

SCENARIOS AS SUSTAINABLE DEVELOPMENT GOVERNANCE TOOL

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Summary

How, and within which limits, is scenario construction a helpful tool for sustainable development policy-making? And how does this future-oriented tool function? Those are the two questions we address in this paper. The global change challenges are described as situations where complexity, uncertainty, cross-scale and cross-sector interactions, long-time horizons, non-linear dynamics and heterogeneity are the rule (Swart et al, 2004). Scenarios are recurrently presented as the ad hoc tool to be used in such complex and uncertain context (Alcamo et al, 2005). Scenarios can be defined as logical sequences of events and/or images of the future, highlighting causal processes and challenges ahead (Barbieri Masini, 2000, p.121; Van Asselt, 1998, p.9). Therefore they are meant to help decision makers to better understand the present situation and to highlight crucial decisions to be taken today. If we can find a lot of literature about scenario typology and methodology, there is however little discussion about their specific contribution to public decisions. Concretely, a theoretical framework is presented which highlights the mechanics and outcomes of scenario exercises as learning and strategizing tool. Further, the paper focuses on the potential and limits of scenario exercises and their contribution to the development of a reflexive approach of sustainable development governance.

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INTRODUCTION

In this article, we argue that scenarios can be regarded as sustainable development governance tools because they encompass characteristics necessary to handle typical sustainable development issues and to influence the very way such issues are handled in the policy context. Indeed, if some authors answer the call for a ‘*Science for sustainability*’ (Kates et al, 2000) through advocating for the integration of “*scenario analysis in the sustainability science toolkit*” (Swart, Raskin, Robinson, 2004), there is also a growing call advocating that SD issues not only require specific scientific methods, but also renewed governance and policy approaches to handle them. Such SD issues are described as situations where complexity, uncertainty, cross-scale and cross-sector interactions, long-time horizons, non-linear dynamics and heterogeneity are the rule (Swart et al, 2004). Firstly, scenarios are recurrently presented as the ad hoc tool to be used in such complex and uncertain context (Alcamo et al, 2005). Further, the call for a ‘new’ (Salamon, 2002) or ‘reflexive’ governance (Voss, Bauknecht, Kemp, 2006) strikingly match with the scenario discourse as ‘reflexive governance’ requires integrated (transdisciplinary) knowledge production, adaptivity of strategies and institutions, anticipation of the LT systemic effects and action strategies, iterative participative goal formulation, interactive strategy development (Voss, Bauknecht, Kemp, 2006). In that regard scenario exercises appear to have relevant qualities in order to support policy in striving towards SD. However, at the current state of art in the domain, scenarios also appear to have considerable weaknesses and their precise effects and advantages for the policy field need to be further investigated.

In this article, in order to support our argument of scenarios as transition tool, we will first briefly outline the definition (A.) and evolution (B.) of this tool in order to precise our area of investigation; we will then further develop on their main mechanics and outcomes, with a critical eye on the covered scenario literature (C.) and develop further why scenarios should be regarded as a necessary tool for a transition towards SD and towards a renewed reflexive type of governance (D.). We will then highlight some limits and shortcomings of this tool (E.) before concluding.

A. SCENARIOS: DEFINITION

As is repeatedly stated, scenarios are not predictions about the futures. The scenarios approach is based on the assumption that the future is unpredictable and that it is necessary to

take uncertainty into account in the decision making process. Scenarios are part of the Futures Studies 'field' which includes different ways of studying the futures from extrapolations of trends up to utopian visions (Barbieri Masini, 2000). This 'fuzzy' field, as characterized by Marien (2002), includes a wide set of buzz words as *foresight, forecasting, backcasting, envisioning, predicting, extrapolating*, etc. which do not have clear-cut definitions; and the same applies for the term 'scenario'.

The term 'scenario' itself is introduced by Kahn in 1960. For him and other early scenario developers such as Wiener, scenarios denote descriptions of future courses of events, sequences of developments, often highlighting key events, decisions, or turning points. This type of definitions refers to pathways scenarios, i.e. diachronic descriptions. For other authors, scenarios include also descriptions of final states, future sets of circumstances: images, i.e. synchronic descriptions (Mermet, 2005; van Asselt, 2003), which are also often called '*visions*'. Schwartz highlights the *narrative* dimensions of scenarios (Mermet, 2005, p.34), often pointed as an easy way to communicate about complex set of interrelated elements towards a scenario-user (Korte and Chermack, 2007, p.807). Finally, Van der hijden focuses on the idea of scenario planning as a strategic conversation within the organisation.

