A normative framework for the water food energy environment nexus

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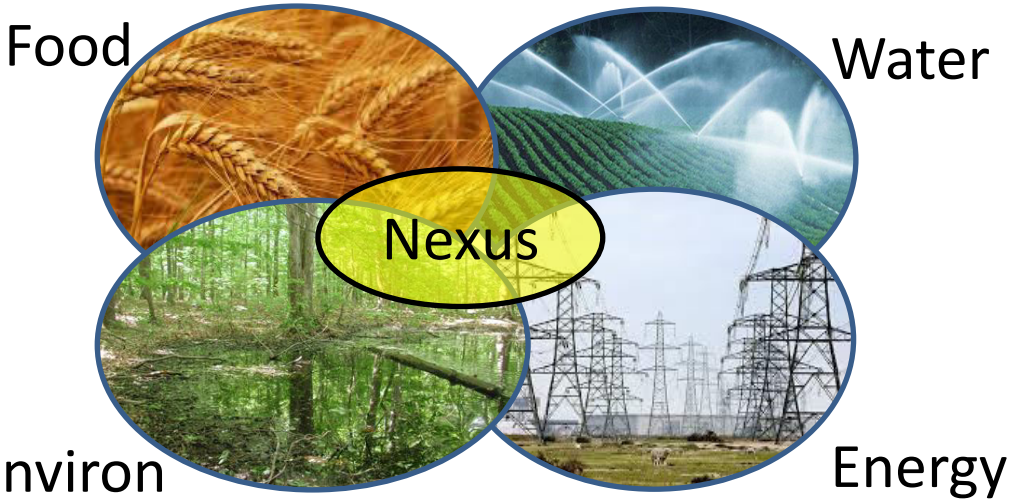
Bruce Lankford, Edinburgh, May 2015



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Current frameworks for the nexus

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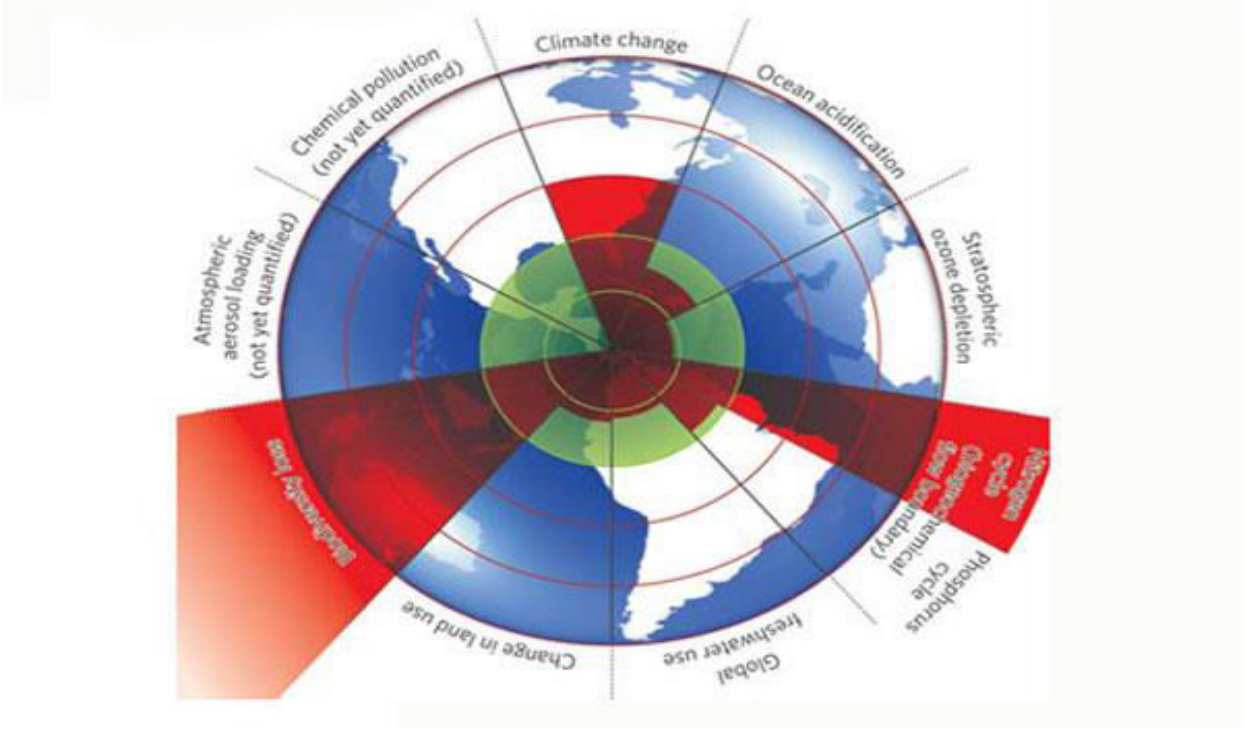
- Most if not all current nexus frameworks are descriptive and heuristic; they describe what a particular nexus formulation comprises and how these components of the nexus are arranged (WEF, 2011; Stigson, 2012; ICIMOD, 2012; IISD, 2013; SEI, 2014).
- Components commonly include the water, energy and food sectors plus sub-dimensions such as institutions, infrastructure, markets, etc.
- These frameworks serve to remind us of the scope and make-up of the nexus. As useful as these are, alongside these, a normative interpretation of nexus theory would more explicitly guide thinking on sustainability in the nexus.

