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Sustainable consumption : a general framework for transition management

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"A theory of consumption must account for periods of relative stasis in needs (and technology), as well as the times when consumption expanded impelled by new needs. The prevailing model is one of stasis (primitive precapitalist consumption) followed by rapid and infinite expansion under specific causes during the modern period. I argue instead for a model that recognizes 1) that consumption has diverse causes rather than being the product of a single historical event and 2) that consuming behaviour is always the result of balances between factors that promote, and those which inhibit or restrain perceived needs and wants (push and pull)." (Wilk, 1999).

1 Introduction: consumption and sustainable development

The emergence and success of the idea of sustainable development cannot be explained except by a growing awareness of the fact that humankind as a whole is nowadays confronting the same problem the average household is facing most of the time: maintaining the right balance between its resources and the needs of its members. And, just like a household has a balanced budget if it ensures its needs correspond to its resources, a society is in equilibrium if its resource basis keeps up with the needs of its population. If for one reason or another, resources become scarcer whilst needs stay unchanged, or needs go on increasing (by population growth and/or changes in wants and desires) while resources stay unchanged, the equilibrium is broken and some needs are left unfulfilled, therefore creating frustration in the society at large and usually increasing inequalities, some groups being more able than others to sustain their own living standard in a context of general impoverishment. In such a case, the society has three and only three ways to come back to equilibrium and lessen the state of frustration and the widening of inequalities. They consist either in finding new additionals resources by extensification of the production basis, in intensifying the productivity of the resources (intensification) or in lowering the aspirations level of its population. Of course, in reality these strategies can be more or less mixed.

a) "Extensification" means the natural resource basis is enlarged by gaining control over more resources than before. This can be done by exploiting new territories (by war, imperialism) or by exploiting hitherto inaccessible resources. Throughout history, extensification has been the most usual way for societies meeting the limits of their resource base to solve their problem of imbalance between needs and resources.

b) Intensification: Intensification means that the natural resource base is more intensively exploited either by working more and harder or by using it more efficiently thanks to technological or

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organisational innovations, both kinds of innovations going frequently hand in hand. It is more or less the "ecological modernisation" solution.

The Neolithic revolution is the first and most impressive example of intensification ever seen insofar as it corresponds to a dramatic increase of production on unchanged portion of territory. The industrial revolution is a process of both extensification and intensification because it would not have been possible without the exploitation of the energy resources of the subsoil and was also from start expansionist (colonial conquests, imperialism) even if it is characterised by a dramatic development of technology and machinery[2].

The problem with the strategy of increasing resources is that it is inherently endless. Indeed, as long as new resources can be brought in to satisfy otherwise unleashed desires, needs keep on growing ever and ever until the system end up reaching some unavoidable and inescapable limits, throwing the system in a deep and pervasive crisis that can be put to end only by resorting to the alternative strategy, discussed now.

c) Lowering or displacing aspirations, i.e. dematerialising well-being. This alternative strategy consists in adapting needs to available resources, which amounts to dematerialising somewhat the prevailing conceptions of well-being and happiness. This means fostering immaterial values and emphasising spiritual and intellectual needs in spite of material ones.

It can be hypothesised that each solution is linked to the social pre-eminence of a different social class. Extensification is probably generally correlative of the domination of the military class, or in modern times to some kind of militaro-industrial complex. Intensification is likely to give social supremacy to a technocracy of engineers and scientists together with a bureaucracy of managers (be it a state bureaucracy like in the so-called oriental despotism and modern times communism, or a private business bureaucracy like in contemporary capitalism). Lowering and substituting needs and aspirations needs some kind of "spiritual power" (Comte 1969) which is generally held by priests or in modern societies, their non-religious counterpart (intellectuals, psychoanalysts, pundits, etc.)…

Anyway, the on-going growth of population and the reaching of the limits of the earth as source of resources and environmental functions are such that the extensification solution to the imbalance between needs and resources is nowadays behind us. Remains only the intensification and needs control solutions. This is all what sustainable consumption is about.

Consumption can be defined as any activity involving the selection, purchase, use and disposition of goods and services by individuals and groups to meet one or several needs or aspirations[3]. At the most general level, all what fulfils needs and aspirations can be subsumed under the abstract, general category of *satisfiers* which are the "individual or collective forms of Being, Having, Doing and

[2] As Veblen observed: "The efficient enlargement of industrial capacity has, of course, been due to a continued advance in technology, to a continued increase of the available natural resources, and to a continued increase in population". For a discussion of the Neolithic and the industrial revolutions as the two main break lines in human economic history, see P. Bairoch (1997).*Victoires et déboires. Histoire économique et sociale du monde du XVIème siècle à nos jours.* Tome I, Gallimard.

[3] The definition is a synthesis of Common and Stagl's (2005: 90) definition of consumption as "the use by human individuals of goods and services to satisfy some of their needs and wants. 'Goods and services' are often referred to as 'commodities…'" and Campbell's (1995:104) one as "any activity involving the selection, purchase, use, maintenance, repair and disposition of any product or service". Note that we have discarded "maintenance" and "repair" activities from Campbell's definition because they pertain much more to production than to consumption, even if for many goods the costs of maintenance and repair are supported by the consumer and not by the producer or the retailer.

Interacting" (Max-Neef 1992:30) whereby an individual or a group actualizes and satisfies its needs. Satisfiers refer to the whole class of material and cultural artefacts and institutional arrangements by which needs are satisfied, of which goods and services are only part. It follows that consumption is the satisfaction of needs or wants by means of goods and services. What is unclear is if the concept of consumption should be restricted to market-based, commercialized goods ("Commodities") and services or if it encompasses also non-commodities such as home-made goods and non-commercial services. In the latter case, consumption would refer only to non-public goods and services, i.e. those whose consumption by one agent reduce consumption by others (rivalry) and of the consumption of which it is possible to be excluded (excludability).

Consumption is crucial for sustainable development simply because it is crucial for people's well-being and flourishing. Indeed, the final objective of sustainable development is to secure opportunities of well-being for all humans whatever their precise time and space location. Well-being, in turn, can be defined as the adequate[4] satisfaction of human needs and aspirations, notably by way of consuming. Therefore, the ultimate concern of sustainability is to ensure adequate consumption for future generations. But, as Agenda 21 put it: "the major cause of the continued deterioration of the global environment is the unsustainable pattern of consumption and production, particularly in industrialised countries". Yet, it gives no definition of the notion of "pattern of consumption" nor of sustainable consumption. The latter came two years later in 1994 at the Oslo symposium where sustainable consumption was defined as: "the use of goods and services that respond to basic needs and bring a better quality of life, while minimising the use of natural resources, toxic materials and emissions of waste and pollutants over the life cycle, so as not to jeopardise the needs of future generations." The link with the ordinary concept of consumption as economic activity came four years later, in 1998 at a workshop on "Consumption in a sustainable world" organised also in Norway by the International Institute for Environment and Development and where it was claimed that "the focus of sustainable consumption is on the economic activity of choosing, using and disposing of goods and services and how this can be changed to bring social and environmental benefit". (Jackson 2006: 5).

2 Towards consumption efficiency: a decomposition analysis

To be sustainable, development must be as efficient as possible in its use of scarce, costly and/or non-reproducible resources. Sustainability could thus be measured by an indicator of productivity of valuable resources (or of material efficiency) in the well-being production process. Nørgärd (2006) has recently provided a useful formulation of this in the consumption domain. Nørgärd decomposes what he calls "overall-efficiency" as the interplay of 4 "local" efficiencies: satisfaction efficiency, service efficiency, maintenance efficiency and throughput efficiency. The overall efficiency ratio between the final output (satisfaction) and the primary input ("eco-sacrifice") is thus disaggregated in a succession of interrelated intermediary ratios, as follows:

Overall-Efficiency = Satisfaction/ Eco-sacrifice

= Satisfaction/Service * Service/Stock * Stock/Throughput * Throughput/Eco-sacrifice

The formula is best understood by starting from the last ratio, the **Throughput/Eco-sacrifice** ratio or "throughput efficiency" which expresses the productivity of the production process with respect to environmental resources. Then comes what Nørgärd calls the "maintenance efficiency" which refers to the durability, reparability, etc. of the stock of goods. The **Stock/Throughput** ratio is the converse of the goods replacement rate, i.e. the number of new goods entering the stock with respect to the size of the existing stock. The "service efficiency" refers to the number of services provided by a given stock

[4] Adequate, i.e. neither insufficient nor excessive.

of goods. This has mainly to do with the way the goods are appropriated and used. For instance, the **Service/Stock** ratio is higher for a taxi than for an individual car, because the former is used the whole day long by many customers, while the latter is most often used only twice a day by one customer only. Finally, the "satisfaction efficiency" refers to the satisfaction brought by the service. For instance, in the current traffic conditions in town, the mobility service brought by the individual car is less and less satisfying. As Nørgärd (2006, 18) observes:

"The reason for adding satisfaction efficiency … is that in the affluent part of the world, *marginal* satisfaction of increasing services from the market seems to be very low and declining, maybe even below zero."

Nørgärd's analysis of consumption efficiency shows how limited and partial are public and business policies that focus exclusively on the throughput efficiency ratio by aiming only at *decreasing the mass of materials in new products*. This is only one part, and perhaps not the most important one, of the answer to the issue of sustainability of our production and consumption patterns. However it is probably the easiest to put at work in a capitalist and technology-driven economy (and culture) because it doesn't challenge their fundamental growth and production orientation. Actually, the more you go from the right of the formula to the left, the more you move away from what is taken-for-granted in our industrial societies and the more you bring into question their deepest and unconscious cultural underpinnings. Indeed, going one step further than the eco-efficiency or "decoupling" policy, a more demanding ecological modernization approach would act also upon the "Stock/Throughput" ratio by encouraging more durable goods and struggling against the "planned obsolescence" of many so-called "durable" goods. This means (Geiser 2001) extending the useful life of multi-uses products[5], designing products for upgrading and adaptation but also for reconditioning and remanufacture and for repair and reuse.

Service efficiency expresses the rate of services acquired from the consumer's stock of goods (durable and non-durable). One effective way to increase service efficiency is to substitute services for goods in final consumption, like in the above mentioned example of the taxi vs. the individual car. Another strategy in this respect is to foster the sharing of products, as for instance in car sharing. More generally, where the use pattern of a product involves long periods of disuse or the acquisition costs are high, products may be shared among multiple users. Examples are numerous (Geiser 2001, 324): ladders, lawnmowers, washing and drying machines in residential areas; tool and equipment rental stores allowing customers to share the services of hardware and avoid individual purchases; video rental stores giving customers a wide choice of films by sharing the services provided by the individual DVD machines, etc.

Finally, the satisfaction/service ratio expresses the fact that the ultimate goal of consumption is well-being, happiness or needs satisfaction. Clearly, some satisfiers are more efficient than others in bringing satisfaction, or well-being.

Actually, Nørgärd's analysis – which is itself based on an equation proposed by Daly (1991) – is close in its inspiration to Common's (2007) suggestion of assessing sustainable development as the ratio between well-being and environmental pressure. More precisely, he proposed to use as indicator of sustainable development the following ratio:

$$\mathbf{S_{it} = WB_{it} / GHG_{it}}$$

Where:

[5] On the contrary, one-use products are those that are totally exhausted (except for wastes and pollutions) in the act of consuming, like food, fuel, drugs, etc.

- S_{it} : the sustainability of country *i* at time *t*
- WB_{it} = the level of well-being in country *i* at time *t;*
- GHG_{it} = Green House gas emissions of country *i* at time *t*.

As indicator of well-being, Common uses the product of life expectancy at birth with the reported level of subjective well-being of the population. We will not discuss here this interesting (but debatable) idea and leave open for the moment the problem of measuring and evaluating well-being. On the other hand, we prefer to use the general idea of "Ecological Footprint" (without necessarily endorsing the way it is currently measured and used) as indicator of environmental pressure rather than the more limited GHG. We propose therefore to start with the following formula, where EF for "Ecological Footprint" replaces "GHG" and the subscripts have been dropped:

$$\mathbf{S = WB/EF \quad (1)}$$

Following Nørgärd's approach (and long before him, Kaya's decomposition in the climate change context), formula 1 unfolds as:

$$\mathbf{S= (WB/C) * (C/EF) \quad (2)}$$

Where **C** = Commodities. **(WB/C)** refers to the productivity of commodities in terms of well-being and **(C/EF)** to the intensity of commodities in natural resources.

Formula (2) shows that sustainability can be improved by increasing **(WB/C),** by increasing **(C/EF)** or both, that is by decreasing the intensity[6] in commodities of well-being, by decreasing the intensity in resources of commodities or both.

Things can be disaggregated further. The term **(WB/C)** can be expressed as:

$$\mathbf{(WB/Se) * (Se/C)}$$

"Se" refers to the notion of service as used by Nørgärd (like in the context of energy and not as used in the national accounting context). Indeed, what matters for the energy consumer is not energy as such (Kw/h) but the lighting, mechanical power, etc. brought by energy. Likewise, what matters for the user of a TV-set is not the TV-set as a thing but the services it provides in terms of TV-programs, etc. One way to define the notion of service in a need-satisfier framework is to define it as the interface between the satisfier and the need or as the "satisfying virtue" of the satisfier.

WB/Se stands for the productivity of the services in terms of well-being and (Se/C) for "consumption efficiency", the productivity of commodities in producing services**.** The full formula then becomes:

$$\mathbf{S = (WB/Se) * (Se/C) * (C/EF) \quad (3)}$$

Formula 3 shows that there are three "pure" strategies to enhance sustainability:

1. Increasing the (WB/Se) ratio by decreasing Se while maintaining or increasing WB. This amounts to partly disconnecting well-being from services. It could be called the *de-materialization* of needs satisfaction strategy.

[6] The intensity in resource R of a production P is the inverse of the productivity of the resource R in production P. In others words productivity is measured by the ratio P/R and intensity by the ratio R/P. The more productivity, the less intensity and vice versa.

2. Increasing the ratio (Se/C) by decreasing C. It could be called the *de-commoditization* (of needs satisfaction) strategy. We will refer to it later as "modal shift" in modes of provision strategy.
3. Increasing the (C/EF) ratio by decreasing EF[7.] This strategy aims at decreasing the energy and materials content of consumption. It is what ecological modernization is all about with its well-known motto of "Factor 4", a 75% reduction in natural resources uses of consumption. We will not develop this strategy anymore because it is already well-known in the sustainable development community.

An effective transition to sustainable consumption will be a mixed strategy acting on the three ratios identified here above. This means that innovations cannot be restricted to technology and, more importantly, that it is certainly illusory and probably counter-productive to rely too much on market forces and technological innovation as the ecological modernization, "market transformation" and "transition management" approaches do[8]. Innovations and changes will have to take place at three different levels:

- at the technological level where products and services with a lighter ecological footprint must take the place of less eco-efficient ones;
- at the institutional level where non-market based modes of provision should be promoted alongside marked-based ones;
- At the cultural level where less materialistic values and lifestyles should be developed and fostered without loss in welfare for people.

This means that the so-called "transition management" approach as it is usually conceived is insufficient. Indeed, the "transition management" discourse relies heavily on technological innovations and market forces for driving modern capitalist societies on a more sustainable development path. In other words, it remains prisoner of the "ecological modernization" approach that many such as Jalas (2006) or York and Rosa (2003) hold fundamentally technocratic and conservative, and that according to Smith and Kern (2007) transition management has failed to "reinvigorate and radicalise". On the other hand, there is growing scepticism about the capability of the ecological modernization approach to make sustainable development happen. Many scholars are convinced that the transition to sustainable patterns of consumption will need much wider and deeper transformations than what the advocates of ecological modernization are ready to consider. Jackson (2005:1) for example maintains that sustainable development needs lifestyles changes that are not reducible to improvements in resource efficiency: "There is an emerging realization that efficiency improvements cannot, by themselves, achieve the kind of 'deep' environmental targets demanded (for example) by the Government's climate change programme. Attention must also be focussed on the scale and pattern of consumption. This task, in its turn, involves policy-makers in the need to understand and to influence consumer attitudes, behaviours and lifestyles".

Or, as Lintott (2007:42) puts it "...it is not enough to improve the efficiency of production in order to achieve more consumption for less ecological damage; it is necessary to improve efficiency of consumption so as to achieve more welfare for less consumption. And it is necessary to end consumerism, and not merely to reduce the ecological impact associated with a particular level or pattern of consumption".

[7] Note that Nørgård's last two ratios are aggregated in our (C/EF) formulation. This means that we don't make a distinction between Nørgård's maintenance efficiency and throughput efficiency.

[8] See Jalas (…for example : "Mere efficiency engineering is a naive solution to the environmental problems of production and consumption, and hardly promoted as such").

Likewise, Shove who seems sometimes to endorse the "transition management" approach states the point very clearly: "Environmental policies that do not challenge the status quo – in terms of division of labour, resources and time, or social and cultural representations of the good life – have the perverse effect of legitimising ultimately unsustainable consumption patterns of consumption." (Shove, 2004:116).

3 A three-tiers framework

In order to act effectively on the three ratios identified here above, consumption policies should be based on a correct understanding of the complexity of consumption and, in particular, of its multi-level structure.

Consuming like many other behaviours can be apprehended at several levels of social reality. More precisely, one can distinguish (Desjeux 2006)

- A macro (socio-cultural) level where consumption is referred to the general cultural values, norms and meanings characteristics of whole societies or civilizations as analysed by anthropology, history and macro-sociology
- A meso (technico-institutional) level where consumption is analysed in terms of systems of provisions (Fine and Leopold 1993) or modes of provision (Gershuny 1983) that can be defined as regular patterns of interactions actors-actors and actors-objects (commodities, techniques…) in different institutional settings such as markets, communities and families. It is mostly at this level that macro-economists and sociologists consider consumption.
- A micro (psycho-socio) individual level where consumption is analysed in terms of cognition, motivations, emotions, experiences, etc. Psychology, consumer research and micro-economics are here at home.

The three levels and their interactions are presented graphically in figure 1 below.

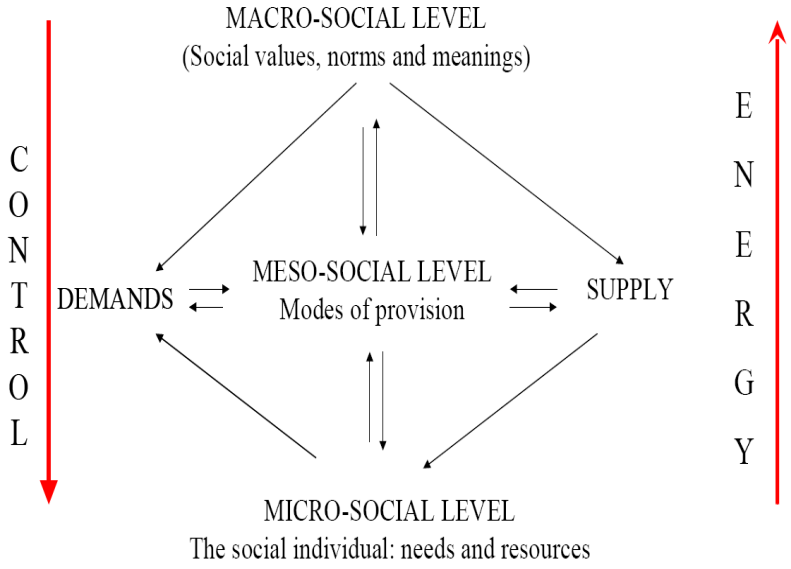

Figure 1.A multi-level framework for consumption analysis and scenarios

One find at the bottom, the individual as an actor motivated by needs and aspirations originating in his/her genetic and cultural heritage and the psychological dispositions coming from her/his primary

education[9]. It follows that basic fundamental needs vary in intensity and salience from individual to individual according firstly to their specific genetic and psychological heritage and, secondly, to their age and the physical and mental state that result form their personal history[10]. The "energy" fuelling the individual will be different and leading to different aspirations and motivations. On the other hand, these aspirations and motivations are always sifted, "translated" and channelled by institutions and culture which vary from era to era and from society to society. More precisely, aspirations are moulded by cultural norms, beliefs and values that shape them as specific demands for (access to) socially and institutionally controlled resources.

Indeed, in order to be satisfied, needs must be changed in legitimate ***demands*** for what society in general considers adequate satisfiers (goods and/or services). On the other hand, demands are nothing else than claims on some share of socially controlled resources. The share of social resources accessible to any individual depends on the structure and quantity of **entitlements** s(he) is endowed with. The concept of entitlement has been forged by Sen (1981) in the context of his theory of famines. Indeed, Sen argued (quite convincingly) that far from resulting automatically from a decline in food *availability*, almost all famines result from a decline in *accessibility* of food for specific social groups or large portions of population due to a loss of their entitlements, that is their (socially legitimate) ability to command (i.e. purchase, command, receive or borrow) food. Thus, entitlements consists of assets, income, power, rights and claims for solidarity. Taking into account the fundamental importance of reciprocity (Gouldner 1960) as underlying principle of justice and sociability, entitlements are always regulated by some kind of reciprocity (direct or indirect, immediate or differed, more or less strictly balanced or not). As will be seen later, institutions differ mostly by the kind of reciprocity they enact.

The interplay between the three levels can be illustrated with the example of food. Nutrition is of course a stringent biological requirement at the individual level and one of the main driving factors of human behaviour. It is associated with numerous physiological and psychological processes and the way it is satisfied (quantitatively as well as qualitatively) is of the utmost importance for objective health (allergies, cancers[11], heart diseases, etc.). On the other hand, nutritional requirements vary according to age, gender, personal circumstances (pregnancy, breast feeding, illness), and activity.

Despite – or, perhaps, precisely because of – these deep biological determinations, the way the need for nutrition is satisfied in every society, is through and through culturally and socially framed by norms, values, meanings and symbols which stipulate what can be ate, how, where, by and with whom, when (season of the year, during feast or on daily basis, at what hour of the day…), in what circumstances. For example, in every known society there exist irrepressible disgusts for one or another otherwise eligible animal, disgusts linked explicitly or implicitly to what anthropologists call

[9]The immaturity of the baby at birth – compared to superior mammals – and the length of its dependency to adults that ensues has deep implications for the structuring of the adult personality and behaviour.

[10] It follows that a society where only 5% of the population is more than 65 years old cannot be identical with respect to individual needs to a society where this proportion amounts to 30%.

[11] According to Cummings and Binhgam (1998), up to 80% of bowel and breast cancers are preventable by dietary change. Diet is also responsible of many lung, prostate, stomach, oesophagus and pancreatic cancers.

a "taboo".[12] Another example of the social and cultural framing of nutrition is the importance of food sharing in human societies.[13]

This translates, at the meso-social level, into various institutionalised practices turning around the acquisition, the preparation and the eating of food. Despite important differences in the institutional setting of nutrition across societies, it is almost always in the family context that food is prepared, shared and eaten. However, food and the sharing of meal play also a fundamental role in friendship, community relations (think for example at the importance of the communion in Christian religion), professional and political meetings, etc. This means that, except in very infrequent circumstances (starvation), eating corresponds to much more than the sole satisfaction of hunger (nutritional need). It is associated with the fulfilment of others needs: identity, status, security, social interactions (meals are usually taken in common, with family members, relatives, friends, etc.), communication and information (conversation is an important component of the pleasure of the meal), etc.

As Fine and Leopold (1993) put it ''(human) food is not fodder; humans do not feed…it is apparent that what is consumed is not obviously determined by physiological or biological needs. Psychological needs also play a role''. In short, if the need for food is basically biological, it is also psychological and its expression and satisfaction is framed and channelled by the cultural and social institutions in which the individual is immersed with the results that it is almost always intertwined with many other (psychological and social) needs.

So, one can conceive of the three hierarchical level as irrigated by two opposite flows: one flowing from the lowest to the highest level and carrying the energy (motivation) arising from the individual wants to satisfy their needs, another one flowing from the highest level towards the lowest and carrying the information shaping the social and cultural conditions of "legitimate "needs satisfaction[14].

3.1 The micro-level: a needs theory of the consumer

The currently dominant (at least in the first world) un-sustainable patterns of consumption have been, for long, supported and legitimised by the utilitarian, neo-classical model of the "sovereign" (free from any social influence) maximising consumer with limited resources but unlimited desires and wants. On the other hand, many contemporary anthropologists and sociologists advocate a vision of the consumer immersed in an immaterial world of communication and of consumption as first and foremost a manipulation of symbols and meanings almost totally devoid (or oblivious) of material constraints and functions. Douglas and Isherwood (1979: 40-1) have given a particularly provocative expression of this kind of approach when writing: "If it is said that the essential function of language is its capacity for poetry, we shall assume that the essential function of consumption is its capacity to make sense… Forget that commodities are good for eating, clothing, and shelter; forget their usefulness and try instead the idea that commodities are good for thinking; treat them as a nonverbal medium for the human creative faculty." Despite its apparent (blatant?) absurdity, this position has

[12] See Simoons (1994) for an analysis of taboos on the consumption of pork, beef, chicken and eggs, horseflesh, camel, dog and fish.

[13] « Humans share food unlike any organisms do. Many other animals, including eusocial insects (bees, ants, termites); social carnivores (lions, wolves, wild dogs); some species of birds (e.g., ravens) and vampire bats actively share food. However, the patterning and complexity of food sharing among humans is truly unique." (Kaplan and Gurven, 2005, p.75)?

[14]This idea is borrowed from T. Parsons (1951) who uses it in a slightly different context.

inspired an enormous number of researches and studies in the sociology of consumption. As Warde (1997) noted at the very beginning of his book on food consumption in Great-Britain:

"This book arose from dismay about shifting fashions in sociology. A decade or more of analysis, founded in political economy and developing a materialist perspective on social life, seemed suddenly to be abandoned for a mode of studying culture which operated with wholly antithetical assumptions, according signs, discourses and mental constructs an exclusive role in understanding social activity… My ultimate theoretical concern is to reconcile the achievements of materialist and cultural analysis, which here takes the form of seeking to understand systematically the interrelationships between processes of economic production and patterns of consumption. Currently, the main barrier to this endeavour is the inadequacy and inconsistency of accounts of consumption."

Amazingly, the visions of the neo-classical economists and the one of these "post-moderns" anthropologists and sociologists converge in their denial of any relevance of needs theory in explaining (and more importantly controlling) consumption. But the concept of need is crucial in sustainable development. Admittedly, it is far from being uncontroversial. Briefly, they are two possible uses of the need concept; as en end or as a mean; as a noun or as a verb. In the sentence "A needs X", X is a verb and is to be understood as a mean for reaching an unspecified and implicit goal. In its full formulation it would read "A needs X in order to Y". Example: "A needs a drug (X) in order to cure her illness (Y)". But, in Brundtland's definition as well as in the need theories of Maslow, Max-Neef, Galtung and many others, need is a noun and refers to a goal. It would be written "X is a need of A". "Self-esteem", "security", "love", or "participation" are examples of needs as goals. However, the fact that if left unsatisfied, people are likely to endure some ill-being suggests that even in their substantial sense needs might be considered as means for the overarching goal of well-being. Therefore, it is probably sensible to consider them as constituents of well-being, as "what-is-to-be-satisfied" in order for man to flourish or to reach a satisfactory level of well-being[15].

We need alternative, more realistic, models of individual behaviour than the "insatiable" consumer model of neo-classical economists or of post-moderns sociologists. Amongst the different possibilities (for a review see van den Bergh, Ferre-i-Carbonell, Munda 2000), post-Keynesian consumer theory offers a sensible needs-based alternative. This model takes its roots in the writings of post-keynesian economists like Joan Robinson, Luigi Pasinetti, and some others. Post-Keynesian consumer theory puts forward 6 basic principles (Lavoie 2004):

1. The principle of procedural rationality. Contrary to neo-classical economics, post-keynesian micro-economics discards the "substantial rationality" assumption and endorses the "satisfycing" or procedural rationality framework. The latter emphasises the uses of "rule of thumb" by real economics agents (including the consumers) in decision-making.

2. The principle of satiable needs. This principle is compatible with the decreasing marginal utility assumption of neo-classical economics but only after a certain threshold has been reached in the satisfaction of the need. It has as consequence that, whatever the change in prices, no additional unit of a good is purchased if the consumer has already reached the satiation threshold. Another consequence is the acknowledgement of a hierarchy of needs: some needs are more basic than others and will be fulfilled in priority. Also, some are more easily and quickly satiated than others. This approach makes room also for a distinction between wants and needs (Lutz and Luz 1988): wants evolve from needs; they constitute various preferences within a common category or level of needs.

[15] For a thorough and illuminating discussion on these questions see Jackson, Jager and Stagl (2004).

3. The principle of separability of needs. Needs (and expenditures) are clustered in categories. This means the consumer makes first an allocation of her/his budget among needs or categories of commodities and then spends that allocation among the various wants or subgroups of each needs, independently of what happens to other needs. There will be no substitution between categories or needs but only inside subgroups. On the other hand, a change in the overall price of a group of goods corresponding to a given need will have repercussions on the budget allocation of all needs. For example, a general increase in food prices will induce consumers to re-allocate their budget between food, housing, clothes, leisure, etc. expenditures. On the contrary, a change in the relative prices of some foods will trigger substitutions but only inside the food category.

4. The principle of subordination of needs. There is a hierarchy in needs, at least there is a distinction between necessities (necessary needs) and discretionary ones. According to the principle of separability and to the principle of subordination, households allocate first their budget between necessities and discretionary needs. Actually, "all the previous principles culminate in the hierarchy of needs: needs are separable and the most basic needs are first taken care of in their order of priority, until they are satiated at some threshold level."(Lavoie 2004, p.645).

5. The growth of needs. A consequence of the subordination of needs, when a need has been fulfilled up to a satisfying threshold, households start attending to the next upward need in the needs hierarchy, at least if enough income is left after providing for inferior needs. It follows that any growth of income leads to a growth of needs. Therefore, the fulfilment of new needs and the purchase of new goods or services are related to income effects and income effects are much more important than relative prices ones in the evolution of consumption.

6. The non-independence principle. Contrary to the standard assumption of neo-classical economics, consumers' preferences and behaviours are non independent one from another. Consumers imitate each other, learn from each other or want to distinguish themselves. Most of all, their decisions are influenced by commercials and other marketing practices.

These principles make sense and most of them are corroborated by empirical research, be it experimental or observational. In particular, the assumption of lexicographic preferences that underpins all of them (with the exception of principle 6) is consistent with many empirical findings, notably in environmental issues (Spash and Hanley 1995). Look, for example, at the evolution of households expenditures in France between 1960 and 2000 (Langlois 2005). Predictions form the post-Keynesian consumer theory are corroborated for categories such as food whose share in total expenditures decreased steadily from 23,2% in 1960 to 11,4% in 2000, or for clothes whose share decreased from 9,7% to 4,0%. Likewise, the expenditures on leisure and communications behave as predicted, that is increased steadily during the period. But the evolution of expenditures on housing, which everyone would consider a basic need, increased from 10,7% of total budget in 1960 to 19,1% in 2000 (it almost doubled) and private health related expenditures grew from 1,5% to 2,9%. In 1960, the three principal expenditures where firstly on food (23,2%), secondly on housing (10,7%) and thirdly, on clothes (9,7%). In 2000 the figures are: housing (19,1%), transport (12,2%) and food (11,4%). The changes that occurred might be the result of changes in the relative prices of the different categories of satisfiers of basic needs. In USA also, Segal (1998) observed a rise in the share of housing and transportation and a fall in food and clothing expenditures, in American household budget between 1970 and 1994. These changes are clearly related to corresponding variations in prices. For instance, the median sales prices for existing homes in USA rose from $23.000 in 1970 to $109.800 in 1994, adjusted for inflation. After having looked similarly at the evolution of prices for other "basic needs" satisfiers such as food, clothing, education, health care, transportation, etc., Segal concludes:

"Yes, over the years Americans have increased consumption expenditures considerably. Much of this increase in household expenditure has gone to meet fundamental needs, either because needs were previously unmet or because in real terms the cost of meeting these needs has increased dramatically. What emerges is a quite different picture than that commonly portrayed with respect to our affluent society. For most Americans the subjective experience that they always need more money than they have is not to be explained by inflation in their appetites or their standards of decency ("I must have more square feet, a newer car, better furniture, new gadgets") but rather, by socioeconomic conditions that have resulted in unmet needs or in increased cost of meeting long-existing needs. This is true of housing, transportation, education and income security." (Segal, 1998, p.192). In short, according to Segal, it is the Need-Required Income" (NRI) that has raised not the consumers' wants or desires. It is to be noted that part of this increase in NRI comes from the shift from a one-career model of family to a two-careers model which created new needs (a second car, day-caring of children, etc.).

To conclude, the post-Keynesian model seems quite plausible but it is probably incomplete and the principles of subordination and separation of needs might be too crude as they don't take into account the differences in quality of goods. On the other hand, it overlooks the importance of psychological and social needs in consumption and their association with material needs in most consuming activities.

There is another explanation of the trend of rising consumption: it would be that people have to satisfy more wants than necessary otherwise, because their wants don't fit their real (objective) needs. Figure 2 portrays the general relation between wants and needs. It shows how real objective wants might be left unsatisfied while un-needed wants might be fulfilled.

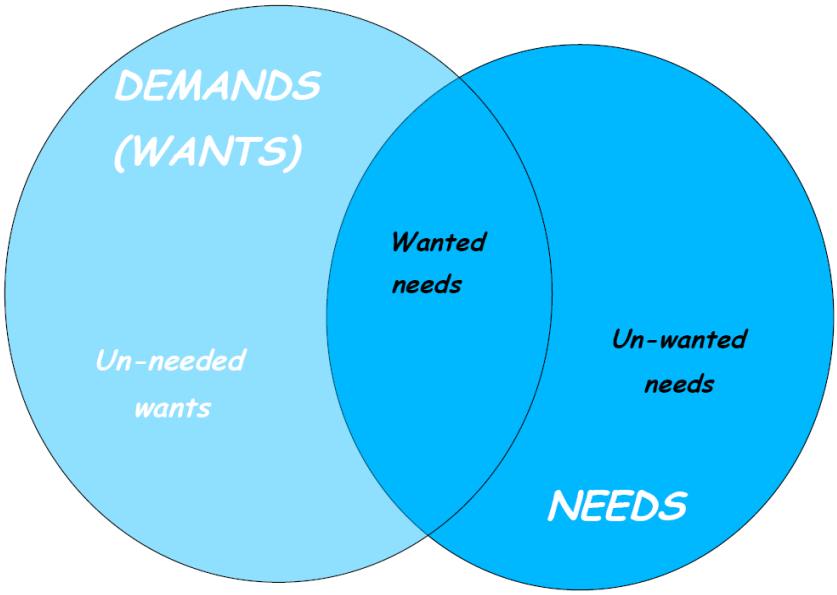

Figure 2. General relations between needs and wants (adapted from Gasper 2004:11.).

This explanation would support Max-Neefs' observation that not all "satisfiers" are equally efficient in fulfilling needs and that some can even be considered as destructive of satisfaction. In general, he argued that satisfiers could be classified as:

- Destroyers: satisfiers which, while intended to satisfy a need, make the very satisfaction of this need (and usually some others as well) impossible. Max-Neef gives the example of the arms race as destroyer of the need for security.

- Pseudo-satisfiers: elements that generate a false sense of satisfaction of a given need. Examples given by Max-Neef are: mechanistic medicine (protection), exploitation of natural resources (subsistence), chauvinistic nationalism (identity), etc.

- Inhibiting: satisfiers that by oversatisfying a specific need hamper the possibility of satisfying other needs. As examples, Max-Neef mentions the overprotective family which by oversatisfying protection curtails the fulfilment of other needs such as identity, freedom, etc.

- Singular: satisfier specialised in the satisfaction of a particular need and neutral with respect to others. According to Max-Neef (1992: 34) "They are characteristics of plans and programs of assistance, cooperation and development".

- Synergic: satisfiers that satisfy a given need whilst stimulating and contributing to the fulfilment of other needs.

- Exogeneous or endogeneous.

This explanation is supported by Kasser and Ryan (1993) findings on the relation between the pursuit of material values and goals and a feeling of insecurity. Amongst other interesting findings, they showed, for instance, that teenagers whose parents had a less-nurturing parental behaviour were more likely to express materialistic values (Kasser 2002). Parental divorce increases also the probability of adopting more materialist goals. Researches conducted by Inglehart and his associates on differences in value orientations between whole nations seem to confirm this link between materialism and insecurity. Inglehart hypothesised two basic families of values characterizing Western societies: Materialist values, respecting the need for physical or economic security, and Postmaterialist values, transcending these immediate physical or economic needs (e.g., aspiring to greater democratization and involvement of people in the political process). Using this taxonomy, Inglehart has accumulated a body of findings (that are based on surveys of thousands of participants in more than 60 countries, including most countries of Europe and North America) that suggests that Western societies have become increasingly Postmaterialist in their orientation since the second World War (e.g., Inglehart, 1981). Their comparison of different cultures and nations led them to conclude that materialism is especially valued by a) the older cohorts of western Europeans who experienced substantial economic and national insecurity in their youth; b) people surveyed during periods of high economic inflation and c) people in poorer nations. He argued that improvements in the standard of living since the two world wars have led to decreased anxiety over basic survival needs (regular meals, a roof over one's head, etc.) and that, as a result, people who have never experienced material scarcity are turning towards Postmaterialist concerns (Inglehart and Abramson 1994).

To sum up: "…materialistic values are both a symptom of an underlying insecurity and a coping strategy taken on in attempt to alleviate problems and satisfy needs…The problem is that materialistic values are rather poor coping strategy…Negative associations between materialistic values and well-being certainly suggest that such a coping strategy is not especially useful in alleviating people's problems" (Kasser 2002:42).

On the other hand, the history of consumption can be read as a slow but never-ending transformation of wants into needs, that is of un-needed wants into wanted needs. This process can well be correlative of a parallel downshifting of previously wanted needs into un-needed wants or even in un-wanted needs in which case it would induce some loss in objective well-being. As Wilk observes, these transformations have been overlooked by social scientists so far.

"While generations of social scientists have remarked on the ratchet-like way that wants gradually become emplaced as needs, they have given the process little serious empirical study (though see Sanne 1995). Instead they focus on the way that new wants are generated and cultivated in a marketplace through advertising, spectacle, and mass media, as a consequence of modernity. Therefore they miss the key counter-movement that naturalizes wants as needs, takes them out of

contention, and embodies them as taste, urge, and impulse, sometimes reducing or eliminating needs." (Wilk 1999)

What was once un-needed (luxury) wants become needed ones either because the general living conditions make them necessary (the refrigerator and the car are examples of luxuries becoming necessities because of the way they have changed systems of provision of food and of transport) or because they are progressively integrated in the definition of minimum standard of living. Precisely, it is often because they have overlooked this fact that "basic needs" policies have been blamed. They didn't take account of the "naturalization" of wants. Furthermore, they have too often been guilty of deciding in place of people what they really needed[16]. Indeed, only people themselves duly placed in a suitable institutional setting can, in a rational deliberation, decide what their real needs (and essential satisfiers) are, taking into account their cultural, economic and technical context.

A third explanation is that what characterises precisely the consumer society is that *needs (or values) that were previously satisfied in a non consumer way are therein fulfilled by consuming practices.* Nowadays, the four kinds of needs identified by Kasser (2002) as necessary for human survival, growth, and optimal functioning would be at stake in consumption practices. These needs are 1) safety, security and sustenance – the human desire to remain alive and avoid premature death; 2) competence, efficacy, and self esteem – the human desire to demonstrate inherent positive attributes in one-self that propels one to accomplish one's missions, goals and objectives; 3) connectedness – the human desire for intimacy and closeness with other humans - the desire for belonging; and 4) autonomy and authenticity – a desire for freedom to act on one's own and to have a feeling that one is self directed. The analysis by Jackson and Marks (1999: 442) of the evolution of household consumption in UK between 1954 and 1994 give some support to this explanation: "First, we find that— in spite of its material nature — much of the increase in consumer expenditure in the last 4 decades can be construed as an attempt to satisfy social and psychological (nonmaterial) needs rather than material needs such as for food and shelter."(Jackson and Marks (1999: 442). But this is not incompatible with our second explanation: "Secondly, we find little evidence to support the idea that increased consumer expenditure in these 'non-material' categories leads to increased satisfaction of the underlying needs" (op.cit.).

Take, for example, the need for identity and self-esteem. In traditional "ascription" societies, the need for identity is fulfilled by the social status ascribed by society according to lineage and family (and therefore the caste or status group). These societies can be highly stratified and non egalitarian but identity personal doesn't pose problem therein. The only problem is to behave in accordance with the ascribed status. A sense of *honor* dictates the way to behave, which depends on the social status. In case of failure to conform, the penalty is social disapproval which results in *shame.* In achievement societies where social status (and therefore identity) is not ascribed but achieved through participation in production or in public life (at the community level at least), identity, self-esteem, etc., depend on merit, which consists in behaving in accordance with moral norms and values such as hard-working, self-restraint, thrift, etc. The social personality corresponding to this kind of societies has been characterised as "inner-oriented" by the sociologist David Riesman in "The Lonely Crowd"[17] which

[16] In a paper titled « Asking people what they want or telling them what they 'need'?", Tom Lavers reports of members of a Peruvian Andes community who decided to use the money received in compensation for the negative effects of mining activities on their environment, in buying musical instruments for a band to play at community fiestas instead of in building a water sanitation infrastructure or a school…

[17] *The Lonely Crowd* was first published in 1952. It is however still up-to-date in many aspects, and principally on the analysis of consumption. Riesman notably already discovered the importance of diversification of goods in the consumer society and this, long before what some have called the "post-fordist" stage in the evolution of consumerism, precisely characterised by the vanishing of "mass consumption" and the birth of a diversified consumerism. Riesman writes, for example: "La production massive comme la distribution massive, parvenues à leur stade ultime, permettent et exigent une augmentation considérable non seulement en quantité, mais aussi

what was the first in depth analysis of the nascent consumer society. To the inner-oriented personality, characteristic of the early capitalism, Riesman opposed the new type of social personality, characteristic of the coming consumer society that he called "other-oriented". While the former is guided by his/her inner gyroscope, the behaviour of the other-directed individual is governed primarily by his/her set of peers. Other-directed individuals have internal "radar" for sensing and responding to their peers that makes them "capable of a rapid if sometimes superficial intimacy with and response to everyone." He also noted that while inner-oriented people suffer from *guilt* if their behaviour departs from the direction indicated by their gyroscope, other-oriented people are more likely to feel *anxious* when failing to orient themselves in society and develop one's individuality in conformity with others' expectations.

This multi-functionality of consumption has been nicely analysed by Holt (1995) in his paper "How Consumers Consume: A Typology of Consumption Practices". Table 1 shows Holt's (1995) basic categories for analyzing consuming. They consist of a double distinction (1) between autotelic (which are end-in-itself) and instrumental (directed towards another goal) consumption actions and (2) between activities that interact mainly with objects versus those that interact mainly with others (using consumption objects as focal resources).