In this article, we will base on a broad understanding defining scenarios as logical sequences of events and/or images of the future, highlighting causal processes leading the evolution of socio-ecological systems; they are myths about the future based on different worldviews. They address the current challenges rather than the future as such.

This broad definition embrace the diversity of the scenario field that we have observed when analyzing five scenario exercises¹ along a reading grid containing around 20 points of entry (Goeminne, Mutombo, 2007) in terms of method (qualitative/quantitative, expert driven/stakeholder oriented, axes-technique, backcasting, etc.), content (temporal horizon, addressed thematic issues, main drivers, internal dynamics, etc.) and 'modes of future thinking'. This latter typology gathers a wide consensus. Generically, scenarios are structured along the categories of *probable, possible* and *preferable* futures (Marien, 2002). These three different 'future approaches' provide answers to three questions one may ask about the future:

¹ The Global Scenario Group work (The Great Transition – Raskin et al, 2002), the Millenium Ecosystem Assessment scenarios (MEA – Carpenter et al, 2005), the European research projects Visions (Van Asselt et al, 2005) and Toolsust (CARLSSON-KANYAMA et al, 2003) and the Belgian scenario exercise on animal production and consumption in flanders in 2020 ("Dierlijke Productie&Consumptie in de 21ste eeuw" - DP21, 2006") were analyzed thoroughly based on reports, publications, website, etc.

‘What will/is likely to happen?’, ‘What can/may happen?’ and ‘How can a specific target be reached?’ (Börjeson et al., 2006). These three questions match three ‘modes of future-thinking’: the *predictive*, the *explorative*, and the *normative* modes of thinking (Dreborg, 2004). However, contemporary scenario exercises are necessarily ‘hybrids’ where choices of modes of thinking, methodology and content are guided by the particular needs of the scenario builders and potential users.

B. CATEGORIZING SCENARIOS: AN HISTORICAL PERSPECTIVE

A brief overview of concrete practices and their evolution sheds another light on the field of scenarios since the end of the Second World War, when studying the future with the aim of informing debate and decision-making appeared. Three bifurcation points are apparent in the evolution of the field:

1. During the Cold War, future-oriented approaches evolved from mere forecasting methods deeply relying on techniques of probability estimations, to scenario techniques as such, as developed prominently by Herman Kahn (initially at the Rand Corporation, USA) based on the progress in computer simulation and the rising era of expertise (see among others Bradfield et al, 2005). Despite a first move away from the traditional ‘one future, one best solution’, and in a context of economic reconstruction (in Europe) and of industrial development in general, scenarios were focusing on the generation of feasible and surprise-free futures; they were heavily quantified exercises which were mainly forecast-oriented.
2. With the oil shocks of the seventies, the uncertain business context led to the development of multiple strategic scenarios focusing on exploration and discontinuities, on dynamic interactions between parameters and leading towards the development of a broad range of futures (Sondeijker, 2006, p.23) rather than on final end states. With the famous example of Shell, scenarios started to imply creativity and imagination for strategic learning, they wanted to foster anticipation and adaptation capacity in a rapidly changing world. In parallel, the failure of the Meadows&Meadows report (Club of Rome, 1972) in terms of accurate predictions led during the 1980s to a gradual loss of faith in quantitative extrapolations methods based on modelling (Sondeijker, 2006, p.23); simultaneously, ‘Limits to growth’ also showed the capacity of scenario-based initiatives to generate societal debate on global long term visions.

3. Following the relative 'failure' of the 'World 3' model, in terms of previsions (used for the Meadows&Meadows report), a double move (Bouvier) within scenario practices emerged, with, on the one hand, a burst of scenario exercises around sectoral and thematic issues, with among others the success of technological foresight and local territorial development scenarios in the nineties, and on the other hand, the rehabilitation of the global scale, particularly fostered by the raise of the sustainable development discourse, starting with the Brundtland report (1987) and the Rio Summit (1992).