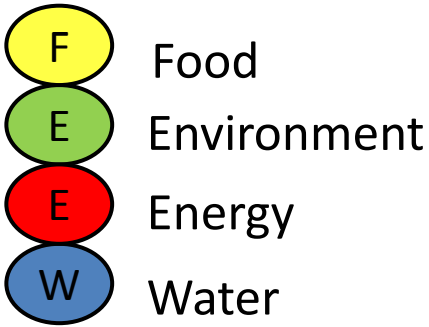
As an example: the planetary boundaries framework is 'normative'. It attempts to guide us towards sustainable living or the idea of sustainability as a norm. There is a 'thesis' or an 'ought' implied in the framework.

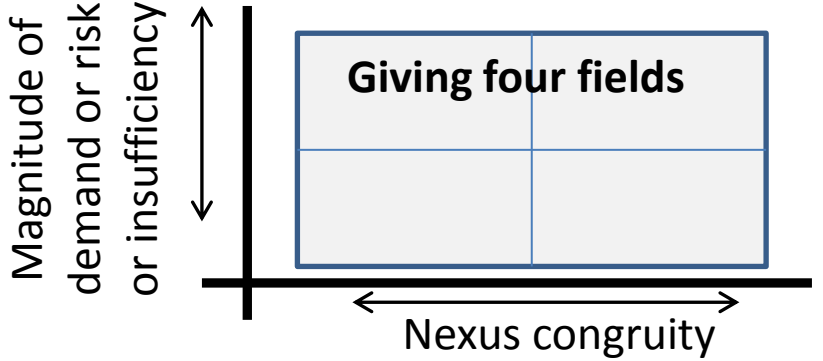


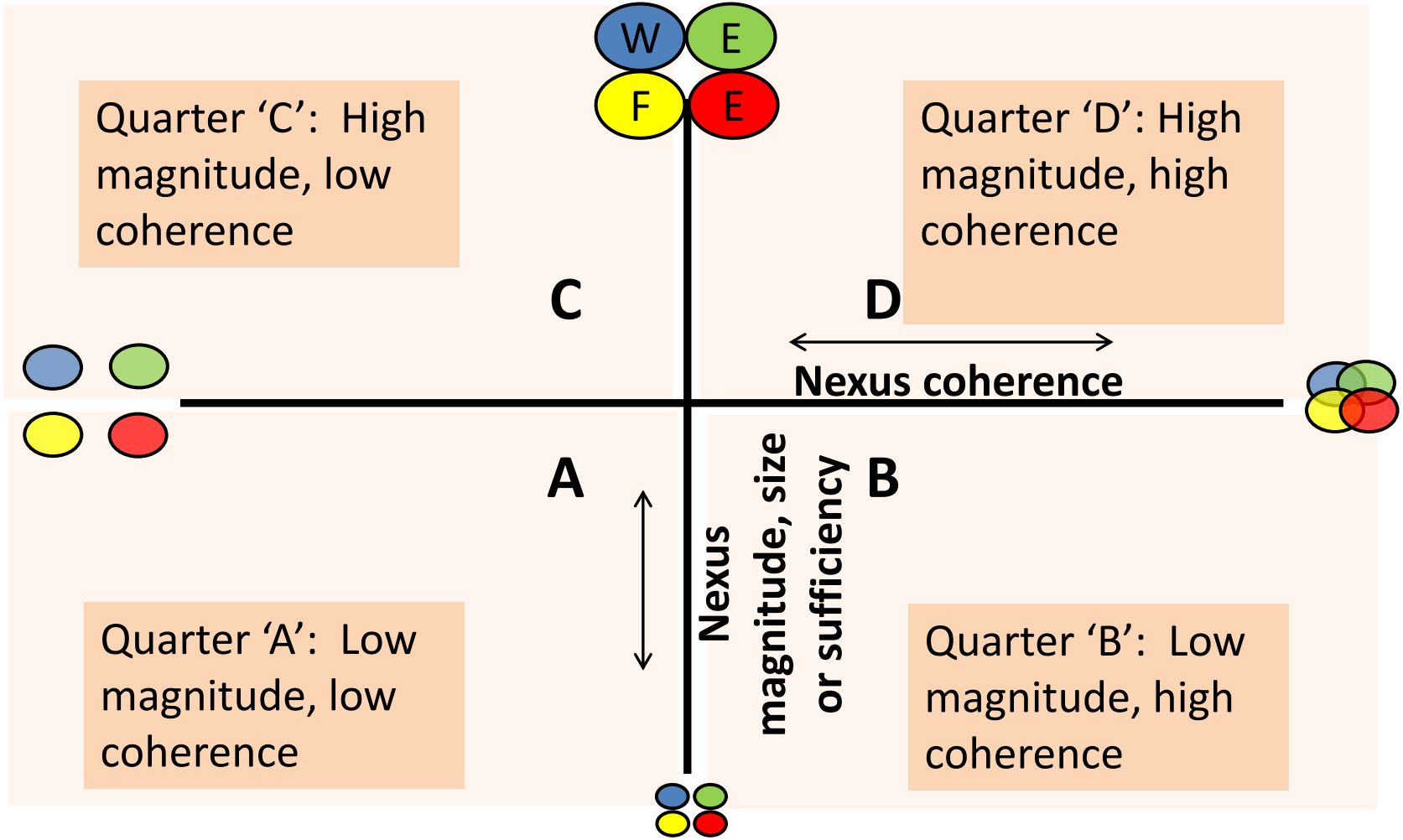
Nexus magnitude-congruity sustainability framework

The normative element of this framework suggests that in risky high-demand/high supply conditions, the ***congruity/fit*** between the four sectors in this nexus needs to be considered to ensure sustainability and equity

Axis	Definition	Sector	Scale
Nexus demand magnitude and risk	Magnitude of demand-supply sufficiency for nexus sectors offer a measure of the size of nexus risk.	Measured by a variety of supply and demand indicators such as population, power generation, water availability, water consumption, habitat loss, freshwater ecosystems	
Nexus coherence, congruity	A measure of fit between the policies, products and outcomes the water, energy, food and environment sectors	Sectors fit together via measures, policies, production, efficiencies, externalities, or other linkages	National down to local scales fit/do not fit together (with emphasis on poverty?)

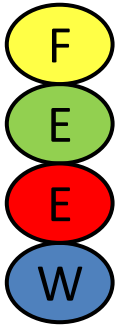




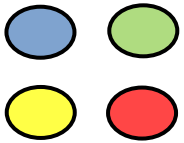

W
E
F
E
Quarter ‘C’: High magnitude, low coherence
Quarter ‘D’: High magnitude, high coherence
C
D
Nexus coherence
A
B
Nexus magnitude, size or sufficiency
Quarter ‘A’: Low magnitude, low coherence
Quarter ‘B’: Low magnitude, high coherence

How to read the graphic and coloured discs

We (as a society) normatively seek to be in Quarters B and D on the graph where higher levels of coherence between sectors are being sought and/or delivered. Especially important is to seek greater congruence in Quarter D where pressure on sectoral output, productivity and environmental protection is greatest

