Futures research and futures maps - ways to study and manage water and environment related issues

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Tulevaisuuksientutkimusta ei ole vesiohjelmassa tunnistettu relevantiksi

Lainaus tarjouspyyntöpaperista:

- Ohjelmassa parhaimmillaan esiintyy tiivistä yhteistyötä perinteisten vesitieteiden (esim. limnologia, hydrologia ja vesiekologia), kulttuuri- ja yhteiskuntatieteiden (esim. sosiologia, oikeus- ja taloustiede, historian tutkimus), perinteisten luonnontieteiden (kemia, fysiikka, matematiikka), terveystieteiden (esim. ympäristölääketiede ja kansanterveystiede) ja teknisten tieteiden (esim. ympäristötekniikka, prosessi- ja mittaustekniikka) kesken.

Distinction between the Futures studies and the (scientific)Futures research

- Like Wendell Bell (1996) I call the emerging field “Futures research” or “Futures studies”. I call the practitioners of the field “futures researchers” or “futurists”.
- I will use the words “ (scientific) Futures research” (or futures research) and “futures researcher” when I speak scientifically oriented activities.
- The terms “Futures studies” (or futures studies) and “futurist” refer all activities and practitioners in the field.

Foresight or the Futures studies/research. Assumptions “that most futurists would accept” (Jeremy Glenn Millennium project Futures Research Methodology 3.0, Introduction)

1. You cannot know the future, but a range of possible futures can be known.
2. The likelihood of a future event or condition can be changed by policy, and policy consequences can be forecasted.
3. Gradations of foreknowledge and probabilities can be made; we can be more certain about the sunrise than about the rise of the stock market.
4. No single method should be trusted by itself; hence, cross-referencing methods improve foresight.
5. Humans will have more influence on the future than they did in the past.

Basic research topics of the scientific futures research

- Epistemic foundations of the knowledge concerning possible futures (futuribles, Bernhard de Jouvenel e.g. 1967)
- How actors (or genuine learning beings) build their futures maps and how futures maps of actors are used in their actions e.g. in their interaction with other actors
- Related other sciences: philosophy, history, psychology, social psychology, sociology, management science, economics, semiotics, technology and innovation studies