Scenarios in a context of SD objectives

Indeed, beyond, the relation in terms of discourse and semantic highlighted in the introduction, SD and scenarios are deeply linked. Indeed, since the Truman discourse in 1949 (Zaccai, 2002, p.75), the concept of development has guided the western societies (and beyond) through a one way evolutionist conception of progress from 'under-development' towards 'development', i.e. from economic misery towards a ever higher economic level of living and well-being.

The SD concept partly builds on a critic of the 'development' concept (and partly on its continuation). First, SD makes development multidimensional through adding the environmental and social dimensions to a concept highly focused on the economical dimension (but also, multi-generational, multi-actors, multi-level, etc). Moreover, and that is our point, SD makes development 'mutli-pathways'. A 'sustainable society' is not a precise objective, it requires to be debated, defined and re-defined by society actors, and thus lead each one to (mentally) construct a sustainable vision of the future, one could say, a scenario. A whole range of recent scenarios, be they normative or explorative, are built in the context of sustainability principles, aiming at the definition of SD objectives and pathways.

If scenario building has been quite integrated in strategic planning and management of (large) private companies (Geldenhuis, 2006, p.43), their use in the public field is far less acknowledged in the literature. In the performed research, we have encountered three main types of scenario exercises (and many hybrids):

- Scenarios focusing on SD issues and themes such as energy, biodiversity, water provision, and climate change. They are mainly expert-driven scenarios and rely on quantitative data and modelling techniques. The emblematic example of the IPCC scenarios stands for this type.

- Global and transversal scenarios which are explicitly normative and SD-oriented. These visions of the future explicitly address the question of the alternatives to ‘Business As Usual’ scenarios and address the nature of change (incremental, transformational, etc.); e.g. the Global Scenario Group publications.
- Local and context-bound participative scenarios, organized by local authorities or local stakeholder platforms, focusing on the potentials deriving from the emergence of a (sustainable) development for a specific territory, region, city or community, or on specific sectoral, cultural ... issues, aiming at developing local projects supported by citizens.

As outlined in the introduction, the link between the SD challenges and the scenario approach is quite clear and has made scenarios quite fashionable since a couple of years. However, it remains often unclear what scenarios can exactly deliver, in particular for the policy field. That is what we try to outline in the next sections.

C. A THEORETICAL FRAMEWORK

The previous section has pointed the diversity of the scenario field. Based on a review of the scenario-oriented literature, the following theoretical framework synthesizes the main characteristics of scenario exercises and highlights their ‘mechanics’ and uses (Mutombo, Bauler, 2008).

Five scenario ‘building blocks’

Beyond the chosen methods and processes, scenario exercises rely schematically on a few central building blocks, which define the generic characteristics and ‘modes of thinking’ of a given scenario exercise. While the focus on one or the other of these characteristics is varying across scenario exercises, these building blocks encompass the variety of realities of the scenario domain. Five distinct characteristics are identified: ***Future-oriented thinking, Collecting and integrating information, System thinking, Story-like approach, Dialogue interface.***

One of the principal characteristics of scenario exercises is obviously that they address the future, and specifically in SD oriented scenarios, they are oriented towards the long term future. Hence one of their main specificities is the ***future-oriented and reflexive perspective*** which is initiated to frame the whole process of thinking and debating. Beyond the three modes of thinking (i.e. predictive, explorative, normative), the interest of scenarios is that

they elaborate on multiple futures which tends not to address opposing points of view, but to take into consideration parallel, equivalent perspectives (Selin, 2006). Those perspectives in turn tend not to be solely defined by current knowledge and individual interests, because the long term horizon highlights uncertainties and blurs the distribution of the potential impacts of current actions (Voss et al, 2006, p.184). As a consequence, in a scenario brainstorming, there is no right or wrong statement and people are freer to expose their ideas, including perspectives which are labelled as divergent, extravagant, etc. It is this inherent unusual setting implicit in scenario exercises (blurred stakes due to the temporal horizon, and blurred norms due to the multiplicity of possibilities) which is said to foster an open minded and reflexive stance during the scenario construction processes.

A second characteristic of scenarios is related to treatment of *information*. Not every future-oriented reflection should be labelled 'scenarios'. Beyond mere imagination, scenarios have a pretention towards scientificity. Concretely, to simulate future evolutions implies to gather a considerable amount of information and parameters, to devote some energy to their validation, but it also necessitates integrating these strains of (largely) non-related information in order to construct a robust picture of the studied system.

