCENARIO-BASED FRAMEWORK FOR MODELLING TRANSPORT TECHNOLOGY DEPLOYMENT: ENERGY-ENVIRONMENT DECISION SUPPORT

Aim of Modelling System:

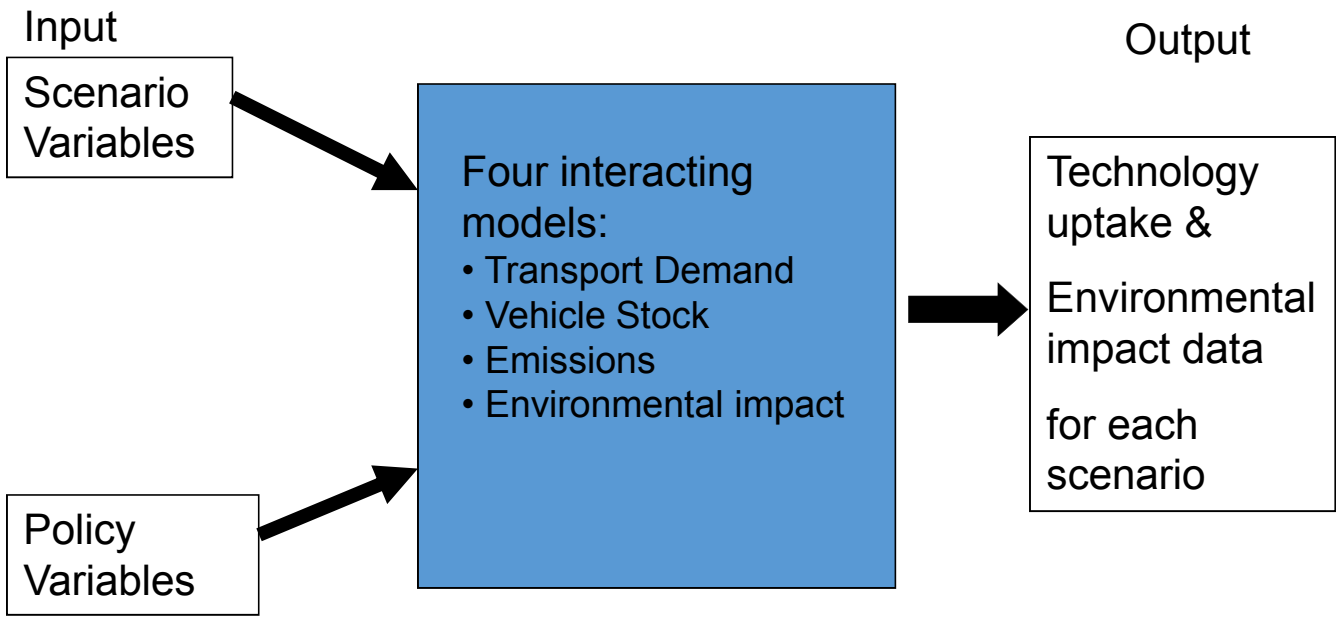
- **to project the market uptake of different transport technologies under various scenarios and policy options;**
- **to assess the energy, environmental and other impacts of these different technology mixes.**

Research funded in part by

THE EUROPEAN COMMISSION

under FP4 – late 1990s

Qualitative contextual scenarios supplying input to a quantitative model system – econometrics style