Table 1. Holt's metaphors for consuming

		PURPOSE OF ACTION	
		Autotelic Actions (end)	Instrumental Actions (means)
STRUCTURE OF ACTION	Object Actions	Consuming as experience	Consuming as integration
	Interpersonal Actions	Consuming as play	Consuming as classification

Source: Holt 1995.

- Consumption as experience. By this Holt emphasises the cognitive (interpreting, accounting), evaluative (assessing, comparing to norms and baseline expectations) and emotional (appreciating, feeling) aspects of consumption. The example (watching a baseball play) used by Holt to illustrate what he calls "metaphors of consuming" is unfortunately something only American consumers can understand for having experienced it but it is possible to grasp what he means with experiencing by thinking at the subjective feelings experienced during a dinner in a grand restaurant or the tasting of a "grand cru". However if the experience aspect of consuming is particularly salient (and noticeable) in exceptional or outstanding consumption events, it is not by any means restricted to such situations. The most important result of experiencing is of course pleasure but it can also be the satisfaction of becoming more competent, a sense of achievement, self-esteem, etc. Note that all these positive feelings have also their negative counterparts: disappointment, frustration, anxiety…

dans les différences de qualité….Cela signifie que l'élève consommateur d'aujourd'hui doit apprendre beaucoup plus de choses qu'au début de l'ère industrielle. (French Translation :113). Or: « De nos jours, la future profession de tous les bambins, c'est d'être des consommateurs qualifiés » (p.118). Or « Le consommateur ostentatoire de Veblen cherche à jouer le rôle qu'exige de lui la position qu'il occupe, ou qu'il espère occuper, dans la vie ; alors que le consommateur extro-déterminé recherche des expériences plutôt que des objets et aspire à être guidé par les autres plutôt que de les éblouir ». (168).

- Consumption as integration. Consuming as integration "references the methods used by consumers to enhance the perception that a valued consumption object is a constitutive element of their identity" (Holt, p.6). This amounts to breaking down the institutional distance between the consumer and the consumption object either by 1) assimilating (gaining competence in the three experiential practices described here above; 2) Producing (participating in the production of the object) or 3) personalizing (altering the object to assert the individuality of their bond with it). This is what Belk (1995:72) refers to when writing that: "…certain goods may come to be seen as extensions of self (…). These things extend our grasp, our abilities or our ego. They provide a sense of mastery of the environment, others and the self. They are expressive and aid feelings of identity, continuity and even immortality. And they often provide us with a sense of past – both individual and shared with others. (…). Such things may become a part of self through appropriating and controlling them, creating or buying them, knowing them, becoming habituated to or contaminated by them, or by literally incorporating them into self.".

- Consumption as classification. When consuming-as-classification, consumers make uses of the object of consumption as a means to classify themselves with respect to (significant) others. Objects of consumption (be they goods like a car or services like holidays or journeys) are thus endowed with social and personal meanings through which people communicate who they are. While Bourdieu (1979) has seen only the distinction aspect of consuming-as-classification, the affiliation aspect is at least as important. Truly, both dimensions are inseparable because to affiliate is always to distinguish oneself from those with which one doesn't affiliate and to distinguish is always a claim to an affiliation with a reference group. The consumption-as-classification metaphor is the most often referred to in the sociological and anthropological literature (Douglas & Ischerwood 1979) but it is often restricted to a classification-through-object point of view. Holt shows that there is also a classification through actions: "consumers also use the manner in which they experience the consumption object to classify. For object classification, the particular meaning associated with a consumption object provide the content of the classificatory act, while for action classification, object meanings are irrelevant – what matters is *how* one interacts with the object" (Holt, p.11).

- Consumption as play. In consuming as play, actors use commodities as resources to interact with fellow consumers. "Playing practices capture the autotelic dimension: consumer-object-consumer that has no ulterior end, interaction for interaction's sake" (Holt, 1995:9).

All these experiences participate to the pleasure consumers expect from and find in consumption. The "pleasurable" dimension of consumption is gaining more and more importance in the way people report on their consumption activities, as Table 2 shows:

Table 2 Is consumption more a pleasure or a necessity ?

YEAR	NECESSITY	PLEASURE	BOTH	DON'T KNOW	TOTAL
1993	29,3	11,3	59,1	0,3	100
1994	32,8	8,8	57,4	1,0	100
1995	35,6	10,6	53,1	0,7	100
1996	26,7	14,1	59,0	0,2	100
1997	25	14	61	-	100

1998	30,6	13,3	55,8	0,3	100
1999	30	19	51	-	100
2000	26,7	15,5	57,1	0,7	100
Source: Langlois 2005, p.174					

The pleasure dimension is gaining importance but not in a uniform steady way. It declines during the periods 1994-1995 and in 1998 but peaks at his higher in 1999. These variations are correlated with the fluctuations in general economic conditions (unemployment, growth…).

Therefore, the challenge is to account for the fact that, in extant consumer societies, consumption is more multi-functional than ever and that individuals, facing a diversity of commodities and services unknown until now, have more opportunities than ever to choose elements of their lifestyle if not their whole lifestyle itself. On the other hand, one has to keep in mind the hard fact that this choice is nevertheless still deeply moulded by materials (financial) constraints, the "hidden persuasion" coming from a flourishing advertising and marketing industry, and the locking-in of the consumer in dominant modes of provision shaped by the producers or the retailers and not by the consumers.

3.2 The meso-level: systems and modes of provision

However, not all consuming activities carry the same amount of pleasure, experiencing, playing, integrating or classifying and it is very important to distinguish between ordinary, or "inconspicuous" consumption", and "display" or "hedonic" consumption. The former refers to consumption driven by routines[18] and habits or practices in which consumers are "locked-in" by dominant modes of provision or by social and economic constraints of which they are usually unaware:

"To take one simple and relevant example, the fuel consumption associated with heating our home is determined (amongst other things) by the available fuel supply, the efficiency of the conversion devices, the effectiveness of thermal insulation in the dwelling, and the level of thermal comfort programmed into our thermostats. These factors in turn are constrained by the historical development of the fuel supply and appliance industries, the institutional design of the energy services market, the social norms associated with personal convenience and thermal comfort, and our individual responses to those norms". (Jackson, 2005:21).

Another example of the way historical development has changed dominant modes of provision is given by Wilkinson in his pathbreaking ecological analysis of economic development,: "the need for larger quantities of packaging materials is linked to the wider problem of preserving perishable goods as supply lines get longer and distribution systems become more complex. Much of our food is now tinned, dried, frozen, vacuum-packed or has artificial preservatives added. In pre-industrial societies it was only necessary to smoke, dry or salt some foods for winter, but modern preserving methods are now essential all the year round for such basic items as foreign meat, fruit and vegetables" (Wilkinson 1977, p.177). More generally, Wilkinson (1977) shows how the processes of industrialisation and of urbanisation constitutive of the industrial revolution created new needs that were unknown (or

[18] "A consumption routine is an executable capability for repeated consumption that has been learned or acquired by groups of consumers in response to social pressures or contexts" (Harvey et al. 2001).

negligible) in the pre-industrial societies. The new working and living conditions and the decline of local communities pushed up the need for education, transport, leisure and communication, clothes, hygiene, etc. The structural factors that surround and frame consumption are systematically overlooked by the individualistic, economic utilitarian as well as cultural "post-modern", theories of the consumer[19]. However, consumption practices cannot be understood without taking account of the general both material and institutional conditions of living (household dimension and composition; housing conditions, urban structure…), of working or making for a living in general and, finally of consuming.

Satisfiers such as food, shelter, transport, etc., are accessible to households through different organisational and technological systems called "systems of provision" (Fine and Leopold 1993) or "modes of provision" (Gershuny 1983).

"The particular means that a household employs to satisfy its needs for a particular function – the 'mode of provision' for the function determines the household's pattern of expenditure on final commodities. Over time, the relative desirabilities of … alternative modes of provision for a particular function may change …This change in the mode of provision for particular functions (or, at the societal level, change in the distribution of modes of provision) will be referred to as 'social innovation'."(Gershuny (1983:1-2)

It may be better to keep the concept of "system of provision" for referring to the concrete material and institutional arrangements by which households have access to the needs satisfiers and the notion of "mode de provision" for referring to the general patterns underpinning extant systems of provision, as in Table 3.

Table 3. A typology of modes of provision.

Mode of provision	Manner of obtaining service	Who does work	Who pays (if anyone)	Principle over which service is obtained
Market	Commercial purchase	Paid employees	Consumer	Market exchange
State	Claim to entitlement	Paid employees	State (tax payer)	Citizenship right
Communal (cooperatives LET)	Personal interconnections	Neighbours or acquaintances	No money involved	Reciprocal obligations
Domestic	Household Do-it-yourself	Members if household	No money involved	Family obligation

[19] Sanne (2002) distinguishes a third model, which he calls "differentialist". It refers to the "classifying" function of consumption (to say it in Holt's language) as depicted by Veblen and, more recently, by Bourdieu. In my opinion, this differentialist conception, if truly individualistic can be considered as part of the cultural model ("consumption as communication") and, if referring to positional goods, is fundamentally non-individualistic but on the contrary based on an over-socialised conception of man.

Source: Harvey et al. (2002:63).

From a sociological point of view, what makes institutions different is the model of reciprocity on which they are based. Indeed, reciprocity can be direct or indirect, immediate or differed, strictly balanced or not. It is direct if A reciprocate to B and B to A; indirect if A reciprocate to B, B to C and C to A. It is immediate if reciprocity must follow very shortly the action to reciprocate; otherwise it is differed. Finally, it is balanced if the reciprocate "cleans" the transaction without leaving a surplus or a deficit (what the receiver reciprocates has the same value than what he received).

Family is characterised by direct or indirect but necessarily differed and unbalanced reciprocity between parents and children. In most traditional societies, for example, children are supposed to reciprocate to their old parents the care they received during childhood. On the contrary, in complex societies with formal social security and pensions systems, reciprocity is indirect (and balanced) because it is generation C that repays (more or less identically, or at least proportionally) generation B for having paid the pensions of generation A. On the other hand, reciprocity relations between spouses are direct, differed and not strictly balanced. Markets are characterised by direct, immediate and strictly balanced reciprocity, LETS (Local Exchange and Trade Systems) by indirect, differed and balanced reciprocity. Hierarchies (bureaucraties, firms, ...) are characterised by direct, differed and approximate reciprocity: the employer exchange money for effort with the employee but the money is usually not paid immediately and the balance is seldom strictly respected between the amount of contribution and the retribution due to the difficulties in assessing efforts. On the other hand, goofing off is often the only possible way for the employee to try to re-balance in his favour a usually unequal exchange.

The relative importance of the different institutions (and thereby of norms of reciprocity) in society in general and in the production, distribution and consumption of food in particular depends on the technology available, the environment and the cultural system of the society. As is well-known, modernity as described by Marx, Weber, Durkheim, Tönnies and de Tocqueville is characterised by the supremacy of markets and bureaucracies at the expense of communities and families. This amounts to saying that direct and strictly balanced reciprocity dominates social relationships at the expense of indirect and differed one.

Sustainable consumption correspond to a "modal split" in the distribution of alternatives modes of provision through population, and a corresponding change in the relative importance of patterns of reciprocity. In particular, it means the substitution of non-commodity (non-market) based modes of provision to commodity based ones. The term "commoditization" is used by Manno (2002:70) for referring to the "tendency to preferentially develop things most suited to functioning as commodities – things with qualities that facilitates buying and selling – as the answer to each and every type of human want and need". It is slightly equivalent to what Hirsch called the "commercial bias" or "commercialization effect" characterized by the fact that "an excessive proportion of individual activity is channelled through the market so that the commercialized sector of our lives is unduly large"(Hirsch 1977:84).

Manno operates an interesting distinction between goods and services with high commodity potential (HCP) and those with low commodity potential (LCP). The commodity potential is a measure of the degree to which a good or service carries the qualities that are associated with and that define a commodity. These qualities are:

- Alienable: the ease with which ownership can be asserted, assigned and transferred;
- Standardizable: independence from the particularity of geography or culture;
- Autonomous: the ability to be used independently, outside the constraints of social relationships;
- Convenient: the ease with which it can be used;
- Mobile: the ease with which something can be packaged and transported.

As an example, Manno considers the need children have for playing. At the most commercial end of the scale, it can be satisfied with mass-marketed toys such as Barbie dolls which are inexpensive, marketed worldwide, whose production and distribution is energy and waste intensive. In the middle of the scale, one finds locally produced, handcrafted toys, dolls and games usually made from renewable materials and with local or culturally idiosyncratic designs. Finally, at the far-end of the commodity-potential scale are activities and games that don't necessitate commercial objects.

The problem is that the market economy acts as a "milieu" exercising selection pressures on satisfiers that are more favourable to commodities than to non-commodities, giving the latter less opportunities to survive. This doesn't mean that one cannot find localized niches for less commoditized ways to satisfy needs but these, by definition, remain marginal.

"Given the selection pressures of commoditization, however, unless public policy deliberately intervenes, HCP goods and services inevitably outcompete LCP goods and services…Commoditization pressures act over time to gradually and inexorably expand the number of commodities available, the geographic spread of their availability, and the range of needs for which commoditized satisfactions exists." (Manno 2002:72-73).

Therefore, de-commoditization is more or less synonymous of de-marketisation. Limiting the influence of markets and economic institutions in general is therefore an important lever of a strategy of sustainable development. Indeed markets, as Bowles (1998) convincingly showed, do more than allocate goods and services. They also influence the evolution of values, tastes and personalities.

"The production and distribution of goods and services in any society is organized by a set of rules, among which are allocated by fiat in states, firms, and other institutions, patriarchal and other customary allocations based on gender, age and kinship (as for example takes place within families), gift, theft, bargaining and of course markets. Particular combinations of these rules give entire societies modifiers such as "capitalist", "traditional", "communist", "patriarchal", and "corporatist". These distinct allocation rules along with other institutions dictate what one must do or be to acquire one's livelihood. In so doing they impose characteristics patterns of interaction on the people who make up a society, affecting who meets whom, on what terms, to perform what tasks, and with what expectation of rewards. One risks banality, not controversy, in suggesting that these allocations rules therefore influence the process of human development, affecting personality, habits, tastes, identities and values." (Bowles 1998, 76).

In particular, markets:

- Favour thinking of goods in an abstract and comparative way, leading to compare things that pertain to very different ontological worlds.
- Foster extrinsic motivations in place of intrinsic ones.
- Reduce the scope and effectiveness of social norms. More precisely, they undermine the reproduction of "nice traits" in a given population by lessening the functioning of mechanisms such as: retaliation, reputation, segmentation, group selection.

De-commoditization is also a condition for meeting non-environnmental requirements of sustainable development: concerns for producers' earnings, working conditions and human rights; worries about animal welfare in husbandry practices, etc. Because markets as institutions are networks of abstracts, universalistic and specialised relationships between actors considered only as bearer of economical characteristics, they rule out concerns for the people as persons as well as any consideration alien to the instantaneous economical exchanges of which they are woven.

In general, the trade-off when shifting from market-based modes of provision to others, non-market ones, is between income-intensive *versus* time-intensive satisfiers. This is especially true for domestic

and community-based modes of provision. This can be explained by the fact that, contrary to markets where transaction are mostly anonymous and neutral from an affective point of view, transactions in families and communities are never affectively neutral nor purely functional. This has costs in terms of extra time devoted to the maintenance of personal "rich" relationships. In fact, it has often be observed that what characterizes modern occidental societies is the fact that people herein accept to trade leisure against consumption even after their basic needs have been satisfied. This is something that would have been hard to understand for our ancestors in pre-industrial era.

As Wilkinson (1973:84-85) puts it: "That some societies show what is called a "leisure preference" has been the despair of many development economists. Many societies have shown a tendency to use improvements in techniques which have reduced the amount of time necessary to produce their subsistence, to increase their leisure time. Economists who have attached a higher priority to increasing the output of goods would have preferred the extra time to have been used to increase production. A leisure preference is a clear indication of the relative sufficiency of a society's material means of subsistence and should be regarded as a feature of societies in ecological equilibrium".

3.3 The macro-level: cultural values and norms

It has often been observed that "…interventions aimed at reducing consumption will be most effective if they bring about higher-level changes in the socio-economic-cognitive system – i.e. by changing cultural values or worldviews." (Brown and Cameron, 2000, p.34). Indeed, the high level of consumption could not stand without a socio-cultural conception of well-being and happiness that legitimate the pursuit of "materialistic" values ('indulgence', 'pleasure", 'comfort') instead of the non-materialist values of self-control, spirituality, simplicity, etc.

From a consumption perspective, socio-cultural patterns of values and norms can be considered as collectively shared ways of:

- Structuring and ranking the different needs for members in general and subgroups in particular (men/women, infant/adult, young/aged, manual workers/intellectual workers, etc.)
- Drawing a border between fully legitimate (needs), acceptable and illegitimate wants.
- Shaping the expression of needs in demands and indicating the adequate satisfiers;
- Arbitrating between needs and resources.

The first and more ambitious attempt to characterise and analyse such general socio-cultural conceptions have been undertaken by the American (formerly Russian) sociologist Sorokin with its 4 volumes "Social and Cultural Dynamics" published in 1937-41. Sorokin used the term "mentality" to refer to such paradigmatic conceptions of:" (1) the nature of reality; (2) the nature of needs and ends to be satisfied; (3) the extent to which these needs and ends are to be satisfied; (4) the methods of satisfaction". (1957, p.25). More precisely:

> 1) Reality can be apprehended as nothing more than what the organs of the senses can perceive or, on the contrary, as something behind (or beyond) the perceived world. In the latter case, what the senses perceive is only a misleading appearance (if not pure illusion) hiding the true reality which is immaterial and transcendent.
>
> 2) Needs may be viewed as purely (or mainly) sensual or mainly as spiritual "like salvation, of one's soul, the performance of sacred duty, service to God, categoric moral obligations and other spiritual demands which exist for their own sake, regardless of any social approval or disapproval" (p.26). But Sorokin considered also the possibility of a mixed conception "like the striving for superiority in scientific, artistic, moral, social and other creative achievements, partly for their own sake and partly for the sake of human fame, glory, popularity, money, physical security and comfort, and other 'earthly values' of an empirical character" (p.26).

3) Concerning the extent to which needs are to be satisfied, different levels are possible form the most luxurious to the barest minimum.

4) Sorokin distinguished three strategies for satisfying needs: two "pure" strategies and one mixed. The first consists in modifying the milieu in order to yield the means of satisfying needs. The second consists in modifying oneself: "one's body and mind, and their parts – organs, wishes, convictions, or the whole personality- in such a way as to become virtually free from a given need, or to sublimate it through 'readjustment of self'". The mixed strategy consists in acting both on the self and on the environment. This is especially relevant for sustainable consumption macro-policies.

On this basis he distinguished two "pure" mentalities: the "sensate" and the "ideational" one and a mixed type he called "idealistic".

Table 4 ***Sorokin's theory of mentalities***

The ideational, sensate and idealistic mentalities according to Sorokin					
	Ascetic ideational	Active Ideational	Active Sensate	Passive Sensate	Idealistic
Reality	Ultimate reality, eternal transcendental	Both with emphasis on eternal non-material	Sensate, empirical, material	Sensate, narrow and shallow	Both equally represented
Main needs	Spiritual	Both with predominance of spiritual	Manifold and richly sensate	Narrow sensate	Both equally represented
Extent of satisfaction	Maximum	Great but moderate	Maximum	Maximum for narrow sensate needs	Great but balanced
Method of satisfaction	Mainly self-modification	Both with prevalence of self-modification	Mainly modification of environment	Utilisation (exploitation) of environment	Both ways

These different mentalities manifest themselves in all cultural productions of society: art, science and philosophy, law and justice, and personality.

Sorokin's model is probably too crude to provide practical guidance for sustainable consumption policies. Indeed, even if one could accept the hypothesis of the domination of a homogeneous cultural

paradigm in many historical societies, it is much more difficult to accept concerning modern industrial societies which are order of magnitudes more complex and differentiated[20].

However, there exists a more recent theory of culture that also claims to cover all possible existing cultures. It is known either as "grid-group" theory (Douglas) or as "cultural theory" (Thompson, Ellis and Wildavsky 1990). The core of the theory consists of a typology formed by the articulation of two modes or dimension of sociality: "group" which refers to the extent to which individuals are incorporated in bounded units and "grid" which denotes the degree to which individual choice is circumscribed by externally imposed prescriptions. Asymptotically, both dimensions reduce to two possibilities: plus (+) or minus (-).

- Group +: means that individual's life is totally absorbed and sustained by group membership (rich interdependencies and strong solidarity)
- group -: characterises a condition marked by individual autonomy and inter-individual competitiveness;
- Grid + : social roles are greatly constrained and discriminated;
- Grid -: roles are loosely specified and individuals have a wide negotiation space

Institutions and cultures (and the people sharing them) are therefore classified by cultural theory as:

- Egalitarians (Group +, Grid -):
- Hierarchs or Bureaucrats : (Group + , Grid +)
- Entrepreneurs (Group -, Grid -)
- Fatalists (Group -, Grid +).
- Hermits (or Autonomous) who withdraw from social interaction.

What is interesting in cultural theory is the assumption that these cultural types are complementary and that a well-balanced society comprises a mix of all of them.

"A well-run community needs some hierarchy in the sphere of government, some enterprise on the part of Individualists, some criticism from Enclaves (Egalitarians), and it cannot avoid having some passive members in the sector of Isolates (Fatalists). If the Positional (Hierachical) culture dominates, it will make things hard for those in the lowest positions. If the Individualist culture dominates, ruthless competition will make the weak suffer. If the Enclave (Egalitarians) suffers, the heavy hand of moral censorship will calcify the cultural scene. If the others combine to suppress the Enclave (Fatalists), violence will erupt as the enclavists will not be silenced. » (Douglas 2005:p.13)

Cultural theory has been put at work at several occasions on sustainable development and consumption issues. Thompson and Rayner (1998) clustered attitudes to sustainable development in terms of Cultural Theory and Dake and Thompson (1999) found from a household survey in Britain that lifestyles and consumption patterns were correlated with these cultural types. Seyfang (2003) analysed the different discourses on food sustainable consumption in terms of the cultural theory categories and concluded that if cultural theory could be useful as an heuristic device it lacked explanatory power.

Likewise, Jackson and Michaelis (2003) link different attitudes, values and beliefs related to sustainable consumption and the environment to the traditional, individualist and egalitarian types of cultural theory.

[20] But perhaps this is only an optical illusion due to our being too close to them to be able to grasp their fundamental specific nature.

Table 5.Cultural theory categories and sustainable consumption

	Traditional/hierarchy	**Individualist/market**	**Egalitarian/community**
Example	20th century civil service or large company	stock exchange, Silicon Valley	monastery, professional association
Goals/moral goods	stability, order, solidarity	liberty, opportunity, efficiency	equality, fairness, solidarity
Social role of consumption	communicate/affirm status/role	self-expression, affirm individual identity	membership of group, affirm collective identity
Problems with consumption	tastelessness of mass consumption; loss of traditional foods, crafts, social structure.	market distortions and barriers constrain freedom of choice: insufficient consumer information/empowerment	inequity between consumers; exploitation of workers; unfair terms of trade.
Diagnosis of environmental problems (Thompson and Rayner, 1998)	population growth, irresponsible behaviour by firms, individuals	lack of market signals reflecting environmental goods/costs	profligate consumption, pursuit of power/self-interest by firms, individuals
Preferred solutions for sustainability	regulation, pollution control, better planning	internalisation of environmental costs, better frameworks for technological/business innovation	public/stakeholder dialogue leading to shared goals/solutions
Preferred mode for sustainable consumption	consuming responsibly	consuming efficiently	consuming less

Source: Jackson and Michaelis, 2003, p.44.

Michaelis and Lorek (2004) use cultural theory as an heuristic device for categorizing consumption patterns (see figure 3 below) and for structuring scenarios of changes therein.

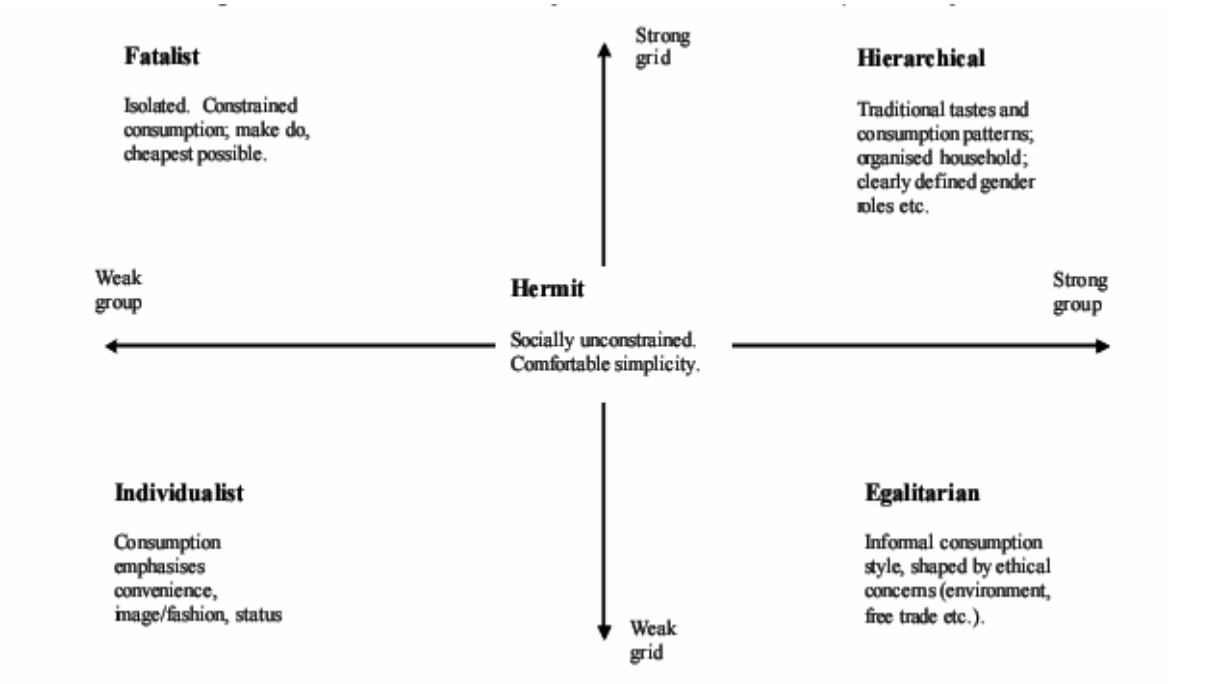

Figure 3. Consumption patterns according to cultural theory. Source: Michaelis and Lorek (2004), p.67

It is tempting to draw a connection between cultural theory categories and Max-Neef's list of needs. Table 6 shows a first attempt to organize some of Max-Neefs's fundamental human needs in the cultural theory framework.

Table 6. Cultural types and fundamental needs

	GRID +	GRID -
GROUP +	Identity	Participation
GROUP -	Security	Freedom

Thus, cultural theory can easily account for some of the fundamental human needs defined by Max-Neef. However, things are more complicated with other needs such as subsistence, leisure, creation and understanding. Sorokin's sensate-ideational opposition could be a plausible candidate, in which case one would find subsistence and idleness on the sensate side and creation and understanding on the ideational one. Inglehart's "materialism post-materialism" dichotomy would give more or less the same configuration.

Schwartz's theory of universal values offers other interesting possibilities to complement (or modify) the Grid-Group dimensions of cultural theory. Schwartz defines values as: "Desirable, trans-situational goals, varying in importance that serves as guiding principles in the life of a person or other social entity. Implicit in this definition of values as goals is that (i) they serve the interests of some social entity, (ii) they can motivate action, giving it direction and emotional intensity, (iii) they function as standards for judging and justifying action, and (iv) they are acquired both through socialisation to dominant group values and through the unique learning experiences of individuals" (Schwartz, 1994 p.21).

According to Schwartz, there are only ten universal human values that account for "all the core values as recognized in cultures around the world" because they correspond to three universal requirements of the human condition: needs of individuals as biological organisms, requisites of coordinated social interaction and survival and welfare needs of groups. These 10 values are:

1. *Self-Direction*. Independent thought and action; choosing, creating, exploring.
2. *Stimulation*. Excitement, novelty and challenge in life.
3. *Hedonism*. Pleasure and sensuous gratification for oneself.
4. *Achievement*. Personal success through demonstrating competence according to social standards.
5. *Power*. Social status and prestige, control or dominance over people and resources.
6. *Security*. Safety, harmony and stability of society, of relationships, and of self.
7. *Conformity*. Restraint of actions, inclinations, and impulses likely to upset or harm others and violate social expectations or norms.
8. *Tradition.* Respect, commitment, and acceptance of the customs and ideas that traditional culture or religion provide the self.
9. *Benevolence*. Preserving and enhancing the welfare of those with whom one is in frequent personal contact (the 'in-group').
10. *Universalism.* Understanding, appreciation, tolerance, and protection for the welfare of all people and for nature.

These ten values have congruence or conflict relation between each other. For example, the pursuit of achievement values may conflict with benevolence. On the other hand, it can be congruent with the pursuit of power values. The figure below shows the 10 values organised in a circular structure in which congruent values stand nearby each other and facing those with which they conflict. The closer any two values in either direction around the circle, the more similar the underlying motivations. The more distant any two values, the more antagonist their underlying motivations. Empirically,

congruence translates in positive correlation between variables related to nearby values and negative correlations with variables indicating opposite values. More specifically (Schwartz 2007):

- Values that are adjacent in the structure should have similar associations with other variables;
- Associations of values with other variables should decrease monotonically in both directions around the circle from the most positively to the most negatively associated value.

For example, voting for a party with a left orientation correlates positively mostly with values such as universalism and mostly negatively with security. Then, going from universalism round the circle to the right (benevolence, tradition, conformity, security) correlations are likely to become less positive and more negative. The same can be said going from universalism round the circle to the left. As another example, figure 4 portrays the Pearson correlation coefficient between approving the following statement "Gays should be free to live as they like" and the ten values. Hedonism is the value the most positively associated with tolerance for gays, conformity and tradition the most negatively correlated. Going from hedonism round the circle to the left, we the correlations rapidly vanishing then becoming negative. It is less clear going from the right because other values shows are rather similar correlation than hedonism with tolerance towards the gay way of life.

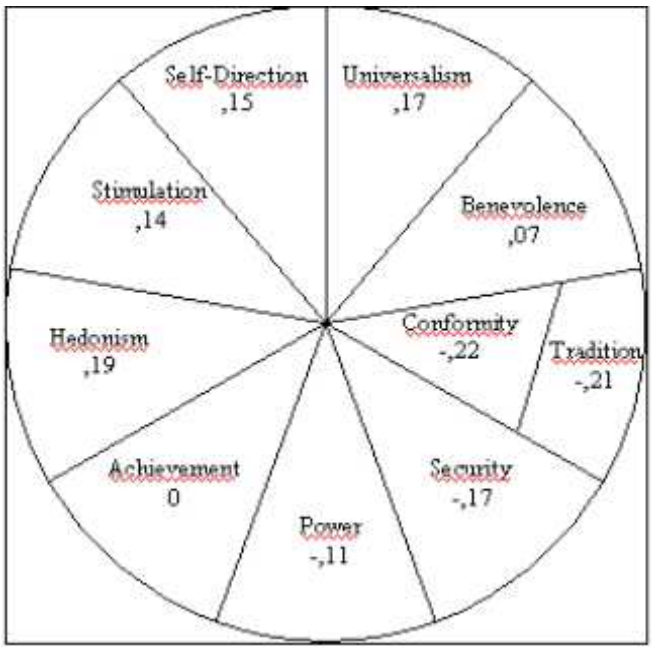

Figure 4. Correlation between value orientation and tolerance towards gay and lesbians. Source: Schwartz (2006).

The circle can be divided in 4 great sections: "Openness to Change" (self-direction and stimulation) opposed to "Conservation" (security, conformity and tradition) and "Self Transcendence" (universalism and benevolence) opposed to "Self-enhancement" (power and achievement). Hedonism shares elements of both openness and self-enhancement. Figure 4 portrays what Schwartz calls the "dynamic" relations of values. It is patent that tolerance with respect to gays living as they like is positively correlated with the general "Openness to change" pattern of values and negatively with the "conservation" pattern. Of course, this is not a scoop but it is reassuring to state that sample surveys corroborate our intuitions.

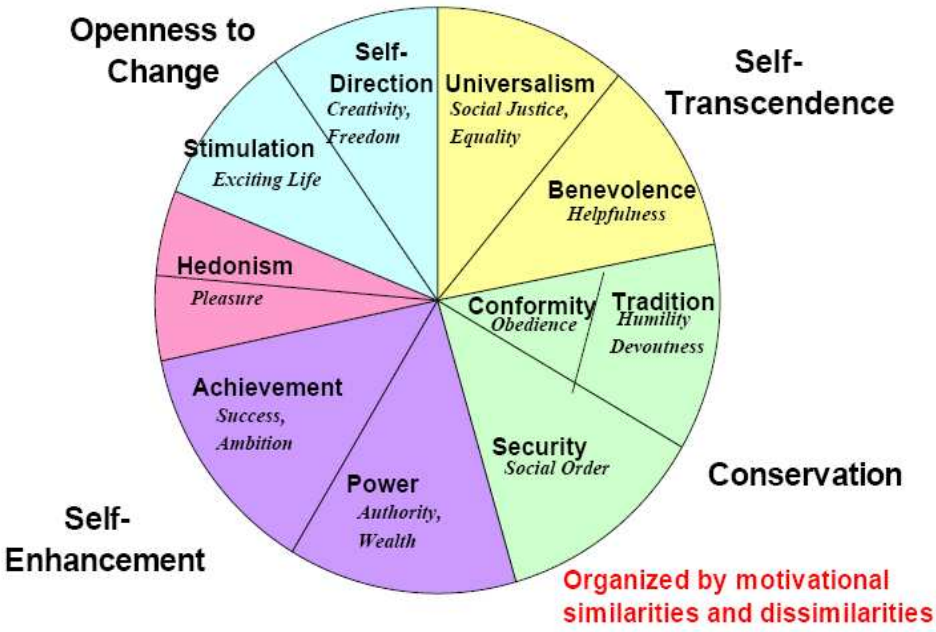

Figure 5. Theoretical model of relations among ten motivational types of values (Schwartz, 2006)

Numerous surveys conducted in Schwartz's values theory have brought the following results:

- People may differ substantially in the importance they attribute to values but the same structure of motivational oppositions and compatibilities apparently organizes their values.
- People's life circumstances provide opportunities (or impose constraints) to pursue some values more easily than others or, otherwise stated, make the pursuit or expression of different values more or less rewarding or costly. Typically, people adapt their values to their life circumstances by upgrading attainable values and downgrading values whose pursuit is too expensive or blocked. However there is an exception for values related to material well-being (power) and security. As Inglehart (1997) showed, people who suffer economic privation and social upheaval attribute more importance to power and security values than those who live in relative comfort and safety.
- Because age, education, gender and other characteristics determine life circumstances, they also determine values.

Wilson (2005) has analysed the relationship between Inglehart's "Materialism vs. Post-materialism" dichotomy and Schwartz's universal values. The main conclusions can be read from figure 6: universalism, benevolence and self-direction are positively correlated with post-materialism, all others are negatively correlated (and therefore, positively with materialism). The highest positive correlation is with universalism, the largest negative one with power. The weakest values are for: benevolence, tradition and stimulation.

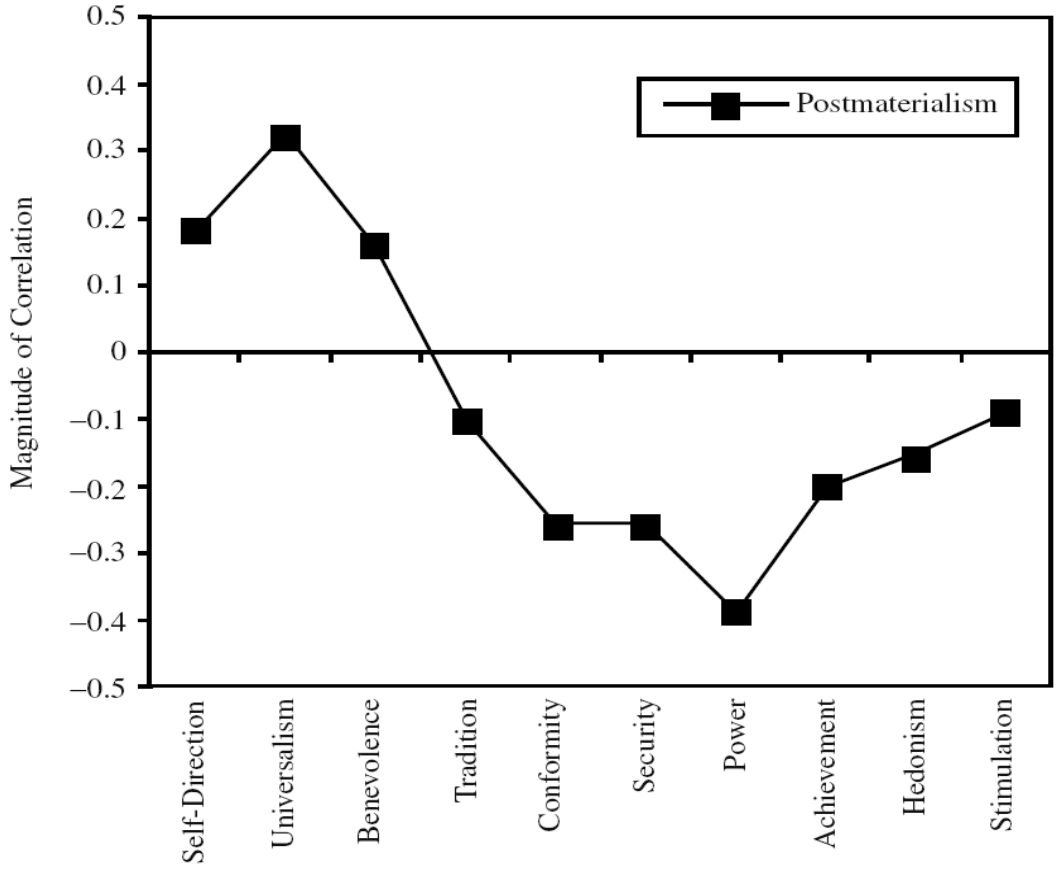

Figure 6. Postmaterialism and universal values. Source: Wilson 2005, p.217.

4 Conclusion: strategies and analytical levels

The three efficiency-ratios strategies and the three analytical levels enable the structuring of sustainable consumption transition policies and visions in the following matrix. It expresses the fact that each strategy will need and/or induce changes at the three levels of social reality, even if with varying intensities and salience.

Table 7. Matrix of strategies and analytical levels.

	Dematerialisation of wellbeing	De-commoditization of satisfiers (modal splits)	Dematerialisation of commodities
Macro-social (general cultural norms and values)			
Meso-social (systems of provision, institutions)			
Micro-social (individual resources, needs and wants)			

For instance, de-materialization of the conceptions of the good life (wellbeing) is mainly a macro-social and micro-social process because it means that important changes will occur in the definitions

of legitimate needs, aspirations and satisfiers with important consequences for the way individuals obtain and allocate their resources (money and time).

De-commoditization of satisfiers will give more importance to currently marginalized modes of provision (state, communal and domestic-based) which both necessitates and foster changes in the criteria with which individuals evaluate goods and services and in the trade-off they are going to make between time and money. On the other hand, as the recent (and ongoing) communist experiences demonstrated, it is counter-effective and anti-democratic to impose institutional arrangements that overlook individual needs for autonomy, competence and diversity.

De-materialisation of commodities is probably the less demanding strategy insofar as it could be restricted to changes at the meso-level (and mainly on the supply side) and at the micro-level (but only by changing consumers' routine behaviours) without directly impacting the macro levels. This is probably the reason why it is the road most easily taken.

What remains to be known is how far each strategy taken alone can lead us on the way to sustainable consumption and development. Many people - mainly from the political and business communities and from some influential international agencies - assume that the de-materialization strategy will do and that it is possible to settle a truly sustainable society without questioning our general cultural systems and the now dominant conceptions of the good life. By unfolding (in imagination) each strategy's internal logic as far as it can goes, a scenario approach can help making more perceptible their foreseeable possibilities but also their limits, contradictions and possible unwanted consequences. It is the more expectable that only mixed strategies will allow us to settle a sustainable society without jeopardizing our most valued social and political achievements.

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Three strategies for sustainable consumption

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Introduction

The environmental objectives of sustainable consumption can be summarised in two concepts: dematerialization and detoxification. Dematerialization means reducing the amount of material required to satisfy social needs or, otherwise stated, by increasing the productiveness of the used materials (Geiser 2001, p.204). Less material used means less natural capital drawn up, less resource depletion, and less material released as waste. Practically, this can be achieved by different means:

- Recycling,
- Reusing,
- Designing products that use fewer materials;
- Substituting non-material services for material intensive services.

Detoxification means reducing the toxic characteristics of materials used in products and processes. Practically this can be achieved by:

- Reducing the volume of toxic materials used in a process or a product;
- Reducing the toxicity of materials used by changing their chemical characteristics;
- Substituting more benign substances for toxic chemicals.

Dematerialization and detoxification are the environmental requirements of intergenerational equity because they preserve the environmental basis of future human activities if not the very existence of humans in the future. They are also fundamental conditions of the preservation of biodiversity.

We have classified the different means by which dematerialization and detoxification of consumption could be achieved in three categories called "strategies": eco-efficiency, de-commoditization (or de-commodification), cultural dematerialisation and sufficiency. It should be stressed that, besides environmental considerations, sustainable consumption is also concerned with social and ethical issues, notably a fair distribution of the social product between the different economic agents or stakeholders, the reduction of illegitimate inequalities, the minimisation of risks, etc. It follows that, when coming to normative considerations, the three strategies should be assessed not only on environmental criteria but also on social and ethical ones.

We will look at them in more detail and illustrate them with examples from the transport and mobility domain.

The eco-efficiency strategy

If the three strategies have the potential of contributing to more efficiency in the use of natural resources in the wellbeing production process, we limit the extension of the eco-efficiency strategy to those actions taken (mainly by the producers) to decrease directly the intensity in materials (including the non-renewable sources of energy) of the production, use and disposal of *commodities*, all other things remaining equal. In fact, the concept of **eco-efficiency** was

coined by the World Business Council for Sustainable Development (WBCSD) in its 1992 publication "Changing Course". The WBCSD objective was (and still is) to produce and consume more goods and services while using fewer resources and creating less waste and pollution.
According to the WBCSD, eco-efficiency is achieved through the delivery of "competitively priced goods and services that satisfy human needs and bring quality of life while progressively reducing environmental impacts of goods and resource intensity throughout the entire life-cycle to a level at least in line with the Earth's estimated carrying capacity."