Thirdly, contemporary scenario exercises are oriented towards *systemic thinking*. Of course, the scenario images gain in precision when elaborated along systemic approaches which facilitates to identify the relevant variables and their interrelations, to map potential multidirectional causes and effect chains as well as to reflect on the complex interrelations within and between (sub-)systems (Raskin et al, 2005, p.39). Scenarios are meant to allow an integrated overview of the studied system and are an opportunity to strive against the modernist tendency to fragment reality into presumably non-related study topics, usually studied by presumably non-related disciplines. Scenarios, as other policy tools, contribute to apprehend in a unified framework, bio-physical, economic as well as social, cultural, institutional and value aspects (Swart et al, 2004, p.142) and to articulate knowledge from different scientific disciplines.

Fourthly, although the dissemination of scenarios can be limited to distribute a factual description of the scenario(s), the enhancement of the *story-like character* of scenarios - for instance through the construction of narratives - is an important element of the scenario approach. It would be "*a more natural way of making judgments and decisions*" (Korte and Chermack, 2007, p.807), a way people are familiar with and which helps highlighting relations between events, actions and consequences. Framing the future through narratives

allows, for instance, to better spot incongruence in a chain of reasoning (Harries, 2003, p.807), and thus facilitate the understanding of the studied system. For quantitatively-oriented scenario exercises, it is also a way to better incorporate qualitative knowledge (Pulver, VanDeveer, 2007, p.2): "*The scenario narrative gives voice to important qualitative factors shaping development such as values, behaviours, and institutions, providing a broader perspective than is possible from mathematical modelling alone*" (Raskin et al, 2005, p.40). Beyond, scenario stories have the "*ability to transmit both rational and creative layers of thoughts and beliefs*" (Rasmussen, 2005, p.230) and can constitute a 'bridge' between the analytical dimension of a scenario exercises and the unconscious emotional and learning mechanisms, which relate scenarios to the narrative categories of myths, tales (Mermet, 2003, p.34) and utopias (van der Helm, 2009).

A final, fifth, characteristic highlights scenarios as a synthesis rendering interrelated information in an accessible form. Scenarios can in general terms be seen as communication tools and further are claimed to "*ease communication with non-scientific audiences*" (Swart, 2004, p.141). Beyond the mere informational source-receptor perspective, scenario exercises can thus also be understood as *dialogue interfaces*, between scientific disciplines, but also between science and policy (van den Hove, 2007), and beyond (see among others, Guimaraes Pereira and Funtowicz, 2003).

Those five building blocks should not be confused with the phases of a construction method, but are rather approaches and perspectives which can be mobilized with different intensities throughout a scenario exercise. They juxtapose and interlink to reinforce each other, and influence the characteristics of the exercise and, hence, of the results.

Scenarios outcomes and uses

Indeed, also in terms of effects and uses, the fuzziness of the scenario field infers different expectations and results according to the developers, the users, the issue, the scope, etc. Within this theoretical framework of building blocks, the many different uses identified for scenarios (e.g. better understanding, awareness raising, fostering debate or anticipation capacity and participatory vision building) can be bundled in two more general categories: scenarios as *strategizing* tool and, scenarios as *learning* tool. Scenarios contribute to strategizing and planning activities, and on the second hand facilitate processes of challenging mental models and learning. According to the typology of information use, strategizing

expects an **instrumental** type of information use, i.e. there is a direct link between the results of the scenarios (content and/or process) and the policy outcome of a decision making process. Learning is more closely related to a **conceptual** type of use, or use for enlightenment, i.e. scenarios influence a user's understanding of a problem or situation, even if the scenario information is not used to base decisions in a direct way (Hezri, 2006, pp.134-137), along the lines of "*decision-makers [...] often found themselves influenced in more subtle ways in the longer term*" (Weiss, 2005).