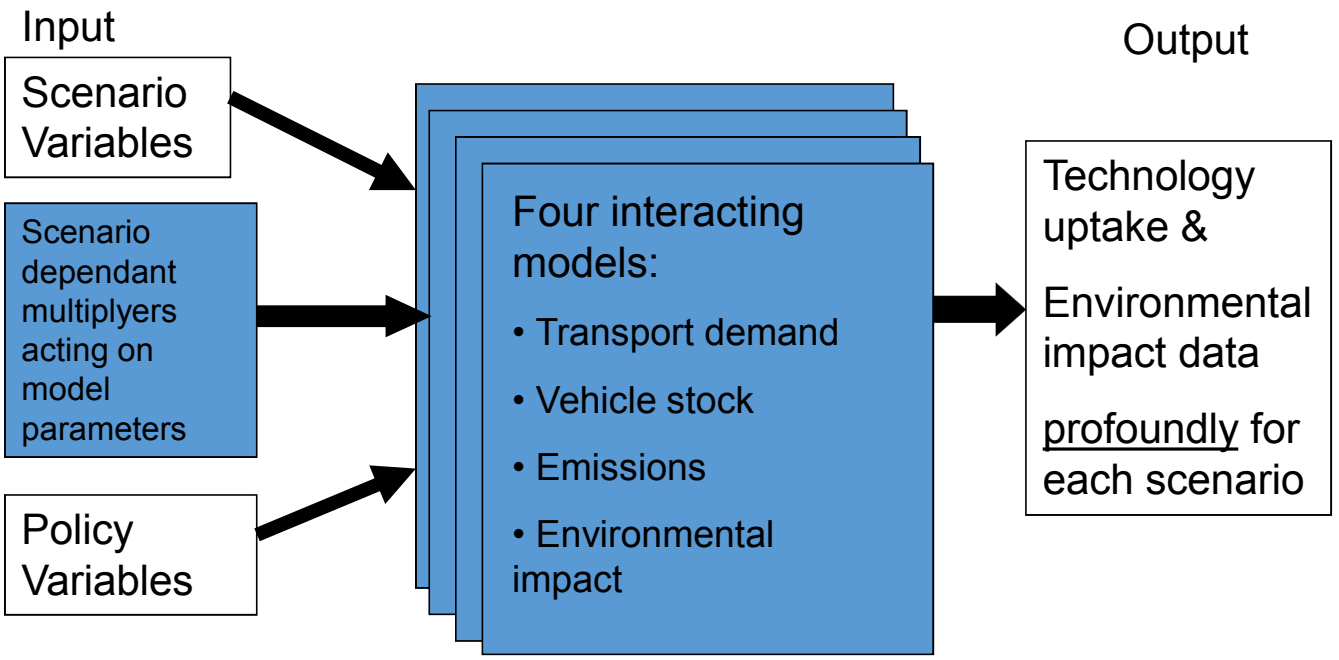
Different worlds – but with identical regularities in the transport sector…

Context Sector	A	B	C
Transport demand	trd	trd	trd
Vehicle stock	vst	vst	vst
Emissions	emi	emi	emi
Environmental impact	env	env	env

A better alternative? Different worlds – each with its characteristic regularities in the transport sector…

Context Sector	A	B	C
Transport demand	Ata	Btb	Ctc
Vehicle stock	Ava	Ava	Cvc
Emissions	Ama	Bmb	Cmc
Environmental impact	Ana	Bnb	Cnc

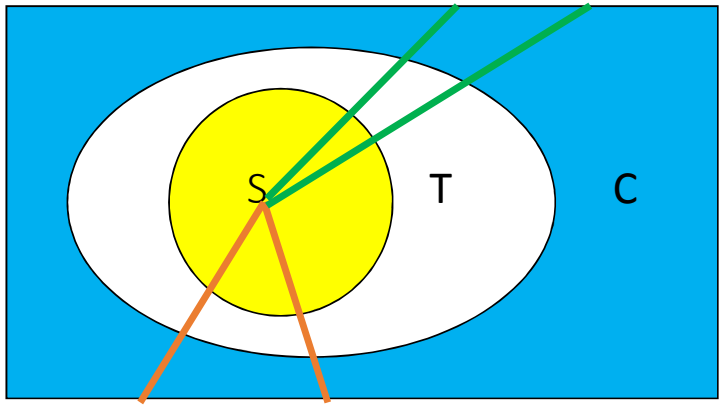
Qualitative contextual scenarios supplying input to a quantitative model system – SCA style



Adaptation of parameters to scenarios gives different versions of the modelling system

Different worlds – each with its characteristic regularities in the transport sector, but on a common econometric (i.e. historical) base

Context Sector	BAU	A	B	C
Transport demand	trd	trda	trdb	trdc
Vehicle stock	vst	vsta	vstb	vstc
Emissions	emi	emia	emib	emic
Environmen-tal impact	env	enva	envb	envc