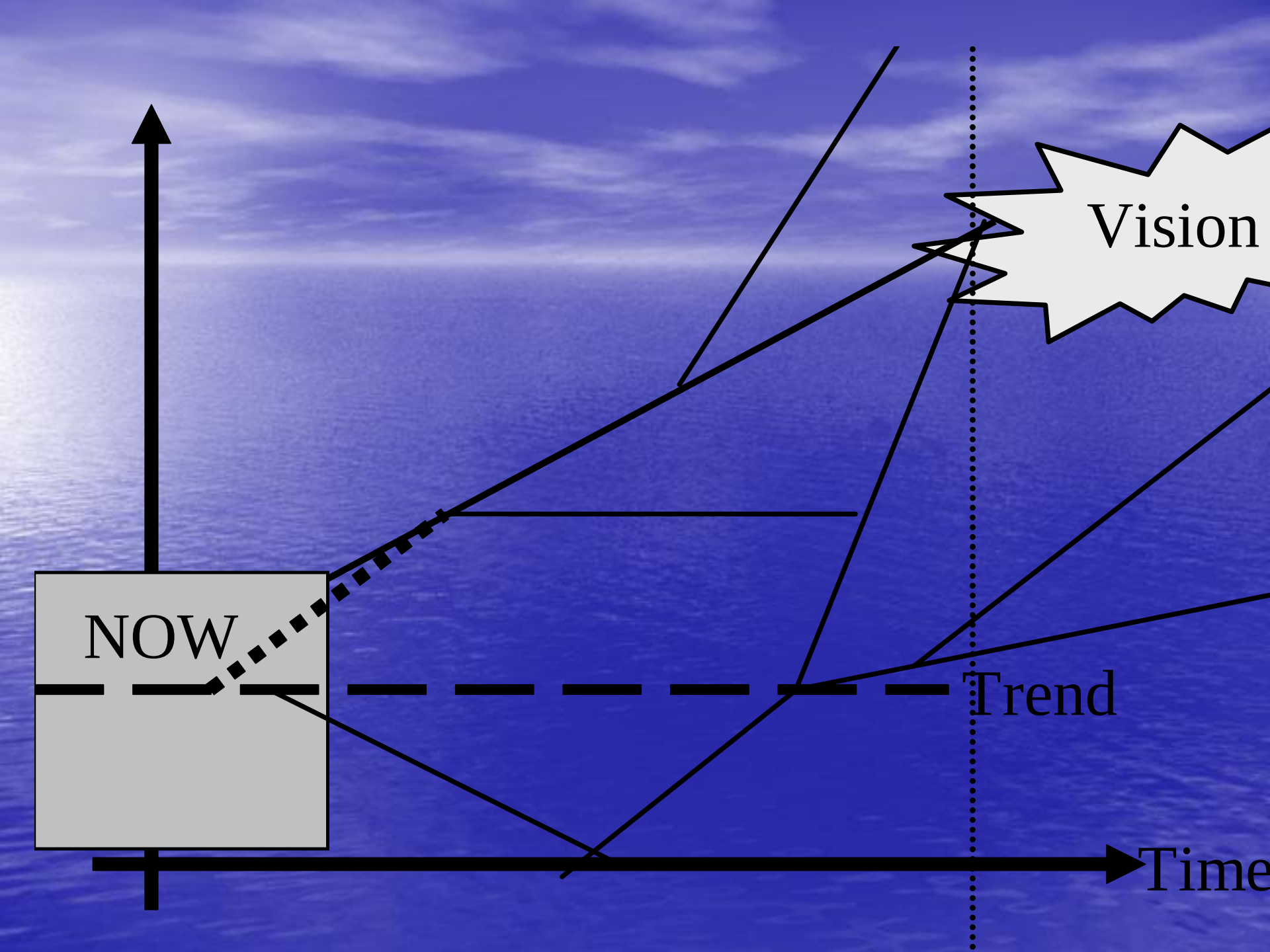
Key concepts in the mapping of futures

- futures map
- actors and their visions
- strong prospective trends and other invariances
- weak signals or wild cards
- paths on the futures map or scenarios
- road maps and strategies

The Aims of the Scientific Futures Research

(compare Wendell Bell: Foundations of Futures studies 1996)

- 1. The Study of Possible Futures +++
- 2. The Study of Probable Futures++
- 3. The Study of Images of the Future+++
- 4. The Study of the Knowledge Foundations of Futures Studies +++
- 5. The Study of the Ethical Foundations of Futures Studies +++
- 6. Interpreting the Past and Orienting the Present +
- 7. Integrating Knowledge and Values for Designing Social Action +
- 8. Increasing Democratic Participation in Imaging and Designing the Future ++
- 9. Communicating and Advocating a Particular Image of the Future -


Vision
NOW
Trend
Time

Four possible storylines of how to achieve a low-carbon Finland (Government of Finland 2009)

	A: Efficiency Revolution	**B: Sustainable Daily Mile**	**C: Be Self-sufficient**	**D: Technology is the Key**
Leading idea	Eco-efficiency	Local services	Self-sufficiency	Industrial Finland
Average annual economic growth	1,7%	1.8%	1.2%	1.8%
Economic structure	The share of services has increased clearly	The share of services has increased	The share of services has increased slightly	Similar as compared to the present
Urban structure	Cohesive	Highly cohesive	Dispersed	Dispersed in urban areas
Passenger transport performance	Decreased	Decreased clearly	At the present level	Increased
Final energy consumption	Halved	Decreased by 1/4	Decreased by 1/3	At the present level
Share of renewable energy	1/1	2/3	4/5	3/5
Use of nuclear power	Ended	Increased	Decreased	Increased clearly