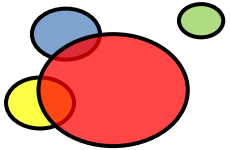


Food
Environment
Energy
Water



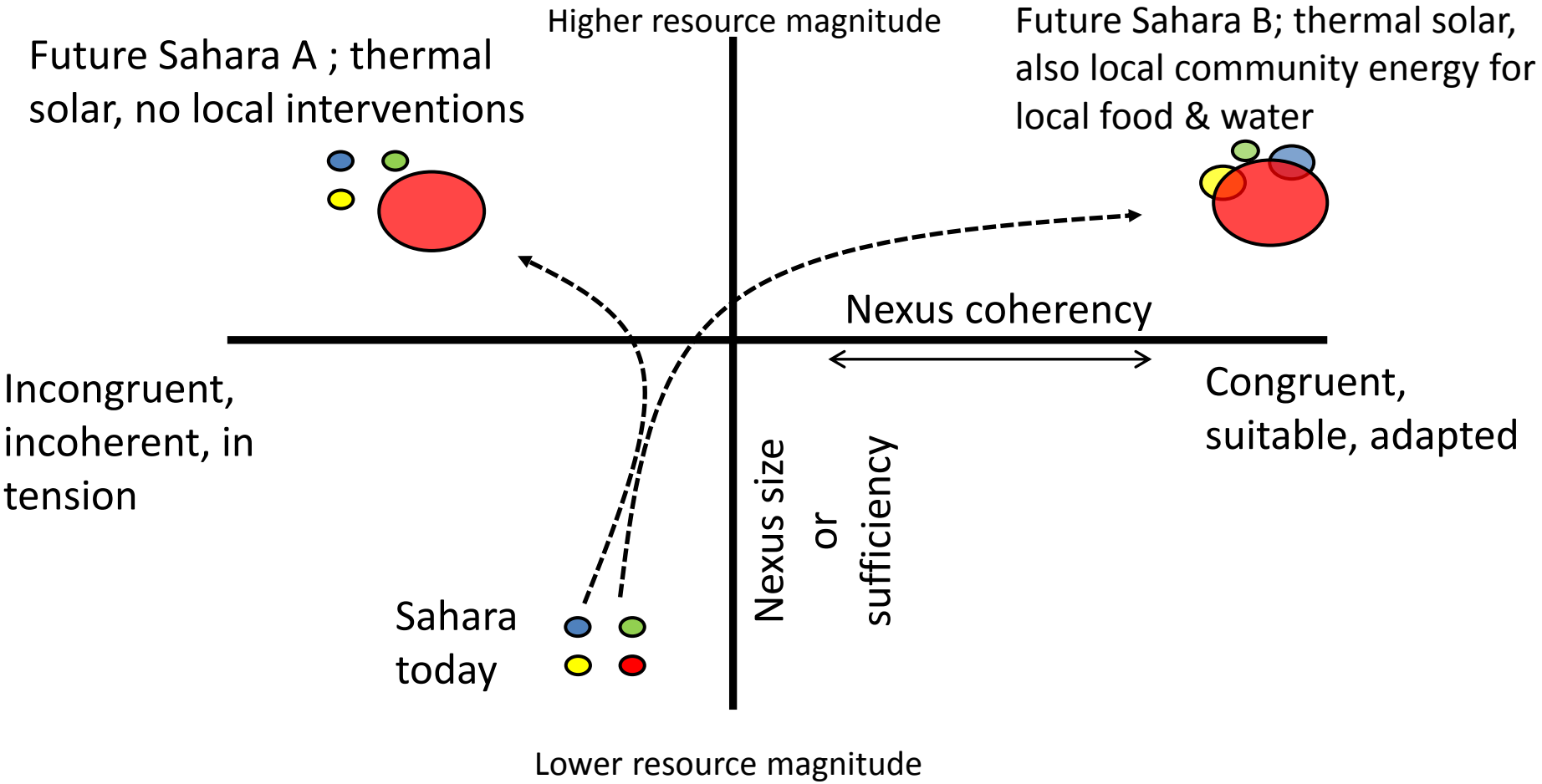
The four sectors are some distance from each other but equally sized. This implies a lack of coherence between the sectors although they are generally in balance.