A scenario system with context * regional scenarios

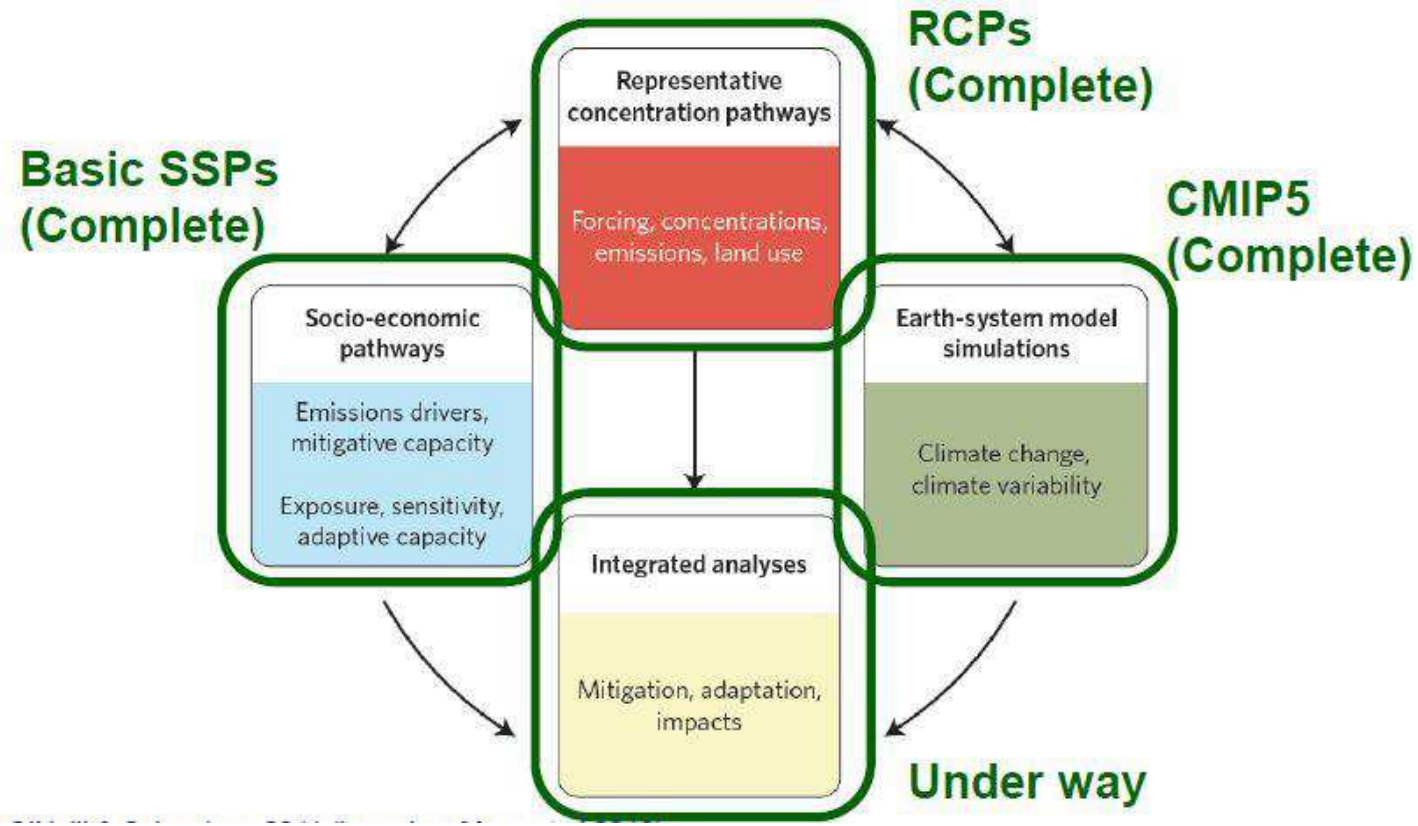
IMPRESSIONS – Impacts and risks from high-end scenarios: Strategies for innovative solutions

The overall objective of the scenario component of IMPRESSIONS is to develop multi-scale, integrated climate and socio-economic scenarios for five case studies (global/central Asia, Europe, Scotland, Iberia and Hungary), including high-end climate change scenarios and more extreme socio-economic scenarios.