Eco-efficiency is what mottos such as “Factor 4”(Von Weizsäcker, Lovins and Lovins 1998) which calls for halving the use of resources whilst doubling wealth, or “Factor 10” (a 90% reduction of resources uses) are about. The fact that the eco-efficiency strategy claims to be compatible with capitalism is made clear by the choice of “Natural Capitalism”((Hawken, Lovins and Lovins 1999) as title for the book published one year after “Factor 4” by two of its authors. In “Natural Capitalism” they criticized Factor 4 for focusing too narrowly on eco-efficiency, i.e. “only a small part of a richer and more complex web of ideas and solution” (*x*). They argued that “Without a fundamental rethinking of the structure and the reward system of commerce, narrowly focused eco-efficiency could be a disaster for the environment by overwhelming resource savings with even larger growth in the production of the wrong products, produced by the wrong process, from the wrong materials, in the wrong place, at the wrong scale, and delivered using the wrong business models” (*x-xi*).

“Natural capitalism”, they said, is based on four strategies:

1. Radical resource productivity: as in former eco-efficiency but at a larger scale;
2. Biomimicry: redesigning industrial system by imitating the functioning of natural eco-systems organised as closed-loop systems where materials are constantly reused;
3. Service and flow economy: changing the relationship between producer and consumer and shifting from an economy of goods and purchases to an economy of services and flows.
4. Investing in natural capital.

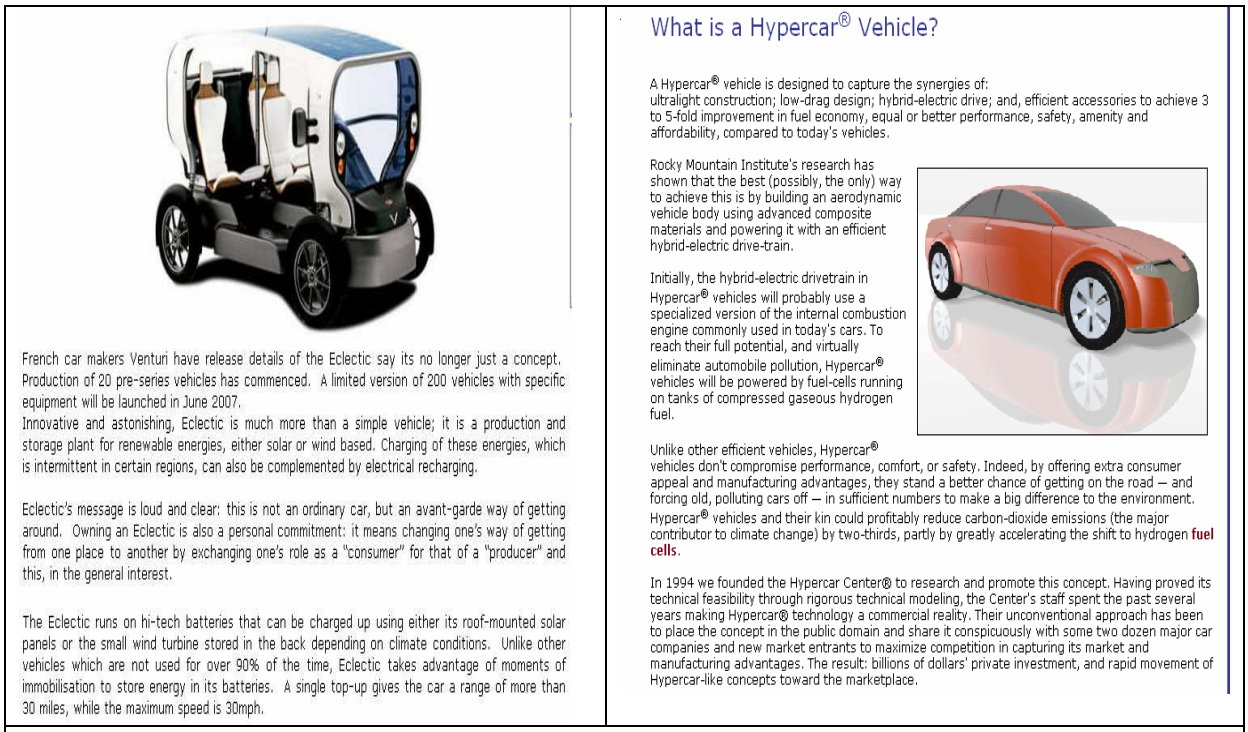
With the introduction of a strategy of “service and flow”, natural capitalism puts on the agenda an important principle which was lacking in Factor 4. In some way, this strategy can be seen as a kind of embryo of a full-fledged “de-commoditization” strategy. However, let us repeat that the proposal doesn’t constitute a departure from capitalism but its reorientation of notably by “making markets work” (title of chapter 13).

The “natural capitalism” concept has been warmly received amongst engineers and firms managers concerned with environment or with their public image. The closed-loop model of the natural eco-systems is central to the “industrial ecology” concept and the idea of biomimicry is nowadays being pushed as far as possible in “green chemistry and engineering” (Doble and Kruthiventi 2007) where former chemical process that needed high temperatures and pressures (and therefore consumed much energy) are progressively replaced with bio-transformation and catalyse occurring at ambient temperature and pressure. Still more spectacular are recent innovations in chemistry based on the imitation of the way living organisms make basic materials such as teeth, hair, skin, shells, bones, tusks, etc.

One recent and popular expression of the eco-efficiency strategy is to be found in the “cradle-to-cradle” movement which claims to go beyond eco-efficiency and…

"leave aside the old model of product-and-waste, and its dour offspring 'efficiency' and embrace the challenge of being not efficient but effective with respect to a rich mix of considerations and desires" (McDonough and Braungart, 2002, p.72).

The fundamental concept of "cradle-to-cradle- is the abolition of the very idea of "waste" by making the case that what was once a waste to dispose off in a way or another, now becomes food for some living system.



French car makers Venturi have release details of the Eclectic say its no longer just a concept. Production of 20 pre-series vehicles has commenced. A limited version of 200 vehicles with specific equipment will be launched in June 2007.
Innovative and astonishing, Eclectic is much more than a simple vehicle; it is a production and storage plant for renewable energies, either solar or wind based. Charging of these energies, which is intermittent in certain regions, can also be complemented by electrical recharging.

Eclectic's message is loud and clear: this is not an ordinary car, but an avant-garde way of getting around. Owning an Eclectic is also a personal commitment: it means changing one's way of getting from one place to another by exchanging one's role as a "consumer" for that of a "producer" and this, in the general interest.

The Eclectic runs on hi-tech batteries that can be charged up using either its roof-mounted solar panels or the small wind turbine stored in the back depending on climate conditions. Unlike other vehicles which are not used for over 90% of the time, Eclectic takes advantage of moments of immobilisation to store energy in its batteries. A single top-up gives the car a range of more than 30 miles, while the maximum speed is 30mph.

Figure 1. Eco-efficiency strategy in transport: the Venturi Eclectic car and the Rocky Mountain Institute's Hypercar. The Rocky Mountain Institute is held by A.B. and L.H. Lovins who co-authored "Factor 4" and "Natural Capitalism". The presentation text of the Hypercar Vehicle is illustrative of the fundamental technology and business orientation of the eco-efficiency strategy.

This shows that the idea of eco-efficiency has evolved since its adoption by the WBCSB. The level of demands has increased steadily going from simple end-of-pipe solutions (if not mere just "greenwashing"), to greening (eco-efficiency, product stewardship) and now beyond greening to "cradle-to-cradle", eco-effectiveness, etc. Of course, it remains to be seen if actual practices have followed tat the same pace…
The important thing is that, whatever their differences, all versions of the eco-efficiency strategy share the following characteristics:

- Confidence in technological innovation;
- Business as the principal actor of transformation. The emphasis is on firms designing new products, shifting to new production processes, investing in R&D, etc. more than on the retailer or the consumer, let alone the citizen.
- Trust in markets (if functioning well);
- "Growthphilia": there is nothing wrong with growth as such. Moreover, with "cradle-to-cradle", growth is *per se* conducive of sustainability.

No special role for the state except for making market function as they should do (removing barriers to market efficiency) and for providing the right incentives through taxes, subsidies, etc.[1]

The de-commoditization (or de-commodification) strategy

De-commoditization of consumption consists in substituting non-commercial goods for commercial ones and non-commercial services for commercial ones. Briefly, in substituting where possible non-commodity satisfiers for commodities, defined as: "goods, services and experiences which have been produced solely in order to be sold on the market to consumers…(and) produced by institutions which are not interested in need or cultural values but in profit and economic values." (Slater, 1997, p. 25).

De-commoditization is the reverse of the "commoditization" process described by Manno (2002:70) as the "tendency to preferentially develop things most suited to functioning as commodities – things with qualities that facilitates buying and selling – as the answer to each and every type of human want and need". It is also slightly equivalent to what Hirsch called the "commercial bias" or "commercialization effect" characterized by the fact that "an excessive proportion of individual activity is channelled through the market so that the commercialized sector of our lives is unduly large."(Hirsch 1977, p.84).

Manno operates a distinction between goods and services with high commodity potential (HCP) and those with low commodity potential (LCP). The commodity potential is a measure of the degree to which a good or service carries the qualities that are associated with and that define a commodity. As an example, Manno considers the need children have for playing. At the most commercial end of the scale, it can be satisfied with mass-marketed toys such as Barbie dolls which are inexpensive, marketed worldwide, whose production and distribution is energy and waste intensive. In the middle of the scale, one finds locally produced, handcrafted toys, dolls and games usually made from renewable materials and with local or culturally idiosyncratic designs. Finally, at the far-end of the commodity-potential scale are activities and games that don't necessitate commercial objects.

Table 1 shows some if the main differences between HCP and LCP goods and services as well as the negative and positive effects of commoditization.

[1] Actually, the role of the state varies according to the version of the eco-efficiency discourse. It can be as minimal as just guaranteeing optimal functioning of markets or a bit more active by engaging in "smart regulation"(Jänicke 2008). It is in the "transition management" approach to ecological modernization, that the government has the most important role but in a context of general "reflexive governance".

Table 1. Differences between HCP and LCP goods and services			
Attributes of goods and services with high commodity potential	*Attributes of goods with low commodity potential*	*Negative effects of commoditization on development*	*Positive effects of commoditization on development*
Alienable, excludable, Patentable Simpler to establish property rights and prices	Openly accessible, inalienable, difficult to establish rights, widely available, difficult to price accurately	Accelerates decline of sense of community Skills and capacity for managing "commons" decline	Release individual and corporate entrepreneurial energy Ability to manage individual property and promote personal gains improve
Standardized, universal, uniform, adaptable to many contexts	Particular, customized, decentralized, diverse, dependent on context	Reduces cultural and geographic diversity Not necessarily suited to particular ecosystems Crowding-out of locally appropriate options	Allows rationalization of production, economies of scale and transfer of skills Greatly increase (human and capital) productivity
Autonomous, depersonalized, Use independent of social relationships, primary relation between consumer and product (product oriented)	Embedded, use or practice occurs in a web of social and ecological relationships (process oriented)	Promotion of individual consumption reduces the efficiency gains made possible by sharing, increases flow of material and energy. Excessive autonomy undermines social relationships	Minimizes the complications of relationships. Advances freedom of individuals
Mobile, transferable, easy to package and transport	Rooted in local ecosystem and community	Propensity for mobility increase flow and export of energy and material	Enhance trading , foster development of markets
Contributes to production efficiency More is produced per unit of currency expended	Contributes to consumption efficiency More satisfaction per unit of material and energy expended	Neglects the potential for achieving sustainability through increased satisfaction with less material	Increased production efficiency create more wealth and greater availability of materials goods and services
High capital intensity, low energy productivity, low labour intensity, high labour productivity	Low capital intensity, high energy productivity, high labour intensity, low labour productivity	Eliminates jobs, encourages replacement of workers with fossil-fuel energy	Increased productivity fees capital to invest in new productivities activities, creating new jobs.
Economically efficient, the most exchange value for a given investment	Sufficient, optimal service for minimal expenditure of material and energy	Reduces capacity to develop low-impact lifestyles	
Contributes to GNP, GNP growth measures commoditization	Contributes little to GNP	Public policy goals become tied to growth in size of economy rather than improvement in quality of life	GNP represents accurate measure of economic activity and is closely related to improved quality of life
Source Manno (1999)			

One would add another crucial difference missing in Manno: HCP goods and services are demand-oriented. If the corresponding needs are missing they are being created through marketing and advertising. The reverse is true of LCD goods and services: they are needs-oriented, even if the demand doesn't exist because of poverty and destitution. In that case, the demand can be created by public allowance or any social program. So, the poor can be excluded from the consumption of HCP goods and services, which is less the case with LCP

ones. The process of commoditization is self-supported. Actually, the market economy acts as a "milieu" exercising selection pressures on satisfiers that are more favourable to commodities than to non-commodities, giving the latter less opportunities to survive. This doesn't mean that one cannot find localized niches for less commoditized ways to satisfy needs but these, by definition, remain marginal.
"Given the selection pressures of commoditization, however, unless public policy deliberately intervenes, HCP goods and services inevitably outcompete LCP goods and services…Commoditization pressures act over time to gradually and inexorably expand the number of commodities available, the geographic spread of their availability, and the range of needs for which commoditized satisfactions exists." (Manno 2002:72-73).

It follows that de-commoditization is more or less synonymous of de-marketisation which can be defined as a partial decoupling of consumption from demand. According to Harvey and al. (2001, p.4) :
"… a useful distinction (is) to be made between demand and consumption, process now too frequently conflated. Demand signifies the concerns of suppliers in markets and thereby focuses upon the possibilities and terms of commodity exchange. Consumption refers to a much broader set of social practices whereby people utilise services and products which are only sometimes acquired by purchase in a market and which are deployed in the context of social values which transcend the confines of instrumental and rational calculation".

Decoupling consumption from demand, limiting the influence of markets amounts to increase the influence of others systems or organisations through which we satisfy our needs and aspirations, that is, others "modes of provision". The relative importance of the different systems of provision in society in general and in the production, distribution and consumption of food in particular depends on the technology available, the environment and the cultural system of the society. As is well-known, modernity as described by Marx, Weber, Durkheim, Tönnies and de Tocqueville is characterised by the supremacy of markets and bureaucracies at the expense of communities and families.

Table 2. A typology of modes of provision. *Source: Harvey and al. (2001)*

Mode of provision	*Manner of obtaining service*	*Who does work*	*Who pays (if anyone)*	*Principle over which service is obtained*
Market	Commercial purchase	Paid employees	Consumer	Market exchange
State	Claim to entitlement	Paid employees	State (tax payer)	Citizenship right
Communal (cooperatives LET)	Personal interconnections	Neighbours or acquaintances	No money involved	Reciprocal obligations
Domestic	Household Do-it-yourself	Members if household	No money involved	Family obligation

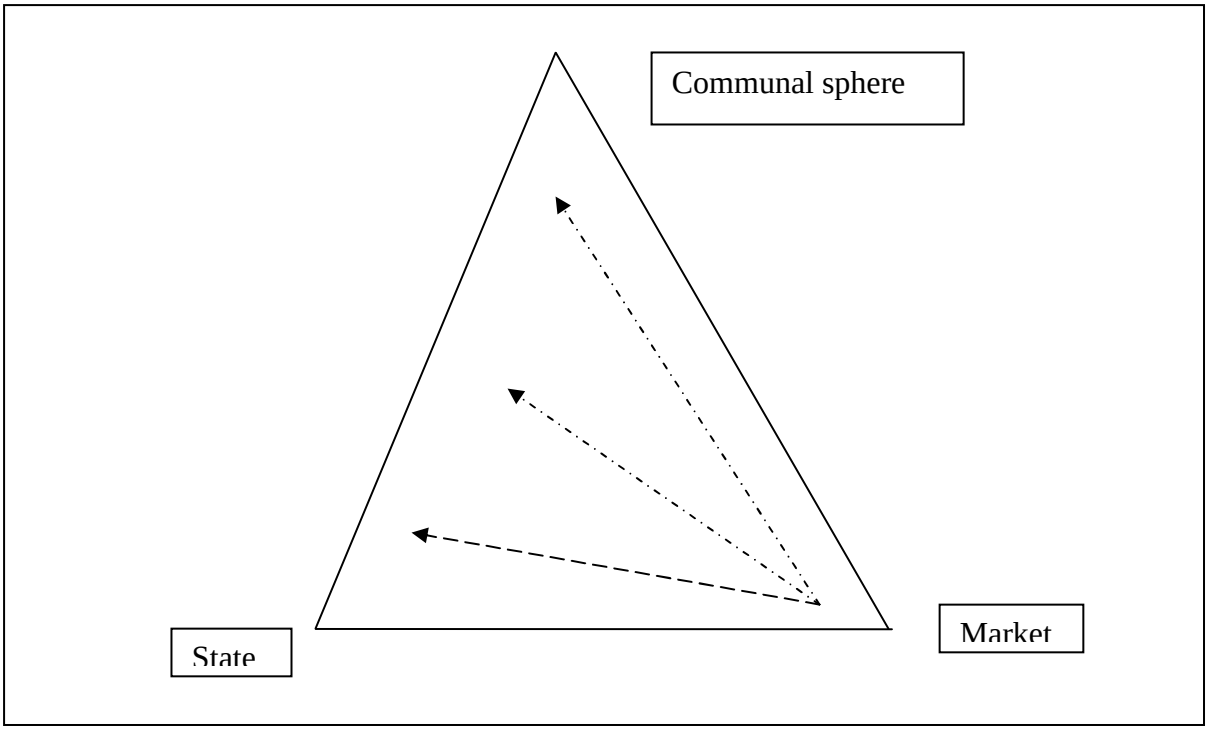


Figure 2. The modes of provision triangle

For the advocates of de-commoditization, sustainable consumption would correspond to a shift in the "modal split", the extant distribution of the different modes of provision through population. If we group together the domestic and the communal modes of provision under the general heading of "communal sphere", we may illustrate the de-marketisation (or de-commoditization) strategy with the help of an equilateral triangle as in figure 2.

Let us call "consumption pattern", the proportion of energy and materials services consumed by households (shares of households' time-and-money budgets) respectively in the form of commercial commodities, of public services and goods and of communal goods and services. Every consumption pattern could be symbolized by a point in an equilateral triangle, the distances between each point and the three sides of the triangle expressing the proportions of consumption occurring under the market, the state and the communal mode of provision[2].
Points situated at the angles are pure state, market or communal consumption patterns, all other involve, though in very different proportions market, state and a community components. One calls "modal split" the most frequent consumption pattern in a given society (Gershuny 1983). In consumer societies, the great majority of consumption (hence the modal split) concentrates in the right bottom area.

Indeed, the consumer society resulted from an historical trend (maybe still ongoing) of commoditization, i.e. of transferring the provision of services or goods from non-market systems of provisions to the commercial one. But, as Warde put it:

"The history of consumption might be written as a process whereby activities shift between spheres – from the household to the market, and sometimes back again, from the market to the state, and sometimes back again." (Warde, 1997, p154).

[2] The idea of using equilateral triangle for this kind of display comes from Kolm (1984).

De-commoditization consists in bringing some activities back to the non-market sphere, the public and communal sectors. Needless to say, this will not be an easy strategy to follow in an age of almost religious faith in the virtues of the market and of distrust in those of the state and perhaps still more, of the community. Indeed, much of the business of the European commission has consisting in taking goods and services away from the public sector and committing them to the market. However, things could have gone otherwise: from the public sector to the communal ones. For instance, "rather than providing completed final services, the state might – as for example in the care of the very young and very old people – provide the material equipment and infrastructure, building and furniture, books and toys, and medical equipment, together with 'intermediate services' in the form of professional advice, which would then be used by community groups to provide the final services themselves, using their own direct, unpaid labour." (Gershuny 1983, p.41).

Examples of (totally or partly) de-commoditized modes of provision

1. Product Service Systems: a first step towards de-commoditization ?

As explained above, the idea of substituting flows of services for stocks of goods can be considered a first step towards a de-commoditization of the production and consumption patterns. The "Product Service Systems" (PSS) program supported by the UNEP (2002) aims at fostering a shift from individual product ownership to a management arrangement of utility provision with a mix of products and services. The PSS "encourage collective activities by advocating systems of leasing, sharing and/or pooling of resources as well as alternative institutional structures that enable these kinds of arrangements. They recommend more intensive use of products and tools for consumption as well as more producer-consumer interaction."(Briceno and Stagl 2006, p.1543). PSS initiatives can be business-led or consumer-led. Not surprisingly, the latter appear to be more concerned with sustainable consumption than the former... Figure 4 refers to a particular commercial PSS in the transport sector.

So far, it doesn't seem that the PSS have been really satisfactory from the environmental point of view. Furthermore, they have also proved unsatisfactory from the human and social perspective though they are supposed to take into account the social context of consumption (UNEP 2002).

2. Local Exchange and Trade Systems: what potential ?

"Local Exchange Trading Systems (LETS) also known as LETSystem**s** are local, non-profit exchange networks in which goods and services can be traded without the need for printed currency. LETS networks use interest-free local credit so direct swaps do not need to be made. For instance, a member may earn credit by doing childcare for one person and spend it later on carpentry with another person in the same network. In LETS, unlike other local currencies no scrip is issued, but rather transactions are recorded in a central location open to all members. As credit is issued by the network members, for the benefit of the members themselves, LETS are considered mutual credit systems." (Wikipedia).

AutoShare: car sharing service

Company background
AutoShare, headquartered in Toronto, Canada, is a private corporation run by two primary shareholders. AutoShare's staff totals four people, and the organisation began operation at the end of 1998. AutoShare has a fleet of 19 cars and a membership of approximately 260 people. It is still very much in a 'growth' phase and as such, approximately half of the staff is focused on marketing and the other half on operations.

Description of Product-Service System
AutoShare, like many other car sharing systems, is a service providing an enabling platform. Cars are stationed near member's homes and accessible 24 hours a day via a telephone reservation system. Members can use the car for as little as one hour, or as long as they like. To obtain these benefits, members pay a small subscription fee to AutoShare to contribute to the fixed costs of the company, and are then charged only for the hours that they use the car. Essentially a member pays for the mobility they use (rather than needing to outlay a large amount of money for something that will spend most of its time immobile).
All AutoShare cars are stationed at, or very near, a transit stop of the public transport system of Toronto, which consists of subway trains, streetcars and buses. This also helps accommodate customers combining public transit and car trips. AutoShare currently has a partnership with a local car rental agency where it obtains nearly new cars from the agency for short-term leases, and in return, sends the agency the longer-term rental business which Autoshare cannot accommodate. Car sharing is targeted at people who will use it for major shopping expeditions, weekend trips to second homes or visits to friends / family who live at a distance.

Product-Service System development
Initially the motive for starting this service was as a means to alleviate the parking congestion in Toronto's 'downtown'. After researching the Quebec City car share (and other successful European car sharing initiatives), it became apparent that large scale car sharing could also have a positive impact on traffic congestion and air quality in the city, and at the same time add a new component to the currently available transport options. The business is now attempting to establish a Canada-wide car sharing association with cross use agreements. For example, allowing a member to fly from Toronto to Montreal and use a car from another car-sharing business. AutoShare is also involved in a joint promotion scheme with the Transport Authority in Toronto, where people who buy annual metro-passes from the Transport Authority are given a substantial discount option on their subscription to AutoShare.

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Figure 4. The De-commoditization Strategy in Transport: An example of commercial Product Services System. Source : UNEP 2002.

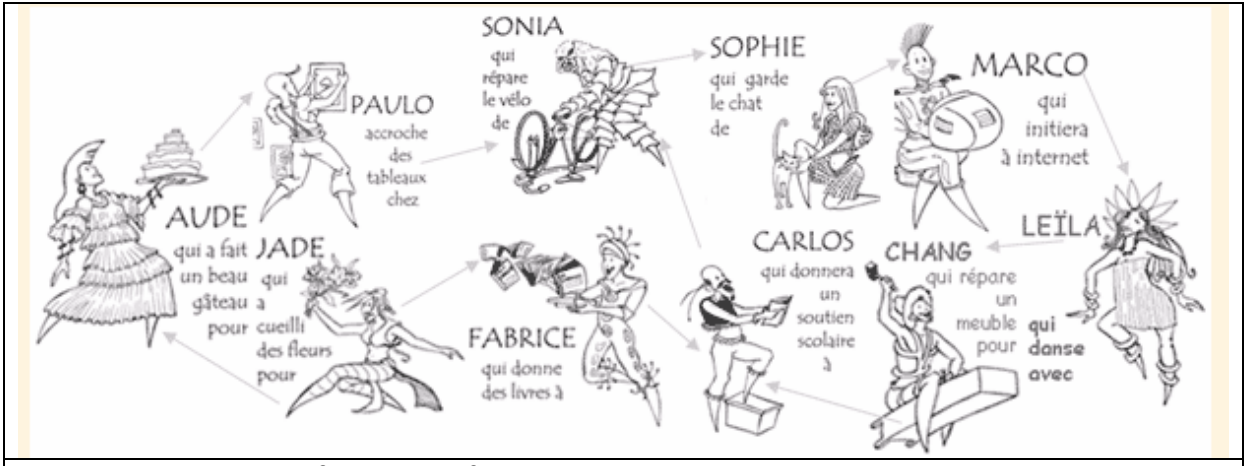


Figure 5. Illustration of the LETS functioning.

The potential of LETS (Local Exchange and Trade Systems) as systems of provision has been assessed by Briceno and Stagl (2006) through a survey of the (unfortunately very limited) empirical literature on these systems. This potential for sustainable consumption can be inferred from facts such as the following:

- For 62% of members of a surveyed LETS, more than 20% of the transactions are innovative ideas, offering new concepts and services. Examples include artwork, health services, repair work, Internet services, house-chore help, etc.

- Seyfang's (2001) survey on the Kwin LETS gave the following information: 91% of participants agreed with the fact that development should involve less consumption but greater quality of life. 77% felt that LETS was a greener economy than the mainstream economy. 40% felt their quality of life had increased with LETS and 31% felt more able to live a greener lifestyle. 23% claimed to have been more environmentally aware of their localities through LETS. 45% of the members bought recycled or second-hand equipment from within the scheme, 25% directly reduced consumption and 37% of traders got property repairs.
- From another LETS, Seyfang (2001) reports that maintenance and repair work was the third largest good or service bought, consumed by 31% of the members.
- In general (Williams 1996), there are many programmes of tools and big-equipment leasing, laundry-machine sharing, car and transport servicing and collective workshops.

To conclude, LETS encourage the localisation of the economy, decreases transportation pollution and costs and change consumption patterns. They foster sharing, pooling, reusing, recycling and repairing. Moreover "they promote and develop new skills and self reliance and are thus effective in meeting many needs of humanistic and social nature that have been neglected in the mainstream economy." (Briceno and Stagl 2006).

"VAP : Voitures A Partager - Vriendelijk Anders Pendelen

VAP offers a car-sharing system based on hitch-hiking for short trips within or around a commune, or to a railway, a metro station, or a bus-stop.

- **VAP** car-sharing is ***safe:*** all participants have to register as members of the association. Furthermore, compulsory (RC) car insurance covers all passengers, including therefore the car-sharers.
- **VAP** car-sharing is a ***sustainable solution,*** both to help reducing the number of cars in town and to make better use of those on the move. It simply requires us to ***change our habits***: opening the door of our car to a pedestrian or getting into the car of an unknown driver, even if they are **VAP** members, may seem unusual at first.
- **VAP** car-sharing is particularly suitable for once-off trips to various destinations. No former arrangements by mail or phone are needed.
- **VAP** car-sharing is an ***ideal complement to public transport*** : many users live too far away from a railway or metro station to get there readily.
  VAP car-sharing provides them with a new, easier mode of access without overcrowding the public parking space.

Friendliness among neighbours is an important part of the initiative. And the more **VAP** members there are in an area, the easier car-sharing will become for everyone!

Figure 6. The de-commoditization strategy: of mobility. Examples of "communal" modes of provision.

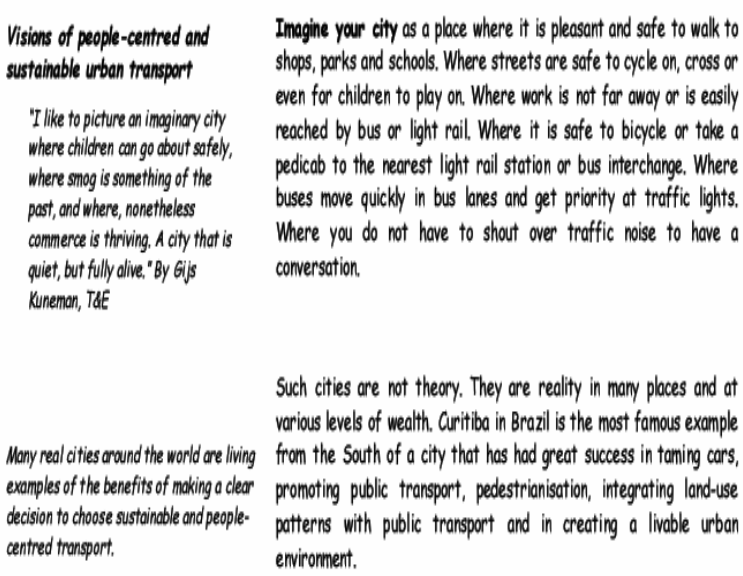
3. Public Services

Not so long time ago, an important proportion of households' consumption was provided by public services, or by state-owned or partly state-owned firms. It was the case for electricity, water, telephone, broadcasting, television, etc. Before the reign of the individual car, most if not all, travelling by train, bus, ship and airplane was provided by public enterprises.

Generally, the public services used to be organised and managed at the highest institutional level. But local authorities an also be providers of goods and services to their populations. For instance, it is often the case in cities big enough to need and afford an urban transportation system.

Many public services in Western societies have been dismantled under the pretext that they were less efficient than private, commercial services. However, there is nothing definitive in this and sustainable development might make necessary to reverse the trend, notably because it entails a redefinition of efficiency which take into account environmental concerns.
On the other hand, many goods and services which cannot be efficiently provided or managed at the state government level could be so at a lower institutional level. Notably the risk of bureaucratisation and of corporatism is more easily controlled when working at the local level. Indeed, there is a tendency to revisit the notion of public service in the perspective of a "new municipalism":

"*A new municipalism is emerging, and characterised by attempts to expand municipal sovereignty, democratise municipal governance, and strengthen the role of municipalities …(Bookchin and Biehl, 1997). Municipalities across the country are increasingly taking responsibility for public concerns abandoned by the federal and state governments, and passing local minimum wage laws, employment and housing regulations, bans of the use of pesticides and genetically modified organisms, and establishing public cable, wireless internet, and energy services."(Manski and Peck,p.166)*



"We Americans can choose between about 200 automobile brands. We can buy or rent any kind of car we want. We have infinite consumer choice. But the one choice you don't have in Los Angeles is the choice for efficient, cheap, accessible, public transportation. That choice is the result of citizens working together and making public choices. Much of what appears to be choice in America is trivial, small private choice. We're always making choices off a menu we don't get to write. Public liberty, public choice, writes the menu. This is why we This is why we have to retrieve our power as citizens, and once again begin to make public choices about public interests." (B.Barber)

Figure 7. The de-commoditization strategy in transport. To have or not to have people-centred public transport: Curitiba (Brasil) vs. Los Angeles (USA)

De-commoditization is giving more importance to the public (especially, perhaps, local authorities) and the communal sectors (families, neighbourhoods, communities) in providing for more needs and wants satisfaction, and, moreover, definition. But de-commodizitation is not a yes-or-no process. It refers to a whole range of transformations, from the less to the most radical. For instance, the re-settlements of small retailers in the city centres at the expense of big supermarkets at the periphery can already be seen as a weak de-commodization measure.

The sufficiency and cultural de-materialisation strategy

The sufficiency strategy consists in:

a) Getting the maximum well-being from each unit of material service consumed (sufficiency).
b) Minimising the role of material services in the production of our wellbeing. (cultural-dematerialization)

The extant high level of consumption in western societies (and more and more in non-western societies as well) could not stand without a socio-cultural conception of well-being and happiness that foster the pursuit of "materialistic" values ('indulgence', 'pleasure", 'comfort') more than non-materialist values of self-control, spirituality, simplicity, etc. It follows that "…interventions aimed at reducing consumption will be most effective if they bring about higher-level changes in the socio-economic-cognitive system – i.e. by changing cultural values or worldviews." (Brown and Cameron, 2000, p.34).

The kind of value system (and of cultural change) corresponding to the adoption of a sufficiency discourse might be analysed with Sorokin's typology of "mentalities". In the 4 volumes of its *magnum opus* "Social and Cultural Dynamics" published in 1937-41, the American (formerly Russian) sociologist described and analysed the manifestation through history and across countries of three fundamental "mentalities", i.e. paradigmatic conceptions of:"

a) the nature of reality;
b) the nature of human needs and ends to be satisfied;
c) the extent to which these needs and ends are to be satisfied;
d) the methods of satisfaction". (1957, p.25).

More precisely, he assumed that:

> 1) Reality can be apprehended as nothing more than what the organs of the senses can perceive or, on the contrary, as something behind (or beyond) the perceived world. In the latter case, what the senses perceive is only a misleading appearance (if not pure illusion) hiding the true reality which is immaterial and transcendent.
> 2) Needs may be viewed as purely (or mainly) sensual or mainly as spiritual "like salvation, of one's soul, the performance of sacred duty, service to God, categoric moral obligations and other spiritual demands which exist for their own sake, regardless of any social approval or disapproval" (p.26). But Sorokin considered also the possibility of a mixed conception "like the striving for superiority in scientific, artistic, moral, social and other creative achievements, partly for their own sake and partly for the sake of human fame, glory, popularity, money, physical security and comfort, and other 'earthly values' of an empirical character" (p.26).
> 3) Concerning the extent to which needs are to be satisfied, different levels are possible from the most luxurious to the barest minimum.

4) Sorokin distinguished three strategies for satisfying needs: two "pure" strategies and one mixed. The first consists in modifying the milieu in order to yield the means of satisfying needs. The second consists in modifying oneself: "one's body and mind, and their parts – organs, wishes, convictions, or the whole personality- in such a way as to become virtually free from a given need, or to sublimate it through 'readjustment of self'". The mixed strategy consists in acting both on the self and on the environment.

On this basis he distinguished two "pure" mentalities: the "sensate" and the "ideational" one and a mixed type he called "idealistic".

Table 3 ***Sorokin's theory of mentalities***

The ideational, sensate and idealistic mentalities according to Sorokine					
	Ascetic ideational	Active Ideational	Active Sensate	Passive Sensate	Idealistic
Reality	Ultimate reality, eternal transcendental	Both with emphasis on eternal non-material	Sensate, empirical, material	Sensate, narrow and shallow	Both equally represented
Main needs	Spiritual	Both with predominance of spiritual	Manifold and richly sensate	Narrow sensate	Both equally represented
Extent of satisfaction	Maximum	Great but moderate	Maximum	Maximum for narrow sensate needs	Great but balanced
Method of satisfaction	Mainly self-modification	Both with prevalence of self-modification	Mainly modification of environment	Utilisation (exploitation) of environment	Both ways

These different mentalities manifest themselves in all cultural productions of society: art, science and philosophy, law and justice, and personality. If Sorokin is right in his typology, the mentality of un-sustainable growth corresponds clearly to the passive sensate "mentality" and the sufficiency and cultural de-materialization strategy would consist in shifting to an active, if not, ascetic ideational one, perhaps after a transition phase of idealistic culture.

Benjamin Barber have coined the term "kidults" for characterizing the kind of personality this "passive sensate" mentality created or at least maintained by marketing:

"*In a never-ending effort to make consumption the centerpiece of every American's existence, marketers have succeeded in infantilizing adults ("kidults," Barber calls us). We're increasingly governed by impulse. No wonder consumer debt and personal bankruptcy have never been higher. Feeling dominates thinking, me dominates us, now dominates later, egoism dominates altruism, entitlement dominates responsibility, individualism dominates community, and private dominates public. Imagine having the ship of state guided by leaders elected by a nation of 12-year-olds. That, according to Barber, is what we've got.* (Barry Schwartz in "The Washington Post". 8 April 2007).

Having analysed with all the resources of experimental and quasi-experimental psychology, the "high price of materialism", T. Kasser, professor of psychology at Knox University gives the following advice:

"*Change your activities. …We have free will, and we can decide we no longer want to watch six hours of a television a day. We can remove activities from our lives that are low flow or that reinforce materialistic values and decrease self-esteem. Put the television in the closet. Cancel your subscription to glamour and gossip magazines. Stop wandering in the mall or shopping on the Internet. Try to take these activities out of your life for a month and observe what happens. Chances are that at first you may not know what to do with yourself and you might feel increasingly anxious and empty. The temptation will be to return to the old habits… Rather than giving in, realize that now is the perfect time to form new habits. Go for a walk. Read a book. Do volunteer work. Meditate. Play with your children. Talk with your spouse. Go dancing. Shoot baskets. Work in a garden. Cook. Paint a picture. Play a musical instrument. Go fishing… By engaging in new, intrinsically oriented behaviours, two important things are likely to happen. First, you will have more experiences that satisfy your needs. Thus your happiness and well-being should rise. Second, by having such experiences, you will probably see the value of intrinsic pursuits. As such, the healthier part of your value system will be strengthened, and the importance of materialism should begin to vane.*" (Kasser 2002, pp.103-104).

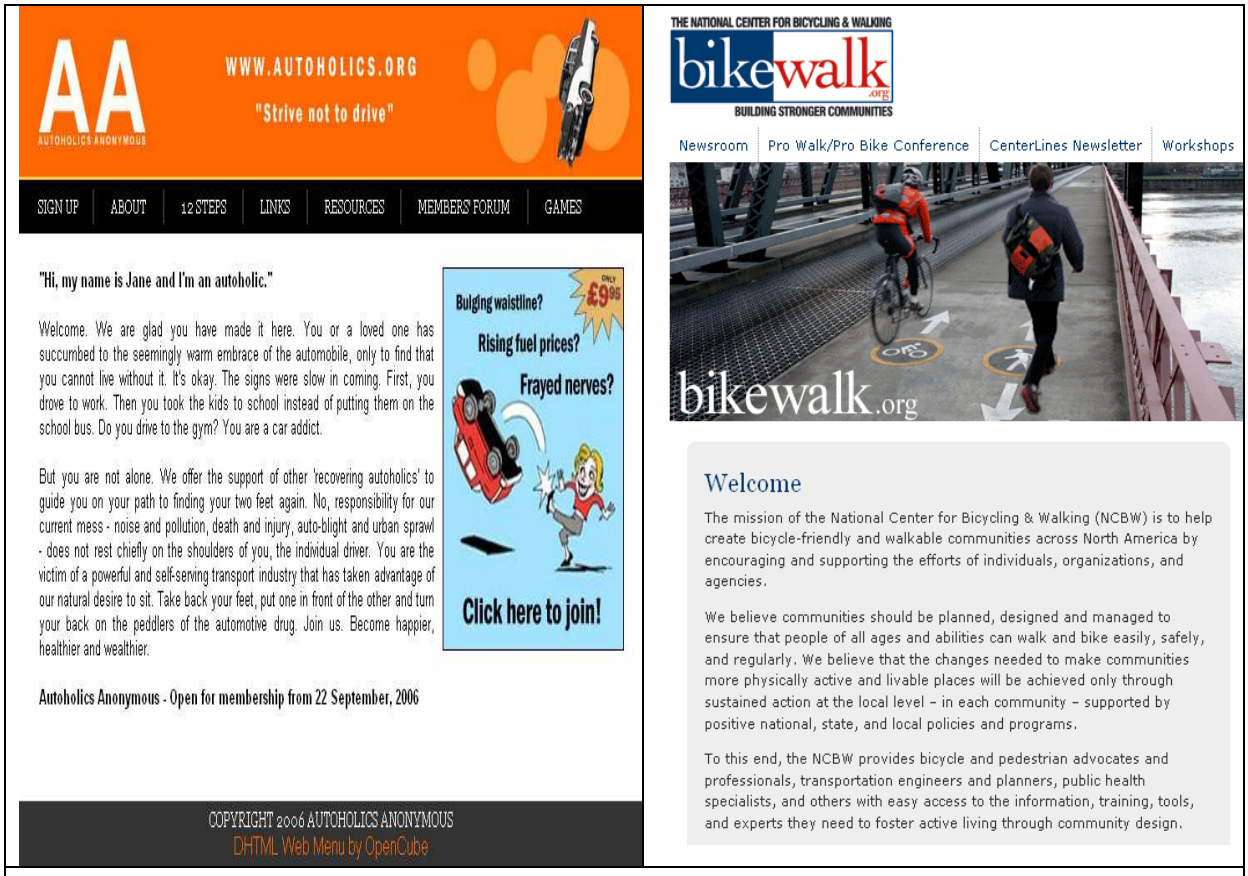


Figure 8. The sufficiency strategy for transport: Re-empowering oneself.

Currently, in current western societies, only a small minority is really endorsing the sufficiency principle. It is advocated mainly by very small (even if burgeoning) groups of activists in name of "de-growth" or of voluntary simplicity and also by a handful of scientists be they psychologists (e.g. Kasser), sociologists (A.Etzioni, amongst others), economists (e.g. F. Hirsch, T. Scitovski, R. Frank, R.E. Lane, R. Layard) or philosophers (K. Soper), etc.

But, very recently, it has become an official national strategy in at least one country in the world: Thailand. This country officially fosters what is called a "sufficiency economy philosophy". Its main principles are summarized in the following box.

"Sufficiency Economy" is a philosophy that stresses ***the middle path*** *as an overriding principle for appropriate conduct by the populace at all levels. This applies to conduct starting from the level of the families, communities, as well as the level of nation in development and administration so as to modernize in line with the forces of globalization.*
*"****Sufficiency****" means moderation, reasonableness, and the need of self-immunity mechanism for sufficient protection from impact arising from internal and external changes. To achieve this, an application of knowledge with due consideration and prudence is essential. In particular, great care is needed in the utilization of theories and methodologies for planning and implementation in every step. At the same time, it is essential to strengthen the moral fibre of the nation, so that everyone, particularly public officials, academia, businessmen at all levels, adhere first and foremost to the principle of honesty and integrity. In addition, a way of life based on patience, perseverance, diligence, wisdom and prudence is indispensable to create balance and be able to cope appropriately with critical challenges arising from extensive and rapid socioeconomic, environmental, and cultural changes in the world."*
Source:UNDP Thailand Human Development Report 2007.

Even without going that far, public authorities, and especially local ones, can make a lot in helping households to adopt the sufficiency strategy, for example to quit driving and go walking or bicycling. Urban and transport planning, in particular, is a very powerful instrument for changing consumptions patterns in housing, transportation, recreation, culture, etc.

Figure 9. Cultural de-materialization strategy in transport: How local authorities can help.