All four sectors in the nexus are closely connected and working together. Thus they are coherent, suitable and over-lapping. There is a reduced risk of sectoral imbalance and inefficiencies etc

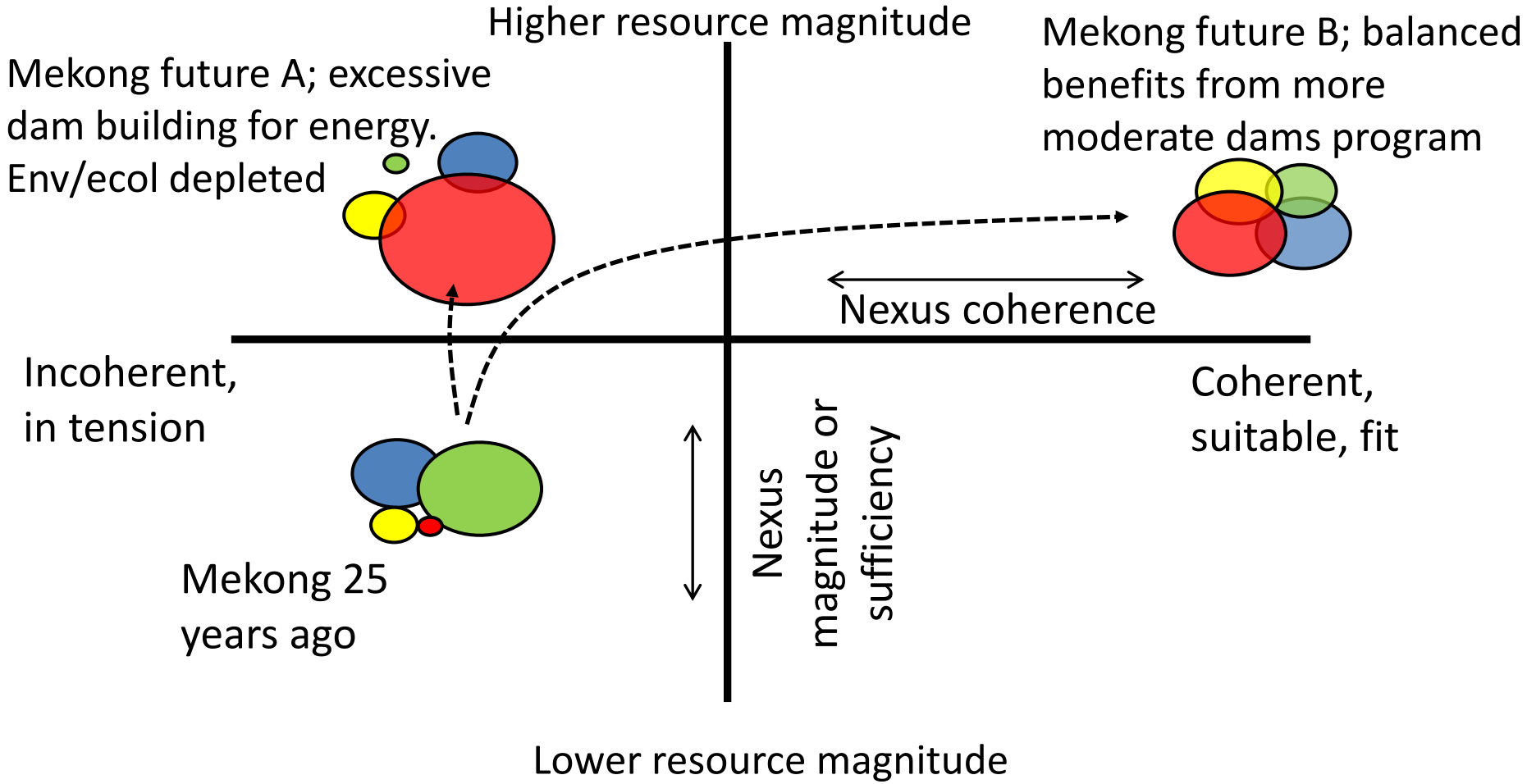


Here the **energy** sector dominates in terms of water use and/or policy emphasis. Water and food sectors closely connected to the energy sector. The environment is a poor relation and is being omitted or under-served.