Scenarios, as future-oriented tools, allow to work in a relatively open and ideally reflexive perspective, hence providing the conditions to foster learning. On the one hand, a scenario exercise can act as a simulator which enables to virtually experiment with situations, actions and their consequences and to learn from it (Korte, Chermack, 2007, p.652). On the other hand, solid scenario exercises highlight the multiplicity of perspectives and the diversity of their underlying values, and so doing they can contribute to challenge mental models (Connor, Dovers, 2002, p.7), i.e. questioning the underlying set of beliefs, assumptions and norms which guide our judgment and perception of the world. Such learning processes are usually disaggregated in different types (Brown et al 2003). Scenario exercises can foster **first order learning**, i.e. getting to know new facts and thus improve our mastering of causal logics. On the other hand, scenarios can generate **higher order learning** which "*concerns new insights at a higher level with regard to problem definitions, norms, values, goals and convictions of actors, and approaches how to solve the problem*" (Quist, 2007, p.44). In other words, higher-order learning is learning with regard to the way one interprets reality (i.e. a change of our mental model) and how causal and normative logics relate. This type of change in the core thinking framework of individuals and organizations can be generated through highlighting and challenging underlying values, assumptions and representations, and potentially lead people to rethink the way they define (policy) problems, as well as their solutions and concrete approaches (see also Hall, 1993). Higher order learning also includes **congruent learning**, i.e. the fact that people participating in such a scenario exercise will share something in common beyond the common experience, i.e. a shared understanding of the issue at hand as well as the collectively elaborated results. Scenarios can be seen as 'boundary objects' or spheres of 'co-production', linking different epistemic communities and creating a locus where they can collaborate and co-exist (Pulver and VanDeveer, 2007, p.4).

Beyond learning, the scenario literature stresses more particularly the interest for scenario construction to the elaboration of *strategies or plans*². According to Van der Heijden, the first objective of scenario-based planning is to generate decisions which are ‘robust’ under a variety of alternative futures (Van der Heijden, 2005, p.5). Scenarios indeed can generate strategic information across various configurations: (1) explorative ‘external’ scenario exercises explore potential transformations of the contextual environment and contribute to the elaboration of robust and adaptive strategies across the rapidly changing contexts; (2) ‘What if...’ scenarios provide the opportunity to simulate and explore the impacts of a specific policy; and (3) so called ‘normative’ scenarios help to generate vision(s) of the future and explore potential pathways towards pre-determined objectives.

However, if in most of the scenario literature this link between scenarios and policy making seems to be straightforward, the studied scenario exercises do not necessarily confirm a very pure *strategic* reading. Scenario outcomes seem not to feed decision or planning process in a direct way, as will be further developed in section E.

D. SCENARIOS AS SD-TOOL

Scenario exercises carry important characteristics with regard to handling SD issues which require new insights and new procedural approaches. For the policy field, particularly in the context of sustainability objectives, scenarios constitute important tools, in three regards: a balanced tool between simplification and complexification, a reflexive tool and a transition tool. As many decision-support instruments, like indicators, models, cognitive mapping, evaluation, etc. scenarios help read and understand issues through a simplified overview of a complex reality; however, unlike most of these tools, scenarios imply a reflexive perspective on the issue, on the way it is framed and handled, questioning assumptions and avoiding unconscious path dependency; because of these characteristics, there is no get away from scenarios when attempting to manage transitions towards sustainability in terms of environmental, social and economical dimensions, as well as institutional and governance dimensions.

² Bood and Postma, 1997; Van der Hijden, 1997; Burt and Van der Hijden, 2003; Mietzner and Reger, 2005; Korte and Chermack, 2007etc.

Between 'Complexification' and simplification

As they *tend* to be comprehensive pictures of reality and to synthesize a considerable amount of information in a supposedly understandable and thus simplified way, scenarios are situated on a difficult demarcation line between two antagonistic trends, typical in policy decision. Indeed, decision makers face an antagonistic tendency "*between the need for simplification and the necessity for 'complexification' of information*" (Bauler, 2007, p.70). It is important that deciders are provided with clear and understandable information, i.e. necessarily simplified analyses of complex realities, and, at the same time, that they are aware of this complexity also in terms of the diversity of perspectives and controversies, among policy actors, but also within the scientific community.

In parallel, the socio-ecosystems are characterized by complexity, uncertainty and political controversy. Researches and studies trying to get a deeper understanding of the various social, environmental, economical, cultural, ... aspects of it generate huge ever growing amount of data, information and knowledge, overwhelming decision makers. However, because of the characteristics of these wicked problems, and despite the efforts of the scientific community, an impartial and comprehensive view is not possible, neither desirable, as it can lead to oversimplifications. Even more, the never ending quest for more complete and precise knowledge is also a way to overshadow the normative side of understanding and governing our societies. The underlying process of problem definition as well as the definition of the values and norms we apply to their resolution should be made consciously. Denying this normative dimension and relying only on knowledge has lead to the current situation diagnosed as unsustainable development (Scrase and Sheate, 2002, p.279).