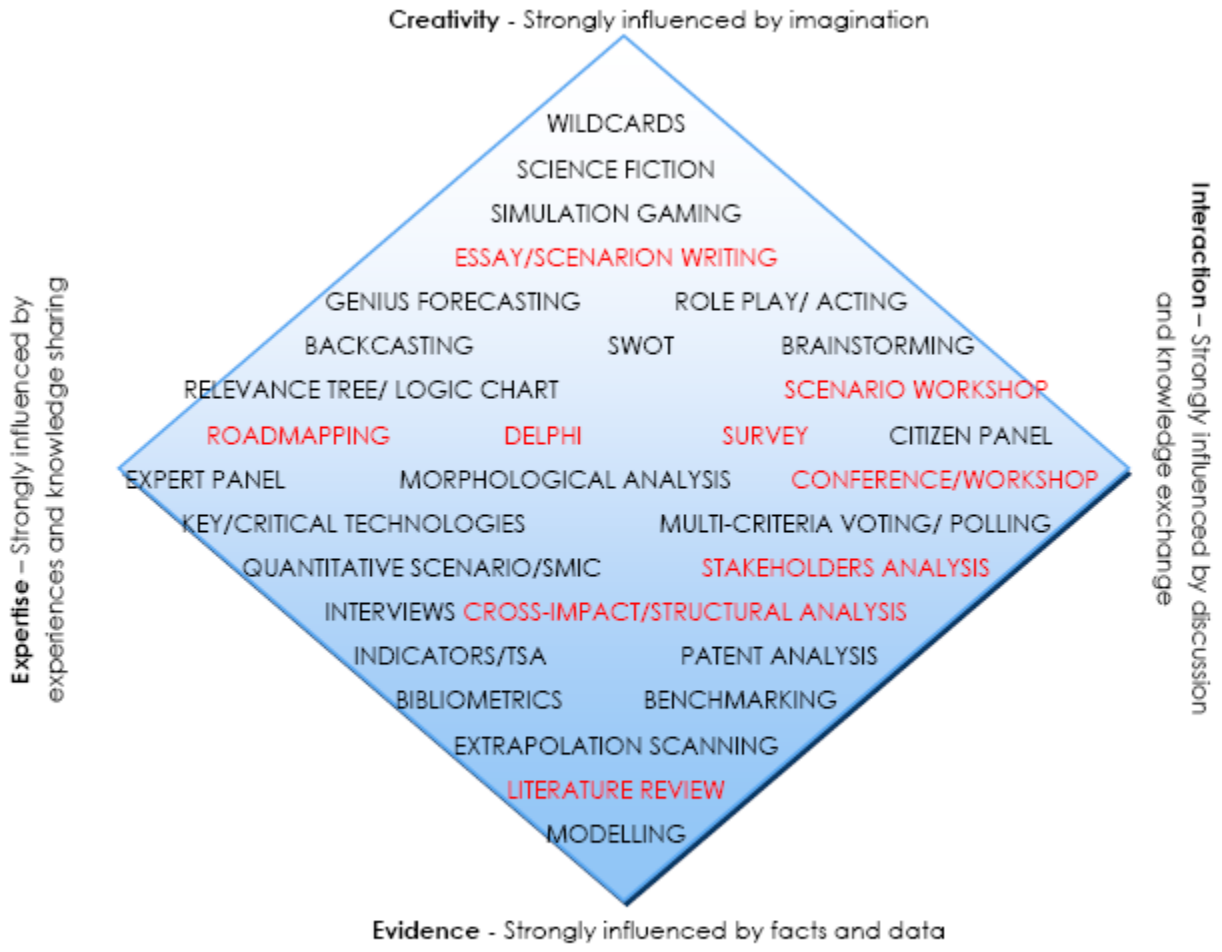


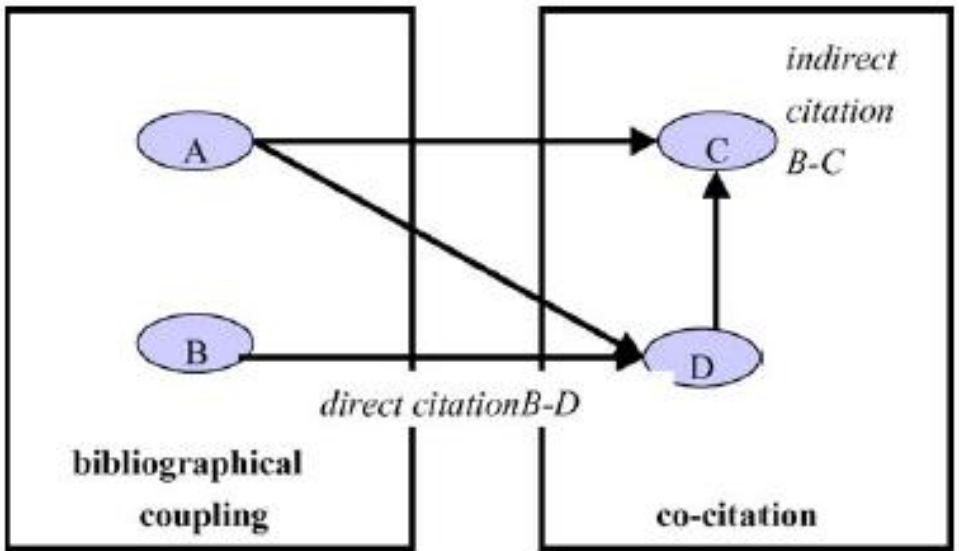
Figure 3 - Foresight Diamond