Conclusions

Effective transitions to sustainable consumption will probably be mixed strategies acting on the three ratios identified here above, the mix being different according to the consumption sector or domain (food, mobility, housing, leisure…) and the kind of society. This means that innovations cannot be restricted to technology and, more importantly, that it is certainly illusory and probably counter-productive to rely too much on market forces and technological innovation as some naïve interpretations of the ecological modernization, "market transformation" and "transition management" approaches do. Actually, there is growing scepticism about the capability of the ecological modernization approach to make sustainable development happen. Many scholars are convinced that the transition to sustainable patterns of consumption will need much wider and deeper transformations than what the advocates of ecological modernization are ready to consider. Jackson (2005:1) for example maintains that sustainable development needs lifestyles changes that are not reducible to improvements in resource efficiency: "There is an emerging realization that efficiency improvements cannot, by themselves, achieve the kind of 'deep' environmental targets demanded (for example) by the Government's climate change programme. Attention must also be focussed on the scale and pattern of consumption. This task, in its turn, involves policy-makers in the need to understand and to influence consumer attitudes, behaviours and lifestyles".
Or, as Lintott (2007, p.42) puts it "...it is not enough to improve the efficiency of production in order to achieve more consumption for less ecological damage; it is necessary to improve efficiency of consumption so as to achieve more welfare for less consumption. And it is necessary to end consumerism, and not merely to reduce the ecological impact associated with a particular level or pattern of consumption".

Likewise, the "transition management" discourse is seen as relying to heavily on technological innovations and market forces for driving modern capitalist societies on a more sustainable development path. In other words, it remains prisoner of the (primitive version of the) ecological modernization approach that many such as Jalas (2006) or York and Rosa (2003) hold fundamentally technocratic and conservative, and that according to Smith and Kern (2007) transition management has failed to "reinvigorate and radicalise". However, things are perhaps changing on the ecological modernization as well as on the transition management battlefront. E. Shove, for instance, is fully aware that: "Environmental policies that do not challenge the status quo – in terms of division of labour, resources and time, or social and cultural representations of the good life – have the perverse effect of legitimising ultimately unsustainable consumption patterns of consumption." (Shove, 2004, p.116). However, she fundamentally sticks to the transition management discourses but "reinvigorate[s] and radicalise[s]" it by introducing concerns for normative dimensions of social practices such as comfort, cleanliness and convenience. Also, Spaargaren's contribution to the ISA-RC-24 Conference "Sustainable Consumption and Society held in Madison in 2006 testifies that leading proponents of the theory are aware of some limitations of their model and are eager to widen it in the direction of the consumer, lifestyles and practices even if he doesn't challenge the fact that the market mode of provision is "the crucial and dominant axis of provision in modern societies" and assumes that no other kind of "consumption junction" is to be seriously considered. This being said, one should not be blind to the fact that they are also recent re-statements of the ecological modernizations approach that reaffirm its technological, market-driven bias (see Jänicke 2007 for an example).

Anyway, there as some indications that a kind of overlapping consensus is slowly emerging on the belief that innovations and changes will have to take place at three different levels:

- at the technological level where products and services with a lighter ecological footprint must take the place of less eco-efficient ones;
- at the institutional level where non-market based modes of provision could be promoted alongside marked-based ones;
- At the cultural level where less materialistic values and lifestyles should be developed and fostered without loss in welfare for people.

However, as already indicated, the three strategies will not have the same relevance, or salience for all and every kind of consumption. Their relative "sustainability potential" will not be the same according to whether we are dealing with food, transport, communication technologies, toys or whatever. On the other hand, the three discourses are still rather abstract and devoid of clear and detailed empirical interpretation. In order to help steering transitions policies they must be copiously fleshed out with facts, plausible hypotheses, uncertainties appraisals, economical evaluations, and so for. In so doing, it will quickly become obvious that they might leave room for quite different practical interpretations. For example, in the food consumption domain, the eco-efficiency strategy still leaves open many different – if not radically opposite – options. It is theoretically possible that GMO or cloning or any other very "hard science" techniques could be in the long run more eco-efficient than organic farming or "permaculture" when it comes to feed nine billions people or more…

The next step for Consentsus project will be to work out scenarios of alternative food consumption futures based on each of the identified discourse or strategy. So doing we expect uncovering their full potential for sustainable development as well as their internal and external limits and tensions or contradictions. Afterwards, it should be possible to build more realistic scenarios by mixing elements of the three strategies on the basis of the appraisals of the strengths and weaknesses of each strategy taken separately. More precisely, structural elements of the three images will be combined into one or several coherent narratives. The process will be expert driven combining explorative and normative elements. This approach will hopefully allow us to make valuable conclusions about how 'sustainable' these strategies actually are (or how their logic can be applied in sustainability research.)

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Working paper for the CONSENTSUS project

The Field of Scenarios: fuzziness as a chance for building appealing future visions

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1. Introduction: futures studies in plural

1.1. Brief historical overview

Although thinking about the future is probably as old as mankind, systematic approaches to studying the future with the aim of informing debate and decision-making are essentially a post WWII phenomenon. The first scenarios are developed in the 1950's, by the US military administration, notably in the RAND Corporation around Herman Kahn. After the WWII and at the beginning of the Cold War, the context of uncertainty leads to a focus on strategic innovations such as, amongst others, new types of weapons. While the initial focus was on technological developments with potential implications for national security, futures studies also start to look at society or some constituent sector from the 1960's on. A famous example is The Year 2000 by Kahn and Wiener (1967). Rapidly, the scenario techniques enter the business world. The first documented experience is lead by the Royal Dutch Shell Company, with among others Pierre Wack. With the improvement of the computer performance and the arising of environmental concerns, global systemic models are elaborated, as the famous World3 which lead to the publication of *The limits to Growth* by *the Club of Rome* in 1972. This work applies a global perspective to development: population growth, production, consumption, resource use and environmental impacts are modelled as a dynamic system with feedback links. The report was criticised as alarmism but had an important role for the emerging environmental movement. After a relative gap in the utilisation of futures studies techniques (notably due to the fact that the

prediction of World 3 turned wrong)[1], the oil shocks and the economic crisis, scenarios made their way back as a tool for strategy building in business organisations and as a tool for R&D (technological forecast) (Bradfield et al., 2005). In France, the school of *La Prospective* was developed by Berger, Godet and others because of the alledged shortcomings of traditional forecasting (predictions based on quantitative modelling). This prospective approach can be described as holistic, mainly qualitative and taking structural change into account; there is also a strong emphasis on human volition. Another interesting 'tradition' is a strand of futures thinking that emphasizes the role of 'images of the future' for the intentions and actions of man. Pioneering work by Polak (1973) inspired several others (e.g. Boulding(1988) and Ziegler (1991)) particularly based on the presumed potential of optimistic and utopian images ('visions') of the future to inspire dedicated action. Today, there is a rich variety of futures study approaches, reflecting different aims and interests and the characteristics of different fields of application. Among others, two types of exercises brought the scenario technique at the forefront in recent years. On the one hand, we can observe the production of global scenarios, whether issue-based, mainly explorative scenarios around climate change, water, etc. (IPCC, EEA, etc.) or integrated normative visions of the future (Great Transitions), and on the other hand more local scaled scenarios focusing on the potential of development of a specific region or city, or on specific sectoral issues.

1.2. Three modes of thinking about the future

Situating the field of futures studies in the research field is not easy. In terms of practitioners as well as in terms of actual scenario approaches, one is confronted with a wide variety which Marien (2002) has characterized as "a very fuzzy multi-field" of "disconnected bits-and-pieces" which is "changing in character, along with technology, politics and culture". A great variety of terms is used in the field of futures studies: anticipating, projecting, planning, imagining, … Marien states that most futurists should describe their activity as exploring probable, possible and preferable futures and/or identifying past trends. There is conflict between the categories, however: scenario-spinners often shun attempts to forecast probable futures, those who look at probable and possible futures are often at odds with those who focus on preferred or normative futures, and those who look at trends often dissociate with other futurists. Also, the study of the future is conducted at a wide range of instances in society such as universities, special research institutes and as part of the work of authorities and companies.

According to numerous authors (Amara, 1981; Dreborg, 2004; Börjeson et al., 2006), studies of the future basically range into three categories: those that explore respectively (i) probable futures, (ii) possible future and (iii) preferable future. These three different 'future approaches' respond to three questions someone may ask about the future: 'What will happen?', 'What can happen?' and 'How can a specific target be reached?' (Börjeson et al., 2006). In response, three corresponding classical or

[1] This distrust is largely explained by a wrong interpretation of the utility of such information. World3 and Limits to Growth provided trends forecasting data, i.e. where we were heading if no profound change should occur. When we look back to this period, the main force of this report has been to initiate the debate around demography and resources use and ecological equilibrium.

even archetypal ‘modes of thinking’ have developed: the predictive, the explorative (or eventualities), and the normative (or visionary) mode of thinking (Dreborg, 2004).

The predictive mode of thinking attempts to get an indication of what will happen by trying to find the most likely development in the future, in order to be better prepared.

The explorative (or eventualities) mode of thinking is characterised by the openness to several possible events and different developments. The -strategic- purpose is to be better prepared to handle emerging situations with the idea that it is impossible to predict what will actually happen.

The normative mode (or visionary) mode of thinking means to envisage how society or some sector or activity could be designed in a better way than its present mode of functioning. This mode of thinking suggests solutions to fundamental societal problems by taking normative goals into account and exploring the paths leading to these goals.

The three modes of futures thinking identified are regarded as fundamental by several authors and this view is also maintained here; we believe these categories reflect three basically different modes of thinking about the future. They will not only serve as a basis to distinguish between different types of scenarios (see Why?-typology); to each of these modes, scenario methodologies will be related which are thus regarded as an elaborate way of utilising these modes of thinking (see How?-typology). Also, content-related items will be discussed along this line.

1.3. Scenarios

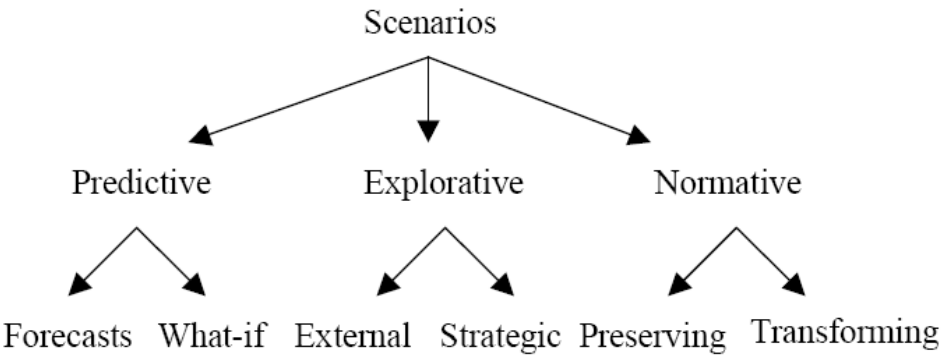
Within the field of futures studies a lot of concepts appear which are quite contested: planning, foresight, vision, image of the future… One of the most basic, but also contested concepts in this field is ‘scenario’. Early scenario developers such as Kahn and Wiener distinguish scenarios from alternative images of the future (Kahn & Wiener, 1967). Scenarios denoted a description of a future course of events, sequence of developments, often highlighting key events, decisions, or turning points (future history), whereas images of the future emphasize the final state, they describe a future set of circumstances, a portrait of the state of affairs (at a specified date or period). Nowadays both alternatives would be included under the heading of the scenario approach: some practitioners view scenarios as descriptions of possible future states, others as descriptions of future developments. Pioneer scenario developers such as Kahn and Wiener would also reject the use of scenario term in the case of predictive approaches. The fact that many practitioners use this term in a predictive sense leads us to keep a broad view on the scenario concept covering predictive approaches (based on e.g. trend extrapolation) as well as explorations of alternative futures (states as well as developments).

In summary, it is impossible to univocally delineate the field of scenario-practice mainly because it is not always clear what is done and for what reason. In the following, we will try to give a tentative answer to these questions based on different “scenario-typologies”. Several classifications or ‘typologies’ of scenarios can be developed based on the questions Why?, How? and What? A first

typology of scenario exercises (the why?-typology) is thus based on the question why scenarios are being developed. Here, this question should be understood in a broad sense of why someone would think about the future and not in a strict sense of practical usage. Such a classification is based on the different possible ways of thinking about the future mentioned above: a distinction between predictive, explorative and normative scenario studies is made here. A second typology (the how?-typology) deals with methodological issues and tries to classify scenarios according to the way they have been developed. Finally, a typology can be thought of (the what?-typology) that concentrates on the content of the scenarios; i.e. the issues that are being dealt with. In the following, these three ways of ordering the scenario field will be described. This will both give an idea of the diverseness of the field and set the conceptual contours for this project.

2. Three scenario categories, six scenario types (why? Typology)[2]

Associated with the three basic modes of futures thinking identified above, one can categorise scenarios into three broad categories: predictive, explorative and normative scenarios. Börjeson et al. (2006) further subdivide each broad category into two types as can be seen in Figure 1. In the following paragraphs this typology is developed in some detail.



Figuur 1 Scenario typology based on three basic modes of future thinking. Source: Börjeson et al., 2006.

2.1. Predictive scenario studies

Within the predictive mode of thinking, forecasts respond to the question 'What will happen, on the condition that the most likely development unfolds?', while What-if scenarios respond to the question 'What will happen, on the condition of some specified events?' The term 'what if' is used here to reflect the idea of potential effects under different assumptions (Greeuw et al., 2000).

Forecasts are conditioned by what will happen if the most likely development unfolds, i.e. when making a forecast the basic supposition is that the resulting scenario is the most likely development. Forecasts can be used as an aid for planning in, for example, the business environment. In such cases, forecasts are made of external factors[3] such as economic events, natural phenomena and organisational statistics. Those forecasts are most suited to the short term, when the uncertainty in the development of the external factors is not too great (Börjeson et al., 2006).

What-if scenarios investigate what will happen on the condition of some specified near future events of great importance for future development. The specified events can be external events, internal

[2] This section is based on a review of scenario literature and mainly on Börjeson et al. (2006)
[3] External factors are those that are not controllable by the actor or scenario user in question, contrary to internal factors such as policy measures which are at the hand of the intended scenario user to cope with the issues at stake.

decisions or both. What-if scenarios can be said to consist of a group of forecasts, where the difference between the forecasts are more like a 'bifurcation' where the specified event acts as the bifurcation point. None of the scenarios is necessarily considered as the most likely development. The resulting what-if scenarios hence reflect what will happen, provided one or more events happens (Börjeson et al., 2006).

2.2. Explorative scenario studies

Within the explorative mode of thinking, external scenarios respond to the question 'What can happen to the development of external factors?', while strategic scenarios respond to the question 'What can happen if we act in a certain way?'.

External scenarios focus on external factors beyond the control of the relevant actors. They are typically used to inform strategy development of a planning entity. Policies are not part of the scenarios but the scenarios provide a framework for the development and assessment of policies and strategies. The external scenarios can then help the user to develop robust strategies, i.e. strategies that will survive several kinds of external development. In the case of certain global climate scenarios, for example, the outcome depends on assumptions regarding how the atmosphere and the sea absorb climate gases. Completely different developments are possible depending on how those ecosystems react. The resulting scenarios then form a basis for discussions on different measures. In a business context, external scenarios can be used for companies and organisations, whose influence on external factors is obviously small, to find flexible and adaptive solutions (Börjeson *et al.*, 2006). External scenarios may also make the company more receptive to weak signals of radical changes in the actor's environment.

Strategic scenarios integrate internal factors, i.e. (policy) measures at the hand of the intended scenario user to cope with the issue at stake. The aim of strategic scenarios is to describe a range of possible consequences of strategic decisions. While external factors are taken into account, the main focus is on internal factors (i.e. factors that can possibly be affected). Strategic scenarios describe how the consequences of a decision can vary depending on which future development unfolds. Different policy approaches are typically tested and their impact on target variables are defined (Börjeson *et al.*, 2006).

These two types of explorative scenarios, by intending to span a wide scope of possible developments, resemble what-if scenarios. But the explorative scenarios are elaborated with a longer time-horizon (Dreborg, 2004; Börjeson *et al.*, 2006). Moreover, explorative scenarios typically deal with a set of structurally alternative scenarios by describing futures that differ significantly from one another (van Notten *et al.*, 2003).

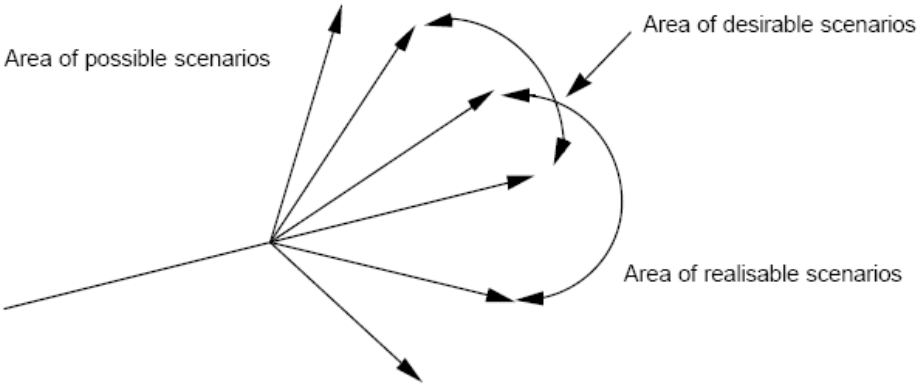
2.3. Normative scenario studies

Normative scenarios consist of two different types, distinguished by how the system structure is treated. Preserving scenarios respond to the question: How can the target be reached, by adjustments to current situation?, while transforming scenarios respond to the question: How can the target be reached, when the prevailing structure blocks necessary changes? (Börjeson, 2006)

Transforming scenarios are elaborated when a marginal adjustment of current development is not sufficient, and a trend break is necessary to reach the target. The backcasting method is mainly used (see the next paragraph on methodologies) and typically results in a number of target-fulfilling images of the future, which present a solution to a societal problem, together with a discussion of what changes would be needed in order to reach the images. It has a rather long time-perspective of 25–50 years (Robinson, 1990).

Preserving scenarios are developed to find out how a certain target can be efficiently met by adjustments to the current situation. Here, it is assumed that the target can be reached within a prevailing structure. Targets can concern environmental, social, economic, technological as well as cultural factors, typical examples being cost or eco-efficiency. Optimising the set of technology and policy measures in order to meet a certain greenhouse gas emission level is an example of a preserving scenario type as has been done in the IPCC scenarios.

In close reference to these three main scenario categories, it is interesting to look at a categorisation proposed by Godet and Roubelat (1996). They distinguish between possible scenarios, i.e. everything that can be imagined, realizable scenarios, i.e. all that remain possible when taking account of constraints, and desirable scenarios, i.e. meeting interests and values considered. It is among the realizable scenarios, which have a higher than zero probability, that we find contrasted (unlikely) scenarios and the field of development where the most probable scenarios are found. As regards desirable scenarios, these are found within the possible zone but not all are necessarily realizable. It is noticeable that most of the scenario methods concentrate on the domain of realisable or desirable scenarios. Many examples of scenario exercises claim to develop alternative scenarios whereas in fact they are at best only marginally unconventional (van Notten et al., 2003), also called ‘perturbations’ of a single business as usual future (Robinson, 2003).



Figuur 2 Categorisation of scenarios proposed by Godet and Roubelat

2.4. Concluding remarks

In conclusion, it should be stressed that this typology is an attempt to categorise the scenario field from a particular perspective, i.e. the different modes of future thinking. Any typology, however, is destined to be challenged by the (complex) reality of the scenario-practice. As discussed above, it can be for example difficult to clearly distinct what-if scenarios and explorative scenarios. Although 'pure' predictive, explorative or normative scenario studies do exist, it is to be expected that actual scenarios will not belong to just one of the categories presented above: most actual scenarios could be labelled as 'hybrids', combining in different degrees the three modes of thinking. In fact, one could think of a three-dimensional classification of actual scenarios depending on the degree of respectively predictive, explorative and normative thinking. According to Robinson (Robinson, 2003), there is a tendency for studies to use more complex approaches. The IPCC scenarios (IPCC, 2000 and IPCC, 2001) are an example of a complex approach covering predictive, explorative and normative elements and also quantitative and qualitative approaches. We will come back to this point in the next paragraph where it will be shown that methodologies, although originally attributable to one particular mode of thinking, are increasingly used in a mixed approach producing 'hybrid' scenarios.

3. How are scenarios constructed (how?-typology)

An important part of the fuzzy nature of the scenario field is linked to the multiplicity of methods used to construct products which have than various characteristics. There are probably as much methodologies and approaches to construct scenarios as there are scenario exercises. A widely reported methodology in the context of explorative scenarios, comprising five main steps, is the one described by Peter Schwartz, firstly in the book The Art of the Long View, and later on, e.g. with Jay Ogilvy for the Global Business Network (GBN) (Ogilvy and Schwartz, 2004). The five steps are the following:

1. Decision focus: Identify the focal issue or decision: What are the central concerns and key issues of the users of the scenarios?
2. Key factors: Identify the driving forces that are likely to have the most important influences on these central concerns of the future.
3. Pre-determined elements and uncertainties: Which of these driving forces seem pre-determined and inevitable and which are the factors which seems likely to change the direction of the scenarios?
4. Selecting the scenario logics (or scenario plots): Ranking of the drivers by their importance and their uncertainty and identifying two or three critical factors of the central themes of the scenarios.
5. Fleshing out. Elaborating the basic scenario logics into full-fledged scenarios. This is often done in the form of narratives that present a plausible sequence of events.

This methodological description can be found in many different variants, sometimes omitting specific steps, sometimes adding others such as the composition of the scenario team. More generally speaking and taking into account predictive and normative scenarios and hybrids, one can identify two major phases. A first phase consists of the development of the scenario logics which comprises the first four steps of the GBN methodology. In fact, the fourth step (‘the scenario logics’) is the result of the developing phase. A second phase deals with fleshing out the scenario logics into the final scenarios (enrichment, integration and consistency) and is essentially the fifth step of the GBN methodology.

The developing phase essentially consists of generating and collecting ideas, knowledge and views regarding some part of the future and structuring them into a limited number of scenario logics. Depending on the mode of futures thinking, either the “generating” work may be more paramount than the “collecting” and vice versa. This has to do with the degree of freedom, creativity and imagination a particular mode of futures thinking can be associated with. It may for instance be clear that predictive scenarios will not involve that much creativity as they are focussed on short term causal developments, e.g. extrapolating present trends and evolutions. Here, the “collection” of knowledge on existing trends

is more important. In contrast, explorative scenarios, which aim at exploring a wide scope of situations or developments that are possible to happen in a long-term perspective obviously ask for creativity in e.g. 'imagining' several alternative developments.

The fleshing-out phase deals with the elaboration of the basic scenario logics into full-drawn scenarios. The development of narratives can enrich the scenarios, while the application of systems thinking (conceptual model, quantitative model…) can deepen the scenarios and ensure both integration and consistency. It should be noted that not all scenarios are actually fleshed out by means of narrative elements. For instance, when a scenario exercise is focussing on the value-added of the process, a narrative fleshing-out of the scenario logics may not be regarded essential. This also relates to the discussion on the quantitative versus qualitative character of a scenario at the end of this paragraph.

In the following paragraphs we will relate scenario methodologies to the three modes of futures thinking. In this way, these methodologies are regarded as an elaborate way of utilising these modes of thinking. It is of crucial importance, however, that this way of presenting scenario methodologies according to one mode of thinking is not to be understood as a kind of strict recipe of what methodology to follow once a mode of thinking has been decided on. The multiple examples of hybrid scenarios rather point towards a trend for highly mixed and ad-hoc approaches, stemming from different modes of thinking. Even though one approach is dominant, sometimes a complementary technique stemming from a different mode of futures thinking can be useful. When e.g. developing several structurally different scenarios (the explorative mode of thinking), one could argue that some phenomena may be possible to predict within reasonably narrow limits. Thus predictive methods may be used to handle a segment of the phenomena studied, without changing the general explorative character of the study. Sometimes, however, methodologies representing different modes of thinking are combined on a more equal basis. For instance, the 'La Prospective Stratégique' (Godet and Roubelat, 1996)) approach combines an explorative mode of thinking for anticipation and a visionary mode of thinking for action. Actually, the most common trend in recent scenario studies is an exploratory process to raise awareness, stimulate creativity, and empower the users of scenarios before engaging, on the basis of a broad range of the resulting exploratory scenarios, a second phase of identifying the relevant and desired goal –or sets of goals- and then building the paths to reach them (Godet and Roubelat, 1996; van der Heijden, 2004). In such cases, one could say that two modes of thinking are combined, in this case explorative and normative, not just different analytical techniques. The whole perspective transcends that of a single mode of thinking. In this way, by supporting successively a social learning and a goal-oriented project, the scenario method becomes both a process as a means and a process as a goal (van Notten et al., 2003).

So, rather than presenting a strict recipe for each mode of futures thinking, this listing of scenario methodologies has to be regarded as three "toolboxes" out of which scenario developers can freely pick and combine methodologies according to the specific purpose of their scenario exercise.

3.1. Methods related to the predictive mode

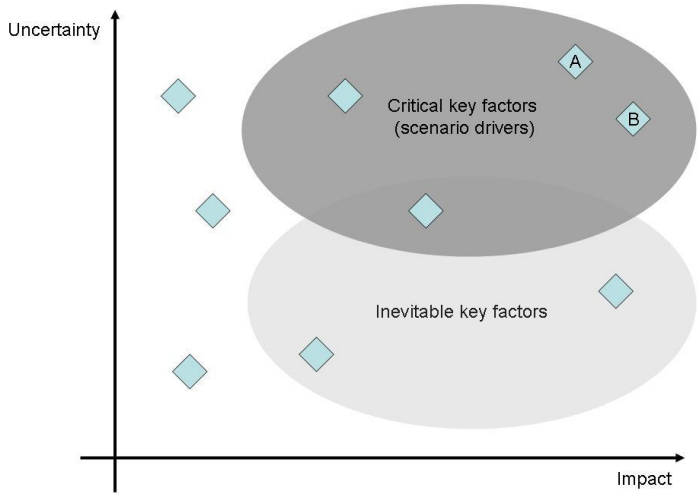
In predictive scenarios, the *developing phase* is rather subordinate and mainly relies on desk-top research in collecting and selecting the trends and issues to be dealt with. Nevertheless, when there is shortage of data or when the complexity of the problem at stake is too big, a participatory approach such as expert panels or the Delphi method can be suitable (see further on techniques).

In the *fleshing-out phase*, the predictive mode of thinking will typically imply quantitative techniques and often rely on the extrapolation of trends or the predictive modelling approach (Dreborg, 2004). The ***extrapolation of trends method*** is based on the assumption that patterns in the past will continue into the future. To perform this method, the information which has been collected about a variable in the developing phase is extrapolated to some point in the future. This analysis can be either qualitative or quantitative; the latter is often labelled as time-series analysis (see below on specific techniques). In the simplest form, trend extrapolation can be based on linear or other straightforward projections. The ***predictive scenario method*** has been specifically developed to answer scenario type 'What-If' questions (see Why?-typology). The idea is that the future cannot be only seen as an extrapolation of current trends and the aim is to analyse the effects of likely changes, as a result of which optimisation or simulation modelling are required. The scenarios mainly address policy (economic, agricultural or environmental policies) or technological changes. The use of predictive modelling often relies on computer models to represent the studied system. Different types of computer models are used in predictive modelling depending on the objective of the study: some seek mostly to explain the causes of past events, others have been designed to predict where, when or how much specific events (e.g. “extreme weather events”) will occur in the future, where some others are designed to assess a-priori how policy interventions will influence a specific event.

3.2. Methods related to the explorative mode

In explorative scenarios, the developing phase is very important due to the high degree of openness to several possible events and different developments. This also points to the need for creativity and imagination in the generation of ideas.

The *developing phase* mainly consists of brainstorming a list of key factors (internal as well as external) and selecting the most critical ones which then form the basis of the scenario logics. This assessment is based on both the level of impact (in relation to the focal issue of the scenario) of the key factors and the uncertainty regarding their outcome. Five general categories of possible forces and trends can be distinguished: social, technological, economic, environmental and political.



Figuur 3 Driving forces

In view of the further construction of real scenario logics, it is at this stage important to distinguish between key factors that seem predetermined or inevitable and those that are most likely to define or significantly change the nature or direction of the scenarios (See Figure 2). Important key factors with a low uncertainty (inevitable or pre-determined factors) should be reflected, implicitly or explicitly, in each of the scenario logics. For example, any set of scenarios about global development issues should deal with climate change, although this might assume a different shape or priority depending on political, regulatory and technological factors. New forces (value systems, ecological impacts,…) that are both very important and very uncertain are crucial for the nature and direction the scenarios take; the most important will form the backbone of the scenarios.

In a next step there has to be decided about which of these forces are most critical and will thus determine the basic premises of the final scenarios. Two somewhat different approaches can be identified in selecting the most relevant variables; one method can be described as inductive, the other deductive. The inductive method is less structured and relies on consensus building whereas the deductive approach or axes technique uses prioritization techniques to select the two most critical uncertainties.

Two variants of the *inductive approach* have been described by Ogilvy and Schwartz (2004), i.e. starting from *Emblematic Events* or from the *Official Future*. The first variant of the inductive approach starts with brainstorming individual “Emblematic Events” or plot elements. Around these different ‘seed’ events larger stories are spun. Building up scenarios from singular episodic plot elements can yield good results, but the process is unsystematic and calls for a degree of creativity and imagination that may be lacking. Also, finding consensus on which events (and thus scenario logics) are truly of paramount importance may be time-consuming and difficult. A slightly more systematic inductive approach starts from “the Official Future”: the way the future will occur according to the belief of the scenario developers. This does not necessarily have to be a BAU-scenario, in which current trends are

projected, it refers to the most plausible scenario according to the scenario developers. In a next step, the key driving forces and uncertainties of the official future are identified. Then, alternative scenario logics can be based on possible (and also surprising) changes to the key driving forces of the official story. Still, consensus has to be found on a few scenarios that are regarded as most relevant.

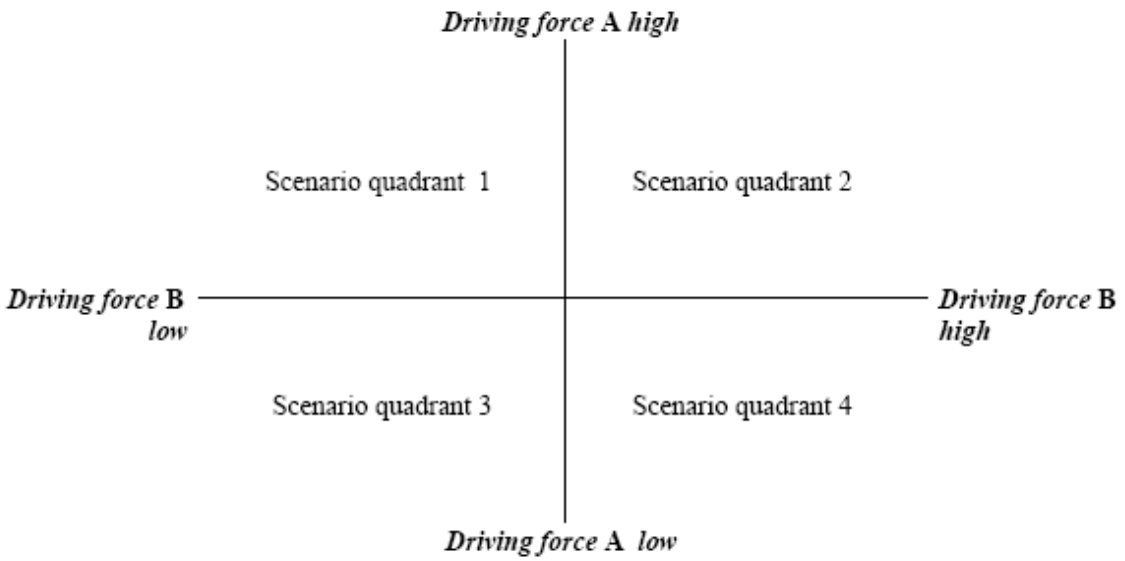
In the *deductive approach or the 'scenario axes technique'*, the idea is to prioritize the long list of key factors and driving forces in order to find the two most critical factors, both in terms of importance and uncertainty (See Figure 2). The two most critical forces then become the axes of a 2x2 scenario matrix which gives origin to 4 scenario logics; one in each quadrant of the scenario matrix[4] (See Figure 3).

The process of selecting the two most important driving forces is of particular interest as it involves a lot of implicit normative and methodological issues which are generally omitted in the discussion of scenario development. According to many scenario theorists and practitioners, the scenario axes technique provides a structured approach in which seemingly unrelated data can be made operationally useful. It is assumed that this technique, being a frame that the different actors share, fosters alignment of different perspectives despite different and often conflicting data that these practitioners are confronted with.

But this view, the '*axes as backbone for scenario development*' seems to be grounded in positivist arguments claiming that the most uncertain and important driving forces do exist ('out there') and that it is only a methodological question to retrieve them. The backbone perspective considers the scenario axes as a frame representing the essential and fundamental forces for the future and argues that fleshing out the scenarios should be done within this given frame.

Van 't Klooster en van Asselt (2006) however point out that the scenario axes do not univocally function as a unifying structure fostering alignment of different perspectives in the way that scenario theorists and practitioners often suggest. They rather argue that these two driving forces do not "exist" a priori but are the outcome of social processes: they are socially constructed (e.g. through Delphi consultation rounds). As a result of this, two other perspectives can be identified besides the backbone perspective: the (relativist) 'building scaffold' perspective and the (post-normal) 'foundation' perspective.

[4] In principle, the scenario logics could also be based on a broader spectrum, including e.g. three axes giving rise to 8 scenarios. For the sake of simplicity and communicability, it is widely believed that 2 axes is the most efficient way of working. Downsizing a long list of key factors to two may be viewed as an oversimplification and neglecting the complexity of the issue at stake. In the next step (fleshing out) however, the other key factors and the complexity involved are taken back into account when developing fully fledged scenarios.



Figuur 4 Scenario axes as a starting point for scenarios

In the '*axes as building scaffold for scenario development*' perspective, it is argued that the axes, as a result of a social construction process, should be removed once the scenario logics have been selected. This relativist perspective holds that every choice of the scenario axes is arbitrary, but at the same time acknowledges that they have a function the scenario construction process. In the building scaffold perspective the axes are merely regarded as a tool, so removing them is not problematic. Instead, removal is considered as a precondition so as to enable futurists to develop more integrated scenarios. Here, the scenario axes technique is used to make sure that the scenarios diverge sufficiently. Once divergence is established, the axes are to be abandoned. In this view, every choice of axes is arbitrary; it is seen as a mere tool to start building the scenarios.

The '*axes as a foundation for scenario development*' perspective holds a post-normal view, in between a positivist and a relativist perspective. It recognizes that the driving forces or axes are not given, nor the result of an arbitrary social process; they are the result of a deliberative choice. So, in a way, the axes are 'co-produced'; they are the social outcome of a systematic process of weighing objective arguments for and against driving forces. The foundation perspective regards this co-production process to be constitutive for the final axes chosen and thus argues that the axes can, under no condition, be removed. This perspective is closely related to the objectives of 'post-normal' science to formulate a more socially oriented process of knowledge production.

In the *fleshing-out phase* the basic scenario logics are elaborated into fully-fledged scenarios. In general, this comes down to weaving the pieces together to form an integrated narrative with a beginning, middle and an end.

While the two or three most critical driving forces have shaped the basic scenario logics that distinguish and drive the scenarios (but see the discussion on the axes technique), the other

significant factors, identified in the developing phase, can be used to enrich the scenarios. Each of the key factors and trends should be given some attention in at least one scenario; some, including the inevitable or pre-determined factors (see above), are likely to show up in all the plots. Demographic trends such as ageing population in a Belgian context or climate change for example, are likely to be implicit in all the plots, although they may have different implications depending upon how political, social and economic factors affect things as immigration or consumption. In this way, the complexity that has been squeezed out in whittling an infinite number of possible futures down to just a few basic scenario logics, can be brought back in. E.g. in the case of a 2x2 scenario matrix resulting from applying the axes technique, the other key factors that were identified can be brought back in by posing the question: “What is the value of this factor in each of the four quadrants of the matrix?”

In weaving all these pieces together, two general methods can be identified: systems thinking and building narratives. While systems thinking is good for deepening the scenario plots and ensuring consistency and coherence, narrative development is good for lengthening the basic premises into stories with beginnings, middles and ends by capturing issues of timing and path dependency.

While the narrative development is a rather intuitive approach, systems thinking, as a general denominator for studying the way parts of a system interact, presents a more structured tool for exploring the logics of a scenario. Alternating narrative development and systems thinking is thus a frequently adopted approach in scenario development. At the basis of systems thinking is a conceptual model that maps out the linkages and interactions between the elements that comprise the entirety of the system under study. In the development of the Millenium Ecosystem Assessment scenarios (see case studies), this framework links indirect and direct drivers with ecosystem services and human well-being. By keeping this conceptual framework as a constant guiding principle throughout the narrative development, all possible links (direct links, feedback loops,…) between direct and indirect drivers, ecosystems and human well-being are kept in mind (and checked) throughout the scenario development process. This also ensures the integration between ecological, cultural and other dimensions (demographic, economic, technological,…). This conceptual model, or parts of it, may then further be numerically modelled in an attempt to illustrate the scenarios in numerical form as has been done in the MEA-case (see case studies). This is one more example of a hybrid approach mixing methods belonging to the predictive mode with those of the explorative mode.

3.4. Methods related to the normative mode

In a ‘pure’ normative mode of futures thinking, one is concerned with how desirable futures can be attained, not with what futures will possibly or probably develop. The backcasting methodology has been developed for this context: it is an explicit normative approach involving working backwards from a particular desirable future end point to the present in order to determine the physical feasibility of that future and what policy measures would be required to reach that point (Robinson, 1990). During the 1970s, backcasting studies started to emerge. These typically addressed a perceived societal problem with the aim of finding a real solution. Examples are studies of the energy system and how it

could be designed without use of fossil fuels and/or nuclear power. The changes required to reach this desirable future are profound. Therefore, the development phase and especially the 'generating' part is crucial and creativity and imagination will play a big role in envisioning (steps towards) a normative vision.

In the *developing phase*, backcasting focuses on designing images of the future that show how a solution to a major societal problem may look like rather than making projections from the present into the future. Typically, the time horizon is sufficiently far off to permit real change to take place. Also, this enables thinking beyond present trends, thus stimulating creativity and making it easier to find interesting solutions. Dreborg (Dreborg, 2004) mentions this aspect as one of the prominent advances of backcasting. When images of the future have been developed, one or more paths leading from the present situation to the images are being explored. Typically, the role of policy-making is highlighted. The backcasting approaches found in the literature show differences in number of steps; they can however be summarized in three main stages (Dreborg, 2004; Hojer and Mattsson, 2000). If there are more than three steps suggested in a particular backcasting approach, it is usually possible to see specific steps as part of the three stages proposed here:

1. ***Choice of targets.*** The first step consists in designing future goals and objectives or targets. This is of course an explicit normative step. It is this particular step, the ex-ante postulation of a target that has to be achieved, which characterizes the backcasting approach as a 'pure' approach under the normative mode. In the POSSUM project, for instance, goals were – amongst others- a 25% reduction of CO_2-emissions and a reduction of public subsidies to all forms of transport to zero (see case studies for more details on the POSSUM project).

2. ***Development of images of the future.*** One or several images of the future are designed to meet the targets set in step 1. The images are tested to their goal fulfilment but also to their attractiveness, feasibility and inner consistency.

3. ***Analysis of paths to the images.*** This step requires the generation of the technological, political and economic pathways that would lead to the specified images. One important question is whether there is a need for trend breaks of some kind and how these could be realised by e.g. policy measures. These pathways need to be validated in terms of feasibility and consistency.

Typically, these steps do not follow in strict consecutive order. In particular, lessons learned in step 3 may lead to a partial revision of an image of the future (step 2). A key goal of the second step of the method is to articulate scenarios of the future that are different from conventional views of what is likely to happen. This suggests that it is important that some thought be given as to how alternative values and preferences get incorporated into the analysis. In most cases, the source of normative content of the backcasting exercise is external to the process itself (Robinson, 2003). The goals and

objectives for choosing, and evaluating, alternative desired future configurations are typically articulated 'back-office', i.e. they may come from a formal study (e.g. IPCC recommendations regarding CO_2-reduction) or from a survey of what stakeholders consider desirable. This has been the method chosen in most 'soft energy path' and 'sustainable society' backcasting studies (Robinson, 2003; Börjeson et al., 2006). In this cases, the purpose of the study was to show implications of achieving one or more normatively defined end-points, with the goal of making that information available, via publication of the results, to decision makers and the general public (Robinson, 2003).
In the early 1990s occurred a shift to participatory backcasting (Quist and Vergragt, 2006) (also called 'second generation backcasting' (Robinson, 2003)) by involving experts groups or grass-root movements and ordinary citizens directly in the process of defining and evaluating the desirability of the scenarios that are developed (e.g. Green and Vergragt, 2002).

The *fleshing-out phase* of a backcasting scenario is similar to that of scenarios under the explorative mode. Also here, external factors are to be taken into account and this will enrich the scenario. Narrative development can again be used to capture issues of timing and path dependency, issues which are of particular importance in a backcasting approach. Systems thinking on the other hand, may be useful to check the feasibility and inner consistency of the images of the future.

3.5. A brief overview of techniques used in scenario construction

In this paragraph we want to give a brief overview of some concrete techniques that are being used in current scenario work. Besides storytelling (the narrative approach), techniques can mainly be grouped in two main categories: one category contains all kinds of participatory techniques, the other deals with modelling techniques.

3.5.1. Participative approaches

As we have seen in the above description of the scenario field, *participative approaches* are being used in different stages of the scenario development and are mainly used for generating and structuring ideas and/or opinions. We briefly describe a few common techniques such as brainstorming, workshops and Delphi; an extended overview of participatory tools can e.g. be found in the Viwta/KBS Participatory methods toolkit (Steyaert and Lisoir, 2005) and the Seamless report (Bousset et al., 2005).

Brainstorming is a well-known technique for the creative generation of ideas without taking into account constraints such as feasibility or cost. Therefore, participants are asked not to criticise, discard or disparage any ideas generated by others, but are instead encouraged to build on them (Bousset et al., 2005).

All kinds of *workshops* can facilitate broadening of perspectives, since decision-makers, stakeholders and experts can be included in the process. A workshop is a kind of idea seminar where participants elicit and structure ideas following an elaborate method. One example are the workshops used in the

scenario planning process by van der Heijden (1996). In a process of identification of events, clustering them and searching for causalities, driving forces are identified by revealing the underlying structure of events. The Emblematic Events or Official Future approaches discussed in the developing phase of explorative scenarios are examples of approaches that can be elaborated in a participatory workshop. Techniques that stimulate creative thinking such as brainstorming are often included in the workshop process.