Thus deciders need tools to provide them as clear as possible overview of complex issues and, at the same time, the consciousness of their factual and normative complexity. If various tools contribute to provide actors with a balanced understanding between (over)simplification and complexification, few at the same time provide them with a multi-perspective overview on the issue at hand. Indeed, scenarios are pictures of realities, and thus necessarily simplified ones. But, they are also designed to unravel the multiplicity of perspectives, be it through the elaboration of multiple expert-based scenarios or/and through a transparent participative construction process with a diversity among experts or stakeholders, etc. Scenarios provide the opportunity to gain insights on alternative options for specific problems in given contexts, and further to question the way policy actors define policy problems, objectives and policy options.

Reflexive tool

This way of revealing complexity and multiple rationalities is typical of reflexive approaches. 'Reflexive', here means, that one not only does pay attention to the issue at hand, but also to the very process of handling this issue (i.e. problem definition, agenda setting, procedures, etc.). A reflexive approach implies to take into account different perspectives (through involving various disciplines and society actors), to acknowledge complexity and uncertainties of system dynamics, to question assumptions, norms and beliefs (i.e. mental frameworks) which influence problem definition and available options. Scenario exercises as open-minded learning processes fit with this definition. They can generate a momentum for the renewal of policy options as well as of the decision process itself.

Such participatory policy renewal has been labelled 'reflexive modernisation', 'reflexive' or 'new' governance according to the authors. Voss and Kemp define 'reflexive governance' as "*referring to the problem of shaping societal development in the light of reflexivity of steering strategies – the phenomenon that thinking and acting with respect to an object of steering also affects the subject and its ability to steer*" (Voss and Kemp, 2006, p.4). The concept is related to Ulrich Beck's 'second modernity' and of the 'global risk society'. The idea start with the diagnosis that the logic of the 'first modernity', through a decision process characterized by fine divisions, specialization and unambiguousness, has lead to unintended consequences, causing new more severe unexpected problems, i.e. second-order problems - sustainability being one of the most important (Voss, Kemp, 2006, pp.5-6). Managing these 'second-order problems', implies in itself to disrupt this rationalist problem-solving approach, as in order to grasp them, it is necessary to transgress modernist boundaries and acknowledge ambiguity and plurality (Beck, 2006, p.33). The main focus of reflexive governance approach is thus on integration, creation of links, communication and interaction between the specialised segments of decision (Voss, Kemp, 2006, p.7).

Reflexive governance implies a new 'problem-handling' (and not solving) procedural approach, and therefore "*an emerging role to be played by a series of policy instruments among which collaborative decision-tools, informative 'propaganda' frameworks, support for accountability...*" (Bauler, 2007, p.90); including scenarios.

Scenarios are of course not alone in the portfolio of reflexive approaches. For example, evaluation is a typical reflexive procedure looking back at the way policies are elaborated and implemented, assessing effectiveness, efficiency, etc. and aiming at learning from this process

(with various success). Nevertheless, in comparison, the main specificity of scenarios is that they are working with long term developments and hypothetical futures and not with stakeholders group enclosed in vested and salient interests. The strength of scenarios is that the learning process is fostered by a de-inhibiting context where "*different perspectives on the world can be true even if they are contradicting*" (Selin, 2006, p.2). As a consequence, involved actors can more easily take distance with assumptions, beliefs and immediate power relations. Moreover, as a type of holistic approach, scenarios by definition strive towards integration and interaction beyond modernist boundaries.

Transition tool

As an approach combining a strategic potential, a learning and reflexive posture within a long term future-oriented and holistic perspective, scenarios should be regarded as a necessary transition tool towards sustainability and towards a reflexive governance, where the 'politics of politics' (Beck, 2006, p.48) becomes central, in order to avoid the vicious cycle of second-order problems. Scenarios, through individual and organizational learning, contribute to these transitions at the level of content i.e. diffusion of insights and concepts, and at the procedural level, i.e. diffusion of new ways of doing and thinking taking into account multiple rationalities, uncertainties, ambivalence, complexity, etc.