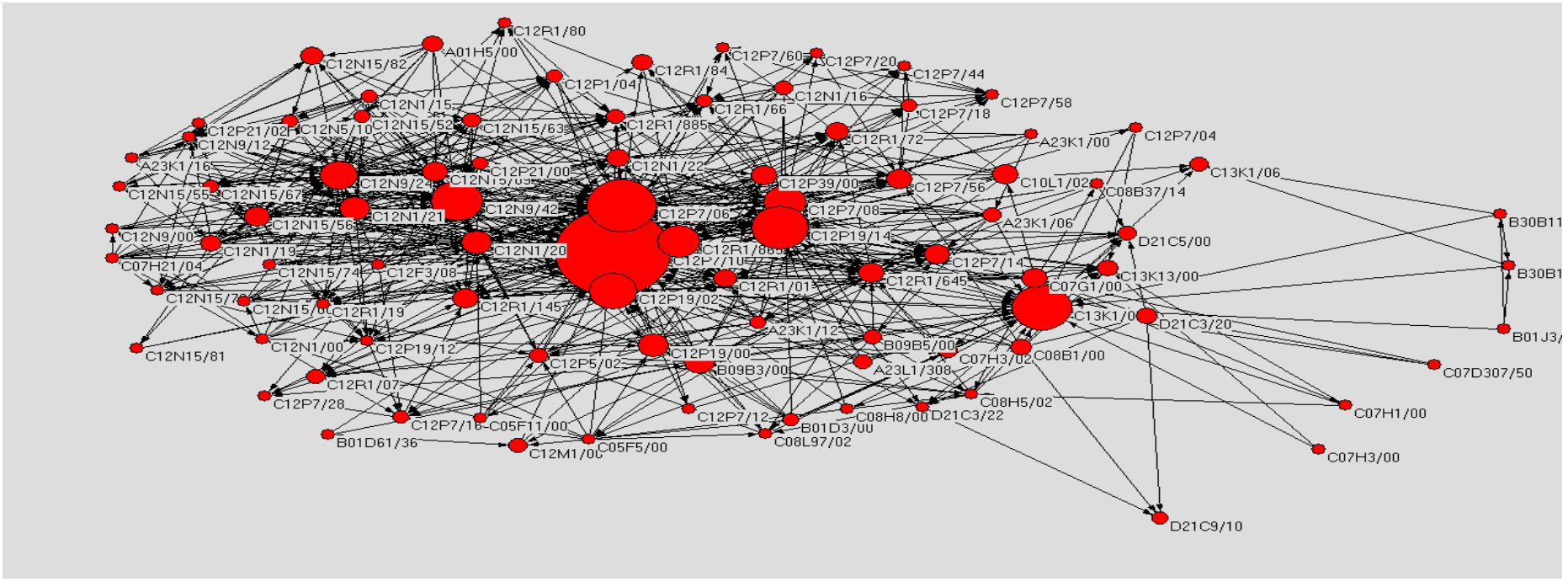
Dimensions of the “Diamond of methods” (Rafael Popper et al. 2006)