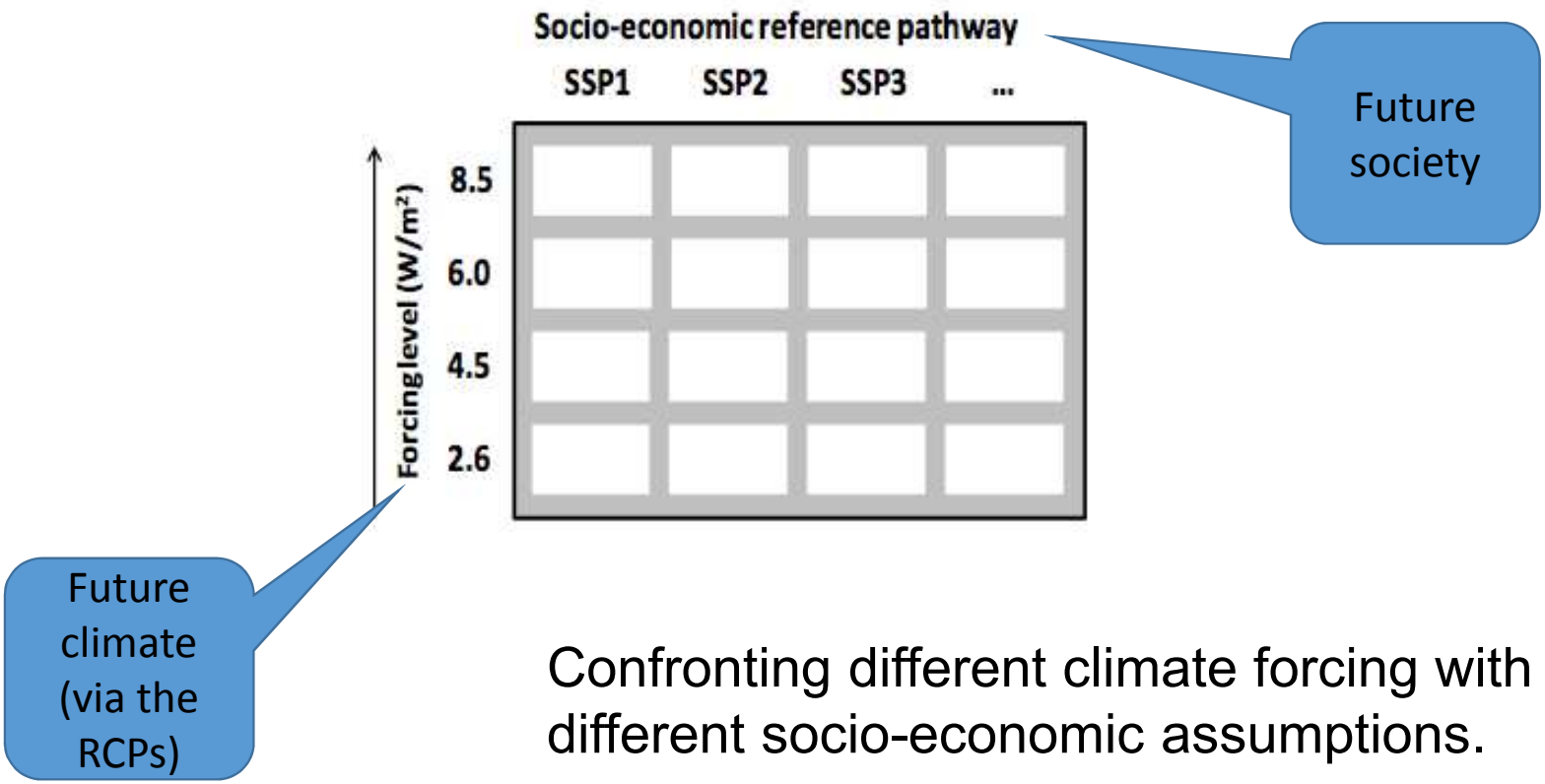
Research funded in part by

THE EUROPEAN COMMISSION (FP7) - ongoing

The climate change research
community's scenario architecture – of course also a scenario system!