E. CONDITIONS FOR SCENARIOS AS SD-TOOLS

Elaborating scenarios may help to better grasp current trends, weak signals of what could possibly happen or give hints of desirable pathways, to reveal uncertainties and diversity of rationalities, using these moments of future-oriented thinking in order to challenge our representations of the world, influence assumptions and therefore behaviors. However, scenario exercises also have notable weaknesses. To be meaningful for the policy field, scenario developers should pay attention to various shortcomings.

Scenario as strategizing tool?

As mentioned in section C., if the scenario literature often presents scenario exercises as strategizing tools, we did not observe such direct 'instrumental' type of use during our research. Information use literature gives us a hints about why it could be so when it acknowledges that "*pure instrumental use is not common. Most studies are not used as the*

direct basis for decisions. [And] expectations for immediate and direct influence on policy and program are often frustrated" (Weiss et al, 2005, p.13).

The absence of direct use within strategy-development is related to various factors³. Among those, there is the problematic junction between the two processes into a common, hypothetical decision cycle. There is a gap between the future-oriented process and the decision-making process in terms of (1) modes of thinking the future (virtual/actual), (2) temporal horizon (long /short term) and (3) in terms of actors (experts or stakeholders/policy deciders)⁴. In fact, these three points can be related to the generic differences between the scenario developers and the scenario users which pertain generally to very different epistemological communities (e.g. science, policy, civil society, administration...) and logically hold different values, objectives and norms.

The effective use of a scenario exercise to feed an actual strategy or plan can be related to the level of credibility, legitimacy and salience of the exercise from the point of view of the potential users (Cash et al, 2002; Mutombo, Bauler 2008). Ultimately, the effective use of scenarios is a question of ownership of the exercise (and its results) by the intended users. This has been widely translated into a call for the direct implication of the potential users in the scenario exercise (Hulme and Dessai, 2007, p.21; Parson et al, 2007, p.88; Pulver and VanDeveer, 2007, p.3). The direct involvement of the user, at least at the beginning and end of the process should foster the salience of the exercise, and generate the necessary ownership. Obviously, involvement of the potential users is also important because the learning outcomes of the scenario exercises are generated during the scenario process as such, rather than merely by the final product.

Scenarios as learning tools?

Scenarios, and particularly some explorative highly quantified and model-based exercises, are sometimes understood as if producing new knowledge as such. A more realistic point of view is that scenario exercises help taking into account and thinking in terms of uncertainties, decision points, potential wild cards, etc. and so doing produce a learning sequence in the way of thinking, i.e. higher order learning. An important element of the potential of scenarios with regard to 'factual' learning rather relies on their capacity to become dialogue interfaces,

³ See also Mutombo and Bauler, "Investigating the functions and utilization of scenarios", 2008, the Part II on Factors of success.

⁴ See the results of a previous research on participative foresight methodologies (Mutombo, Bauler, Wallenborn, 2007).

which leads for instance scientists from different disciplines to meet and exchange. Scenarios become thus potentially important learning tools, also because they function as knowledge networking tool (within and beyond the scientific communities).

Furthermore, the association of the targeted users should be planned carefully when defining the objective and design of the scenario construction process. If the main objective of an exercise is to feed a decision process, deciders will have to be associated to the exercise so to enable them to experience ‘learning’ and to raise their level of ownership on the results. The call for associating users to the exercises is also linked to the fact that the question remains unanswered of what the influence of a finalized scenario product on recipient-users (users who did not participate to the process) could be; as a consequence one is tempted to question the use of scenarios as wider exercises of awareness raising or vision building when the scenario exercises target an unfocused group of ‘stakeholders’ or the population at large. In such cases, the eventual impact chain of the scenarios relies heavily on the diffusion interface (e.g. the narrative, the oral presentation, the dissemination, etc).

Finally, if it is admitted that sustainability will require learning processes and changes in the way of thinking, learning is a condition of change and not a guarantee (Quist, 2007, p.43/45). Beyond ‘experience of life’, there are different pathways towards change, from soft information-oriented to more coercive ones. If attitude and ideas can guide behaviours, the contrary is also true.