- Expertise
- Creativity
- Interaction
- Evidence

Certain historical knowledge or uncertain futures related knowledge: Bibliographic coupling or co-citation analysis in the clustering of patents

- Co-citation: OLD D and C are interesting because 2 (many) citations
- Bibliographic coupling: NEW A and B are connected because they cite D (or have many common citations)

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	Futures researcher	Natural scientist	Economist	Sociology, social psychology
Main source of anticipated future developments	Learning actors design the future based on the futures maps	Invariant laws of nature	Rational economic behavior, utility and profit maximization	Learned behavioral patterns
Typical empirical data base	Judgments or plans of actors (documents, expert or stakeholder information)	Scientific experiments and measure-ments	Statistics of the past behaviour of economic actors	Observation of individual or group behaviour
Important languages in anticipation	Actors' and their representatives' languages	Universal language of the laws of nature	Scientific language based on axioms of the economic theory	Cultural interpretations and expectations having impacts on behaviour
Role of values	Actors' and their representatives' values defining their aims	No role	Preferences of economic actors behind economic choices	Values of social groups shared by their members that explain their behaviour
Success criterion	A map of possible futures for reasonable actions that actors will not regret	New invariant law or behavioural pattern of nature	Anticipations and rational choices in different situations following from axioms of economic theory	Invariant rules of behaviour of individuals and social groups

Modern (Argument) Delphi method in the anticipation of emerging technologies (e.g. Kuusi 1999)

- Anonymity (”safe” environment for presenting innovative and unconventional arguments or judgments)
- Expert based and controlled (success of a Delphi study depends first of all on its panel, the Delphi manager can identify who has given a specific argument)
- Direct feedback (beside judgments on theses, comments of other panelists focused on specific arguments)
- Iteration (interviews, Internet based discussion resulting in further arguments and judgments concerning validity and relevance of futures related theses)

Vesiongelmat yhä vähemmän kansallisia ongelmia!

- Ekosysteemipalvelut ovat AKVA-tutkimusohjelmassa keskiössä. Yleisesti sillä tarkoitetaan luonnon ihmisille tuottamia hyötyjä ja palveluja (*ecosystem goods and services*, ks. esimerkiksi Millennium ecosystem assessment), mutta ekosysteemipalvelu on samalla käsite, joka korostaa ekosysteemien ja ihmisten välisiä vuorovaikutussuhteita (sosio-ekonomiset systeemit).
- JPI Water neljä temaattista kohdentumisalaa ovat *1) bio-based economy, 2) sustainable ecosystems, 3) healthier water systems* ja *4) closing water cycle.*
- Tutkimusohjelmassa pyritään edistämään yhteistyötä Suomen Akatemian yhteistyömaiden ja vesialan yhteistyöhön parhaiten sopivien kumppanimaiden kanssa. Tavoitteena on yhteistyö ja liikkuvuus kansainvälisesti korkeatasoisten tutkimusryhmien kanssa.

