Knowledge Synthesis Methods

17. Scenario analysis[1]

Summary of method

Scenario Analysis formulates assumptions about future developments in one connected storyline. Scenarios are consistent and coherent descriptions of alternative hypothetical futures that reflect different perspectives on past, present, and future developments.

Qualitative storylines for the future development of complex systems can be integrated with quantitative modelling. “Scenarios and models play complementary roles, with scenarios describing possible futures for drivers of change or policy interventions and models translating those scenarios into projected consequences for nature and nature’s benefits to people.” IPBES (2016).

Scenarios are more likely to lead to read policy outcomes if they use participatory approaches to involve stakeholders throughout, from the initial phase of problem definition and feature frequent exchanges between scientists and stakeholders.

Participatory scenario development aims to supplement and synthesize existing data and formalized knowledge with other relevant forms of stakeholder knowledge.

[1] A guidance note from Dicks LV, Haddaway N, Hernández-Morcillo M, Mattsson B, Randall N, Failler P, Ferretti J, Livoreil B, Saarikoski H, Santamaria L, Rodela R, Velizarova E, and Wittmer H. (2017). *Knowledge synthesis for environmental decisions: an evaluation of existing methods, and guidance for their selection, use and development – a report from the EKLIPSE project.*

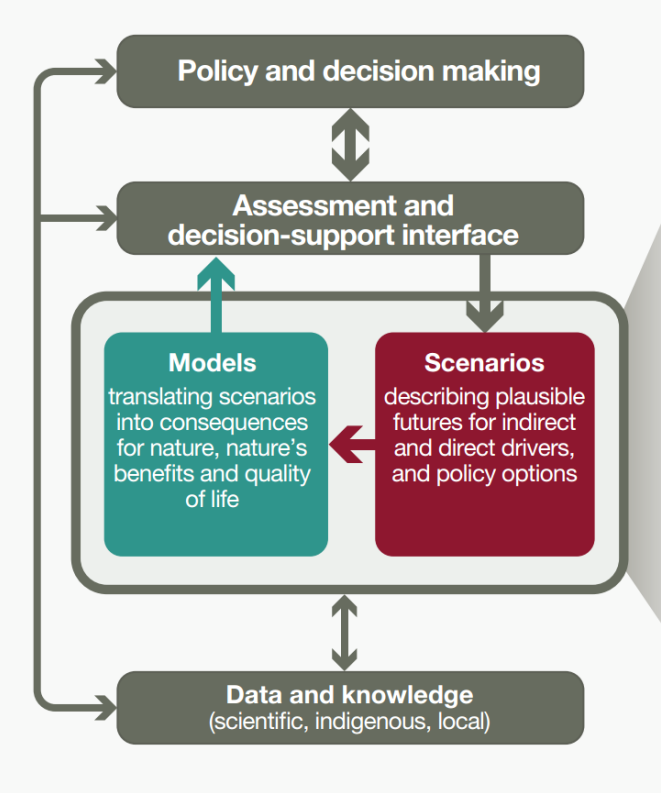

Figure 1 shows the roles of scenarios and modelling in informing policy and decision making. Scenarios and models are directly dependent on data and knowledge for their construction and testing, and provide added value by synthesizing and organizing knowledge. Source: IPBES (2016).

Key references

The Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES 2016) assessment report on scenarios and modelling presents a best-practice 'toolkit' of the approaches that can be used to decide on policies and actions by Governments, the private sector and civil society.

Slocum (2003) provides detailed guidance on how to develop qualitative scenarios through participatory workshops.

IPBES (2016). *The methodological assessment report on scenarios and models of biodiversity and ecosystem services.* S. Ferrier, K. N. Ninan, P. Leadley, R. Alkemade, L. A. Acosta, H. R. Akçakaya, L. Brotons, W. W. L. Cheung, V. Christensen, K. A. Harhash, J. Kabubo-Mariara, C. Lundquist, M. Obersteiner, H. M. Pereira, G. Peterson, R. Pichs-Madruga, N. Ravindranath, C. Rondinini and B. A. Wintle (eds.). Secretariat of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, Bonn, Germany. 348 pages. http://www.ipbes.net/work-programme/scenarios-and-modelling

Slocum, N. (2003.) *Participatory Methods Toolkit. A practitioner's manual.* United Nations University, King Baudouin Foundation and the Flemish Institute for Science and Technology Assessment. Available from: http://archive.unu.edu/hq/library/Collection/PDF_files/CRIS/PMT.pdf Accessed 29/01/2017.

