

Scenarios, -how to deal with uncertainty and transformation

The future is not only for the most part *unknown*, it is to a large extent *unknowable*.

But we try. We build deterministic models that, with uncertainties, predict things within small ranges of time, space and parameters. We build ensemble systems which use small perturbations in the initialization of the system to create probabilistic outcomes of the future.

The world is not a mechanical system. It is not only complicated. It is complex. Complex systems have nonlinear and emergent behaviors. *Complex Adaptive Systems, CAS*, (Walter and Salt, 2006. <https://islandpress.org/books/resilience-thinking>) are special cases of complex systems that are *adaptive* in that they have the capacity to change and learn from experience. Examples of CAS are immune systems, the reader of this text, a forests, global economy and the climate. These systems are alive and all the properties of complex systems makes them impossible to predict. The future of everything we care about is neither deterministic or pre-defined.

Some science based future worlds of climate change differ so much from the world of today that one need to raise the question of collapsing civilisations. (*Tipping Elements*, Lenton et al. <https://www.pnas.org/content/105/6/1786> and *Climate tipping points*, <https://www.nature.com/articles/d41586-019-03595-0>)

So how to deal with, prepare for or even influence future events? There is at least three different approaches:

1. More data, better tools (faster computers) and better understanding of the system. The underlying assumption in the response is that the problem lies in our imperfection of our knowledge rather than the unknowability of the future.
2. Pragmatic response to the uncertainty: "the world is so complex that any attempt to predict it will fail". The response is to develop an early warning system and react promptly to any signs of change.
3. To find a range of possible/not impossible, futures that might arise from the uncertain courses of the identity of the system. This forms a boundary of alternative possibilities. The goal is to find strategies to cope with any of the system states within this boundary. i.e. to stay focused, resilient and flexible.

And you might want to consider the intrinsic possibilities, not only problems and constraints, a complex adaptive system gives a *system agent*, i.e. someone within the system with an ambition to change, or prevent changes of, the system. By pulling the right levers, changing flows, feedbacks or even creating knowledge at the right moment, one can change the system. However the outcome will not be certain. One technique to do this is called "*Transformative Scenario Planning*" (Adam Kahane, 2012 https://reospartners.com/transformation-scenario-planning_2/).

Scenarios are alternative futures we want to be prepared to confront. They need to have a narrative and holistic view. They are designed to have a plot and story line describing trends, interrelationships, causes and effects. The storytelling is also an important tool to educate stakeholders and implementing changes in the system level of concern (family, institution, society, country...).

There are different ways to create scenarios. You can seek future worlds through brainstorming or more systematic methodologies. The latter identifies areas with big impacts and uncertainties, hence creating large differences between future worlds. In general the methodologies vary along two axis: An objective versus Normative approach, and Analytical versus Intuitive approach. (*The Scenario Planning Handbook*,

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Ralstone and Wilson, 2006). The future worlds, typically 3-5, are not necessary the most probable. The purpose is to span the universe of not unthinkable future worlds or systems.

Side event workshop/seminar. In times large uncertainties and even risk of systemic collapse regarding climate, ecosystem, energy, food, health, geopolitics, and futures pathways of the Earth system we need to be able to visualize, avoid and ultimately prepare for the dangers of slippery slopes that may lead to hostile futures.

The participants will be guided through the 101 of scenario approaches and thereafter discuss big impact parameters, uncertainties, principles and pathways for identifying leverage points in the complex system to explore future worlds.