Scenario assessment

One of the research questions underlying this research investigates the outcomes and uses of scenario exercises. Scenario developers are often strikingly vague on that topic. Even if it can sound trivial (see among others Burt and Van der Hijden, 2003, pp.1016-1020), the non-clarity of the objectives of scenario exercises is frequent and appears to be an important cause of project failure. Many scenario exercises are not given precise objectives; vague mottos are surprisingly present in reports such as ‘identifying trends, challenges, needs, wishes’. Simultaneously, these ‘objectives’ are not necessarily shared, entailing sometimes that sponsors, developers and participants seem to have different perspectives on the main objectives. Furthermore, scenario exercises are even less often developing action-oriented objectives, i.e. identifying windows of opportunities for policy change. Most exercises are aiming at learning without pre-determined opportunity for (policy) action, for instance

through exploring potential impacts on ecosystems, or calculating the energetic capacity of alternative scenarios, or even through exploring the scenario approach as such.

In fact, so far, scenarios have been assessed in terms of content or methodological credibility. However, the question of scenario evaluation in terms of effects (i.e. influence of the produced outputs) and uses is a relatively new topic of research (see Pulver and VanDeveer, 2007), particularly when it comes to their influence on decision making (Sondeijker, 2006, p.23). This is partly due to the fuzziness of the scenario field in terms of ‘schools’, approaches, context, actors, and moreover, to the just mentioned lack of clarity of the targeted purposes. More generically this situation is due to the general problem, in terms of information use, to trace back causal links between the information source and its influence on decision processes, as this influence is generally very indirect entailing conceptual use instead of instrumental (direct) use. This situation of fuzziness implies that evaluation should be an effective phase of scenario exercises, and be designed in function of the targeted objective. Definition of clear, shared, and potentially action-oriented objectives is thus a key phase of the exercise. More generically, scenario exercises should not be conceived as an end in themselves but as part of a wider project. Scenario exercises should be one step within an iterative process from future-oriented thinking to actual decision taking and implementation, to monitoring and evaluation of the measures, and back again to opening up reflexive thinking... This type of iterative process can be related to the theory of reflexive governance.

F. CONCLUSIONS: SCENARIOS FROM INFORMATION TOOL TO GOVERNANCE TRANSITION TOOL

To conclude, we come back on two important strengths of scenario exercises within a SD-policy context. Scenarios, as process and product, are an interesting policy tool as scenario construction aims at elaborating images of reality, necessarily simplified, while highlighting the complexity of the issue in terms of uncertainties and ambivalence through exposing the multiplicity of the possible and of the perspectives on a specific issue. So doing, they answer the antagonistic needs of public decision making for simplification and *complexification*.

In some discourses on scenarios, the underlying idea was to orient scenarios towards diminishing uncertainties. Scenarios on the contrary, reveal uncertainties linked to our irremediably partial knowledge of complex systems with and within which we are living and interacting. Scenarios highlight uncertainties through the multiplicity of possible images and pathways developed. So doing they contribute to enhance our knowledge on ecological and

social systems, not so much through diminishing uncertainties, but in preparing minds not to think anymore in terms of certainties. On the other hand, scenarios, through highlighting the multiplicity of the possible futures and through questioning perspectives and the underlying values and assumptions, contribute to reintegrate the normative dimension within political decision-making, which tends to rely on the generation of scientific 'truth' before taking action (or not).

From these statements, it occurs that scenarios can help to construct a distance with a modernist perspective which denies uncertainties and the ambivalence of objectives. Scenarios contribute to a transition towards a non-modernist perspective of decision-making, claimed to be a necessary step when addressing the challenges of the current unsustainable development (Beck, 2006). However, let us not fall from the vicious cycle of modernist problem-solving approach into the never ending cycle of reflexivity: beyond uncertainties of system dynamics and ambiguity of SD criteria, decisions have to be taken to effectively progress towards sustainability and not only towards procedural sustainability. This calls the challenge of (re)connecting reflexive and problem-solving perspectives.

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Scenario building has been developed since the 'Cold War'. Since then there have been periods of success and of distrust. Since the nineties the spread of the SD concept and more lately with the climate change challenges set high on the agenda and the example of the IPCC, scenarios are really hype. Presented as strategizing and learning tools, they reveal weak signals to help anticipate problems and question our mental framework. However, we have also shown that they have important weaknesses and limits, particularly in terms of effective assessment of these results, quite difficult to grasp. Beyond the need for further research and in depth case studies, we argue that scenarios are part of the renewed portfolios of reflexive tools which are necessary to handle wicked issues, and moreover that they are suited to contribute to an evolution of the governance approach from only rationalist problem solving perspective towards a balanced combination of rationalist and reflexive perspectives.

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