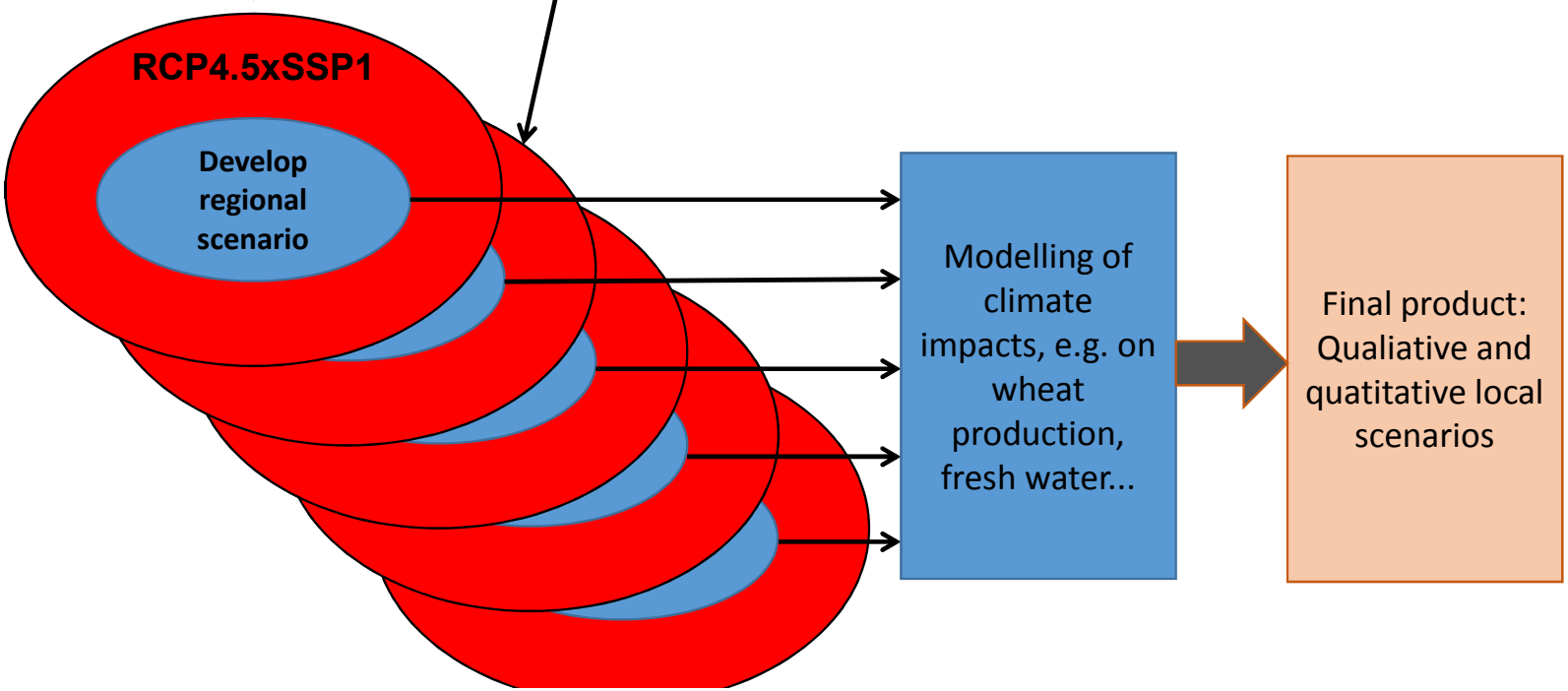
The Scenario Matrix Architecture



Confronting different climate forcing with different socio-economic assumptions.

Everything on the global scale!

	SSP1	SSP2	SSP3	SSP4	SSP5	
RCP8.5			X		X	High climate change
RCP6						
RCP4.5	X		X	X		Moderate climate change
RCP2.6						("Paris")



Another example of contexts * regions (Scholz & Tietje 2002)

	S_1	S_2	S_3
V_1	$set_{1,1}$	$set_{1,2}$	$set_{1,3}$
V_2	$set_{2,1}$	$set_{2,2}$	$set_{2,3}$
V_3	$set_{3,2}$	$set_{3,2}$	$set_{3,3}$
V_4	$set_{4,1}$	$set_{4,2}$	$set_{4,3}$

Figure 9.4. Construction of Scenarios on Different Scales

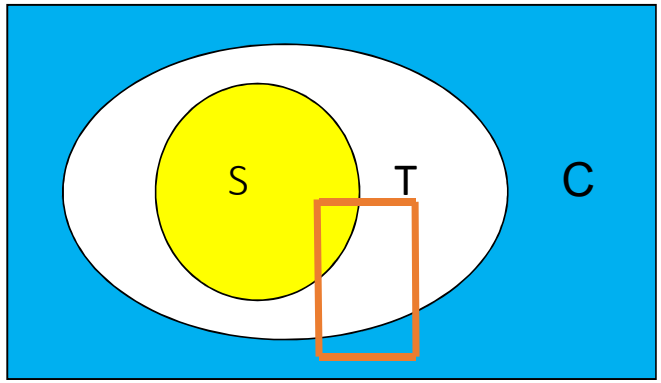
NOTE: Often, it is favorable to separate the construction of local scenarios (subsequently denoted as variants, or V_m) from global scenarios, S_k, which provide frames or shells for variants. The combination of a variant with a (shell) scenario is labeled $set_{m,k}$. The figure provides the schema for and example of four variants and three scenarios.