The main idea of the *classical Delphi* method, originally developed by the RAND corporation in the 1950s, is to collect and harmonize the opinions of a panel of experts on the issue at stake. It recognizes that the judgement of a number of informed people is likely to be better than the judgement of a single individual. As such, it regards human judgement as a legitimate input to e.g. forecasts. The classical Delphi method can be said to be a multi-round expert survey with the aim of reaching consensus among the experts regarding the development of certain key factors. The result is thus a consensus forecast or judgement and Delphi is therefore regarded as a quick method for getting the information needed for making decisions. The fact that consensus is strived for has generated a lot of criticism in particular on the inevitable loss of important information. In the context of explorative scenario development, a *modified Delphi* method has been elaborated by Best et al. (1986). Here, different groups of opinions are identified after the first round of questionnaires. Within these groups, a classical Delphi-process is then followed in order to arrive at meaningfully different but coherent futures. A Delphi-like process has also been used in a backcasting approach developed by Höjer (1998) and has appropriately been termed *Backcasting Delphi*. Here, the Delphi experts are asked to evaluate and improve the images of the future in respect of their feasibility and coherence to the defined target.

3.5.2. Modelling techniques

Modelling techniques are mainly used in the fleshing out phase, either as a predictive tool (predictive mode) or as a tool to check the consistency and coherence of a scenario plot (explorative and normative mode). In doing so, it can moreover illustrate the final scenarios with quantitative data. Here, we distinguish three subgroups of such numerical models: time-series analysis, explanatory modelling and optimising modelling. The focus in these techniques is on projecting some kind of development with more or less explicit constraints.

Time-series analysis is a quantitative technique to make forecasts by extrapolating one variable into the future based on historical values of this same variable. The system in question is treated as a black box. The underlying causes of development are not in focus, either because they are too difficult to analyse, or because the results are given higher priority than the behaviour of the system. This technique is e.g. used to predict the size of human populations.

In *explanatory modelling* inter-relationships between variables are taken into account by projecting not variables but relationships into the future. It is thus based on causal links in the form of equations

connecting variables and consists of a quantitative description of the mechanisms and processes that cause the behaviour of the system. To create this model, a system is analyzed and its processes and mechanisms are quantified separately. The model is built by integrating these descriptions for the entire system. A specific model can thus only produce scenarios within a given system; by changing the causal links, a new model with a new system structure is developed (Börjeson, 2004).

Optimising modelling is a useful technique to represent human decision-making processes (Lambin et al., 2000). As in explanatory modelling, optimising models also project relationships between variables into the future but have an explicit optimising aim. They seek to describe what should be done based on a set of pre-determined goals and concerns. A lot of mathematical optimization techniques exist aiming at maximizing or minimizing some kind of utility or cost (e.g. profit maximisation). Optimizing models are limited by their inability to describe dynamic processes (change through time).

As an illustration of the highly complex methods that are being used in the scenario development field, *participatory modelling*, being a combination of participatory and modelling approaches, can be mentioned. In participatory modelling, the modelling environment, model formulation, and model development must be transparent and within the grasp of the participating stakeholders (Mendoza et al., 2004). This is in contrast with traditional modelling approaches, which are often limited to scientists with technical expertise.

3.5.3. Storytelling – narrative approach

As already mentioned, a narrative approach may enrich the scenario 'skeleton' with 'flesh and blood', that is, living, detailed and consistent storytelling. *Storytelling*, according to amongst others Rasmussen (Rasmussen, 2005), is also an excellent method weaving together the relatively certain aspects of the future with imagination about the uncertain: scenario stories have the ability to transmit both rational and creative layers of thoughts and belief, they help us to make sense of what has been, what is and what might be.

Rasmussen further makes an essential distinction between *storylines* and *plotlines*. A storyline consists of essential events (essential in relation to the issue at stake) in a causal relationship; it describes events occurring within the time frame of the scenario. While storylines are causal relationships between events that set out a movement towards fulfilment of the story's promise, a story's plotline is the events that make the story advance along its storyline in a dramatic and compelling way. As the storyline's events make the story progress along its storyline, the events on the plotline operate to dramatically heighten that advance. In other words, a coherent configuration of the different storylines makes up the scenario skeleton while the plotlines serve as 'flesh and blood'.

It is important to make this distinction, as it allows for the qualification of bad scenarios on two levels. On the one hand you find bad scenarios that have poor storylines failing to convey the core ideas despite of a lot of appealing plotlines and on the other hand a lot of scenarios do not seem to have any

plotlines, failing to bring an appealing and compelling story. Indeed, one of the strengths of 'rich' scenarios is that they may appeal to the human being as a whole creature: senses, emotions, thoughts, behaviours and so on. A lot of scenarios however, as Rasmussen appropriately points out, seem to be made without a plotline: 'dry' stories without any sensuous or emotional descriptions. The Millenium Ecosystem scenarios are an example of such a lack of plotlines, perhaps due to an undue focus on the purely logical and rational relationships between the events to make the points as analytically clear as possible. It is also possible to create a scenario with a lot of appealing plotlines which are however not rooted in the deeper story issues. Very dramatic stories in which the plotlines are strong but the story lines are weak may have difficulties in transferring the core ideas to its audience. The dramatic actions may not 'ring true'; they will be perceived as pure entertainment as they lack a clear connection to the central assumptions and ideas.

It is not easy to find an example of a scenario that has both strong storylines and plotlines. There even seems to be a trade-off at work between both: Either, scenario's focus on the rational and logical aspects (e.g. explicitated in a conceptual framework) which seems to work as a straitjacket curtailing the imagination and creativity needed to come up with compelling plotlines or, vice versa, the focus is on creating original, memorable, provocative and compelling with the risk of loosing hold of the underlying core messages. One of the major challenges in future scenario-work may well be situated in overcoming this dichotomy.

3.6. Concluding considerations on methodology

In conclusion of this overview we briefly discuss a few central methodological characteristics which are worth some extra consideration if one is to engage in an actual scenario construction process.

3.6.1. On quantitative versus qualitative approaches

Whether the scenario developers chose to use mainly modelling approaches or storylines approach, the method can be characterised as respectively *quantitative* or *qualitative*. Qualitative scenarios describe possible futures in the form of words rather than numerical estimates, whereas quantitative scenarios provide needed numerical information in the form of tables and graphs. Before listing advantages and disadvantages it is interesting to observe that in a major part of the scenario literature, a narrative fleshing out is regarded as an essential characteristic of a scenario. This view can hardly be maintained within our broad scenario concept, especially as it includes predictive approaches. However, for scenarios which adhere to the explorative or normative mode, it seems crucial that at least *the idea* of a coherent story or image of the future of the system under study has to be there, even if it is not made explicit in a real narrative story.

The main advantage of qualitative scenarios seems to be situated in the "interpretive flexibility" quality of narratives (Smith and Kern,2007). Such a scenario can integrate disparate ideas, thoughts and feelings of several different stakeholders into one holistic image while at the same time reflecting uncertainties, incorporating surprise and account for human volition. Also, well-written narratives with both strong storylines and plotlines may present an understandable and compelling way of communicating information about the future as they enrich the scenario 'skeleton' with 'flesh and

blood', i.e. living, detailed and consistent storytelling. The main disadvantage is that qualitative approaches do not, by definition, satisfy a need for numerical information.
Modelling on the other hand, as the principal approach for quantitative scenarios, is mainly criticized for containing many implicit assumptions about the future as models tend to represent only one point of view about how the future will unfold. In this way, models produce scenarios that are unnecessarily narrow in view. This point of critique is sometimes countered by the argument that the assumptions behind models are at least made explicit in the form of model equations, parameters and coefficients contrary to qualitative scenarios, where most of the assumptions remain locked in the heads of the scenario developers. Another advantage of model calculations is their internal consistency which makes them useful tools for checking the consistency and coherence of qualitative scenarios, at least those parts which can be modelled. A last point of comparison between qualitative and quantitative approaches is related to scientific credibility in the sense that the exactness of the numbers in quantitative scenarios may be mistaken as a guarantee for their scientific soundness and vice versa for qualitative approaches.

So, there are convincing arguments on both sides of the question of qualitative versus quantitative approaches. In this context, it is important to note that the more recent scenario exercises and literature stress the importance of the integration of quantitative and qualitative data and techniques in order to develop more complete representations. As an example, the 'storyline and simulation' approach of the MEA-scenarios can be mentioned (see case studies). It is based on an iterative combination of quantitative and qualitative approaches. Five different models were used, and each model was run separately for each storyline with input values based on the story lines. The results of the model runs were then compared with the narratives to verify the assumptions, to check the story lines for internal consistency, and to add quantitative information. The final product for each scenario was a qualitative narrative that contained quantitative information.

3.6.2. On participatory approaches and the value-added of scenarios

The use of *participative* tools, the level of participation and the different kind of actors involved are an important characteristic of scenarios. A typical feature of contemporary scenario development is the involvement of decision-makers and important stakeholders in addition to the traditional group composed of scientists and experts. The involvement of stakeholders is done at different degrees (from single interview to workshops) with the aim to increase the quality of scientific inputs into the scenario building process. As has been discussed in the particular context of the scenario axes technique (see above), this trend addresses the objectives of 'post-normal' science to formulate a more socially oriented process of knowledge construction (e.g. Funtowicz and Ravetz, 1993). Indeed, scenarios have a potentially important role to play with regard to the increasing demand for more public and stakeholder involvement in the scientific activities. This demand is driven by a complex mix of factors, including increased public distrust of expert-driven decision making, growing awareness of a diversity of opinions in the scientific community, and increased sophistication of NGO, private sector and public involvement in regulatory and other decision-making fora. These evolving dimensions of the

policy–science interface suggest that participatory forms of scenario analysis could be particularly effective in addressing the strategic and normative elements of sustainability questions by incorporating values and preferences into the scenario analysis process itself. In parallel, scenario exercises are more and more presented as characterised by a focus on the *process and/or the output* of the exercise. The double question here is whether one aspect is more important in terms of impacts then the other, and whether it is necessary to make a trade-off between the two. In this context we have already referred to the recent trend in scenario studies of combining a broad exploratory process to raise awareness, stimulate creativity, and empower the users of scenarios before engaging, on the basis of a broad range of the resulting exploratory scenarios, a second phase of identifying the relevant and desired goal –or sets of goals- and then building the paths to reach them. In this way, by supporting successively a social learning and a goal-oriented project, the scenario exercise is characterised by a focus on both process and product.

3.6.3. On intuitive and structured approaches

From the methodological discussion, it may have become clear that scenario development can also be characterized by a varying degree of adhering to an *intuitive versus structured approach*. The 'emblematic events' approach described above can be seen as a rather intuitive approach whereas the scenario axes method is (rather) structured. It could be argued that a structured approach may contain a higher guarantee that a final product in the form of one (or more) scenarios will be delivered but may reduce creativity, although this is not necessarily the case. The use of systems thinking, e.g. in the form of a conceptual model, has been suggested as a structured way to explore the logics and check the consistency and coherence of a scenario. This is contrasted by the fact that a lot of coherent and consistent scenarios have been developed without a conceptual model as a basis. It may at this point be illustrative to look at the analogy with two different kinds of novelist: the intuitive and the structured writer. Whereas the structured kind of writer will start by getting the outline of his novel down on paper, the intuitive writer sits down and starts writing the novel, perhaps having some implicit outline in the back of his head. Reality shows that both types have produced literature of the highest quality.

4. Scenario content (what?-typology)[5]

In terms of content, scenarios can be analysed along different dimensions that allow situating an exercise in the diversity of exercises. After a broad overview of content-related issues, which are summarized in Table 1, a few specific themes will be discussed in more detail by analysing them with respect to the three basic modes of futures thinking.

Obviously, scenarios can be classified according to their *main focus*. In that respect, we can distinguish between: *global & integrated* scenarios which aim to address a whole range of issues at the Earth/global system level (e.g. , the MEA, the Great Transition scenario), *area-based* scenarios addressing the evolution(s) of a specific geographic level (Liège 2020), *issue-based* scenarios focusing on specific societal issues or sectors (the IPCC scenarios, the biodiversity focus ALARM scenarios, DP21), *institution-based* scenarios which address the spheres of interest of an organization, of a sector (e.g. the OECD scenarios, the Shell scenarios, etc.). Of course, these distinctions are overlapping; one scenario or scenario exercise can be characterized by more than one focus, e.g. being at the same time area- and issue-based, at the same time issue- and institution-based (World Water Vision[6] or the Greenpeace energy scenarios). Moreover, a scenario can also be area-based and integrated (e.g. Nord – Pas de Calais 2020, VISIONS[7], etc.).

A related important parameter to classify scenarios is the *spatial scale*. Scenarios can be developed for different spatial levels: global, supranational, national, sub-national, regional and local. But more and more, scenario developers stress the need of vertical integration through different spatial scales (like in the VISIONS project at the European level, or the World Water Vision).

Scenarios can easily be classified according to their *time scale*. This characteristic distinguishes between a *long-term* and a *short-term* perspective, sometimes completed by a *medium-term* perspective. Whether a study takes a short or long-term view significantly depends on the context of the study. 10 year may well be a long-term perspective in a business scenario focussing on the development of new product line, whereas the same period could mean a short-term in e.g. a mobility scenario. However, as a general rule a long-term scale for a scenario is 25 years or more whereas a short-term scale is 0–5 years.

The *temporal nature* of the scenarios itself can be a classification parameter. Some experts[8] distinguish between a diachronic description of the evolution of the studied system across time, a

[5] This section is based on a review of scenario literature and mainly on van Notten et al. (2003)
[6] The World Water Vision, is a scenario exercise clearly focused on the water issues, but which have been developed through the pre-existing World Water Council.
[7] The VISIONS scenarios developed by the ICIS Dutch team are meant to be vertically (between spatial scales) and horizontally (between issues) integrated visions of the long term future of Europe in the framework of sustainable development.
[8] E.g. Mermet

chain scenario (or *development* scenario), and a synchronic description of a specific state of the system at one moment in time, a *snapshot scenario*. As has already been mentioned, some scenario experts do not classify snapshots as scenarios at all. Another, less important, temporal characteristic of scenarios, is their *vantage point*, i.e. the point in time when the story starts (it can be in the present, the past or the future).

Linked to the 'how?-typology', scenarios are mainly characterized by the selected *variables* used to structure and develop the narrative: their type (*qualitative*/*quantitative*), their numbers, the nature of the variables (actors, sectors, factors, etc.). As a scenario is developed on the basis of a selection of driving forces and/or trends, an interesting point to analyse is which variables have been chosen, in which direction they evolve and also try to understand why the authors chose this direction. For example, if in a scenario the technology factor plays an important positive role, we can question the authors beliefs and values in the "power of human volition" or in "the power of science to solve problems", and look if this kind of assumptions are made explicit or not by the scenario developers, in the construction phase or in an ex-post evaluation of their work. This issue is discussed in more detail in the case studies.

At another level of analysis of the content, we can also differentiate the dynamics inside and between scenarios. Considering the *dynamics within one isolated scenario*, we usually distinguish between trend and peripheral scenarios. Trend or "surprise-free" scenarios are characterized by continuity; they can be generated, for a large part, by the predictive mode of thinking about the future. *Peripheral* or shock scenarios are precisely meant to include surprises, wild cards, unexpected events, i.e. discontinuity. Considering the *level of deviation* between different scenarios of a same scenario exercise, between a range of possible futures, we can distinguish between *alternative* scenarios which differ significantly from one another, and *conventional* scenarios where all are trends scenarios and overlap are possible (can be used to fine-tune an existing strategy). Close to this idea, we can also observe the *diversity of perspectives* in one scenario or scenarios set. If we define "perspective" as supposedly consistent descriptions of how the world functions and how decision-makers should act upon it, it can be interesting to know if one scenario is trying to describe one specific perspective or to integrate different points of view, etc. and if it is done on purpose or not.

Scenario can be distinguished according to the explicit *inclusion (or exclusion) of norms*. This criterion is controversial as far as we think that norms cannot be excluded from one's way of working and thinking. But so far as we limit our considerations to what is explicitly stated, some scenario are meant to be more descriptive and other to be more normative. See below for a more detailed discussion of normativity with respect to the three modes of thinking.

One more characteristic is the *level of integration* of the different dimensions and variables described or developed in a scenario. Nowadays, scenario developers insist on the extent in which components relevant to a subject are incorporated and brought together to form a coherent and logical whole. This

is presented as an important characteristic of scenarios, which, through their narrative, are said to have a higher capacity than other tools, to make apparent the links and interconnections between the different elements of a specified system. This focus on the integrative capacity of scenarios is closely linked to the need for an integrated approach towards sustainable development.

In Table 1, the main features addressed here are summarised. From the multiplicity of issues it may be clear that this "what?-typology" is too detailed to help order the field of scenarios. It can be mainly useful in a stage when somebody is already engaged in a particular process and tries to get an overview of what has already been done. The interest for one or several of these "what?-parameters" will be a function of one's engagement in the field of scenarios (a specific issue, area, or of the objectives pursued, etc.). For example, in the Consentsus project, where the idea is to construct different pathways towards sustainable consumption, the focus may be on the inclusion of norms and diversity of perspectives. Indeed sustainable development is a normative goal, which can be traduced through different world views, and it is important to identify in the studied scenarios how this aspects are included or not, explicitly or not and how, etc (see below on normativity and modes of thinking).

WHAT? TYPOLOGY (SCENARIO CONTENT)	
Scale(s)	global, supranational, national, sub-national, regional and local, vertical integration
Main focus	global & integrated, area-based, issue-based, institution-based, etc.
Time horizon	Short, medium, long term
Temporal nature	Snapshot or chain scenario
Variables	Qualitative/quantitative, etc.
Dynamics (within one scenario)	Trend or peripheral
Level of deviation (between the scenarios of the exercise)	Alternative (high)/conventional (low)
Diversity of perspectives (in one scenario)	Yes or no
Inclusion of norms?	Yes or no/ implicit vs explicit
Level of integration	High or low

Table 1 Main dimensions related to scenario content

Besides these qualitative issues characterising specific scenarios, two more substance-related aspects are worth discussing based on reviewing several case studies (see case studies). One is related to the assumptions underneath the scenarios (the driving forces), the other is related to the scenario plots.

What forces are shaping scenarios?

Scenarios are a way of understanding the dynamics shaping the future. Driving forces at work in scenarios can be categorised in many different ways which pertain to a different way/level of looking at the way society is shaped and possibilities for change.

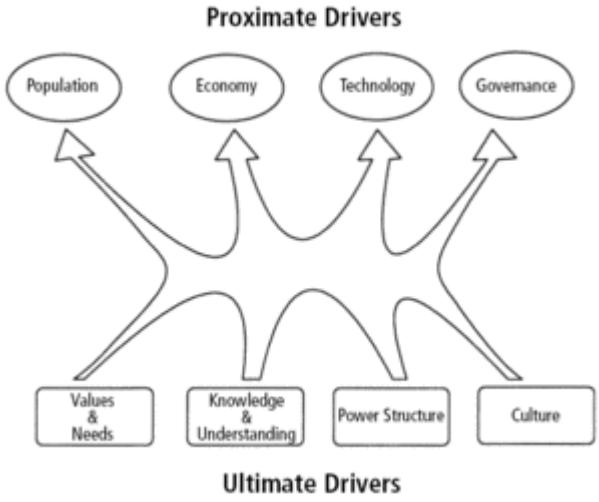
In a rather straightforward approach, driving forces can be related to five major categories: social, economic, political, technological and environmental issues. These are the same five categories of possible driving forces as proposed by GBN in their methodological explanation. Under the description of the methodological step "Brainstorming a list of key factors" they suggest to consider these five general categories of forces and trends. And indeed, looking at the variables/driving forces identified in the case studies, it is always possible to allot them to one of these categories, or a combination of them. Indeed, categories are only handles and real issues will entail a bit of all five forces. It will also depend on the focal issue at stake, which categories will be prominent. Also, it can be expected that backcasting approaches will focus on the political drivers as the question 'how can a desired future be realised' is at stake here. E.g. in the Possum project (see case studies) different policy paths were constructed based on different policy packages, i.e. combinations of policy measures that are likely to work well together, which create synergies. This does not imply that backcasting is exclusively used in a political context; a company may well use a backcasting method to identify possible paths towards e.g. increased sales figures.

If we look for instance at the key uncertainties of the DP21 scenarios; we can easily relate them to one or more of the categories mentioned above: Non-trade concerns in WTO negotiations (political/economical), prosperity and buying power (economical), regulatory framework (political), role of new-EU countries (political/economical), position distribution sector (economical), implementation Flemish manure policy (political), consumer confidence (social). As the focal issue of this exercise is an economic sector, it may be no surprise that mainly economic and political driving forces were identified.

It is interesting to no note that the Toolsust researchers present another categorisation. They have observed a posteriori that the different dimensions used as axes for the scenarios in the different cities can be synthesised in four general 'regimes' that govern society and shape our visions of the future: 'the use of space', 'the values of everyday life', 'how society is organised', 'the role of technology'. Scenario drivers or uncertainties can be characterised by more than one regime and some are mainly based on one of those regimes. This level of analysis/categorisation seems already more focussed on driving forces that have the potential to provoke fundamental change in society.

The Great Transition project further identifies a (more) 'fundamental' level of analysis in which they distinguish between categories of 'ultimate drivers' (See Figure below). They argue that whereas mainstream development policy focuses on the proximate drivers (as is the case in their scenario *"Conventional Worlds"* where strategies operate on the direct levers of change that can influence economic patterns, technology, demographics and institutions), fundamental change in society can only be attained by going deeper to the root causes that shape society and the human experience (as is explored in their *"Great transition scenario")*. These ultimate drivers include values, understanding,

power and culture. Proximate drivers are responsive to short-term intervention. The more stable ultimate drivers are subject to gradual cultural and political processes. They define the boundaries for change and the future



When being involved in a scenario construction process, it may be essential that these different levels of analysing and categorising driving forces are brought to the attention in the developing phase. As one has to think about possible scenario variables, it can be important to think within these different levels as these pertain to different ways/levels of shaping society. In particular, when thinking about scenarios focussed on the theme of sustainable consumption it might be interesting to think of consumption in terms of the different levels of analysis identified above: from a more policy-reform oriented view to a perspective of fundamental societal change. In fact, this is what has been done in WP1.

What kind of worlds are portrayed in scenarios?

As Ogilvy and Schwartz (2004) point out, each scenario plot or logic should be different, yet relevant to the focal issue. Nonetheless, there seem to be a few archetypal scenario plots that seem to arise over and over. Winners and Losers is a familiar plot based on the concept of a zero-sum game: the strong survive and the weak get weaker; Challenge and Response is a typical adventure plot story of overcoming obstacles and being transformed in this process; Evolutionary Change, finally, is a plot governed by slow change in growth or decline in all systems. These plots are derived from observing the twists and turns of our economic and politicial systems, the rise and fall of technologies, and pendulum swings in social perceptions (Ogilvy and Schwartz, 2004). A similar conclusion is also drawn by Raskin et al. (2005) who states that beneath the diversity, scenarios are rooted in a common set of archetypal visions of the future – worlds that evolve gradually, shaped by dominant driving forces; worlds that are influenced by a strong policy push for sustainability goals; worlds that succumb to fragmentation, environmental collapse and institutional failure; and worlds where new human values and forms of development emerge. Also Gallopin et al. (1997) maintain a similar typology of scenario

plots by referring to three fundamental streams of social visions reflecting fundamentally different mindsets about how the world works: the evolutionary, the catastrophic and the transformational.

Ogilvy and Schwartz	**Raskin**	**Gallopin**	**DP21**	**MEA**	**Costanza**	**Possum**	**GSG**
Winners and Losers	***Worlds that succumb to fragmentation, environmental collapse and institutional failure***	***Catastrophic***	The Race	Order from Strength	Mad Max		barbarization
Evolutionary Change	***Worlds that evolve gradually***	***Evolutionary***	Forum Europaneum	Global orchestration	Big Government		
Challenge and Response	***Worlds that are influenced by a strong policy push***	***Transformational***	Global Bazar	Adapting Mosaic Technogarden	Ecotopia Star Trek	All 3 images	Policy reform
	Worlds where new human values and forms of development emerge						Great transiton

In the Table above, the different scenarios addressed in the case studies are listed according to the plot category they adhere. As could be expected for a backcasting exercise such as Possum, all images fall under the Challenge and Response category.

In conclusion, a few specific content-issues are discussed in relation to the three basic modes of futures thinking as is schematically depicted in Table 2.

	Predictive	**Explorative**	**Normative**
Time scale	Short	Long	Long
Variables	Desk top (collecting)	+Imagination (generating)	+Imagination (generating)
Normativity	Implicit	Implicit + explicit	Implicit + explicit + ex-ante
Dynamics	Surprise free	Real surprises?	Trend break?

Table 2 Content issues in relation to the basis modes of futures thinking

Regarding the ***time scale***, it is often reasonable to assume that present trends or dynamics will prevail for some time, even though in the longer perspective there is always the possibility of structural change of the system of interest. Hence, the hypothesis is that the predictive mode of thinking applies in the short to medium term whereas the explorative and normative mode in the long term. In some areas, however, development seems to alternate between long periods of stability and relatively short periods of rapid change and instability (often related to shifts in technological regimes). During these 'chaotic' phases, new patterns evolve and eventually dominate for some time, although these patterns are difficult to discern early on. A consequence of this line of reasoning is that predictive models may sometimes be inadequate even in the short term, because the system studied is currently in a stage of structural change, but its observed behavior is difficult to interpret (Dreborg, 2004).

On the issue of the ***variables*** in relation to the basic modes of thinking, there is an interesting point to say on creativity, imagination and the way variables come into being in a scenario construction process. Within the predictive mode of thinking, the trends and issues to be dealt with are collected mainly via desk-top research. When there is shortage of data or when the complexity of the problem at stake is too big, a participatory approach such as the Delphi method can be suitable but also here, it is merely a process of collecting and selecting the variables that need to be 'predicted'. In the explorative mode, the selection of the variables is very important due to the high degree of openness to several possible events and different developments. Besides collecting information on existing trends, a certain degree of imagination and creativity is needed in envisioning possible crucial events. The changes required to reach desirable images of the future under the normative mode of thinking are profound. Imagination and creativity will therefore be crucial in envisioning the necessary steps towards a normative vision.

According to Swart et al. (2004), ***normativity*** enters a scenario in two ways. First, explicitly, the scenario plots make assumptions about future behaviours and worldviews of scenario actors, involving assumptions on norms and values as well as socio-political and institutional options. Second, implicitly, the worldviews of the people creating the scenarios shape the way the story is told and what policy lessons are drawn. With respect to the three modes of thinking, it is clear that the explicit way, absent in the predictive mode, is most prominent in the normative mode. Here, a normative target is explicitated ex-ante and storylines are 'shaped' to lead towards this target. It is this specific aspect which distinguishes the normative mode from the explorative mode where normative elements do enter the storylines but they are not constituted by an ex-ante high level target; they are 'explored'. Regarding the implicit way normative elements enter scenarios, it may be clear that these will be present in any human-made scenarios whatever mode of thinking they belong to.
In this context, it is remarkable to observe that scenarios are promoted as a means to address the inherently normative decisions of sustainability that goes beyond the boundaries of the traditional

scientific enterprise. In the context of 'sustainability science' (Swart et al., 2004), it is argued that the systemic character of sustainability problems demands a holistic perspective that unifies across sectors, problems, methods, disciplines, spatial scales and time. Furthermore, the strict distinction between the realm of the normative and the objective, the ''ought'' and the ''is'', is not useful when the system under scrutiny entrains human values and choices as irreducible and critically important system constituents and drivers of change.

Concerning the ***dynamics*** within one scenario, it is clear that the predictive mode of thinking gives rise to trend or surprise-free scenarios. It is indeed impossible to predict or model surprises or trend breaks. Peripheral scenarios can be related to both the explorative and the normative mode of thinking as these are supposed to reflect uncertainties, incorporate surprise and account for volition and the possibility for 'seeds of change' and 'trend breaks'. At this point, a critical and possibly crucial question regarding the possibility of human beings to imagine real surprises and trend breaks can be posed, i.e. Is it really possible for human beings to get beyond extrapolation and "more of the same"? Indeed, a lot of scenarios which pretend to deal with real surprises and trend breaks are mere extrapolations where present innovations such as bioengineering or hydrogen technology are made absolute (De Rijk, 1996). In the scenario literature, however, the analysis is made saying that our present society, as a stable science-technology-society configuration is an emergent phenomenon; the result of a complex evolutionary process which transcends the limits between science and society. It is only ex-post that the evolution of emergent phenomena can be interpreted. Both the natural order (scientific knowledge and technology as a result of science) and the social order (society as a result of politics) are the stabilised result of the same evolutionary process. Is it not reasonable to state that the interwoven ways in which Internet has shaped everyday life of people and has itself been shaped by people's beliefs and desires could not be imagined ex-ante? Then, where originates the idea of scenarios as a new tool which can make sense of these complex processes?

5. Preliminary conclusions

Perhaps, one of the major conclusions to be drawn from this survey study of the scenario field is that there are no clear-cut conclusions to be presented to somebody who wants to embark on a scenario construction process. There is indeed no cut-and-dried recipe to be given on what methodology to be followed to attain a certain goal. This is due to what we have called the 'fuzziness' of the scenario field. Although we have tried to order this broad and fuzzy field from three perspectives (the why? what? and how? typologies), it has often been stressed that such a categorisation is a mainly a theoretical perspective which is challenged by the complex reality of the scenario practice. Indeed, modes of thinking, which are in a way fundamental, as well as methodologies, originally attributable to a mode of thinking, are combined in combined in differing degrees to form a 'hybrid'; the particular choice for the latter informed by the particular needs of the scenario users to be met. These typologies set a frame of reference, they can form the basis of a conscious choice for a particular approach but they are not a prescriptive tool.

So, in a way, the fuzziness and the related existence of hybrid senarios, can be regarded as an opportunity rather than a weakness. Rather than following a cut-and-dried recipe we can take the 'ingredients' (approach, technique, content elements, …) we like and mix these to make our own hybrid that suits our needs. E.g. a hybrid scenario (such as Possum) mixing explorative and normative modes of thinking and related methodologies (such as the axes technique and backcasting, …) may suit our needs as it combines a comprehensive view of the field of driving forces and influential pervasive phenomena in society together with the strategic options available for reaching a certain target. It may be clear that a clear view on the intended use and relevance of a scenario will further determine the needs that have to be fulfilled by the approach eventually opted for (see Work Package 3).

In assessing our needs with respect to the tools that are available, there are however a few essential considerations to be taken into account when embarking on a scenario construction process. Recently, a whole discourse has developed which sets the context for the scenario approach holding the prospect of great potential for sustainability issues. In such theoretical considerations, rather contrasting potential benefits are said to be attainable from working with scenarios while looking at real scenario cases a kind of trade-off between them seems to be at play. Apparently, certain pitfalls are present when making scenarios. By presenting them here in terms of tensions, we want to make these pitfalls clear, indicating at the same time some major challenges for future scenario work.

5.1. Scientific soundness versus creativity and imagination

The tension between scientific soundness and creativity and imagination has been addressed at several points throughout this paper: The discussion on strong plotlines versus strong storylines as well as on participatory versus expert driven, structured versus intuitive and quantitative versus

qualitative approaches can all be related to this basic tension. It seems that the classical norm of scientific soundness as being equivalent to objective, quantitative data obtained in a structured approach is still in force in the scenario field. Indeed, a lot of scenarios can be found that show a tendency towards this classical idea of 'scientific soundness'. Big scenario exercises such as the Millenium Ecosystem Assessment adopt structured approaches with a lot of attention to modelling for delivering quantitative data but seem to fail in bringing a challenging and compelling scenario. This has e.g. been discussed in the context of storytelling where a qualification of bad scenarios was proposed based on scenarios that either have poor storylines and strong plotlines or vice versa. An undue one-sided focus on either scientific soundness (resulting in strong storylines but poor plotlines) or creativity and imagination (resulting in strong plotlines but poor storylines) seems to be the fundamental cause for this kind of 'failure'. Similar reasoning could be developed on participatory versus expert driven, structured versus intuitive and quantitative versus qualitative approaches. It may be clear that a major challenge for scenario developers is situated in overcoming this tension.

5.2. Consensus scenarios versus scenario ownership

A typical feature of contemporary scenario development processes is the involvement of decision-makers and important stakeholders in addition to the traditional group composed of scientists and experts. The involvement of different stakeholders and experts is done at different degrees (from singe interviews to workshops) but also with different aims. On the one hand, participatory approaches are promoted as a means to increase the quality of scientific inputs by incorporating expert knowledge and judgement of relevant stakeholders into the scenario building process. On the other hand, participatory approaches are deployed to ensure the acceptability and relevance of the results or –to put it even stronger- to create 'ownership'. In particular, when the scenario-product is taken a step further in a change process (e.g. a transition management exercise), it seems important that the participants involved take ownership of the process and the results Related to this aspect of ownership is another potential pitfall in scenario development. It has e.g. been observed that broad participative constellations tend to end up with a 'consensus' scenario: a scenario all participants will settle for but which none of them regards as being 'his' or 'her' scenario. This limits the possibilities for using the scenarios in a consecutive change process. A limited participative process, on the other hand, may well succeed in elaborating a scenario all participants 'own', but may not be useful because of the lack of stakeholder involvement, i.e. the persons who could initiate a process of change were not involved. How to engage people, having differing worldviews and normative frameworks and often contrasting concerns in a participatory process to develop a scenario they all 'own' is clearly another major challenge. On a more practical level, it should be realized that the composition of the scenario team is of major importance. What kind of people are needed and what kind of people should be avoided in order to arrive at a 'useful' scenario. This not only relates to their scientific or other expertise but also to their 'human' capacities: openness to other worldviews, capacity for creative thinking,…

5.3. Process versus product focus

On a more overarching level, scenarios are often presented as characterised by a focus on the process and/or the output of the exercise. The double question here is whether one aspect is more important in terms of impacts then the other, and whether it is necessary to make a trade-off? Post-normal science offers an interesting perspective from which this challenge could be tackled as it provides us with a framework which focuses on the process of knowledge construction as a major characteristic for the quality of the product of this process. Scenarios, viewed as the social outcome of a systematic process of weighing different arguments, have a potentially important role to play with regard to the increasing demand for more public and stakeholder involvement in the scientific activities. These evolving dimensions of the policy–science interface suggest that participatory forms of scenario analysis could be particularly effective in addressing the strategic and normative elements of sustainability questions by incorporating values and preferences into the scenario analysis process itself. In this way, the quality of the scenario construction process, although not sufficient, is a prerequisite for a high quality scenario.

One final consideration, although of a practical nature, may well turn out to be of overriding importance. A scenario process needs two essential ingredients: people and time. This implies that time and budget will constitute important boundary conditions for the elaboration of such a process.

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RESEARCH PROGRAM SCIENCE FOR A SUSTAINABLE DEVELOPMENT (SSD)

CONSENTSUS PROJECT

INVESTIGATING FUNCTIONS AND UTILIZATION OF SCENARIOS

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Université Libre de Bruxelles
Institut de Gestion de l'Environnement et d'Aménagement du Territoire
Centre d'Etudes du Développement Durable

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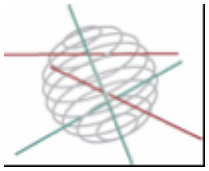

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This document is a working paper elaborated for the Consentsus project ('Construction of scenarios and exploration of transition pathways for sustainable consumption patterns') in the context of the work package 3 ('Investigating scenario demand and utilization').
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INTRODUCTION

OBJECTIVES OF WORK PACKAGE 3

Work package 2 *"Analysis and interpretation of existing scenarios"* (see GOEMINNE and MUTOMBO, 2007) has highlighted how scenario construction exercises intervene in areas with multiple levels of uncertainties and complexities. We concluded that even *'successful'* scenario exercises cannot eliminate such uncertainties and complexities, but that they can help specific user groups to develop some order and coherence in their perceptions of the many possible future pathways. In the present working paper, we elaborate further on the characteristics, which determine a particular aspect of the *'successfulness'* of scenarios, i.e. the impact of scenario exercises.

While scenario exercises are occasionally analyzed for their 'technical' robustness and even for their procedural strength, there are only few analyses available which integrate the question of adequacy and applicability of the exercises' outcomes and processes for policy- and decision-making. The generic objective of WP3 is to investigate the influence of scenario exercises on policy and practices and to gain better understanding of the factors that influence the success and failure of scenario exercises.

Subsequently the results of WP3 have and will participate to configure more consciously the transition process of the present project (WP4, i.e. scenario construction and, partially, WP5 and 6, i.e. transition pathways in system innovation). On the other hand, the present work package will also use the other tasks of the project as a case study which will allow to experiment during the scenario-construction exercise with the identified parameters of success.

Eventually, WP3 will be followed-up by WP7 developing further the governance track in the Consentsus project. WP7 is meant to use and structure feedback gathered during the project in order to learn from the present experience, discuss and envisage the way transitions and system innovations could be steered and will submit recommendations and conclusions to policy actors with regard to an implementation in the Belgian context.

The general objective of this paper, within the Consentsus research project as well as from a broader scientific perspective, is to contribute to the reflection on long term governance in the context of sustainable development. Through WP3, we focalise our attention on an emerging category of policy instruments (Lascoumes, Le galès, 2004), among which scenario exercises. In this perspective, we want to inform on the usability for SD-policy of this new category of instruments which could become an integral part of the policy-process itself (Bauler, 2007).

METHODOLOGY AND WORKFLOW OF WORK PACKAGE 3

Largely referring to the project proposal, we briefly present the different stages of work package 3.

Task 3.1 Exploration of existing studies on the use and impact of scenario exercises, and typology of encountered factors of success (and failure)

Logically, we started to review the literature in the scenario domain in order to explore existing analyses on the use and impact of scenario exercises, including literature on factors of success (and

failure). As acknowledged in the research proposal, our review confirms that specific literature on the assessment of scenario impact and use is not abundant, and empirical studies quasi inexistent. Despite the current prevalence of scenario exercises, the systematic analysis of scenarios in terms of their objectives and their impacts (on policy) is clearly in its beginning stages.

Most of the analytical stances - and some of the methodology - needed thus to be constructed specifically for the present project, on the basis of adjacent literature (for instance in the field of evaluation use, information impact, etc) and existing expertise and experiences. We complemented thus a first structure of our analytical framework on the basis of two information channels.

On the one hand, a first range of straightforward questions concerning the uses and users of scenarios were highlighted, and submitted[1] to a series of scenario specialists: Al Hammond (*Innovation & Special Projects* at the *World Resources Institute*), Rob Swart (*European Topic Centre for Air and Climate Change of the European Environment Agency*), William Cosgrove (*World Water Council*), John Robinson (*Sustainable Development Research Initiative* at the *Institute of Resources, Environment and Sustainability*), and some other authors of articles around scenario functions: Russel F. Korte (*School of Human Resource Development and Technology - University of Texas at Tyler*, USA), Thomas J. Chermack (*Department of Learning and Performance Systems at the Pennsylvania State University*, USA), Clare Harries (*Centre for Decision research, Leeds University Business School*, UK) On the other hand, we expanded our literature review into the study of adjacent information-generating policy processes and their use/effects; e.g. we explored the existing literature on evaluation use, the use and effect of policy instruments in general as well as in particular (e.g. indicators, impact assessments, modeling processes, etc).

As a result we have developed a theoretical framework which synthesises and structures some of the current knowledge on scenarios, and which describes and puts into context the functions and effects of scenario exercises in policy-making situations. In the first place, the framework highlights the main building blocks which define the nature of scenario exercises - in terms of their process and their product – which in their turn influence two levels of outcomes; i.e. outcomes in terms of *'adapting mental models'* or in terms of *'facilitating planning and strategizing'* (as illustrated in figure 1).

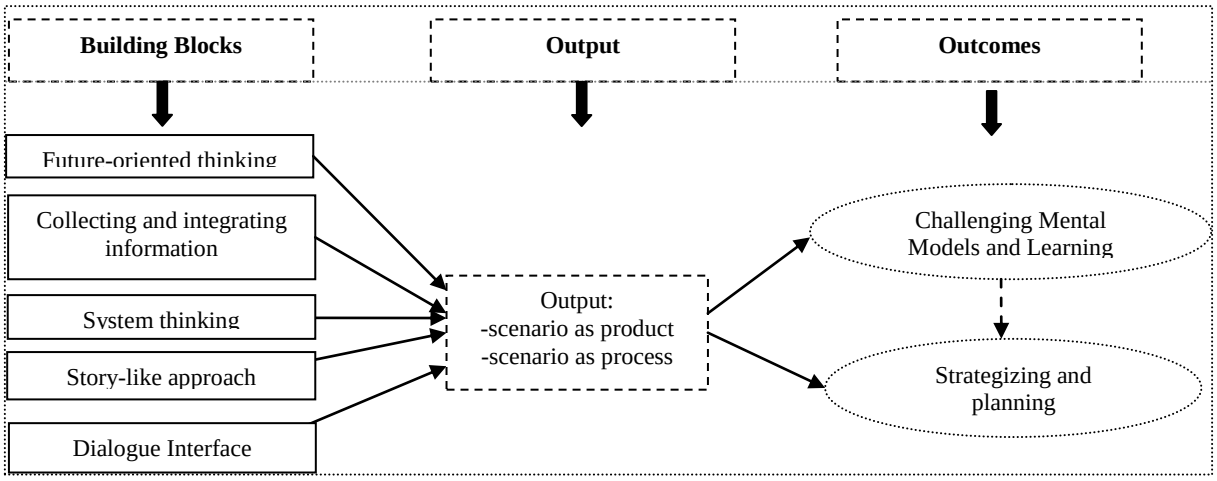

Figure 1: Deconstructing the influence chain of scenario exercises

[1] The dialogue with these experts was conducted either through email exchanges, or prolonged telephone interview.

In order to refine, test and populate the framework at the light of existing experiences, we (ULB-IGEAT and UG-CDO[2]) conducted ten semi-structured face-to-face interviews with Belgian French- and Dutch-speaking experts, stakeholders and initiators involved in the main Belgian scenario exercises of the last years (See Annex 2: lists of the interviewed experts). We used these interviews also to gain some insights with respect to the two following tasks of the working package: the current demand for scenario exercises (Task 3.2) and the assessment of existing scenario exercises (Task 3.3).

Task 3.2 Identification and characterization of the current demand for scenario construction exercises

We based ourselves thus on these interviews (see task 3.1) to sketch a more precise picture of the landscape of Futures Studies in Belgium, and to gain a better understanding on the existing situation in Belgium in terms of long-term planning and scenario construction exercises. This appreciation of the Belgian context will be more specifically explored with regard to the expectations (i.e. the demand for scenario exercises) of SD actors (policy actors, stakeholders, etc.) during the final stages of phase 1 of the project. We will explore this 'scenario demand' with regard to scenarios in general, as well as w/r to initiatives linked to transition management and system innovation.

Task 3.3 Assessment of existing scenario exercises

The conducted interviews (see task 3.1) provided also elements which permit to assess existing scenario exercises. The questionnaire (see Annex 3) has been elaborated on the basis of the conceptual framework (task 3.1) not only in order to refine the framework itself, but mainly to collect information on elements influencing the success and failure of scenario exercises.