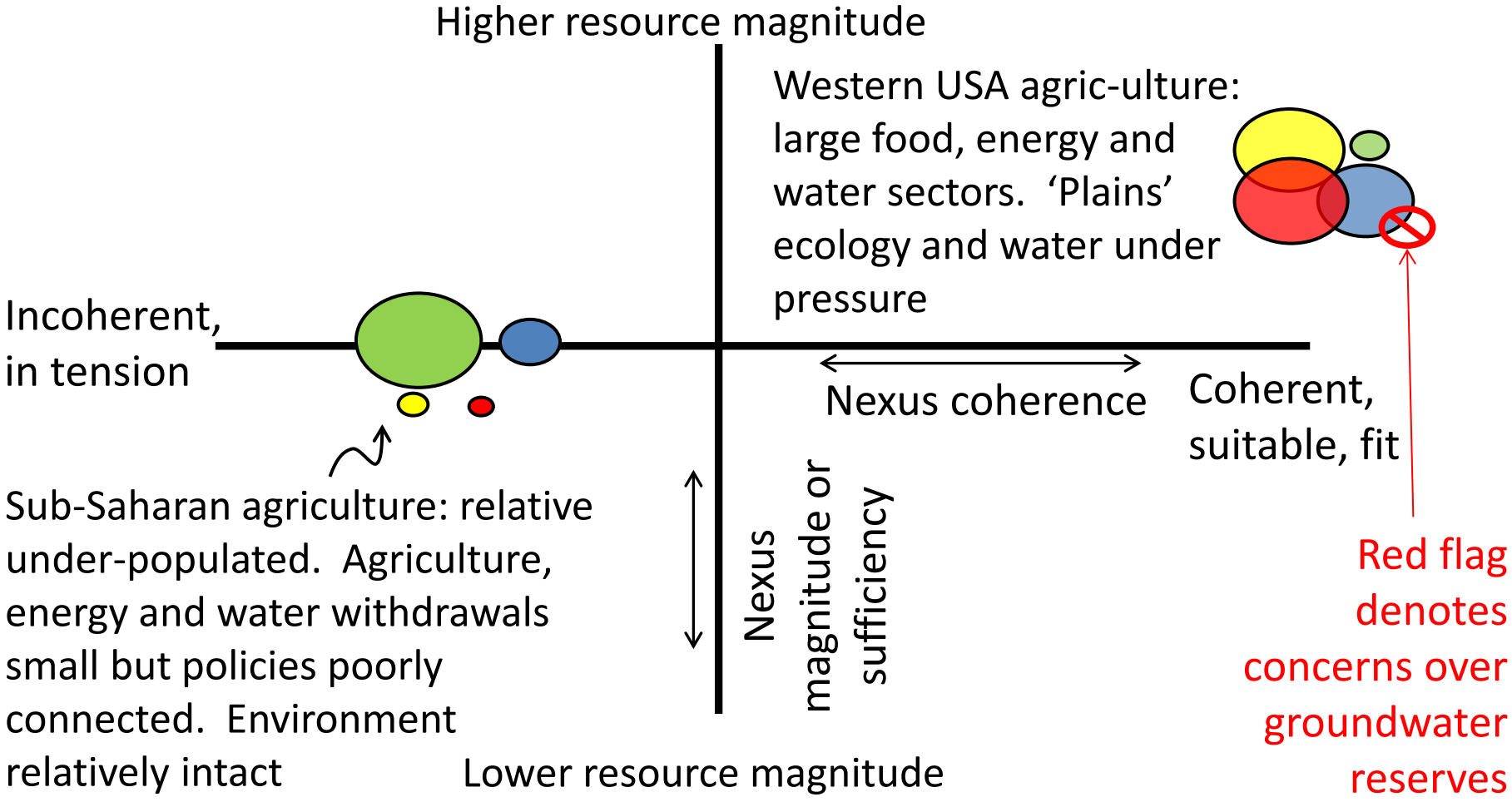
Nexus in Sahara desert; current and two futures based on thermal solar



Nexus in Mekong; past and two futures recognising dam building



Comparing SSA savannah and Western USA groundwater agriculture



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Thanks

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