Table 4. Two key drivers and the basic ideas of the Millennium Ecosystem Assessment scenarios

	Anticipatory managing of environmental problems	Reactive managing of environmental problems
Solving problems through global cooperation	Focused on environmental technology (TechnoGarden TG) Economic value of good environment is realized. Trust in environmental technologies. Environmental values are priced and standardized locally and globally.	Global Orchestration GO Foci of international cooperation are economic growth and human capital. There is a belief that environmental problems will be solved as they appear, just as long as inputs are made into technological development, education, health care and well-functioning infrastructure.
Local (or no) problem solving	Adapting Mosaic AM Attempts to master global problems, including environmental ones, do not properly succeed. Problems are solved both through local interaction, empowering the local populations and using information and communication technology	Order from Strength OS Environmental problems are not taken care of, since attention in rich countries is concentrated on questions of national security and safeguarding national interests. Poor countries struggle with basic needs of their population.

Table 2. Futures table of the up-dated Millennium Ecosystem Assessment scenarios

Variables	Scenarios with different assumptions	Global Orchestration GO	Techno-Garden TG	Adaptive Mosaic AM	Order from Strength OS
1. Conclusions of IPCC (2007)		True in general terms	True in general terms	True in general terms	True in general terms
2. Global average warming 1990-2050		2,4 ºC	1.4 ºC	2.0 ºC	1.9 ºC
3.Cyclone in Hong Kong area		2033	2015	2017	2039
4.The global average price CO2 ton equivalent emission in 2020, in 2012 Euros		2	20	7	3
5.Biodiversity in focus 2020		Little	Rather much	Very much	Rather little
6.The yearly real increase of global average personal income 2012-2050		3%	2,5%	2%	1%
7.Leading economic powers of the world 2030		China and USA, secondary other BRI(C)S, EU and Japan	China, EU and USA secondary other BRI(C)S and Japan	Clear leaders lacking, changing from context to context	USA, EU and Japan, secondary BRICS
8.Leading economic areas of the world 2030		Pacific area	China-EU-USA axis	Many comparative independent centers	USA-EU-Japan axis, econo-mically less successful axis leaded by China
9.Global customer average demand of ecologically certified products 2020		Low	Rather high	Very high	Rather low
10.International trade of bioproducts		Average yearly growth 2012-2050 7%	Average yearly growth 2012-2050 5%	Average yearly growth 2012-2050 2,5%	Average yearly growth 2012-2050 2%, inside the coalitions
11.The use of new biotechnology (e.g. zink-finger nucleases) after 2020		Effective use dominated first by big companies	Effective use of all kinds of companies	Little use before 2030	Use dominated by big companies
12.Characteristic form of bioproduction 2030 in tropical and subtropical areas		Agrobusiness	Evergreen revolution	Eco-economy	Agrobusiness
13.The volume of tropical and subtropical forests in 2050		Less than 2012, much less rain forests	Larger than 2012	About same than 2012	Very much less than 2012

Millaista menetelmällistä apua tulevaisuuksientutkimuksesta?

1. Vesiympäristöihin kohdistuvat muutospaineet ja niiden hallinta

- Virtausten tutkimiseen erityisen hyvin soveltuva systeemidynaaminen mallinnus ollut tutun vahvuus jo 1970-luvulta lähtien (Kasvun rajat, feedback-mekanismit), heikkojen signaalien käsittelyn menetelmät

2. Vesiympäristöjen ekosysteemipalvelut ja niiden turvaaminen sekä vesivarojen kestävä käyttö

- Biotalouden tulevaisuuskartat eri mittakaavoilla lähtien globaalikartoista. Tulevaisuustauluilla kausaalisuhteiltaan läpinäkyviä (transparent) hahmotuksia, joilla vältetään suurten taloudellisten mallien rakenteisiin kätkeytyvät hyvin kyseenalaiset yksinkertaistavat oletukset . Tulevaisuustaulu soveltuu alustaksi, jolla erilaiset tutkimustulokset yhdistetään läpinäkyvien mallien tuella.
- Perusteltuja asiantuntija-arviota kertyneeseen tekniseen osaamiseen perustuvalla paneelityöskentelyllä (Delfoi-menetelmä)
- Teknologian kehityksen ennakointiin perustuvat skenaariot