Initially the objective was to concentrate on some precisely identified scenario-initiatives and to assess with their developers, participants and users the outcomes and impacts of scenario exercises. However, it occurred that only few scenario-initiatives had been looked upon consciously and critically by initiators, developers or even participants for their impacts on policy situations. Instead of assessing in depth a few scenario exercises (as proposed in the research proposal), it was decided to focus on experts, academics and policy-makers, who had some recurrent and broad scenario development experiences. For Belgium, the most important scenario exercises were selected and a series of experts were identified that were recurrently involved in them. A selection of these experts has been interviewed (Peter De Smedt; Philippe Destatte; Florence Hennart; Frederic Heselmans; Moritz Lennert; Erik Mathijs; Bernadette Merenne-Schoumaker; Michael Van Lieshout; Eva Verstraete; Donaat Cosaert, Stef Steyaert[3] - see Annexes 1 and 2: list of interviewed experts and the list of referenced scenarios (and prospective) exercises).

[2] The Dutch speaking interviews have been prepared and performed by Maarten Crivits (UG-CDO).

[3] Besides, we had the opportunity to organize a meeting with Alain Wouters, Managing Director of *Whole Systems* and internationally experienced scenario facilitator. We also discussed these issues with Nadine Gouzée and members of the SD Task Force of the Planning Bureau during a meeting addressed to several research teams in order to diffuse insights drawn from the elaboration of the scenarios of the Fourth Federal Report for SD.

Task 3.4. Providing feedback to improve the robustness and potential use of scenarios of the present project.

The operational objective of WP3 is to use the gained knowledge in order to anticipate difficulties and shortcomings which could occur during the present scenario construction exercise in WP4 and WP5. The conclusion of the present paper provides thus insights for the elaboration of the procedural setting of the scenario- and transition pathway constructions (WP4 and WP5).

PRODUCTS FROM WORK PACKAGE 3

So far, the elaboration of this paper, from research to redaction, has already generated concrete products. The analyses conducted within WP3 have been partly presented in academic conferences. These presentations and the content of the present paper will provide the necessary material to produce at least one paper which will be submitted to an international peer-reviewed journal.

The following presentations were conducted on the basis of WP3:

Bauler, T., Mutombo, E., Wallenborn, G., (2007), *Long Term Strategizing for Sustainable Development: Discussing the difficult linkage between prospective and planning endeavours*. Paper presented at the European Society for Ecological Economics Conference 2007 'Integrating Natural and Social Sciences for Sustainability', 5-8th June 2007, UFZ - Centre for Environmental Research in Leipzig, Germany.

Bauler, T., Mutombo, E., Wallenborn, G. (2008), *The Impact of Long-Term Scenario Exercises on Sustainable Development Policy-Making*. Paper presented at the Conference on the Human Dimensions of Global Environmental Change, 'Long-term Policies: Governing Social-Ecological Change', Berlin, 22-23 February 2008.

Bauler, T., Bonifazi, A., Mutombo, E. (2008), *Sustainability Evaluations in the Context of Long-Term Strategizing. Crossing Insights from Urban Development and Transition Management*. Paper presented at the EASY-ECO Vienna conference 'Governance by Evaluation : Institutional Capacities and Learning for SD', 11-14 March 2008, Vienna.

STRUCTURE OF THE WORKING PAPER

The present paper is divided in two parts. Part I presents the developed theoretical framework. We first highlight what we identified as the main building blocks (A) of a scenario exercise and their interactions. We then develop on potential outcomes of scenario exercises (B). We conclude this part with insights on the place and influence of scenario exercises in the policy context (C).

Part II presents a range of factors of success and failure of scenario initiatives, as well as some intermediary conclusions.

I. THEORETICAL FRAMEWORK

Based on our literature review, we draw a theoretical framework of the functioning of scenario exercises. Subsequently, we develop in two sections, first (A), what we have labeled, *scenario building blocks*, i.e. the principal generic characteristics that define the modes of thinking to which a particular scenario exercise refers itself to. Second (B), we elaborate on the *scenario outcomes*, i.e. the way scenario exercises can be *used* in policy-making.

Finally (C), this theoretical framework will contribute to draw conclusions on the influence of scenario exercises.

INTRODUCTION

Investigating the subject of impacts and uses of scenario exercises in policy-making, and their influence on policy and practices, means to take into account insights from the research field of information- and evaluation use. Generically, literature acknowledges that information can be used *"(a) instrumentally, to give direction to policy and practice; (b) politically or symbolically, to justify preexisting preferences and actions, and (c) conceptually, to provide new generalizations, ideas, or concepts that are useful for making sense of the policy scene"* (Weiss et al, 2005, p.13).

Instrumental use occurs when there is a direct link or linear relationships between the result of a study (or a group of related studies) and decision outcomes and where the informational content is used as the basis for decision-making (Weiss et al, 2005, pp.13-14; Hezri, 2006, pp.134-137). This is what has traditionally been expected. However, it has been acknowledged 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).

Political (or symbolic or tactical) use provides legitimation (Weiss, 2005, p.13). It occurs when the content of a study is *"used to justify what decision makers want to do anyway",* when it is *"used as a sign or symbol of some other reality"* (Hezri, 2006, pp.134-137). This type of use is often negatively connoted. There is however no harm in using evidence to strengthen one's position. There is *misuse* of information if the decision maker distorts the results (Weiss, 2005, p.14).

Conceptual use (or use for enlightenment) occurs when a research or study influences a user's understanding of a problem or situation, even if the information is not used to base decisions in a direct way (Hezri, 2006, pp.134-137), or in other words: "*decision-makers might not base their next decision on the evidence, but they often found themselves influenced in more subtle ways in the longer term*"(Weiss, 2005, p.14).

We do argue that this generic typology of 'information influence' can be applied to scenario exercises, because at their basis scenarios encompass the construction of information and generate a wider knowledge base, as we will develop in the next section. However, we argue also that scenario exercises do more than providing 'information'.

In effect, the provision of information is only one aspect of a scenario exercise. The nature of scenarios is multiple: scenarios, more or less explicitly, encompass norms and values, beliefs and emotions and hence cannot be limited to 'informational instruments'. Scenarios in fact gather the characteristics of different types of tools, approaches, processes (informational tool, participative approach, etc), which makes difficult to classify them. The next section tries to shed some light on these questions.

A. SCENARIO BUILDING BLOCKS

We could have based our analysis on the why-typology highlighted in WP2 and pointing at three different modes of future-thinking (see below point a.). However, these three modes are quite theoretical and as explained in WP2, most scenario exercises are hybrids and do gather characteristics of the different types. To understand scenario exercises impacts and influence we needed to understand how scenarios exercises function. We thus looked for characteristics that are recurrently and more or less systematically referred to in scenario literature and highlighted what we called the scenario 'building blocks' which are fundamental elements as such (A1) as well as through their interactions (A.2).

A.1 THE "SCENARIO BUILDING BLOCKS"

Indeed, the scenario literature is quite generous in presentation of methodologies, approaches and tools, generic or ad hoc, but does not seem to highlight clearly the main elements that constitute the core of a scenario exercise. Beyond the chosen methods, tools and processes that configure the mechanics of scenario exercises, we pose that scenario exercises rely on a few central *building blocks*, which define the generic characteristics of a given scenario exercise. Basing on the existing literature, and synthesizing it in an original way, five distinct characteristics are identified: *Future-oriented thinking*
Collecting and integrating information; System thinking; Story-like approach and Dialogue interface. The focus on one or the other of these characteristics is not the same according to the encountered exercises, but these characteristics encompass the variety of realities of the scenario field.

a. FUTURE-ORIENTED THINKING

One of the principal characteristics of scenarios is obviously that they concern the Future. Scenarios can *"generate and integrate knowledge about complex future states*" (Wiek, 2006, p.751) or *"are a means to explore the future and identify what might possibly happen*" (Bood and Postma, 1997, p.635). Even if in most cases these statements are properly contextualized and explained, they remain ambiguous. As the future is unknowable by definition, scenarios are not about generating 'Truth' about it, neither about identifying the 'Possible'; at best, scenarios explore a small part – and help to define the limits - of the 'possibility space' ("*champ des possibles"* , Godet, 2007, p.42*)*. As repeatedly stated in the Futures Studies literature, scenarios are not predictions. In fact, they are often acknowledged (for a discussion, see Goeminne and Mutombo, 2007) to tell us much more about the present than the

future, as they focus attention on existing causal processes, patterns of change, uncertainties, seeds of change and decision-points.

As identified in WP2 (Goeminne and Mutombo, 2007, p.3), *futures thinking* can be classified in three modes of thinking about the future. The *predictive* posture, by thinking about what will happen, is a way to identify current main trends and driving forces as well as urgent challenges. The *explorative* mode of thinking is characterised by an open-minded point of view on the possible future events and developments. The strategic purpose is to be better prepared to handle emerging situations with the idea that it is impossible to predict what will actually happen. The *normative* mode of thinking starts from a specific and value driven vision of how society should be, or, which specific goal one wants to reach, and which paths are leading to this vision. These future-oriented modes of thinking create a space of creativity and reflexivity. When we are talking about possible futures, there is no right or wrong point of view and people are freer to expose a divergent point of view. It is the new light brought on the present informed by new perspectives sustained with an open-minded process that contributes to an improved preparation to react to new events or attempt to shape them.

b. COLLECTING AND INTEGRATION OF INFORMATION

The objective of simulating possible future evolutions of a geopolitical entity, a private organization or an ecosystem implies the necessity to gather a considerable amount of information and parameters and to integrate them in order to construct a more or less precise picture of the studied system.

Beyond traditional forecasts (based for instance on trend projections of quantitative data) on the one hand, and descriptive accounts of qualitative elements through narratives on the other hand, the integration of quantitative and qualitative data has been emphasized as being determinant in scenario exercises (Swart et al, 2004, p.141). Notably, this emphasis is made to permit to consider in a *"unified framework, bio-physical, economic as well as social features and cultural, institutional and value aspects"* (Raskin et al, 2004, p.60). Through and beyond this requirement, scenarios have been interpreted as a way to articulate information and knowledge from different scientific disciplines. Furthermore, as illustrated in projects such as the *European Environmental Outlook (EEO)* or the *Millennium Ecosystem Assessment (MEA)*, the construction of scenarios is drawing on the collaboration of different types of experts, who are articulated to bring together their knowledge about ecosystems (in these examples) and society in order to better understand the interactions that shape these socio-ecosystems. According to Swart (et al, 2004, p.141) "*so doing, scenarios also help to organize scientific insight into an integrated framework*".

However, the integration of quantitative and qualitative elements has proven a real challenge (see among others, Parson et al, 2007, p3). So far, a number of scenario projects tried to operationalize such an integration, mainly through the parallel or serial mobilization of both modeling techniques and narrative approaches. But the integration of the respective outputs has proven a considerable challenge notably in terms of consistency, e.g. in the IPCC and MEA scenarios (Parson et al, 2007, p3). Simultaneously, the translation of qualitative sequences of events into quantitative inputs for the models (and, to a lesser extent, of the translation of quantitative outputs of models into qualitative narratives) has proven a difficult methodological step. Among other lessons, the encountered difficulties amplify or highlight a pre-existing bias, which is notably to be linked to the high influence of the implicit normative choices occurring both during the modeling phase and the 'translation' phase. One illustration of these difficulties is, for example, the problematic of comparing or translating qualitative scales into quantitative scales. Another examples include the choice of criteria to be used

for the selection of the quantifiable parameter(s) that will stand for the monitored phenomenon. These operations imply to run implicit (or even unconscious) normative choices.

Second, the difficulties encountered during the integration of quantitative and qualitative aspects can be related to the more general discourse on the necessity of 'integration', which is, among others, linked to environmental management and sustainability perspectives (Scrase and Sheate, 2002). Indeed, the idea to construct a faithful representation of reality implies an objective of integration; integration of data, of different scientific expertise, of the different aspects of a problematic (social, biological, psychological, economical, etc). The term 'integration' itself is positively connoted to the idea of completeness, impartiality, and the reduction of the potential for conflicts (Scrase and Sheate, 2002, pp.276-277).

On another level, the call for integration can be linked to the perspective - rooted in the rationalistic paradigm - that more and better information leads to better decisions and policy making (Scrase and Sheate, 2002, p.275). Nevertheless, such deterministic views can potentially lead to situations where *"questions of an essentially political nature are removed from the realm of democratically accountable decision-making and presented as reconcilable by technical and rational methodologies or procedures*" (Scrase and Sheate, 2002, p.287). It has been highlighted that the link between information, knowledge and decisions is far from straightforward (Bauler, 2007, p.69) and that more information does not generally help *"disputants parties converge around a single, scientifically obvious policy choice, and commonly has the opposite effect*" (Herrick and Sarewitz, 2000, p.319).

c. SYSTEM THINKING

As presented in WP2 (Goeminne and Mutombo, 2007, pp.1-2), historically scenario techniques emerged after WWII in an atmosphere of rising uncertainty and complexity (scientifically, politically and economically). Administrations around the world wanted to simulate the future environments in which decisions will have to be taken. Based on systems analysis, and parallel to the development of computer modeling, scenario exercices emerged in order *"to create holistic, integrated images of how the future might evolve"* (Mietzner and Reger, 2005, p.224). Scenarios are based on a reflection around multidirectional causes and effect chains. They are meant to allow an integrated overview of the studied system, highlighting the relevant variables and trends and the interrelations between different elements, actors, sector, scales, etc., which are traditionally studied in separate fields (economics, environmental sciences, social sciences, politics, …). Opposed to the reductionist and scientific tendency to fragment reality into (presumed) non-related study topics, a systemic approach tries to identify the interactions between the different sub-systems. A systemic approach does not necessarily imply to work on a global level: it can be applied to transversal issues (such as climate change in the IPCC scenarios) or to more sectoral themes (like water, in the World Water Vision) at any geographic scale.

A weakness of such an integrated and systemic posture is the risk to loose grip to the amount of information - *a fortiori* when working at the global or transversal level - and to end up with a superficial result in terms of insight and analysis. It could also be that our current knowledge about systemic linkages remains rather poor (Rotmans, 1999, p.5), be it in the natural or human sciences.

To a certain extent, the systemic approach can also develop into an answer to the call for integration. Systemic approaches can be designed as a tool to go a step further in the integration of information and in the understanding of the complex interrelations within and between (sub-)systems (MEA, 2005, p.39). Typically used in ecology and ecosystem studies, the systems approach has been extended to the analyses of the impacts of multiple anthropogenic stressors on the environment, and

further of the interrelations between the social and ecological systems. It contributes to further structure and integrate available information and to identify the variables, the functionings and the patterns of change of the studied systems, which eventually also contributes to clarify where uncertainties and decision points are situated.

d. STORY-LIKE APPROACH

The outputs of such a systemic approach (i.e. the interrelations between elements of a studied system) can be pictured through, e.g., a flowchart made of points, lines, and arrows; but they can also be rendered through a narrative. In some scenarios, like the IPCC ones[4], this narrative part is limited to an explanatory text which is mainly a factual description (usually of the quantitative outputs of the model runs).

Other approaches develop however a full narrative. The classical elements of a narrative are the tension(s) (the driving forces of the story), the actors (and factors) which play a role, the sequence of events and, last but not least, the message (Rasmussen, 2005, pp.231-232). Indeed, stories and narratives in general aim at communicating (about) *"values, visions, strategies, rules and may create a 'we' feeling"* (Rasmussen, 2005, p.233;235); sometimes objectives go beyond persuasion and touch upon the manipulation of the reader.

As most narratives, scenarios can be used to communicate a specific message, and be 'sense making', i.e. "*the narrative scheme serves as a lens through which the apparently independent and disconnected elements of existence are seen as related parts of a whole*" (Barry and Elmes, 1997, p.431).

The story-like character of scenarios is presented as an important element of the scenario approach, as it is "*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, behaviors, and institutions, providing a broader perspective than is possible from mathematical modeling alone*" (MEA, 2005, p.40). Beyond these aspects related to the construction of scenarios, the story-like character of a scenario exercise allows to relate the exercise to myths and tails (Mermet, 2003, p.34), which call upon unconscious mechanisms and emotional reactions, often playing on fears, despair and hope.

Scenario stories can thus be seen as *"a 'bridge' between the analytically oriented planning and the creatively oriented vision making activities due to their ability to transmit both rational and creative layers of thoughts and beliefs"* (Rasmussen, 2005, p.230). Scenario exercises, by building coherent and plausible narratives and stories of the futures, are presented, on the one hand, to facilitate understanding, and on the other, to render emotions, both of which combined to influence representations and behaviors.

However, striving towards the elaboration of a compelling scenario narrative requires mastering the balance between identification and fascination, logic and emotion, and to have a clear idea of the

[4] See for example, IPCC, *Summary for policy makers. Emission Scenarios. Special Report of IPCC working group III*, IPCC, 2000.

objective of the scenario exercise in itself, as well as of the needs of the users. Simultaneously, the effective potential of influence of a scenario is difficult to assess in terms of impacts as it would require tracing and monitoring the links between the reading of a scenario narrative and the change in understanding or behavior. Third, special attention should be attached to the ethical question concerning the carried message and the means used to diffuse it: no narrative is ideologically neutral and the objectives of the author should be clearly presented.

e. DIALOGUE INTERFACE

Scenarios can in general terms also be seen as communication tools. Being articulated narratives (in our understanding), scenarios carry information and can *"ease communication with non-scientific audiences"* (Swart, 2004, p.141).

Beyond the mere informational source-receptor mechanism, scenario exercises can also be understood as *interfaces*, among others between disciplines as seen above, but also between science and policy (van den Hove, 2007), leading to frameworks such as post-normal science focusing on *"uncertainty, value loading and a plurality of legitimate perspectives"* (Funtowicz and Ravetz 2003, p.1).

This plurality of perspectives that should be taken into account is not limited to the interlinkages of science and policy. Scenarios ease not only communication from science towards other groups, but, beyond the mere monologue of science, a dialogue seems necessary, acknowledging that science can also be informed by the experience of non-scientists. As well can scenario exercises create dialogue spaces between science and society, society and policy and/or among stakeholders (see among others, Guimaraes Pereira and Funtowicz, 2003), as well as between scientists from different disciplines (for instance in order to facilitate interdisciplinary understanding and the development of more interdisciplinary approaches).

Scenario processes create such momentum for dialogue interfaces, and as a consequence, a scenario 'product' (i.e. a narrative) can be understood as a *"boundary object"* (Pulver and VanDeveer, 2007, p.4). Scenario exercises can be seen as 'co-production process' generating a shared reference (the scenarios), and beyond, a shared understanding and a common language which can facilitate further discussion or even collaboration. Mutual discovery of actors and their respective opinions, exchange of information, debate and settling of agreement or even consensus are targeted as outputs of such interfaces.

However, there is evidence that bringing people together in a same room is not sufficient to label scenarios as interfaces. The question of the results and impacts of such a dialogue interface created through the arena of a scenario construction process remains complete. If there is evidence that, through a well-designed participative approach, scenarios can generate discussion, debate and shared understanding (Guimaraes Pereira and Funtowicz, 2003), the impacts of an improved shared understanding on behaviors or even on the emergence of a shared 'vision' seem unclear.

Some factors for a successful initiation of the necessary dialogue have been highlighted, including among many others, trust between the participants as with the facilitator(s) (Selin, 2006, pp.6-7). Other factors include credibility, legitimacy and relevance (see below Part II), as well as other criteria identified in the study field around participation (e.g. the skills of the facilitator, the recruiting of the participants, etc.).

A2 BUILDING BLOCKS INTERACTIONS

These different building blocks of scenario exercises (BB) are not necessarily present in each specific scenario exercise. Though each of the building blocks represents a specific aspect, they are related to one another. A clear common thread across the different aspects is the idea of integration. As developed above, the current discourse in favor of integration can be linked to environmental management and sustainability issues, which claim for more integrated research, integrated analyses, integrated assessment, integrated policies, etc. Scenarios contribute to answer these calls in various aspects. The very idea of elaborating pictures and stories about the future implies an integrated approach (→ see a. Future-oriented thinking above). In order to build a credible and coherent picture of the current 'realities' of a specific system, scenarios have to base themselves on a sound diagnosis of the current situation through integrating available information (→b. .) and on a clear understanding of the interconnections between (internal and external) variables through systemic analysis (→ c.). Integration is also a crucial condition to build a coherent and challenging narrative; and vice versa, such a narrative reinforces the interconnected character (→ d.). Finally, participation is a tool to gather new information and diffuse it, and also a way to address the poor existing communication and collaboration between diverse actors (Scrase and Sheate, 2002, p.287) (→ e.).

Beyond the link between each BB and the idea of integration, the different building blocks are directly closely interrelated. Table 1, here under, develops the influences and implications among the five building blocks.

Following Table 1, we further present the interrelations and illustrate them in Figure 2. Both in the text and the figure, we have named each interrelation according to its place in table 1, at the intersection between a lettered and a numbered BB, e.g. 'C2' is situated at the intersection between the BB *System Thinking* in the vertical column (C) and *Collecting and integrating Information* in the horizontal line (2).

Table 1 must be read from the vertical axe towards the horizontal axe asking the following question: *What does the perspective or approach of the building block A (B, C, D, E) adds to the other building blocks (1, 2, 3, 4, 5)?* For example, the interrelation represented by the intersection 'D3' has to be understood as follow: 'Adding a *story-like approach* to a *system thinking* perspective will helps *highlighting potential incongruence in the interrelations framework and presents it through a more accessible language*'. In other words, being attentive to use and implement a story-like approach when focusing foremost on system thinking will contribute to better spot inconsistencies in the interrelation framework and translate the systemic results in an accessible language.

The table is not symmetric. Indeed, the inverse interrelation 'C4' does not result in the same outcome (as 'D3') and means that 'adding a *system thinking* perspective to the *story like approach* provides t*he interrelation framework which helps structure the story and develop a coherent narrative*'.

The table could be read as presenting a succession of delimited steps, if we look at the grey-coloured squares of Table 1 and the logical thread between them; this would mean looking at the building blocks as phases of a chronological process. Those steps are somewhat different from the classic sequence proposed in the manual of scenario construction (i.e. 1) Decision focus; 2) Key factors; 3) Pre-determined elements and uncertainties; 4) Selecting the scenario logics; 5) Fleshing out; Ogilvy and Schwartz, 2004). Indeed, what we have presented in this section are not steps of a scenario exercise, but a range of approaches and perspectives mobilized (at different degrees) all along the exercise and which have transversal implications.

These building blocks are not simply tools implemented one after the other. They are different perspectives influencing the exercise and its outputs. They are also all of different nature: *Future-oriented thinking* is a specific 'state of mind', a way of looking at things through the lens of the future; *Collecting and integrating information* is a research phase influencing the exercise to be grounded into facts; *System thinking* is at the same time a formal tool and a state of mind preaching that everything is linked to everything; *the Story-like* approach is a kind of (non-formalized) approach and a way to communicate through a less usual and more entertaining opening up device; the *Dialogue interface* is, in fact, a situation and as perspective it preaches for the necessity to communicate and to learn from diversity of perspectives.

	1. Future-oriented thinking	*2. Collecting and integrating information*	*3. System Thinking*	*4. Story-like approach*	*5. Dialogue interface*
A. Future-oriented thinking	*Future-oriented creativity and reflexivity space*	Help look at current knowledge from other points of view, take distance from current knowledge	Help question interrelations taken for granted and to identify new ones through taking other perspectives	Contribute to a creative and open-minded state of mind in the redaction	Provide the open-minded posture necessary for people to listen and understand other points of view
B. Collecting and integrating information	Base of knowledge about the present to project/imagine the future of a given topic.	*Research and state of the art of the studied topic; factual base*	Base of knowledge on which to build an integrated framework of interrelated variables.	Provide the elements which compose the narrative and ground the narrative in facts	Provide the information on which to base the discursive reflection
C. System Thinking	Identifying potential future patterns of change	Connect and structure the collected information according to the interrelated framework	*Construction of the interrelation framework*	Provide the interrelation framework which helps structure the story and develop a coherent narrative	Provide the interrelation framework which allow a better understanding of the topic and structure the discussions
D. Story-like approach	Help project into a new world and transmit this future-oriented perspective to writer and reader.	Make the information more accessible through a familiar language	Help highlighting potential incongruence in the interrelations; translate them in a more accessible language	*Translation into narrative language*	Help people apply causal reasoning and create a concrete collective product.
E. Dialogue interface	Gather the different perspective needed for more creativity and reflexivity	Contribute to gather and exchange new information, to present them through different perspectives	Bring different new lights on the way interactions, power struggles, etc. are understood.	Bring specific inspirations in the way to present things in an accessible and appealing story	*Encounter of multiple perspective*

Table 1: First- and second-order interactions between building blocks

This table structures and details the interrelations between the identified building blocks in first- and second-order interrelations. The first-order interrelations, i.e. building blocks interacting with themselves (the grey-colored squares), allow accounting for the main purpose(s) pursued by the characteristic (e.g. 'C3', applying s*ystem thinking* during scenario exercises is foremost meant to 'configure a *systemic framework* for the interrelation of variables'*).* Second-order interrelations allow a more differentiated reading of the implications of building blocks; they define in a certain sense the profile and the overall character of a scenario exercise. For example, 'C2' can be read as follows: 'mobilizing *System thinking* across the scenario exercise's process will allow hardening the connection and structuring the *collected information* according to the interrelated framework'. Conversely, 'B3' means that

'*Collecting and integrating information* will supply additional knowledge on existing *integrated and systemic frameworks'*.

Most of the time, the five building blocks reinforce each other; even if the interactions between some building blocks may seem to have antagonist tendencies, i.e. *Collecting and integrating information* and *Future-oriented thinking* ('A2';'B1'). Indeed, the research phase of collecting and integrating information is meant to build strong roots into the present and current knowledge, whereas the future-oriented posture, and more particularly the explorative and normative modes of future thinking imply taking distance with what is currently taken for granted. However, the future-oriented perspective is necessary to be endorsed throughout the whole exercise, and is of help to open the door to new way of looking: it can allow a new look, even on the type of information one is searching for. Vice-versa, creativity and reflexivity without a robust factual basis, end up in pure divagation.

Some building blocks provide the work material for others. The research of information building block provides material for the systemic analysis ('B3'); and this latter provides an interrelation framework for the construction of a coherent narrative ('C4'). But it is not mono-directional as, in parallel, the story-like approach also help check the coherence of the systemic framework ('D3') and the systemic approach contribute to structure the collected information ('C2') (see the three central BB in figure 2 for the illustration of these feedback mechanisms).

As said above, these last interrelations could make think the building blocks constitute a kind of step-divided process with simple feedback mechanisms. However, interrelations are multiple and transversal as also illustrated in Figure 2 below.

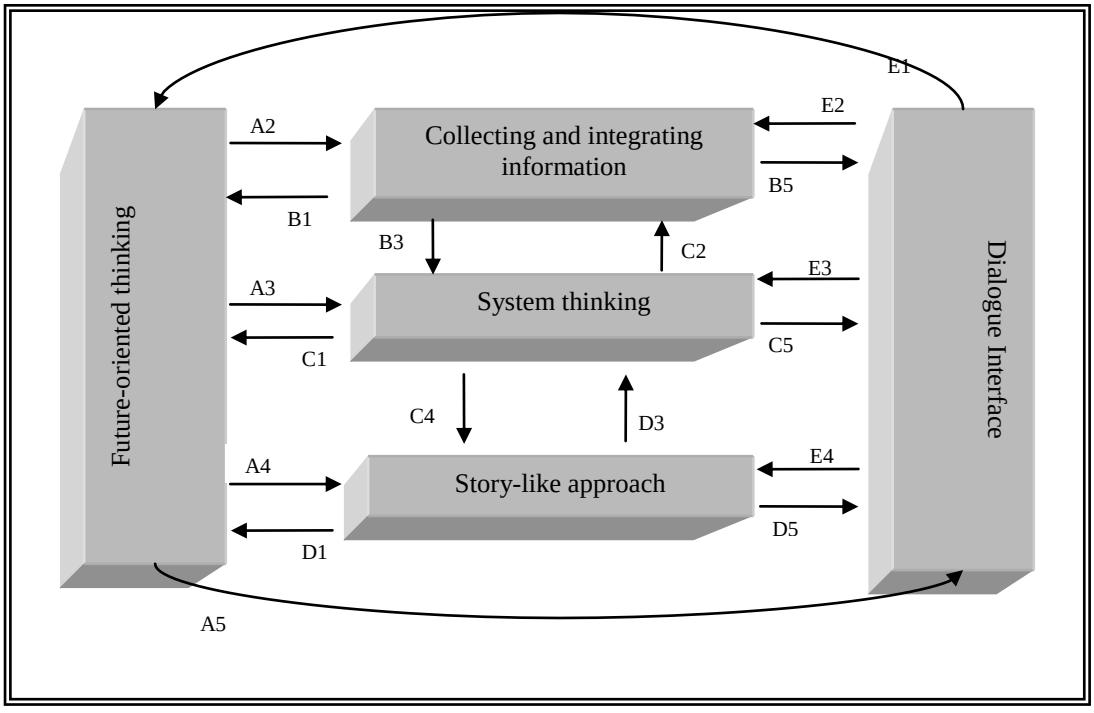

Figure 2 Examples of interrelations between the scenario building blocks

Beyond the already addressed interactions, we can see e.g. that the system analysis also help identifying future patterns of change ('C1'), and to a lesser extent, to structure the discussions in the dialogue interface ('C5'). The research of information posture also influence the story-like approach ('B4') and the dialogue interface ('B5') which need to depart from a robust factual basis. And the Story-like approach facilitates the projection into imagined world and thus reinforces the creativity posture ('D1'). Further, the future oriented perspective necessary to be endorsed during the exercise

generates the creative and reflexive open-minded background posture influencing the other building blocks (‘A 2,3,4,5’). This open-minded state of mind contribute e.g. to facilitate the encounter of different types of actors and encourage them to better listen and understand each other (‘A5’). While, the dialogue interface also contribute to creativity and reflexivity through 'bringing' the diversity of people and perspectives in the different building blocks (‘E 1,2,3,4’).

*

The different aspects presented in this chapter are not as such new material in the scenario field. However, the way we present them as five building blocks, i.e. core elements constituting most scenario exercises, interacting with each other in order to enhance the qualities of the scenarios as process and product is a new reading grid. It may help scenario developers and users better understand the mechanisms at stake in their exercise and better structure their approach of scenario exercises.

B. OUTCOMES AND USES

The preceding section described five building blocks of scenario exercises, presenting five generic characteristics of scenarios. These characteristics define the linkages between *how* a scenario process is configured by its initiators, and *what* is produced during the exercise. In the following we investigate what the scenario process and product can influence in a policy cycle; e.g. what the use and impact of scenario exercises are. We address these policy effects as different types of *outcomes*, e.g. *better understanding, debate, shared vision* which we summarize in two main clusters of influence of scenario exercises*: challenging mental models and learning* and *strategizing and planning.*

INTRODUCTION

The *output* of a scenario exercise materializes in one or several scenarios. These outputs - and the process which led to it - generate under certain conditions (see Part II below on factors of success and failure) a series of *outcomes* for the users. Four of these *outcomes* are briefly discussed hereafter.

Here, a distinction must be made between the users of the scenario according to their 'distance' to the construction process. Users who have participated to the construction of the scenarios will be labeled *'producer-users'* and all other are labeled *'recipient-users'*. In many instances, literature proposes a distinction between process- or output-oriented exercises. It is however often impossible to clearly distinct the process from the product and their respective *outcomes* in concrete exercises. This distinction remains however useful at an analytic level. Among the above presented scenario building blocks, some aspects are more unambiguously linked to the content i.e. collecting and integrating information, the systemic and the narrative approach will generate outcomes for both types of users. The whole issue lies in mechanisms which are more linked to the process, i.e. a dialogue interface configuration and a reflexivity and creativity perspective. These types of approaches will firstly generate outcomes for those who have been participating in the process (i.e. the producer-users). The influence on recipient-users will be indirect and tributary of the quality of the diffusion interface (see Part II).

As has been highlighted in point A. developing on scenario building blocks, each of them brings something specific to the whole scenario exercise which generates various outcomes.

First, the ***future-oriented character***, which is part of the essence of a scenario exercise, creates a **creativity and reflexivity space**

Second, as a concentrate of ***information*** woven into a coherent ***systemic*** framework, scenarios can contribute to the better understanding of a topic or an issue. Through the study of possible structurally different patterns of development, scenario exercises deliver to the user specific information on causal links and interrelations between variables, on possible patterns of change of a system and answer the current discourse urging to take uncertainties into account. In this respect, scenarios can be used as **input for other research and policy processes,** such as impact and risk assessments, policy simulations, etc. (Hulme and Dessai, 2007, p.23).

Third, the ***narrative character*** of a scenario participates to generate some coherence of the imagined development. Elaborating the narrative facilitates the assimilation of the information and the understanding of the causal links for the producer-users. If the proposed story succeeds in balancing identification and fascination, rationales and emotions the reader is supposed to better understand the content of the scenario and better perceive and apprehend the meaning of it. In this respect, scenarios

can be used as a **communication tool**, be it to communicate scientific based information or a more explicit normative message.

Fourth, scenario exercises acting as ***dialogue interfaces*** bring different types of actors together and can enhance the creation of a shared understanding of the studied issue, or enhance the emergence of a common language. In this respect, scenarios can **facilitate agreement on issues, problem definition and solutions (Quist, 2007, p.208)** and generate consensus. They can be the source of **networking**, and engagement in further collaboration.

Finally, ***scenario exercises as a whole*** give us distance from the present, open up the future, challenge or dispel assumptions about the 'official' future and allow renewed thinking by removing obstacles to creative thinking. Scenarios highlight new options for decision making or help reframe existing decisions by providing a new context for decisions (new perspectives and considerations) and exploring the potential impacts of specific decisions.

All of these can be bundled in two more general categories of uses, impacts and effects: scenario exercises main outcomes contribute to **challenge** the views of the producer-users **and** facilitate (higher order) **learning**, two mechanisms which are necessary when engaging into **strategizing and planning**. The next section thus develops what *'challenging mental models and learning'* and *'strategizing and planning'* involve in the context of scenario exercises.

B.1 CHALLENGING MENTAL MODELS AND FOSTERING LEARNING

According to scenario literature, scenario exercises are instruments of reflexivity and learning. They help to be more aware of beliefs and assumptions about the studied topic and contribute to influence it. Indeed, as humans we have a limited cognitive capacity and, even within these limits, we always dispose of incomplete information: *"our judgments of the world are based on perceptions guided by beliefs – our mental models"* (Connor and Dovers, 2002, p.7). Some authors[5] mobilize this concept of mental models and pose that scenario exercises have an influence on it.

A mental model can be defined as *''a relatively enduring and accessible, but limited, internal conceptual representation of an external system (historical, existing or projected) whose structure is analogous to the perceived structure of that system. […They] guide, shape, and provide the basis on which individuals interpret and make sense of organizational life"* (Korte and Chermack, 2007, p.648). At a more social level, this corresponds to the concept of discourse developed by Dryzek (1997) as a *"shared way of apprehending the world. Embedded in language, it enables those who subscribe to it to interpret bits of information and put them together into coherent stories or accounts. Each discourse rests on assumptions, judgements, and contentions that provide the basic terms for analysis, debates, agreements, and disagreements…"* (Cited in Connor and Dovers, 2002, pp.8-9).

Mental models are characterized by a relative inertia as *"individuals often fail to consider alternative models in their reasoning thereby perpetuating the same deductive inferences about causality."* (Korte and Chermack, 2007, p.647). But of course, people's representations, beliefs, assumptions, etc. may evolve, and so lead to *"a different way of understanding and acting in the world"* (Korte and Chermack, 2007, p.648); and that is through learning.

Learning is generally said to occur *"when individuals assimilate new information, including that based on past experience, and apply it to their subsequent actions"* (Hall, 1993, p.278) and can thus be generated through different channels. Nevertheless, learning through experience can

[5] Van der Hijden, 1997; Bood and Postma, 1997; Harries, 2003; Korte and Chermack, 2007; Meppem and Gill, 1998, etc.

sometimes be difficult, particularly when a long time-span elapses between action and results and moreover because learning as such is an incremental process occurring over a period of many years and which need to overcome the inertia of mental models to influence patterns of decisions and behaviors (Bood and Postma, 1997, p.636; Harries, 2003, p.799).

Tenants of scenarios pose that such exercises can help challenge mental models and foster learning. Indeed, on the one hand, scenarios, through the construction of alternative futures, highlight the beliefs and values that underly those futures (Korte and Chermack, 2007, p.650) and thus allow to become more aware of beliefs and confront them with other points of view, so, to challenge people's mental models. On the other hand, scenarios act as a simulator, enabling to virtually experiment situation, actions (and their consequences) and to learn from it.

As for individual mental models, organizations also have their specific values, principles and beliefs, their own culture[6] (Bood and Postma, 1997, p.637). Be it an enterprise, an administration, an ONG, etc., beliefs and assumptions are characterized by inertia and it can be difficult to question the current perspective and to change, without the fear to lose markers.

Scenarios ease the process of questioning current beliefs, as a legitimate framework in which to challenge the current organization and envisage alternatives. They can be used as *'transitional objects'* (Bood and Postma, 1997, p.636; Harries, 2003, p.799): "*Scenario planning, as a form of simulation, may run parallel to the existing cultural context of the organization; It is a method to figure out the actions, beliefs, and knowledge required in a new cultural context without disrupting the existing context*". (Korte and Chermack, 2007, p.652).

The specificity of scenario exercises is that "*different perspectives on the world can be true even if they are contradicting"* (Selin, 2006, p.2), as we are speaking about hypothetical futures. The future-oriented posture would thus work as a de-inhibiting approach allowing people to take some distance with what is usually taken for granted and have a look from other point of view; creating a fertile ground for learning.

This concept is usually disaggregated in different types of learning (technical, conceptual, policy, organizational, social, etc.); depending on the author, the field or the assumed theory, the definitions are quite different and often overlapping.

We choose here to base on the conception of learning of Brown (2003) as it combines elements from a range of theories on learning and is a more operational definition. It has proven to be applicable in projects dealing with innovations (Brown, 2003) and in study cases about the impacts of three backcasting exercises (Quist 2007). This conception distinguishes between first order learning *"which reflects new insights with regard to options in the case of a given problem and a given context"* and 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).

Brown focuses on 'higher order learning' which "*leads to changes in the frames of actors and thus increases the space for actions and behavioural alternatives and allows for the formation of alliances or cooperation with other stakeholders. Higher order learning is also about actors who change problem definitions and perceived solutions, shift preferred ways and approaches how to deal with the problem and the extent to which these changes and shifts are shared among the participants*" (Quist, 2007, p.72, based on Brown et al. 2003).

[6] Some authors speak about 'shared mental model' or 'organizational mental models', i.e. "the dominant way in which changes and events in the environment are perceived and interpreted within the organization" (Bood and Postma, 1997, p.637).

It is more precisely defined as *"consisting of three interrelated shifts: (1) a shift in the framing of the problem and of the perceived solution (or a menu of solutions); (2) a shift in the principal approaches to solving the problem, and in the weighing of choices between desirable yet competing objectives; (3) a shift in the relationship among the participants in the experiment, including mutual convergence of goals and problem definitions" (*Brown et al., 2003, p.296). The third type of shift is thus related to what we have highlighted above as creation of shared understanding or common language.

It is widely assumed in the sustainability related discourses that changes and change processes towards SD require learning by stakeholders. However, as argued by Grin and Van de Graaf (1996), *"learning is an important condition but not a guarantee for change"* and has been highlighted as very difficult to achieve (Quist, 2007, p.43;45). Further, effectiveness of such outcomes remains so far difficult to assess as it supposes to pursue in-depth case studies, following developer-users from the beginning of the exercise until the end and beyond.

However, according to Quist, learning is measurable as "*it is possible to reconstruct frame of meanings and evaluate changes with regard to this topic, for instance using in-depth interviews*" (Quist 2007, p.46) and he could observe it through his case studies on backcasting scenario exercises. This confirms the theoretical literature, but would also call for further in-depth research to bring more concrete insights on scenario exercises in general and learning.

B.2 STRATEGISING AND PLANNING

In the scenarios literature[7], it is obvious that the interest for scenario construction is often linked to the elaboration of strategies or plans. A strategy can be defined as a guide, a line of conduct for action in the future. It is mainly characterized by a focus on the evaluation of the external environment and the identification of opportunities and threats, and on the internal evaluation of strengths and weaknesses (SWOT model) (Risse, 2004, p.36). It can be understood as very similar to *planning*. At this level of definition, the main difference between planning and strategizing is that the first *identifies ways and means* to mobilize in order to reach a fixed objective, while the second is based on *available means*. (Godet (Tome 1), 2004, p.24). But strategy can also be defined as a *"way of doing specific to an organization, a model of behavior coherent through time, etc."* (Risse, 2004, p.36). Some authors present plans as being part of a strategy (which *"involves a goal, a vision, a blueprint of the future and a plan on how to get there"* (van der Hijden, 2004, p.147). So, according to the authors, users and context, there is clearly some overlap and confusion. For example, if we take the terms of the Belgian federal authority concerning SD, the 'SD strategy' is the law organizing the SD institutions, actors and processes, whereas the 'SD plans' are the documents containing the envisaged objectives and actions. If we take the European level or even the forthcoming Belgian national strategy, the term 'SD strategy' refers to an ensemble of policy objectives and actions to be implemented.

It is interesting to note that a strategy can also be seen as a sense-making and storytelling activity (Barry and Elmes, 1997, p.430) and further as *"something that is constructed to persuade others toward certain understandings and actions"* requiring *"acceptance, approval and adoption"* (Barry and Elmes, 1997, p.433) to be implemented. Strategies as stories-and-tales are supposed to provide meaning to the organization and the employees.

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

According to the literature and experience in the private sector (with the emblematic example of Shell), scenarios can help elaborating strategies for organizations: *"they are […] like hypotheses of different futures specifically designed to highlight the risks and opportunities involved in specific strategic issues"* (Ogilvy and Schwartz, Peter, 2004). Several kinds of scenarios can be developed in a strategizing context for the public field. One can work on the simulation of the impacts of a specific policy (what if scenario); check the robustness of a policy against different possible scenarios (multiple explorative scenarios); or attempt to identify pathways towards a fixed objectives (normative scenarios).

The link between scenario construction and strategizing/planning is often presented as straightforward. However, the analysis of some encountered exercises hasn't confirmed this view. On the contrary, there seems to be a hiatus in terms of temporal horizons, involved actors, modes of thinking; the articulation between the two approaches seems *not* to be straightforward. This is, at least partly, due to a difference of context and actors between the private and the public field.