Examples of application

The following two examples are used in IPBES (2016) to illustrate the use of different types of scenario at global and local scales.

Global scale

The Global Biodiversity Outlook 4 assessment of the Convention on Biological Diversity, used to evaluate the Strategic Plan for Biodiversity 2011-2020, relied heavily on target-seeking scenarios to explore ways of achieving multiple sustainability objectives for 2020.

IPBES(2016), Figure SPM.3.

Local/regional scale

Policy-screening scenarios were used to explore future land use in the Thadee watershed in southern Thailand, where the water supply for farmers and household consumption has been degraded by the conversion of natural forests to rubber plantations (Trisurat, 2013). Scenarios were built using local datasets and knowledge. The municipality has agreed to find means of collecting a conservation fee based on payments for watershed services to fund forest protection, reforestation or conversión to mixed cropping. IPBES (2016), Figure SPM.4.

Many examples were presented at a conference on scenarios and models of biodiversity and ecosystem services, France, 2016 (ScenNet, 2016).

ScenNet (2016). International Conference on Scnenarios and Models of Biodiversity and Ecosystem Services in Support of Decision-Making. Abstract Book. https://scennet2016.sciencesconf.org/data/pages/ScenNet2016_Book_of_Abstracts.pdf

Trisurat, Y., (2013). *Ecological Assessment: Assessing Conditions and Trends of Ecosystem Services of Thadee watershed, Nakhon Si Thammarat Province (in Thai with English abstract).* Final Report submitted to the ECO-BEST Project. Bangkok, Faculty of Forestry, Kasetsart University.

Scenario analysis

Cost	Cost depends on: • The scope of the scenario exercise, e.g. scale of the problem, number of sectors, countries involved/addressed and level of detail • Software used, some freeware and trial versions available • Number of stakeholders/experts involved • Level of disagreement among stakeholders/experts • Number of revision rounds • Availability of existing scenarios

	A facilitator or moderator is needed , if participatory
Time required	Simple scenarios can be developed in 2-5 days with few resources, but the entire organising process can take up to 6 months. (To analyse complex systems, longer process is needed, involving more knowledge-holders and stakeholders
Repeatability	Low. If done with two different groups of people, the scenarios will likely differ
Transparency	Depends on documentation of the process (e.g. how far are assumptions made explicit), the data used and the participants involved. Complex scenarios with quantitative modelling can have low transparency to those not involved in developing them
Risk of bias	Medium. Depends on representativeness of stakeholders/experts involved, and whether individual input is incorporated or obtained in group discussion (greater bias likely from group discussion)
Scale (or level of detail)	Flexible, from local to global, but different methods appropriate to different scales
Capacity for participation	High. Participation is part of the method for qualitative scenario building
Data demand	Qualitative scenarios depend on expert/stakeholder knowledge (e.g. tacit knowledge), which can be combined with other sources of information (e.g. from quantitative models, literature reviews, or interviews) Quantitative scenarios depend on quantitative data and often have high data demand
Types of knowledge	Scientific/technical, opinion-based, indigenous and local; tacit and explicit (ALL)
Types of output	Report (qualitative and/or quantitative information), maps (including quantitative information), tables and graphs (including economic scenarios)
Specific expertise required	Topic experts needed. Facilitator required for participatory process

Strengths	Weaknesses
Option for including stakeholders in the assessment process	Can be time-consuming. Lowering the time used to build scenarios trade-offs with time for involving stakeholders
Using participatory methods, local or tacit knowledge can be incorporated	A qualitative approach should put a strong emphasis on the selection of suitable participants/ experts; in practice this can be challenging
Flexible structure for analyses with the possibility to easily adapt the method to various contexts	Requires substantial technical knowledge and capacity
'Target-setting' scenarios can be used to identify desirable future developments and map out the steps needed to achieve a desired future outcome	Data and information from disparate sources have to be collected and interpreted
Many different approaches are available, to suit different policy and decision contexts	*Quantitative scenarios, with integrated modelling*
Quantitative scenarios, with integrated modelling	Risk that assumptions not set out transparently
Very robust results	Very high resource requirements
Used for complex, quantitative analysis of impacts, with multiple inputs or outputs	All models require complete data sets and results depend on input data
Provide fixed structure for analyses (e.g. most economic models are based on national accounts)	