A scenario system with context * event/situation scenarios: Swedish Armed Forces 2003-04 and ongoing

Context **Conflict**	**A**	**B**	**C**	**D**
1	A1			
2	A2			
3		B3		
4		B4		
5			C5	
6			C6	
…	…	…	…	…
n				

A scenario system with context * event/situation scenarios: Swedish Armed Forces 2003-04 and ongoing

Context Conflict	A	B	C	D
1	A1	XXXX	C1	D1
2	A2	B2	XXXX	XXXX
3	XXXX	B3	C3	D3
4	XXXX	B4	XXXX	XXXX
5	A5	B5	C5	D5
6	XXXX	XXXX	C6	XXXX
…	…	…	…	…
n	XXXX	Bn	Cn	XXXX



A scenario system with context * event/situation scenarios: Swedish Armed Forces 2003-04 and ongoing

Context Conflict	A	B	C	D
1	A1	XXXX	C1	D1
2	A2	B2	XXXX	XXXX
3	XXXX	B3	C3	D3
4	XXXX	B4	XXXX	XXXX
5	A5	B5	C5	D5
6	XXXX	XXXX	C6	XXXX
…	…	…	…	…
n	XXXX	Bn	Cn	XXXX

Now assume Conflict (B)4 requires some really expensive capabilities, needed nowhere else.

If OK in terms of temporal aspects (warning time, response time) this is an ideal case for **adaptive (…static) robustness**.

Terribles simplificateurs? Thoughts from the Shell school (our emphasis):

”These three levels [of corporate activity] provided a foundation for relating different sets of scenarios and avoiding the assumption of top-down logic in which global scenarios always provide the reference frame for focused scenarios. Different sets of scenarios […] could be related by seeing the combinations between different sets of global and focused scenarios as ‘attractors’…”

Wilkinson & Kupers (2014, 66)

Or is it that the Shell school doesn’t want to advise on simple choices?

’Deep uncertainty’ and – static and adaptive – robustness

“Even analyzing a well-crafted handful of scenarios will miss most of the future’s richness and provides no systematic means to examine their implications.” Wiser then “to seek among the alternatives those actions that are most robust – that achieve a given level of ‘goodness’ across the myriad models and assumptions consistent with known facts”

Walker et al. 2013

Context **Models and assumptions**	**BAU**	**A**	**B**	**C**
1	BAU1	A1	B1	XXX
2	BAU2	XXX	B2	XXX
3	XXX	A3	B3	C3
4	XXX	XXX	XXX	C4
…	…	…	…	…
m(yriad)	BAUm	Am	XXX	Cm

A scenario system with context * event/situation scenarios: Swedish Armed Forces 2003-04 and ongoing

Context Conflict	A	B	C	D
1	A1	XXXX	C1	D1
2	A2	B2	XXXX	XXXX
3	XXXX	B3	C3	D3
4	XXXX	B4	XXXX	XXXX
5	A5	B5	C5	D5
6	XXXX	XXXX	C6	XXXX
…	…	…	…	…
n	XXXX	Bn	Cn	XXXX

Now assume Conflict (B)4 requires some really expensive capabilities, needed nowhere else.

If OK in terms of temporal aspects (warning time, response time) this is an ideal case for **adaptive (…static) robustness**.

Historical sociology as guide to futures studies

"[I]n contrast to the focus on macro drivers (intuitive logics approaches) […] I will suggest an explicit focus on the actors, causal mechanisms and chains of events that effect changes in the level of privacy protection."

Minkkinen (2015)

Context **Actors, causal mechanisms…**	**BAU**	**A**	**B**	**C**
1	BAU1	A1	B1	XXX
2	BAU2	XXX	B2	XXX
3	XXX	A3	B3	C3
4	XXX	XXX	XXX	C4
…	…	…	…	…
n	BAUm	An	XXX	Cn

Thanks for listening!

Questions now or at eae@foi.se