In the scenario literature based on experiences in the business field, it is quite clear that the focus is on managers, head of services, etc. i.e. decision makers. The Shell methodology advises to set up a process where all the main decision makers of the enterprise are part of the construction process ('primary recipients') or more concretely people delegated to be part of the process and to take 'insights back to their business', and, where the main message of the process and the final scenarios are communicated to the rest of the organization ('other internal recipients') and further ('external recipients') (Global Business Environment, 2003, pp.29-31). Further literature, notably on climate change scenarios, as well as our interviews, confirm this point of view and call for close collaboration between developers and users (particularly at the beginning and ending stages of a scenario exercise) (Parson et al, 2007). If the objective of a scenario exercise is to contribute to a strategizing or planning process, than the targeted users are those contributing to the planning process and to the decision making (if the strategy is to be implanted).

However, even if some authors seem to believe that methods can be indifferently copy-pasted from one (private) context to another (public context), there are clear differences between the private and the public field. The business context supposes a clearly delimited system managed by a group of clearly identified and unchallenged deciders limited in number, and aiming at well defined goals (make profit and sustain the organization in time). In the public field, the boundaries are more blurred, there can be a high number of deciders to take into account for a specific topic or area (particularly in Belgium) and their responsibilities are moreover sometimes overlapping and limited in time (due to electoral terms). And finally, it is not possible to define mono-dimensionally the 'goal of society', or even the mission of the state or the administration.

According to Meppem and Gill (1998, p.126), the "*learning organisation framework is the integrated involvement of an organisation's entire stakeholder community in decision making. When extended from the business to the environmental management and policy domain, the stakeholder community becomes that entire section of society with interests in the relevant issues*." If we follow them, scenario building for strategizing (and learning) at the level of a country demands to involve a large range of actors.

Nonetheless, we know through concrete exercises that it is possible and relevant to develop a scenario exercise at the level of an administration department (e.g. in the socio-foresight exercise conducted at the level of the federal scientific department) or even at the level of a whole administration, as exemplified, e.g., by the report of the French planning office (*The state facing the challenges of sustainable development,* Ayong le Kama, 2005). This kind of exercise has also been organized at a local or regional level, as illustrated by some local experiences (e.g. Liège 2020, Wallonie 2020, Objectif 2020 - Nord Pas de Calais, etc.) with highly variable success and outcomes.

*

Whatever the obstacles between scenarios, planning and further decision making, scenario exercises should be regarded as learning processes which generate a momentum for the renewal of policy options. Scenarios are developed for a number of reasons, but intrinsically all are meant to influence our comprehension of the future in order to orient present decisions towards steering the adaptation of societal development pathways. Scenarios should be understood as being part of the emerging portfolio of instruments for policy-making, which have been termed 'new' (Salamon, 2002) or 'reflexive' (Voss et al., 2007) governance, as is further developed in Point C. below.

C. THE THEORETICAL FRAMEWORK: CONCLUSIONS

As developed in the first section on 'scenario building blocks', we see that scenario exercises are multifaceted instrument. It would be reductive to see them only as information and communication tools. It would be plausible to define scenarios as an *interrelated body of beliefs, information, evidence, and explanations*. This is in fact the definition given by Hezri to 'policy knowledge' (Hezri, 2006, p.114). If we do not pretend scenarios are a synthesis of knowledge available for policy making, this illustrates however that they can be associated to another level of utility.

The argument for this is two folded, based on the two main types of outcomes of scenario exercises: learning and strategizing.

The learning outcomes of scenario exercises can be linked to what has been highlighted in the evaluation use research as *'process-related information use'*. Some authors claim such process-related information use to be another type of use aside the three aforementioned uses (i.e. information use, political use, strategic use). However, other authors like Weiss affirm such process-related use pertains to another *level* as it is not linked to the output of the exercise (evaluation in the original context), but to the process itself (Bauler, 2007, p.87): "*Instrumental use is presumed to yield decisions of one kind or another. Conceptual use yields ideas and understanding. Political use yields support and justification for action or no action. Process use tells how evaluation's* [or, here, the scenario exercise's] *influence arose*" (2005, p.14).

In addition, knowing that scenario exercises and futures studies are associated to the level of strategizing and planning tools, as well in the private (Godet, 2004 tome 2, p.35) as in the public field (Mutombo, 2007, p.28[8]), and that Lascoumes and Le Galès (2004, p.359) pose that planning can be classified as a "meta-tool"[9], we do argue that scenario exercises can be classified as meta-tools.

Scenario exercises when developed towards learning - or towards the generation of insights for strategizing - are in fact a preparation phase for policy actors and a preliminary phase for other policy instruments. Scenario exercises as open-minded learning processes can generate a momentum for the renewal of policy options. Such 'participatory' policy renewal has also been labeled 'reflexive governance'; *"reflexive governance refers 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). And further, this "*shift towards (reflexive) governance entails an emerging role to be played by a series of policy instruments among which collaborative decision-tools, informative 'propaganda' frameworks, support for accountability… or in other words, softer management tools (including ISD)"* (Bauler, 2007, p.90) and also, we argue, scenario exercises.

Scenarios *tend* to be comprehensive pictures of reality and can synthesize a considerable amount of information in a supposedly understandable way. However, given that the socio-ecosystem is characterized by complexity and uncertainty (and political contentiousness) (Scrase and Sheate, 2002, p.275) an impartial and comprehensive view is not possible, nor desirable, as it can lead to oversimplifications. Further, the quest for better information and knowledge risks to overshadow the

[8] This can be, among others clues, deduced from, the (partial) reorientation of the missions of some national (former) planning offices (in France, Netherland, Belgium, etc.), towards prospective missions.

[9] Un "méta-instrument" aiming mainly at "the coordination of heterogeneous intervention modalities" (our traduction from Lascoumes and Le Galès, 2004, p.359)in Lascoumes and Le Galès, 2004, p.359.

conscious value- and problem definitions, a risk which can precisely be the cause of what is a widely admitted diagnostic, i.e. current unsustainable development (Scrase and Sheate, 2002, p.279). But precisely, in order to remain digestable, scenarios cannot avoid simplifications.

Parallel to this, there is an antagonistic tendency at the level of policy decision, *"between the need for simplification and the necessity for 'complexification' of information"* (Bauler, 2007, p.70), as 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 the diversity of perspectives and controversies.

We think scenarios can be useful for both needs, i.e simplification and complexification: they are pictures of realities, and thus necessarily simplified ones. And they can be designed to unravel to decision-makers the multiplicity of perspectives, be it through the elaboration of multiple scenarios or/and through a transparent participative construction process through the expression of diversity (among experts, or stakeholders, etc.). On the other hand, through and beyond the content-related aspect of scenario exercises, they can provide the opportunity for users to gain insight on alternative options for specific problems in given contexts, and further, for producer-users, to question the way they define policy problems and settle objectives.

II. FACTORS OF SUCCESS AND FAILURE

INTRODUCTION

On the basis of the preceding elements of the conceptual framework, a questionnaire has been elaborated in order to assess the strength of the grid during an interview round and look for insights about the factors of success and failure encountered in some concrete Belgian scenario exercises. A secondary objective of this interview round was to gain insight into the Belgium Future Studies landscape. We have conducted ten semi-structured face-to-face interviews with Belgian (French- and Dutch-speaking) people involved in the development of scenario exercises (See Annex 2: list of the interviewed experts).

Based on the above developed framework, the interview results, as well as the literature review and the first information collected from international scenario experts (see general Introduction on methodology p.5), we identify hereafter a preliminary series of *factors of success and failure*. Those factors are no prerequisite conditions or recipes of success, but should be understood as a series of determinants which appeared as influential to the utilization of scenario exercises, and thus will be considered with care during the configuration of the CONSENTSUS-process (i.e. WP4). In the following section, these elements have been specifically translated to scenario exercises and bundled as factors of success and failure. We tried to illustrate them as much as possible with examples from the various encountered cases of scenario exercises.

Relevant, *challenging* and *plausible* are the three most cited criteria when developing evaluation criteria for scenario exercises. They are of course appropriate, but, according to us, they do in fact more address the narrative part than the whole exercise. Further, they appear as a variant of the L, C, S criteria: legitimacy, credibility and salience.

According to Eckley (2001, p.7-8), in the context of evaluating the effectiveness of assessment processes, ***Credibility*** refers to the believability of the exercise to a defined user. Traditionally, it is based on the 'scientificity' of the exercise and the followed methodology *"prepared with the quality-control of peer review"* (Cash et al, 2002, p.3), or more basically on the credentials and expertise of the producers. ***Salience*** or *relevance*, refers to the ability of an exercise to address the particular concerns of a user. For example, "*an assessment is salient to a user if that user is aware of the assessment, and if that user deems that assessment relevant to current policy or behavioral decisions*" (Eckley, 2001, p.7). On the contrary, there is lack of salience if the exercise remains on a shelf or asks questions to which a particular user is not interested in. ***Legitimacy*** refers to the political acceptability or perceived fairness of an exercise to a user. For example, "*a legitimate assessment process is one which has been conducted in a manner that allows users to be satisfied that their interests* [or what they consider as legitimate interests] *have been taken into account, and that the process has been a fair one"* (Eckley, 2001, p.7).

We do argue that this framework is also applicable as a synthetic way to structure factors of success and failure in scenario exercises. However, there are many elements which influence the legitimacy, credibility and salience of a scenario exercise in the eyes of specific users, such as the nature of the participants, the expertise and involvement of the developers, the expectations of the sponsors, the characteristics of the narrative, the interface with the users, the context of the exercise,

etc. In the following section, these elements of influence have been specifically translated to scenario exercises and bundled as factors of success and failure.

A. FACTORS OF SUCCESS

Time

Scenario construction is a very time-consuming activity. This may sound trivial, but it is an often underestimated parameter which can lead to heavy repercussions in terms of expected outputs and outcomes.

At the operational level, each phase of a scenario exercise is dependent on the dedicated various types of means, among which the allocated time resources is a very important one. The research phase to gather necessary information on the field under investigation, systemic analysis and the development of the narrative are steps which may well be underestimated.

For example, in the Toolsust project[10] , two workshops were scheduled with participants in order to construct sustainable visions of their city and to discuss possible policy measures through a backcasting method. In the second workshop, the participants were presented with the finalised visions, in order to discuss and criticise them. After this, too little time was left for the backcasting phase (among others because the meeting had been scheduled in the evening). One possible answer recommended by the Toolsust teams was to "*take framework scenarios that already exists and let stakeholders come up with moves towards sustainability that fit within one or the other scenario*" (Carlsson-Kanyama et al, 2003, p.19). In the Walloon prospective participative exercise, Wallonie 2020, a lack of time at the end of the project has resulted in a change of leadership from citizens and stakeholders to the scientific committee, which has been reported by the participants as a factor of de-ownership, i.e. as if the results were not theirs (see infra).

The selection of suitable participants (experts, stakeholders, etc.) can also turn out to require more time than expected (Mietzner and Reger, 2005, p.236; Van Asselt et al, 2005, p.177; Carlsson-Kanyama et al, 2003, p.14) (this aspect will be developed in the succeeding section on participation).

Moreover, scenario exercises are often spreading over several years, meaning that the motivation of the various actors linked to the project (participants, sponsors, etc) and the developers themselves must be kept vivid. This issue of keeping motivation alive is resource- and time-intensive in itself.

At the more conceptual, generic level and according to the context, the bigger difficulty related to time can be the ability (in terms of time availability and self-capacity) to think beyond urgent matters, particularly if the exercise is developed within an organization. Organizations (private firms, administrations, departments, NGOs, etc.) are submitted to short term pressures (norms, electoral terms, etc.), which tend to limit their view to the short term (Burt, Van der Hijden, 2003, p.1016), and can lead to a subsequent non-investment into time-consuming activities, even more so if these are obviously linked to the long term.

[10] For details about the cited projects and inerviewees, see Annexes 2 and 3.

Acceptance and Clarity of the Purpose

Furthermore, according to Van der Hijden, (2003, pp.1016-1020) the non-clarity of the objectives of scenario exercises is an important cause of failure. People who begin to work with scenarios can have very different ideas about what such an exercise can bring to them. It is necessary to make clear and unambiguous what are the main expected outcomes of the exercise, the role of the different actors, etc.

As a corollary, the pursued objectives must be extremely clear for the developers themselves and the participants (and subsequently for the users). To avoid dissatisfaction and frustration, which can have serious repercussions on the process and further use of the results, a 'contractualisation' should be settled with the participants about what the overall meaning of the project is, what is awaited from them and how the product of their work will be valorized and further used, etc[11] (Van Asselt, 2005, p.178). *For example*, in the case of the Walloon exercise *'Prospective des politiques d'entreprises'*, a factor of failure was linked to the tension between the objectives pursued by the supporting actor and main targeted user (the minister) who expected a strategic economic development plan (and even more precisely, a synthetic 5 pages document with policy actions, budgets and identified actors), while the developers (here, the administration), also better informed about the Futures Studies methods, developed an extensive report on trends and issues, strategic axes and ideas of policy actions[12].

An important point in the context of the Consentsus research project, is the reaction of the participants in Fredrikstad (Toolsust project), which "*were not satisfied when they heard that the aim of the whole exercise was to test and develop a method*". Participants *"saw the content as more important and wanted to know what will become of it after the workshops"*. Here, it is the relevance of the project which was questioned. The developers propose that in an early phase, one could identify a *"potential custodian"* for the final product (a local authority, etc.), which in this case would have represented a factor of relevance to the citizens.

Acceptance and Clarity of the Method

The scenario approach, so far, represents a novelty for many actors and organizations. It can be disturbing to work with multiple explorative scenarios or backcasting, and leave aside the traditional idea of *"one plausible future, one best solution"* (Burt, Van der Hijden, 2003, pp.1016-1020). It is thus of importance that participants accept the chosen methods and tools; which can be a challenging task, e.g. with experts who have their own agenda or toolbox, or with citizens who are not acquainted to certain types of methods (as has been stated by F. Heselmans with regard to formal methods using multi-criteria choice software). *For example*, in the Toolsust exercise, for the first workshop conducted in Fredrikstad, some participant hadn't understood they were asked to imagine sustainable futures, and not to project current trends, which resulted not only in some lost of time but more dramatically into partially biased outcomes. This necessitates that participants have to be carefully introduced to the used methods and trained if necessary: for example, working for the first time with scenarios in an administration can mean to develop skills which are usually not mobilized as, e.g., be able to perceive the organization in a systemic context (external environments and interrelations).

[11] Interview with Fredéric Heselmans.
[12] Interview with Philippe Destatte; Interview with Florence Hennart.

Future-Oriented Thinking Facilitation

One thing is the acceptance and clarity of the method and the scenario exercise objective, another thing is the capacity of the participants to adopt a future-oriented perspective, i.e. the capacity to think beyond short term and disconnect from the current constraints.
Beyond the necessity of time management mentioned above, i.e. the necessity to divert time from urgent matters towards "parallel" activities, it can be difficult to adapt to future thinking, particularly to explorative and normative modes of thinking.

This kind of future-oriented thinking seem to present considerable difficulty to some people. This difficulty can notably be linked to specific local or personal context. *For example*, in the Toolsust project, most participants in Padova had considerable difficulties to envision the possibility for current evolutions to change direction and/or to break current trends (notably because of a series of structural failures of the local governance system, such as the corruption). It is interesting to note that the same phenomenon occurred a second time in Italy, in the Visions project for the Venice workshop. This tends to demonstrate the importance of trust or hope in the system to be able to embrace a pathway which leads to breaking current modes of thinking.

That is why most scenario developers highlight the necessity to devote attention to the ways and tools used to help participants to disengage with the present (imagery, music, art, etc.). This is specifically true for backcasting exercises, where it seems necessary to *"make the visions come alive"*, maybe also in an unconventional ways (including artists, etc.) (Carlsson-Kanyama et al, 2003, p.19).

Participation

As it appears from several projects (Toolsust, Visions, *"Étude prospective en appui de la politique scientifique fédérale"*), **recruiting stakeholders**, moreover when more than one meeting is required, is a difficult task. In the Toolsust project, "*several teams thought that the relative success of the first workshop would make the participants come to the next one even with little effort*" (Carlsson-Kanyama et al, 2003, p.14), but e-mail invitations were not enough. That is why, they point out the importance to have personal contact with each participant in order to motivate them to attend the sessions. Van Asselt et al (2005, p.177), based on their experience from the Vision project, speak about *"workshop tiredness"* by many stakeholder representatives as one of the main cause for possible disengagement. Many participative exercises (be it scenario constructions, indicator developments, strategy consultations, steering committees…) use the same pool of prominent stakeholders, which are chronically 'overbooked'. Moreover, it can be that their interests and stakes are not in line with the addressed issues and objectives or that they do not consider themselves as problem-owners (Van Asselt et al, 2005, p.177; Visions-Venise, Toolsust project in Padova). Van Asselt et al (2005, p.178) recommend to "*develop an a priori strategy for recruitment of stakeholders, as well as for communication and feedback processes over the course of the participatory exercise in order to maximize the satisfaction and interest. This will help to provide a base for continuous involvement and the necessary support and commitment of the stakeholders*."

According to Quist (2007, p.78), contrary to what is expected in some participation literature, a high degree of influence of the participants on the process and/or the content of a participative scenario exercise, i.e. stakeholders-driven, does not influence the exercise's outcomes towards more follow-up activities. Further the choice of a **stakeholder-oriented** (and not stakeholder-driven) approach can "*enable a more effective and efficient use of the stakeholder's time*" (Van Asselt, 2005, p.179), an approach which is also promoted in the Toolsust project (Carlsson-Kanyama et al, 2003,

p.19). Similarly, in the Visions project in Venice, Guimaraes Pereira (2003, p.60) has observed that providing participants with ready-to-use 'extreme' scenarios with which they disagreed strongly (even if it wasn't intended) has triggered a *"rich and effective"* discussion about the future of the city (although the participants tended to ignore the scenarios). From a **methodological** point of view, it is also important to anticipate the structure and the composition of the group (homogeneous/heterogeneous, if they know each other beforehand, etc.) in order to choose an adequate participatory method. This can be done through interviews or a kick-off meeting before the process design (Van Asselt, 2005, p.179).

As it is widely stated in participation literature, **diversity** is an extremely important element if we want to take into account multiple perspectives in the scenario construction process. According to the Visions project evaluation, diversity through participation *"yields a richer knowledge and idea base from which scenario developers can draw"*. *For example*, according to Philippe Destatte[13], there was a lack of participation of young people in the *'Wallonie 2020'* prospective exercise (a characteristic which was enforced by the place and timing of the meetings). They decided then to conduct a parallel identical exercise with 5-6 school classes of teenagers, which generated many ideas, which hadn't been brought up by the adults, but with which these later totally agreed. In the Toolsust project, the participants themselves reported that maybe their group was too homogeneous because the generated ideas felt too classical. According to the developers, this would imply that the generation of *"something new"* passes through the gathering of different views and expertises under informal circumstances. One of their conclusions was that they should have devoted more resources (time and money) to the recruitment phase. (Carlsson-Kanyama et al, 2003, p.19).

Further, participants must be properly motivated to engage in a time-consuming scenario exercise. Beyond clear explanation of the methods, their role, the objectives and expected outcomes, the developers have to think from the stakeholder perspective about what the project has to offer them (Van Asselt, 2005, p.178); their time and effort have to be "rewarding"; i.e. the exercise has to be relevant for them. *For example*, the developers of the *"Étude prospective en appui de la politique scientifique fédérale"* exercise have observed it was difficult to keep experts attending all meetings they were invited to during an exercise of several years. One way to motivate them has been to link these meetings to other events, like conferences, that they could valorize (but also further, to rethink the method in order to make it less time consuming; in this case through a mini Delphi via Internet)[14]. For exercises involving citizens, if one of the objectives is to collect their opinion, it is of value for them that some influential personality attends the meetings, like an important policy decider: in the case of "Wallonie 2020", the attendance of Minister President van Couwenbergh to every meeting has been highlighted as a factor of satisfaction for the participants[15].

Narrative

The important output of most scenario exercises is the narrative, which describes one/several causal development(s) through time and/or vision(s) of the future. Scenario literature usually puts forward three criteria: *relevant*, *challenging* and *plausible*, further the narrative must of course be consistent (no intern contradictions) and clear (see among other Chermack, 2007, p.11). Indeed, first and foremost, to make a compelling scenario narrative, it is crucial that the underlying idea (or message) makes sense for the user (cf. salience) and appears clearly (this can be hindered e.g. when the scenario story is filled with too many details) (Rasmussen, 2005, p.244). Further, narratives, in

[13] Interview with Philippe Destatte.
[14] Interview with Frederic Heselmans.
[15] Interview with Philippe Destatte.

general and particularly in scenario exercises, require equilibrium between, on the one hand, credibility (or 'believability') and on the other hand, 'defamiliarization' (or novelty) (Barry and Elmes, 1997, p.434; Rasmussen, 2005, p.232). The first is needed in order to generate identification and make the user feel involved. But it must not sound too familiar, and thus uninteresting. That is why the story must also generate 'fascination' and curiosity (i.e. be challenging). As we noted in the section on story-like approach (I.A.1), this seems to be a difficult balance to reach and certainly requires some (journalistic) skills of communication.

For example, the Toolsust team presents the construction phase of the scenario narrative as a *"rather difficult step"*, and recommends prior experience, and at least that the team works together throughout the project and particularly for *"the crucial steps from clusters of ideas to images (scenarios)"*.

Further, it is quite remarkable that this step is often the less reported aspect of scenario construction in the various cases and documents we did consult.

Diffusion Interface

The interface between the scenario and the users seem to be of utmost importance in the way people will adopt the exercise as relevant, appealing, etc. The design of scenarios, the interface between what scenarios are telling (content, ideas, etc.) and the users will have an impact on the way people will read (or watch or listen, etc.) to the scenarios.

The way people are brought into contact with the scenario exercise depends if they have been participating to the scenario exercise (producer-users) or not (recipient-users). Among these latter, we can maybe make another distinction between a targeted user group and a wider diversified audience.

The producer-users discover the scenario from the inside. They are supposed to have been properly introduced to the future-thinking approach and clearly presented the method and objectives. Depending on the configuration, they have manipulated the data, brainstormed on future visions, etc. Based on the whole process, they have built a judgment about the process and the product they have participated in; their interface is the scenario construction process in itself.

Recipient-users are introduced to a final output, i.e. most of the time a printed version of the narrative, with some explanations on the construction process. Indeed, it is of the utmost importance for the scenario exercise credibility that all users are acknowledged about the followed methodology, underlying data and reasoning in a transparent way, in order to allow the users to judge their confidence in the scenarios, to express critics (Parson, 2007, p.68) and moreover to allow appropriation promoting further use and improvement. Information about content and method are most of the time diffused through a printed report.

However, there is evidence that such static diffusion interfaces are not sufficiently attractive. Some authors say *"scenarios must incorporate themes such as songs by the Beatles (Ogilvy & Schwartz, 1998), catchy phrases that are easy to recall (Ringland, 1998), and colorful images to make the set of scenarios aesthetically pleasing (Kahane, 1992)"* (Chermack, 2007, p.11). Beyond this, more "personal" contact between the recipient-users and the scenario developers through a life presentation supported by a multi media presentation or a fine tuned speech seem to be a factor of success.[16]

Further, if the communication is directed at a clearly identified group, it is of importance to identify the specific characteristics which will appear adequate to their perspective, be they deciders, stakeholders, citizens, etc. In case of a diversified audience, people will have different interests and

[16] Phone Interview with Al Hammond (*Innovation & Special Projects* at the *World Resources Institute*). (see Introduction on methodology, p.5 of this paper).

information needs, sometimes contradicting, and it is a real challenge to appear "attractive" to the different groups at the same time.

Strategic and Operating Agents

Credibility and legitimacy can also be reached through the individuals or institutions involved around the project, among other, the strategic agents, i.e. those who have "ordered" or are supporting the exercise through financial, logistic help, etc., and the operating agents, who are concretely coordinating and developing the scenario exercise.

A scenario exercise, will be favorised if it dispose of a valued support or leadership. For example, if developed within an organization, the exercise needs to have internal support, e.g. to be introduced via the support of a leader or an influential person, so to convince hierarchy and collaborators to engage. The exercise's credibility will be partly associated to such engagement and leadership. When developed to reach a wider audience, such 'valuable' support will be to find among recognized institutions or well known researchers, etc.

A negative example is the one of UK climate scenarios program (UKCIP). The dominance of certain funding institutions *"acted to exclude other potential institutions, research groups, models or ideas from contributing to the scenario construction"*. The consequence of this was a deficit in legitimacy as seen by the wider UK peer community and criticisms against the scenarios from other UK climate scientists and against the way the UK government *"secured its scientific advice on climate change"* through a scientific committee of enquiry (Hulme and Dessai, 2007, p.24).

Further, Quist (2007, p.83) propose the idea of a 'vision champion', i.e. "*a leading individual strongly committed to the vision and acting as a vision broker*". Indeed, it has also been highlighted in other participative context, that the presence of a leader, which pushes the project as a locomotive motivates the other participants, seems decisive in the success of such exercises (Mutombo, 2006, p. 46).

In the case of the '*Prospective des politiques d'entreprises*' exercise this was clearly the role of Rudy Aernoudt (at that time chief of the cabinet of the minister of economic affairs, S. Kubla), who initiated the exercise and managed to "sell" his idea to the minister and to the administration.[17]

If these actors may play an important role in terms of success, a logical consequence is that change in this support or leadership can jeopardize the exercise.

In the *'Prospective des politiques d'entreprises'* exercise, there has been a clear ownership issue due to a discontinuity in the staff. The exercise has been developed by the administration, but the initiative came from Rudy Aernoudt (see above). When he left his position, the link between the exercise and the minister was fatally weakened.[18]The result has been that the minister did not use the results and was even reluctant to diffuse them.[19]

To ensure the continuity of this type of projects, it can be necessary to foreseen 'backup' mechanisms and to create intern dynamic beyond single champion (Evans et al, 1999, p.177; Buckingham-Hatfield, et al, 1999, p.4)

[17] Interview with Philippe Destatte.
[18] *Ibidem*
[19] Interview with Florence Hennart.

Consulting the User

Based on examples from the climate scenarios, it seems that so far, scenarios have predominantly been science-led with no or too few mechanisms allowing the users to be heard (Hulme and Dessai, 2007, p.21). Even if some cases seem to show that there is progress to involve users in the scenario development process, like in the MEA exercise, for which "*focus group and interviews in order to identify issues of concern to users*" have been conducted (Pulver and VanDeveer, 2007, p.3), there is a strong call for close collaboration between developers and users (Parson et al, 2007, p).

It is of importance that the people who are targeted as users be heard or associated to the process in a way or another in order for the results to be seen as relevant and legitimate. As stated in the section on strategizing and planning, if an exercise is elaborated in order to inform a strategizing process, the planners' and decision-makers' points of view must at least be listened to. Further, from the encountered cases, it seems that, in order to be concretely used, the exercise has to link to some extent to a request from administration or better from the political level.

For example, in the *"Étude prospective en appui de la politique scientifique fédérale"* exercise, a formal and precise request from the Federal Scientific Policy department (formulated : to identify strategically important domains for federal policy programs) matched a parallel and simultaneous proposal from a research team, the process and objectives having moreover the support of the minister. Beside stakeholders consultations, the exercise has closely involved members of the department. The result was that conclusions of the study have been concretely used to shape the federal science policy programs[20] (Verbeiren, 2002).

More negatively, the *'Liège 2020'*-scenario exercise has succeeded in delivering insightful outputs (i.e. 4 macro scenarios for Liège and many micro-scenarios focused on specific sectors or issues) based on the work of an arena of stakeholders and citizens, but which seem to have been institutionally unused so far. This appears to be due to a lack of involvement of decision-makers, and further to the partial independence of the output (for instance in terms of diagnosis) with the stakes and interests of the potential policy users.[21]

Differently, we can see that consulting adequate members of a more or less delimited group is a key to reach and get approval from the whole group. *For example*, the *'Prospective des politiques d'entreprises'* exercise didn't succeed in its main objective i.e. to provide to the minister insights that he could use to elaborate policies. But the exercise can be seen as successful in terms of diffusion in the enterprise field, via the "*Union Wallonne des Entreprises*"[22]. This seems to be due to the participation of influential business leaders, obviously also acquainted with the *UWE* and its members. We can deduce that the results have been evaluated as legitimate, credible and relevant by the economic Walloon community because of the involvement of some 'representative' actors.

It appears that, to be relevant and legitimate to a specific user group, a scenario exercise has, on the one hand, to answer an existing demand, and on the other hand, to involve (representatives of) the specific user group in the exercise.

An extreme case is of course when a scenario exercise is 'ordered' by the final users in order to inform a specific decision. But, as we have seen with the example of the 'Prospective des politiques d'entreprises' exercise, it is no guarantee.

[20] Interview with Frédéric Heselmans
[21] Interview with Philippe Destatte.
[22] *Ibidem*

Context

The specific and general context of a scenario exercise has been highlighted as an important factors of success and failure, but also a difficult parameter to analyze. The diversity of scenario exercises' configurations make it already difficult to isolate determining elements in terms of success, contextual aspects are even more diverse. If the specific context of the studied issue has to be taken into account (e.g. conflictual domains like nuclear power or GMO's), external factors as events and ongoing development are highly contingent, they can be enabling or constraining and exert a diffused influence (Quist, 2007, p.221).

For example, the emblematic case of the *Limits to Growth* report of the *Club of Rome* (1972) has an important impact in terms of awareness raising and diffusion of new debate questions at the international level, among other, around demographic, resource use, ecosystem and pollution issues (Mermet, 2003, p.57). But this report was produced in a specific context: parallel to, among others, the oil shocks and an economic crisis, as well as the space conquest (first step on the moon) providing the first images of the Earth from space which have then helped visualized the finitude of the resources. It seems likely that those elements have prepared the ground for the report and contributed to make people more receptive to the message of the report.

But those are elements scenario developers have hardly any grip on and which can mainly be observed *a posteriori*.

B. TENSIONS AND LESSONS

Highlighting the importance of time management can seem a trivial remark, but it has been pointed by lot of practitioners. It is partly because time and other resources are limited that some choices have to be made and trade-offs appear. We have highlighted a couple of those tensions and general lessons.

The tension between product and process has already been highlighted in the literature and in the WP2 (Goeminne, Mutombo, 2007, p.33). Somehow it is difficult to "fully" develop both process and product outputs. This means that there is a trade-off between devoting enough resources on the organization of a dialogue interface where producer-users involve time, creativity and social links and the elaboration of a fully fledged scenario set diffused through an appealing design appearing relevant, credible and legitimate enough to be appropriable by the recipient-users; however they can constitute a fruitful starting point.

Further, a stakeholder-driven approach have better chances to develop scenario exercises which appear legitimate and relevant to those actors who have been fully involved; however we have seen that stakeholder-driven approach is time-consuming and does not automatically bring more outcomes than a stakeholders-oriented approach, based e.g. on pre-existing scenarios. This is partly contradictory as pre-existing scenarios will be less appropriable by the participants.

As well, it can be tricky for someone in the policy field to use an exercise developed by a previous minister, another administration or political color. So we could argue for the development of scenario exercises in independent department or study center, so that they can be used indifferently by different categories of users. However, once more, the exercise will be (considered) more relevant and legitimate if developed inside the specific department where it will be used.

In this respect, it seems valuable to define a main targeted user group from the start and to elaborate a strategy in order to make sure the exercise appear enough legitimate, credible and relevant in their point of view. Beyond this rather limited and homogeneous group, remaining resources can be put into effort to reach a wider audience through appealing diffusion forms.

Another point concerns the importance of transparency in the scenario construction exercise. It will of course contribute to the credibility of the exercise; But more than a factor of success or failure, it is a guarantee of honesty and a reflexivity tool. We have highlighted several time in this paper (and WP2) how personal world views and normative choices influence the scenario content, be it in the choice of relevant data and information and variables, or during the redaction of the narrative. It is unavoidable as there is no such thing as a "neutral" research, and particularly in the scenario field. But transparency is a possible answer (Hulme and Dessai, 2007, p.26). This point confirm what has already been proposed, i.e. a thorough report on the scenario construction process within the Consentsus project which will serve as further reference and reflexive tool for the developers (upcoming report on Work Package 4).

This transparency question highlights a tension concerning the diffusion interface. To maximize the credibility of the exercise, it is important that all users have access to details concerning the methodology, the data, the assumptions, etc. through, e.g. a paper report more or less illustrated with maps or graphics. However as stated supra, the design of the diffusion interface have to be appealing, as the narrative itself. A balance has thus to be found between transparency and attractivity. Depending on the user, this balance will be more or less difficult to reach, as an appealing interface e.g. for experts can be more content oriented than if citizens are targeted and it needs to be very synthetic for decision-makers. This can quite easily be solved through developing specific reports, presentation, etc. for each type of audience. But this, one more, requires more time, financial and skills resources.

This point can be further related to the antagonistic tendency at the level of policy decision highlighted in the conclusions (C.) of the part I. (Theoretical Framework). Deciders at the same time need to be provided with clear and understandable and thus necessarily simplified information *and* to be aware of the intrinsic complexity of reality and of the diversity of perspectives and controversies about reality. One of the main challenges of scenario exercises is thus to reach a balance allowing to answer these specific antagonist needs for policy decisions, particularly in situation of complexity and uncertainty as SD.

C. THE FACTORS AND THE LCS FRAMEWORK

For each user, these different aspects influence the level of legitimacy, credibility and salience of the scenario exercise. We have developed, in table 2, the way these "factors of success" influence the LCS criteria: most of the time, a factor has a determinant impact on one of the criteria, and indirect or second level effects on the two other criteria. We have presented this through colours and arrows: for each factor, the grey-coloured square highlight the most influenced criteria, and the arrows point at second order influences.

From table 2, we can observed that the predominant influence that each factor exerts on one of the three criteria follows a clear logic, linked to the correspondence between the nature of the factor and the definition of the criteria.

The *credibility* of the exercise, defined as based on the 'scientificity' of the exercise and the followed methodology, as well as on the credentials and expertise of the producers, is influenced by the factors which are linked to methodological aspects, including the actors implementing the methodology: Time management, Acceptance and clarity of the scenario approach, Future-oriented thinking capacity and facilitation and the influence of the operating agents predominantly have an impact on the level of credibility of the exercise as they firstly inform the "scientific soundness" of the exercise's methodology.

The *legitimacy* criteria, which refers to the perceived fairness of the exercise and the fact that the exercise has taken into account what is considered as legitimate interests by the user, is mainly influenced by factors caring about the link with specific actors: Participation, Influence of the strategic agents and Consulting the targeted user group all imply taking into account adequate and/or multiple points of view.

And the *salience* or relevance of the exercise, which refers to the ability of an exercise to address the particular concerns of a user, mainly is influenced by factors bothering about what is of interest (for the user), i.e. Acceptance and clarity of the objectives; about what is concretely said, i.e. which message is carried through the Narrative; about how to present the outputs to raise interest, i.e. the Diffusion interface; and how this interest can evolve due to external factors, i.e. the Context.

On a partially different level of analysis, we also observe that the Diffusion Interface has the specificity to be the synthesis of the different aspects of the scenario exercise, and as such, to encompass different characteristics (linked to those aspects) influencing the three LCS criteria. In addition, the Narrative part of the scenario exercise can be seen as having as much influence on the credibility as on the salience of the exercise due to the researched balance between 'believability' and 'fascination' (see p.29 of this paper).

	Legitimacy *(perception of the scenario exercise's fairness in coping with stakes)*	***Credibility*** *(perception of the implementation of high standards of scientific work)*	***Salience*** *(perception of the integration of the stakes valued as important in the domain)*
Time Management	Indirectly interferes with legitimacy: adequate time management as pre-condition for the thorough development of the process (e.g. participation).	Basic capacity accounting for the scenario developers' ability to properly manage their exercise (how credible is an exercise with chaotic time management?).	
Acceptance (and Clarity) of the objectives		Indirect link to credibility; can be a guarantee of capacity of the developers to clarify and adapt objectives.	Clear relation to salience as the factor influences how the whole exercise answers a question of interest for the users.
Acceptance and Clarity of the method		Factor linked to the credit and trust that users have to put (blindly) in such relatively 'new' and unconventional exercises.	As a consequence, the user may question the relevance of the method (What is the use of future-oriented thinking for my domain of interest?).
Future-oriented thinking capacity and facilitation		Perceived capacity to help participants to 'disconnect' with their personal situation, i.e. facilitation capacity.	Indirect influence on salience; prepare participants' comprehension of the interest of the chosen approach.
Participation	How participation is organized, sketched and allowed to influence the exercise, influences legitimacy (Have I or the "relevant" stakeholders been involved?).	The acquaintance of the developer with participatory processes influences credibility; and the credibility of invited participants influence the whole project	The involved participants can contribute to reinforce the salience of the exercise according to the stakes they represent or their expertise.
Narrative	The way it presents specific/multiple perspectives of an issue influences the legitimacy of the exercise.		Direct link to salience through the familiarity of the narrative and its 'connectability' to his life, i.e. carry a message which is meaningful and relevant.
Diffusion Interface		Credibility is influenced by the level of methodological transparency conveyed through the interface, as well as by the information channel chosen, the editor…	Salience is influenced through the scenario interface's appeal (design, illustrations, etc.) to the user.
Influence of strategic agents (financial or logistic support)	Legitimacy is influenced by the strategic agents according to the domain of the scenarios. Conflictual domains (nuclear power, GMOs) need specific care w/r to fairness and diversity of represented opinions.	This indirectly influences the credibility of the exercise regarding 'scientific' objectivity quest.	
Influence of the operating agents (scenario developers)		Direct link to the credibility of the operating agent; w/r to capacity, objectivity, trustfulness, etc.	Salience can depend on the capacity of scenario developers to master the method/ the domain
Consulting the targeted user group	Legitimacy is directly linked to the way users are consulted or involved.		And it provides first source of information w/r to the integration of relevant stakes.
Context		Influence on credibility when the context impacts on e.g. paradigmatic shifts.	Diffuse influence on what is considered as relevant at one point in time due to current events, ongoing developments, etc.

Table 2 - Success factors and their influences on LCS

*

The list of "factors of success" highlighted through the encountered implemented exercises which is presented here is not exhaustive and is not, in any way, a 'key for success' or anything alike. As well, the LCS criteria are no recipe for success. The degree of legitimacy, credibility and salience, dependent on the different aspects of the scenario exercise, represent a set of conditions to generate a *usable* exercise.

Indeed, we do think the factors of success, as the utilization and effective outcomes and impacts of a scenario exercise, are deeply linked to the objectives and dependent on the whole exercise's configuration (who, why, how, concerning what, targeting who, with the help of whom, in which context, etc.). This chapter has highlighted aspects of scenario exercises which are factors of success or 'successfulness', i.e. they generate an exercise which can be potentially used as it satisfies basic conditions (not *minimum* conditions). Fulfilling these criteria contribute to the 'usability' of the exercise, and also to its 'appropriability'.

Indeed, if a potential user considers the exercise as sufficiently and adequately legitimate, credible and salient, the exercise will be susceptible to be "appropriate". The appropriation or feeling of ownership developed by users appears as an important condition for the outputs to be effectively used and generate outcomes. Involving people in the exercise seems to be the more straightforward way to generate ownership, through reaching high level of legitimacy as they are themselves involved in the exercise, of relevance, as they can have an influence on the content, and of credibility, as they have a firsthand view on (part of) the methodology. The whole challenge lies in generating appropriation for recipient-users. This will be the results of the different scenario exercises characteristics and to the diffusion interface.

Note that the Consentsus scenario exercise will be evaluated with regard to the above factors of success, as well as with regards to the whole theoretical framework. We can at this stage of the scenario construction already observe most of these aspects in our scenario process and product, as well as begin to assess how Consentsus did perform on the different factors.

CONCLUSIONS

As was already stated, the research and practical experience concerning the influence of scenario exercises, in general, and particularly their influence on policy-making, are at their beginning stage. To contribute in advances in this field, this paper develops a theoretical framework of building blocks and outcomes of scenario exercises and identifies elements which influence the success and usability of such exercises (as illustrated in figure 3).

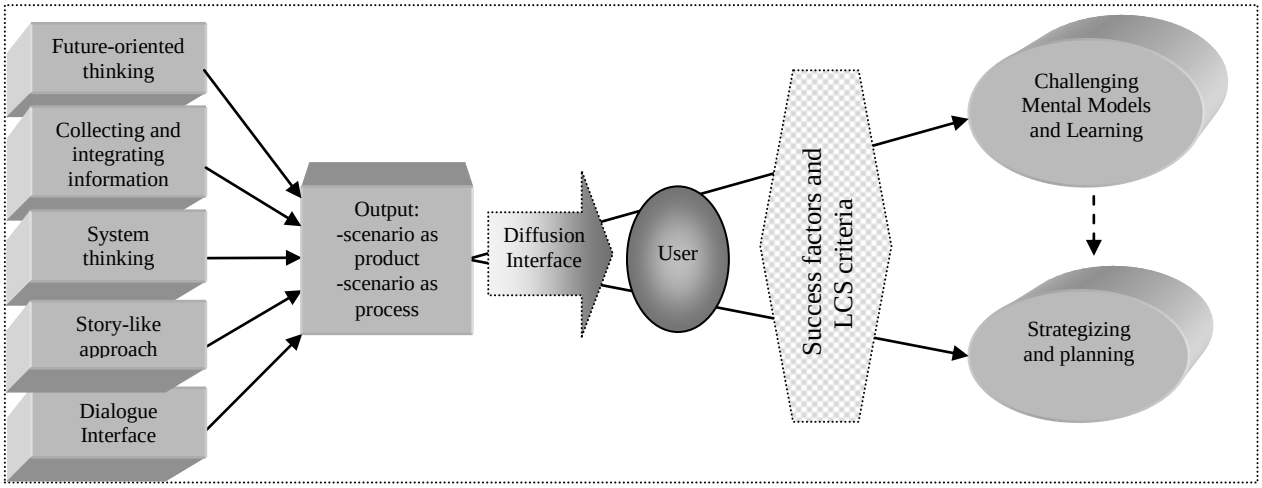

Figure 3 Simplified scenario exercise functioning including the user perspective

The developed theoretical analysis framework may appear linear; and of course it is. What we proposed here is an analysis grid, i.e. a simplifying tool to read a complex reality. As we have mentioned in this paper, simplification and 'complexification' are antagonist tendencies but necessary stances to endorse in order to evolve in reality.

This linear framework is the result of a deconstruction process and an attempt of generalization of a fuzzy field. It is in no way a recipe or a blueprint. This analysis framework has to be adapted to each case and its specific complexity in order to be operational. The grid can be useful to read existing exercises and ease the deconstruction analysis or to structure the reflection when starting to elaborate a scenario exercise project. And this is the main purpose of this paper, as tool for the next phases of the Consentsus project.

On the other hand, the interviews did provide us with a range of very concrete example of success and failure from which we deduce a range of factors of usability of scenarios. All of them influence the credibility, legitimacy and relevance as well as the ‘appropriability’ of the scenario exercise, but are no recipe for success. They should be regarded as a basic checklist to be consulted when developing a scenario process and to be complemented along further experience.

Usability and 'appropriability' conditions can be identified through the LCS factors and the above success factors, however they are part of the definition of each scenario exercise and depend on numerous parameters, differing for each exercise.

This framework is not aimed as baseline for a methodology ‘reasoning backward’, i.e. starting from the targeted outcomes and working backward to elaborate the success methodology and conditions. However, it can help scenario developers and users to better understand the mechanisms at

stake in their exercise and better structure their approach of scenario exercises, as well as contribute to the research on scenarios in general.

The different aspects of a scenario exercise, i.e. the building blocks, generate different outcomes which are not only typical of future studies (better understanding, debate, shared vision). However, it is the combination of the building blocks and their interactions which generate a specific momentum for challenging mental models and learning; this state of mind as well as the produced (strategic, normative, …) scenarios are central for renewing strategizing and planning approaches and institutional structures towards sustainable development-oriented outputs and practices.

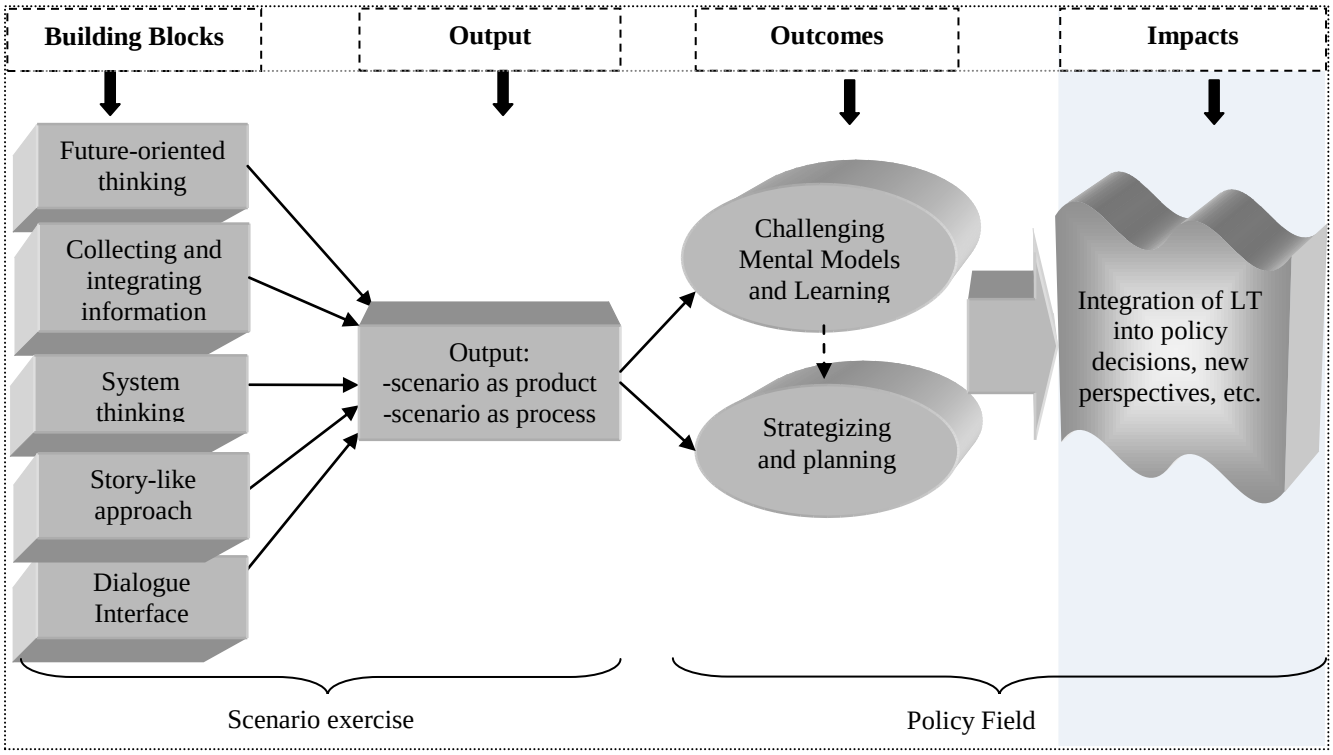

Figure 4 - Deconstructing the influence chain of scenario exercises

Figure 4 illustrates the simplified scenario functioning we have discussed in this paper. At this point of the investigation on scenario exercises uses and influences, research is still wandering into hypotheses, assumptions and whishes about the final impacts of scenarios on effective decisions, behaviors, etc. and further on the way they help striving towards e.g. sustainability. In depth and diversified study cases will be needed before robust conclusions could be drawn. The study of the outcomes and impacts of scenario exercises at an individual and societal level requires mobilizing insights from many different fields: psychology, policy, planning, communication, knowledge management specialists, etc. are needed in this task. Moreover, the fuzziness of the scenario field does not help drawing general conclusions as each exercise seems to be unique in his general configuration (focus, scale, involved actors, etc).

From a policy point of view, scenario exercise should be regarded as a tool among others to be used in function of a pre-existing objective. As a meta-tool, scenario exercise can generate learning processes with regard to new issues and help reframing the perspective on a specific problem definition. So doing, they can generate a momentum for the renewal of policy options. Scenario exercises, as defined in this paper, are part of the reflexive governance trend which preach for "*shaping societal development in the light of reflexivity of steering strategies"* (Voss and Kemp, 2006, p.4).

*

The intention here was to generate insights on the general understanding of functioning and outcomes of scenario exercises. At the project's level, the objective is to provide the CONSENTSUS-project with insights for the configuration of scenario sketches for sustainable consumption of food (WP4). WP3 insights provide clues to guide the elaboration of the procedural setting of the scenario- and transition pathway constructions (WP4, 5 and 6), anticipate difficulties and shortcomings and improve the robustness and potential use of scenarios of the present project.

The conclusion of this paper should still be considered as intermediary. Indeed, in the following, basing on the practical experience within the Consentsus project (i.e. WP4 which is still ongoing until end 2008) we will aim at gathering further insight on scenario functions and utilization.

In the last part of 2008, following the construction of the Consentsus scenario sketches, we will also assess the expectations of potential stakeholders and decision-makers with regard to *federal* Belgian scenario exercises, as well as their present knowledge and use of scenario studies through a round table. This appreciation of the Belgian context will be explored with regard to scenarios in general, as well as with regard to initiatives linked to transitions and system innovation.

Further, WP3 will be followed-up by WP7 in the second phase of Consentsus, developing further the governance track of the project. WP7 is meant to research on the governance aspects from the transition and system innovation perspective as well as on their implementation in the Belgian context. WP3 is the first phase of this reflection: generating better understanding of the mechanisms of such reflexive (meta-) instruments as scenario exercises, it enlightens us on one of the elements within the emerging portfolio of instruments for SD-policy.

The present work package will act as a reflexivity task throughout the entire project duration, i.e. monitoring and contextualizing project decisions and at a later stage engaging into collecting the necessary feedback from participants, developers and users. The stance taken is to allow us to monitor and evaluate our own efforts. It remains obvious from the existing literature, that it is difficult in many respects with many scenario projects to encounter a sufficiently rigorous information base in order to construct learning also at the level of project operators.

From this reflexivity stance applied to the Consentsus project, we can highlight interesting and challenging questions, such as the following: What can be the uses and impacts on policy-making for scenarios elaborated in the context of a research project?

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ANNEXES

As explained in the paper, we have conducted so far ten semi-structured face-to-face interviews with Belgian French- and Dutch-speaking people involved in the development of scenario exercises As explained in the main introduction of the present paper, we used the outcomes of these interviews to gain insight regarding two aspects: the current demand for scenario exercises (Task 3.2) and the assessment of existing scenario exercises (Task 3.3).

Task 3.2 Identification and characterization of the current demand for scenario construction exercises: We based ourselves on these interviews to sketch a more precise picture of the landscape of Futures Studies in Belgium, and to gain a better understanding on the existing situation in Belgium in terms of long-term planning and scenario construction exercises. This appreciation of the Belgian context will be more specifically explored with regard to the expectations (i.e. the demand for scenario exercises) of SD actors (policy actors, stakeholders, etc.) during the final stages of phase 1 of the project. We will explore this 'scenario demand' with regard to scenarios in general, as well as w/r to initiatives linked to transition management and system innovation.

Task 3.3 Assessment of existing scenario exercises: The conducted interviews provided also elements which permit to assess existing scenario exercises. The questionnaire (see Annex 3) has been elaborated on the basis of the conceptual framework (task 3.1) not only in order to refine the framework itself, but mainly to collect information on elements influencing the success and failure of scenario exercises.

Initially the objective was to concentrate on some precisely identified scenario-initiatives and to assess with their developers, participants and users the outcomes and impacts of scenario exercises. However, it occurred that only few scenario-initiatives had been looked upon consciously and critically by initiators, developers or even participants for their impacts on policy situations. Instead of assessing in depth a few scenario exercises (as proposed in the research proposal), it was decided to focus on experts, academics and policy-makers, who had some recurrent and broad scenario development experiences. For Belgium, the most important scenario exercises were selected and a series of experts were identified that were recurrently involved in them. A selection of these experts has been interviewed (Peter De Smedt; Philippe Destatte; Florence Hennart; Frederic Heselmans; Moritz Lennert; Erik Mathijs; Bernadette Merenne-Schoumaker; Michael Van Lieshout; Eva Verstraete; Donaat Cosaert and Stef Steyaert[23] - see Annexes 1 and 2: list of interviewed experts and the list of referenced scenarios (and prospective)

Annexes 1: Interview Questionnaire
Annexes 2: List of interviewed experts
Annexes 3: List of scenarios exercises referenced in the paper

[23] We also had the opportunity to organize a meeting with Alain Wouters, Managing Director of *Whole Systems* and internationally experienced scenario facilitator; and we discussed these issues with Nadine Gouzée and members of the SD Task Force of the Planning Bureau during a meeting addressed to several research team s in order to diffuse insights drawn from the elaboration of the scenarios of the Fourth Federal Report for SD.

ANNEXES 1: INTERVIEW QUESTIONNAIRE

To prepare the interviews, a questionnaire has been elaborated on the basis of the conceptual framework presented in the Part I of this paper. This is the generic version of the questionnaire, which has been adapted for each interview to the specific experience of the expert.

Dimension 1: Objectives/outcomes

- How and why have you begun to be interested by scenarios (to read/to develop/to sponsor)
  What did you think it could bring to you or to a targeted user? Was it clear?
  - If yes: explain
  - If no: (*we give examples like better understanding, awareness raising, etc. of whom and to do what, etc.*)

  If you use scenarios in order to develop/inform a planning/strategizing procedure, how did you manage to use the information/experience of the scenarios exercise into the planning/strategizing phase?
  (answers linked to the methodology and organisation of the exercise, to political support, the a specific thematic, etc.)

Dimension 2: Building blocks

- What is for you a scenario (exercise)?
  (a definition like predictive/projection, multiple explorative, normative, etc.)

  What are the main components of it? And what do they bring to the exercise/to the final product, what is their function in the exercise?
  (this type of characteristic or mechanism in the exercise is important in order to reach this types of result/impact, etc.)

  Do you think the following items have something to do with scenarios as you developed/understand it? And what place did/would you give to them?
  What did (would) they bring to your exercise/product?:
  Future oriented thinking, Collecting and integration of information, system thinking, story-like approach, Interface.
  (in other words or with more explanations)

Dimension 3: process & Content

In your experience, is the scenario approach, mainly about having a final product, a set of scenarios or about developing scenarios through a certain process, i.e.

- *Reading (or else) and using a final product, i.e., usually a set of scenarios? And what does that bring exactly (to the developers, participants, final product users)? (deciding, problem solving, acting, etc. once only)?*
- *Developing a scenario along a specific process associating specific actors, etc? And what does that bring exactly (to the developers, participants, final product users)? (thinking, opening-up, etc. ongoing)?*
- *Or both?*
  In the exercise you experienced, can you clearly dissociate these two aspects (and their results)?

Dimension 4: Who

- Who have been involved in the scenarios you experienced? (types of actors and of status)
  Do you think certain types of actors have absolutely to be part of a scenario exercise? And why?
  - *Do you think deciders have to be part of such exercise for them to take sense and have consequences?*
  - *What about the place of stakeholders and citizens? What is their added value in a scenario exercise?*
  - *Etc.*

Dimension 5: general questions

Factors of success and failure

- In the exercises you experiences, were there particular reasons for the success/failure of (parts of) the scenario exercise?
  What about the supporting role of personalities,
  what about the general economical and political context, etc.?

Private vs. Public

- *If they know something about the roots of scenario approach in the private sector or if they directly worked in the public field at any level:*
  Do you think the scenario technique which has been developed mainly in the private sector (and military sector) can be useful in the same way in the public field? Would you change something to adapt it to the administration or to the municipality or federal level, etc?

Status of Scenarios

- In the range of tools or instruments you use, how would you classify scenario exercises?
  (do you classify it aside intern or extern communication tools, aside planning or strategising tools like existing urban plans, etc.)
  Based on your experience, do you think scenario exercises have their place in a policy making toolbox? Why and at what stage?

SD & scenarios

- How would you describe the place of scenarios in the context of sustainability policies?
  [to be developed]

- Could you indicate us other scenarios or authors that you find really interesting.
- If you had to start this project over…

ANNEXES 2: INTERVIEWED EXPERTS

Here is the list of the Belgian French- and Dutch-speaking people involved in the development of scenario and prospective exercises that we have interviewed so far. For each person, we mention the date of the interview, the function and the scenario or prospective exercises he/she has been involved in (which will be briefly presented in the next section).

French Speaking Interviews

- **Moritz Lennert** (28 September 2007)
  Researcher in the *"Géographie appliquée et Geomarketing" unit* at the IGEAT *(Institut de Gestion de l'Environnement et d'Aménagement du Territoire) / Université Libre de Bruxelles*
  - Lead partner in the Espon project.

- **Philippe Destatte** (28 November 2007)
  Director of the *"institut Jules Destrée"*.
  - Leading developer/initiator of *"La Wallonie au futur", "Wallonie 2020", Mission prospective "Wallonie 21",* the *Collège Régional de Prospective de la Région wallonne*
  - Consultant for the exercise *"La prospective des entreprises wallonnes"*
  - Coordinator of the "Intelliterwal" platform (*Plateforme d'Intelligence territoriale wallonne*)
  - Other foresight related activities at the European level (Mutual Learning Platform, Blueprints for Foresight Actions in the Regions), for the Millenium project.

- **Heselmans Frederic** (3 December 2007)
  Director of the CLEO *(Centre d'Etude de l'Opinion) / Université de Liège*
  - Partner on the exercise "Étude prospective en appui de la politique scientifique fédérale"
  - Redactor of the "Guide pratique pour la prospective régionale en Belgique", involved in 'Liège 2020'

- **Florence Hennart** (10 Decembre 2007)
  "Direction de la Politique Economique; DG économie et emploi" at the Walloon Region
  - Developers of the exercise *"La prospective des entreprises wallonnes"*

- **Bernadette Merenne-Schoumaker** (9 January 2008)
  President and professor at the "Département de Géographie, Faculté des Sciences"
  - Member of the "*Collège Régional de Prospective de la Région wallonne*"
  - Scientific expert for the prospective group at the DATAR (France) (former "*Délégation à l'aménagement du territoire et à l'action régionale*) (Territoires 2020), for the exercise "*Cinq scénarios pour l'Europe de 2020*" (Datar), and in "*Liège 2020*" scenario exercise

Dutch Speaking Interviews

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ANNEXES 3:

LIST OF SCENARIO EXERCISES REFERENCED IN THE PAPER

Through the literature review, the WP2, the interviews and previous research, we have encountered a range of scenario exercises in a broad sense. Some have been used as illustration in the paper. Thus to be clear, we present briefly here

ESPON PROJECT 3.2	
Commanditaire	European
Developers team	IGEAT - AETS (Agence Européenne «Territoires et Synergies » - Fr)
Objectives/ Thematic	Spatial Scenarios and Orientations in relation to the ESDP and Cohesion Policy
Territorial level	Europe and regions
Methodology	Explorative scenarios, expert-driven

ÉTUDE PROSPECTIVE EN APPUI DE LA POLITIQUE SCIENTIFIQUE FÉDÉRALE	
Commanditaire	Federal science policy (Ex OSTC)
Developers team	Vito - CLEO
Objectives/ Thematic	Identify the strategically important domains for federal science policy
Territorial level	Federal administration level
Methodology	Strategic foresight, stakeholders participation

GSG SCENARIOS (Great transition)	
Commanditaire	Paul Raskin (Global Scenario Group et Stockholm Environment Institute)
Developers team	
Objectives/ Thematic	Transition towards SD
Territorial level	Global
Methodology	Trend projection, explorative and backcasting scenarios, experts-driven

LIÈGE 2020	
Commanditaire	SPI+
Developers team	Benoit Collet (coordinator) (consultant: Futuribles)
Objectives/ Thematic	Identification of future challenges for the city of Liège
Territorial level	City
Methodology	Explorative scenarios, stakeholders-driven

MILLENIUM ECOSYSTEM ASSESSMENT (MEA)	
Commanditaire	UNEP/GEF
Developers team	Scenarios Working Group of the Millennium Ecosystem Assessment
Objectives/Them.	Approaches to ecosystem management and the impact on human well-being
Territorial level	Global
Methodology	"Storyline-and-simulation" approach combined with "axes-technique"; Interviews with stakeholders

PROSPECTIVE DES ENTREPRISES WALLONNES	
Commanditaire	Walloon Economy Ministry (Kubla)
Developers team	Administration (consultant: Destrée Institute)
Objectives/ Thematic	Explore needs and wishes of private firms in order to identify propositions of public policy for the Walloon economy ministry.
Territorial level	Regional
Methodology	Strategic prospective, stakeholders participation (business leaders)

TOOLSUST	
Commanditaire	European Sustainable Cities and Towns Campaign ; Fifth framework Programme of the EU (1998-2002)
Developers team	Eivind Stø, The National Institute for Consumer Research (SIFO) (coordinator)
Objectives/ Thematic	Research project ***SD***
Territorial level	City level (participative process in 5 cities): Fredrikstad (Nw), Stockholm (Sw), Padova (It), Guildford (UK) and Groningen (Nl)
Methodology	Scenario axes-technique, backcasting approach, participation of citizens

VISIONS	
Commanditaire	Commission Européenne**,** DG RTD
Developers team	Prof. Jan Rotmans (Maastricht University, International Center for Integrative Study - ICIS) (coordinator)
Objectives/ Thematic	Research project The future of Europe at different scales
Territorial level	Europe at various level (elaboration of 5 scenarios at the different level): Green Heart (Nl), Venice (It), Northwest (UK), Europe as institutional level and as a whole.
Methodology	Explorative scenarios (participation of stakeholders, citizens and experts)

WALLONIE 2020	
Commanditaire	**/**
Developers team	Institut Destrée
Objectives/ Thematic	Renewing the vision for Wallonia (Participants: stakeholders and citizens; Target audience: political parties)
Territorial level	Regional
	The future of the Walloon region
Methodology	Participative prospective

FOOD CONSUMPTION AND SUSTAINABLE DEVELOPMENT: AN INTRODUCTION (1)

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1 Introduction

The relation of sustainability to the area of consumption was first stressed in Agenda 21, where it was said that unsustainable consumption and production patterns were the main cause for global environmental deterioration. In 1994, at the Oslo symposium, sustainable consumption was defined as "the use of goods and services that respond to basic needs and bring a better quality of life, while minimising the use of natural resources, toxic materials and emissions of waste and pollutants over the life cycle, so as not to jeopardise the needs of future generations". Consumption, in general, is crucial for sustainable development. Since food belongs to the very basic needs of all living beings, since it is, worldwide, the most essential product for daily consumption, one can even say that food consumption, in particular, is capital for sustainable development. In an analysis of the environmental impact of products (EIPRO), Tukker et al. (2005) underlined that within the EU-25, approximately one third of total environmental impacts (amongst which energy use, land use, water and soil pollution, emission of greenhouse gases, …) from households could be related to food and drink consumption. When including the environmental affects of storing and preparing meals and of out-of-home consumption, the figures for food-related environmental impacts rose to more than 40% of the total. They also revealed that, in fact, the environmental impact of consumed foods and beverages exceeded the impacts of all other investigated consumption domains, even transport (17% of measured impacts) and housing (7% of measured impacts).

Moreover, besides of external environmental aspects, food is also an "internal" issue, closely connected to our health. (Tischner and Kjaernes, 2007).

Following Schäfer et al (2007), present food consumption patterns cannot be called "sustainable", as they endanger not only the carrying capacity of the earth, but human health as well. A transformation to sustainable food consumption would be essential for sustainable development.

There is no common definition nor internationally accepted criteria system for sustainability of food. Most definitions mention three dimensions of sustainability: social sustainability (i.e. people issues, such as health, food safety, quality of life, hunger, …), environmental sustainability (i.e. land use, energy use and gas emissions, soil pollution, …) and economic sustainability. One cannot speak about food sustainability without evoking a *sustainable agriculture* (a way of producing / raising food that is healthy for consumers and animals, does not harm the environment, is humane for workers, respects animals, provides fair wages to farmers and supports and enhances rural communities), and *sustainable nutrition*, defined by Koerber et al (2004) through the following aspects: enjoyable and easily digestible foods, preferably plant-based foods, preferably minimally processed foods,

organically produced foods, regional and seasonal products, products with environmentally sound packaging, and fair-trade products. (Tischner and Kjaernes, 2007)

Also linked to the idea of sustainable food is the concept of "*food security*".

Sometimes confused with food safety, the term food security means ensuring that all members of a population have access to a supply of food sufficient in quality and quantity, regardless of their social or economic status. A secure food supply satisfies the consumer's needs without jeopardizing the production process in the short or long term. It ensures the sustainability of supplies while considering the safety of the methods of production and the nutritional suitability of the food produced. In addition, food security means that everyone always has both physical and economic access to enough food for an active, healthy life. The concept encompasses the following principles

• The ways in and means by which food is produced and distributed respect the natural processes of the earth and are thus sustainable.

• Both the production and consumption of food are grounded in and governed by social values that are just and equitable as well as moral and ethical.

• The ability to acquire food is assured.

• The food itself is nutritionally adequate and personally and culturally acceptable.

• The food is obtained in a manner that upholds human dignity. (WHO, 2004)

Sustainable food consumption can be defined as access and use by all present and future generations of the food necessary for an active, healthy life, through means that are economically, socially and environmentally sustainable.

As Tischner and Kjaernes (2007) underline it : "The goal cannot be to reduce consumption of food as much as possible, but to figure out which kinds of food, produced and processed where and in what way, prepared how and by whom, consumed, digested, with leftovers disposed off or even reused in what way etc. are the most sustainable options for different regions and cultures, different productions systems and consumers/ citizens.

Food consumption and its sustainability cannot be considered as such, but in a broader system including the production, processing, transportation, packaging, preparation, and disposal of food, each of the various stages being possibly analyzed both in terms of their impact on the environment and on human health.

2 Consumption

2.1 Misconsumption

The processes of modernization and economic transition have led to industrialization and urbanization in many countries and the development of economies that are dependent on trade in the global market. Food and food products have become commodities produced and traded in a market that has expanded from an essentially local base to an increasingly global one. Rapid changes in diets and lifestyles resulting from those processes are having a significant impact on the nutritional status of populations. At a global level, good evidence indicates a transition in nutrition, in which rising national wealth is accompanied by a shift away from diets based on indigenous staple foods, such as grains, starchy

roots and locally grown legumes, fruits and vegetables, towards more varied diets that include more processed food, more foods of animal origin, more added sugar, salt and fat, and often more alcohol.

This combines with a decline in energy expenditure that is associated with a sedentary lifestyle, with motorized transport, and labour-saving devices at home and at work largely replacing physically demanding manual tasks, and leisure time often being dominated by physically undemanding pastimes. Because of these changes in dietary and lifestyle patterns, nutritional and diet-related diseases are increasingly significant causes of disability and premature death in both developing and newly developed countries. (WHO, 2004). These consumption patterns not only undermine the quality of life but also have other negative environmental, social and economic impacts. (Barber, 2000)

2.2 Over-consumption

The over-consumption of food is also a serious issue. This trend appears in both developing as well as affluent industrial nations. In contemporary post-industrial societies, where the food system provides people with ample access to a wide variety of foods, many of which are high in fat and are calorically dense, there is a strong link between food, eating, and weight. Post-industrial food systems add unnecessary calories at all stages (production, processing, distribution, acquisition, preparation, and consumption) and are therefore labelled "fattening food systems" (Sobal, 2006: 385)

Obesity is one of the greatest public health challenge of the 21st century. Its prevalence has tripled in many countries in the WHO European Region since the 1980s, and the numbers of those affected continue to rise at an alarming rate, particularly among children. Obesity is already responsible for 2-8% health costs and 10-13% of deaths in different parts of the EU. (Tischner and Kjaernes, 2007)

The problem of overweight and obesity has only recently come to the forefront of public health, as public health nutritionists were primarily concerned with the problems of undernutrition, especially in vulnerable groups in society. WHO, however, calls overweight (a body mass index – BMI2 – of 25–29.9) and obesity (BMI of 30 or more) the biggest unrecognized public health problem in the world; they contribute substantially to both ill health and death in populations. Excess weight is calculated to be responsible for nearly 300 000 deaths annually in the EU – nearly 1 in 12 of all deaths recorded – by contributing to cardiovascular diseases and cancer. The major complications of excess weight are type 2 diabetes, high blood pressure, coronary heart diseases, strokes, a range of cancer types, arthritis, tooth decay and osteoporosis. A series of disabilities and psychological problems are linked directly to excess weight. (WHO, 2004)

2.3 Between over and mis-consumption: anorexia and bulimia

Sociologists have commented on how the social system provides easy access to high-calorie inexpensive food, with a consequently high prevalence of obesity and the parallel development of a fear of fatness (Sobal, 2006: 385). In developed countries, food is abundant, and food manufacturers, through the media, continuously and persuasively encourage people to enjoy the full pleasure of food consumption. As a number of authors have noted, when food is scarce, cultural ideals favour a large body, whose "abundance" symbolizes wealth and status. Conversely, in times of plenty, social mores shift towards disciplining food intake, and the thin body becomes the ideal. In today's advanced capitalist societies, food is readily available and social worth is increasingly measured by a person's ability to resist excess. Regimes of body control, particularly through the regulation of food intake, are now common features of Western culture. (Germov and Williams, 2006), and starts to permeate other cultures. Indeed, eating disorders are increasingly becoming a global problem, with rising number of cases in non-Western countries worldwide. (Hepworth, 2006)

2.4 Under-consumption

While inhabitants of industrialised countries often consume too much calories leading to negative health effects, still a too large proportion of inhabitants of developing and emerging countries have no access to enough food and save drinking water. Hunger, defined as "inadequacy of dietary intake relative to the kind and quantity of food required for growth, activity, and maintenance of good health" (Whit 2004), is a salient indicator of the unsustainability of the global food system. (Barber, 2000)

Agricultural production at current levels could feed everyone on the planet, but it does not. Beyond the nutritional minimum requirement of 2,300 calories per day, each person could regularly be provided 2,650 calories. World Resources Institute reports that there is enough food in the world to feed 12% more than the actual population (Barber, 2000). Though, ten years after the 1996 Rome World Food Summit (WSF), the number of undernourished people in the world remains high. There has been virtually no progress towards the WSF goal – to reduce hunger by half by 2015. In 2001-03, FAO estimates that there are still 854 million undernourished people worldwide: 820 million in the developing countries, 25 million in the transition countries and 9 million in the industrialized countries. (Tischner and Kjaernes, 2007). At the same time, one-third of the food wasted each day in the United States could feed 26 million people. While there is more food, the poor cannot afford to buy it (Barber, 2000).

Adequate nutrition could be derived from grains, but only 40% of the grain grown in the world is fed to livestock to produce high-priced meat. (Whit, 2004). Moreover, large parts of the surface of the globe to produce luxury products for rich consumers – for example beef, sugar, coffee, tea, and chocolate, at the expense of food crops for less affluent consumers. (Leahy, 2004). This can lead us to think again about over-consumption (cf.supra) through another lens…

Following P-M Boulanger, from a sustainability perspective, there is overconsumption if it results in underconsumption elsewhere (contemporaries) or later (future generations), i.e.when:

- Some people don't have access to sufficient amounts (i.e above a specified threshold or norm) of a given resource or of resources in general (underconsumption)

- Others enjoy levels of consumption of these resources above that threshold (overconsumption as such);

- There is a causal relation between the deprivation of the former and the (over)consumption of the latter. (Boulanger, 2007:24-25).

There is over-consumption of certain kinds of foods (especially meat) in industrialized countries, since it has as consequence to make the increase the price of the crops, from now on unaffordable for the poorest…

Barber (2000) also points out the problem of "hidden hunger" (deficiencies in vital micronutrients such as iron, iodine, and vitamin A)0 which strikes at 1.2 billion, leaving a devastating wake of illness.

The WHO claims that "nearly 30% of humanity are currently suffering from one or more of the multiple forms of malnutrition." Problems linked to malnutrition claim the lives of 40,000 people each day, with 19,000 of these deaths among infants and children. Worldwatch points out that "roughly half the population in all nations – wealthy and poor – suffers from poor nutrition of one kind or another"

3 Production

Contemporary methods of food production resulted from scientific developments in agricultural research: the genetic selection of crop strains and animal breeds; the application of nutrients to crops and animal feed; the increase of yield through the use of biochemicals, such as pesticides and growth enhancers; and the use of veterinary medicine to prevent disease outbreaks in groups of confined animals and to promote their growth and productivity. These technical developments have been matched by increased financial investment in farming and food production to gain from economies of scale. This has led to reduced labour costs; increased mechanization; the development of monoculture cropping patterns; increased field, herd and flock sizes; reduced crop biodiversity; longer transport distances; increased food processing and use of additives; greater concentration of retailing outlets; and increased marketing and advertising activity. (WHO, 2004)

Consumption depends on where and how food is produced, processed, packaged, preserved, distributed, prepared and disposed of. The most significant environmental impacts occur at the beginning of the production chain, in the area of food production. Agricultural production requires 28% of the food sector's total energy requirement. (Friedl et al, 2006). Together with livestock production, agricultural production is responsible for the following impacts and costs of industrial agriculture:

- **Soil degradation and soil erosion** through ploughing and subsequent exposure of bare soil to rain and wind, through the use of herbicids that destroy weeds cover for soils, and through the removal of tree cover on slopes.

- **Cropland loss to urbanization**

- **Gradual destruction of forests**, wetlands, and other wild areas to create land for agriculture, destruction of wildlife.

- **Loss of biodiversity in crop species**

- **Yield loss:** The dramatic rise in grain yields between the 1960s and 1980s tended to outweigh the loss of arable land. However, since 1984, grain yields have slowed to such a degree that they no longer compensate for the steady elimination of grainland.

-**Water pollution:** The increasing use of inorganic fertilizers is resulting, in some areas, in the contamination of drinking water with nitrates and damage to aquatic ecosystems from eutrophication.

- **Overpumping of groundwater:** In many irrigation-dependent countries, including China, India, North Africa, Middle East, southwestern United States, water tables are falling because of overpumping.

- **Salinity in dry-land culture**

- **Overfishing:** overfishing has resulted in reduced productivity of fisheries, with the marine fish harvest now stagnant. Fish stocks are declining, with about one-fourth currently depleted or in danger of depletion and another 44% being fished at their ecological limit. Moreover, fishing techniques are used that destroy other sea animals or habitat. (Barber, 2000)

- **Resistance of plant and insect pests to chemical pesticides and herbicides**

- **Elimination of predator insects**

- **Dependence on oil and external energy resources:** Modern agriculture relies substantially on fossil fuels. Nitrogen fertilizers, feed concentrates, pumped irrigation, and power machinery such as tractors account for much of the energy used on farms.

- **Greenhouse gases emissions**: while fuel combustion is the main source for CO2 emissions, other important greenhouse gases are methane (CH4) from animal husbandry, waste and rice planting, and nitrous oxide (N2O) from industry and agricultural soils.

- **Concerns about animal welfare**:Animals and nature have become commodities: raw material for an industrial production system. (Tischner and Kjaernes, 2007). Farm animals are made to work very hard in producing meat, milk, eggs and wool, not least because the genetic selection of many breeds to generate profit has outrun the strength of their bodies. There is evidence that animals suffer discomfort or severe pain throughout their short lives so that the consumers can buy cheap food in the shops. (ex: joint deformities and heart diseases due to forced fattening, enhanced reproduction rates to the limit of the animal's biological capacity, restriction on the movement of the animals, …) (Atkins and Bowler, 2001)

Impacts on health:

- Insecticide, rodendicide, herbicides, and fungicides are of concern to the consumer's health because of the residues that appear in food. Adverse health effects can result from both acute and chronic exposure too foodborne chemicals and may include kidney and liver damage, fetal developmental disruption, endocrine system disruption, imunotoxicity and cancer (WHO, 2004).
- Drugs (for instance antibiotics) are also routinely used by farmers to increase the growth or yield of their animals and to protect them from diseases. There is a risk that, over a period of time, bacteria become immune to them and that this immunity might pass through the food chain to make bacterial infections in human more difficult to treat.
- A similar issue is raised by the use of hormones as growth promoters, that could have bad implications on both animal and human health. (Atkins and Bowler, 2001 : 216)

3.1 Processing

The European food processing industry is the third biggest EU industry employing some 2.7 millions people with more than 26000 companies across the EU. More than 70% of the agricultural goods produced in the EU are transformed into food industry products. There is a tendency toward the consumption of highly processed foods (fast and convenience foods) and a higher amount of appliances in the kitchen, accompanied by decreasing knowledge about nutrition and food. (Tischner and Kjaernes, 2007).

The alteration of natural foods to make them more appetizing or to preserve them has been a feature of the food industry for hundreds of years. We have come to accept such practices as a matter of course and indeed, processed or manufactured foods constitute about three quarters of our diet and seem quite normal. About 3800 additives are used in our daily food, for three basic purposes.

- First, there are cosmetic chemicals that make products look more attractive to senses, especially colouring agents, flavours, sweeteners and texture modifiers, such as emulsifiers and stabilizers.

- Second, there are preservatives, including antioxidant and sequestrants, which add life to a product.

- Third, processing aides assist the manufacturing process, for instance by preventing food from sticking to machinery.

A small but significant group of people are allergic to individual or group additives. Such allergic reactions can be sudden and dramatic, but perhaps even more worrying is the unknown and insidious long-term effect that food additives and chemical residues may have. (Atkins and Bowler, 2001)

Methods of storing and processing food tend to reduce than enhance nutritional content.

4 Distribution

Once food is produced, it is then packaged, transported and delivered to a sales outlet. Some food is moved by cart to the local village market, other (an increasingly major share, cf.infra) is loaded into huge cargo boxes and shipped or flow thousands miles away, later carried by refrigerated railroad cars and/or trucks to a warehouse to perhaps wit for weeks or even months. (Barber, 2000)

Global trade in agricultural products has increased rapidly in the last few decades. In the last five decades, the volume of agricultural exports has risen by 550% and total agricultural production, 320%. The difference shows that an increasing proportion of food is grown for export rather than local consumption. The volume of exports has increased significantly, but their value has increased even more dramatically, rising an estimated 1730% in the period, indicating a significant increase in the per-unit value of the foodstuffs being shipped, as a result of refrigeration techniques and faster delivery using air transport. Several problems associated with increased food trading may threaten the sustainability and security of the food supply. These include the selection of the commodities traded; the concentration of trade among a few dominant multinationals; the effects of transport – increasing transport adds to air pollution and road hazards – , storage and packaging on the environment, and the need for traceability in the food chain. (Barber, 2000; WHO, 2004)

5 Food safety

Although today control and regulation of food safety are very high, the consumer trust in food safety is reduced by food scandals. Food scares are becoming common: salmonella, BSE, bird flu, genetically modified crops, … Whether the science supports such worries or not seems to be a marginal matter, because media have raised the debate to such a pitch that consumers are making purchase decisions on the basis of fear rather than fact. (Atkins and Bowler, 2001)

Therefore, food safety – the assurance that food will not cause harm to the consumer when it is prepared and/or eaten – has commanded the most attention from public, politicians and officials in Europe in recent years.

Concerns over food safety and control of food supplies have arisen from a number of factors such as:

- rising numbers of incidents of foodborne disease
- the emergence of new, serious hazards in the food chain
- the globalization of the food trade
- demographic changes and an increase in vulnerable groups
- new opportunities for chemical contamination
- the need for appropriate risk assessment procedures for new technology.

Adverse health effects can result from:

- exposure to foodborne chemicals (arising from environmental pollutants, agricultural and veterinary practices such as pesticides, fertilizers and drugs, and food processing and packaging techniques)
- infection: when viable organisms (bacteria, viruses, or parasites) are present in the food and enter the body, where their growth and metabolism produce the disease response)

- intoxication : when the presence and growth of an organism in the food because of incorrect storage are accompanied by the accumulation of a toxin that is ingested with the food and causes illness. (WHO, 2004)

Food poisoning is among the commonest forms of illness. It is on the increase in developed countries. The reasons for the secular increase is bound up with the changing food system. First, food production has become much more intensive over the last 50 years and there are pressures on farmers and food processors to cut corners in order to reduce costs. Abattoirs and food processing plants have been shown to be major points for infection and, because they are growing larger and larger, a single incident can have a big impact.

Second, consumers are demanding more convenience food but these are often not properly stored. Refrigerator temperatures over 5°C are dangerous as is food kept beyond its use-by date, and also frozen food not fully defrosted before cooking. Traditional cooking skills have often been substituted by technological innovations such as microwave ovens, which may give a false impression that the food has been thoroughly heated. (Atkins and Bowler, 2001)

6 Conclusion : sustainable food?

Summarising the environmental impacts of food consumption, of all stages of a food product life cycle, agriculture production is responsible for the highest environmental effects. The influence of packaging material and transport is of minor importance compared to other categories. Concerning food categories, the smallest environmental impacts can be expected from seasonable and fresh vegetable products grown in an extensive manner (such as organic agriculture) with little transport and light packaging. Not surprisingly, meat and meat products show the most severe environmental consequences, followed by dairy products and other product groups (such as fats and oils, soft drinks and bread/bread products).

A sustainable food diet would give preference for meatless or reduced meat diets, organically, regionally and seasonally produced foods, minimally processed, ecologically packed and tastefully prepared foods, diets that have low environmental impacts but provide the required amount of nutrients and energy to maintain good health, as well as foods traded fairly.

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Towards integrated sustainable food consumption strategies: a Q Methodology study

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1 Introduction

Q methodology was invented in 1935 by the physician and psychologist William Stephenson. Since then, it has been considerably enriched by the political scientist Steven Brown and has been the subject of many applications in political science, marketing, sociology, etc. It has more recently been applied to the environmental field (Addams & Proops, 2000) and sustainable development issues (Swedeen, 2005).

The method consists in having a set of proposals (i.e. sentences, statements, pictures…) called the *Q* sample, sorted by a small sample of subjects, called the P sample. The subjects are asked to rank the propositions of the *Q* sample, usually from those with witch they most

disagree to those with which they most agree, taking care to reproduce an almost normal distribution. Once this sorting obtained, an analysis reveals the correlations between the different subjects' sortings, and a factorial analysis reveals factors which are in common to the different sortings. Both analysis are combined and make it possible to reveal standard sortings of the proposals

The idea of using *Q* methodology arose as we were trying to find a way of combining elements from the three scenarios in order to build one (or more) common vision(s) of a desirable sustainable future of food consumption in Belgium. This "ideal" integrated scenario would play out a range of principles, logics, aspects and interrelations coming from the 3 strategy-images and illustrate one possible sustainable world in terms of food consumption. *Q* methodology, which is said to be "particularly well suited to situations in which a single "issue" is made out of subdimensions, and in which you are not necessarily sure how all these sub-dimensions will fit together" (Donner…) seemed, at first sight, to be a perfect tool to solve the problem of the possible arbitrary character of the selection and combination task.
During the process, though, our aim slightly changed. Our first objective turned out to be too ambitious. *Q* methodology wouldn't offer elements of an integrated scenario as such, but, rather, three kinds of outputs that could be of rich interest for us:

1. First *Q* methodology highlights *the distinct groups, or different shared perspectives that appear in the sample*. Indeed, thanks to a factor analysis, the participants who completed the sort are "compressed" into a few subgroups, each reflecting a common pattern of responses. Each of these subgroups can be portrayed with a "snapshot", summarizing the average sort of the participants in that subgroup.

This first kind of output could enable us to determine whether and in which measure the three strategies/scenarios were well operant in the mind of a larger group of people. Indeed, we could easily and quickly check if the factors extracted during the analyses would correspond, more or less, to our three strategies.

2. A second kind of output brought by the *Q* methodology analysis is the *contention elements*, i.e. elements that garner a real split decision, meaning that they are considered as highly desirable for some participants and disagreeable to others. Those elements, that distinguish a subgroup from another, are particularly prone to feed discussions. They could be seen, in our case, as elements to discuss and themes about which to spark off debates when coming to proposition for policy.

3. Eventually, *Q* can reveal *consensus elements*, i.e. proposals that were rated at roughly the same level (either high, low, or neutral) by most participants. These statements can serve as a point of departure for consensus building among groups represented by the different factors. Again, those elements are precious in order to discover themes that could serve as a point of departure for policy makers: which are the ideas rejected by, or, on the contrary, shared amongst the different representations of what could be a sustainable food consumption?

Practically speaking, a *Q* study involves six steps: (1) identification of a discourse area of interest; (2) collection of statements by the full range of people with some interest in the topic; (3) selection of a representative set of statements from the full concourse; (4) selection of participants and execution of *Q* sort; (5) statistical analysis; and (6) interpretation of discourses.

2 Selection of discourse topic: "epistemological" considerations

Since *Q* methodology is nothing much than "a basis for a science of subjectivity" (Brown 1980), and since subjective viewpoints can be expressed and communicated around any theme, *Q* can fit any topic that concerns tastes, preferences, sentiments, motives and goals. Yet, some of its characteristics make it particularly well suited for certain situations.

A first characteristic of *Q* is that "questions pertaining to one and the same domain are not analysed in separate items of information but rather in their mutual coherence for the respondent." (Van Exel 2005:3). According to Donner (2001), this makes it especially good for cases in which a single « issue » is made out of subdimensions, and in which it is not necessarily sure how all these subdimensions fit together.

This is exactly the situation we were facing in Consentsus, knowing that Sustainable Development policy could benefit from elements from the three strategies/scenarios developed, but ignoring how those elements could be selected and assembled together. Moreover, aware of the inevitable subjective and normative aspects involved in the selection task, we were looking for a method that would be in the line of the participative scenario exercises, and would prevent the researchers to make their own selection, according to their own criteria. Here again, *Q* appeared to be a precious tool.

Indeed, a second specificity of *Q* methodology is that it considers the subjects as self-referent, and thus allows them to define the discourses and categories themselves rather than having the researcher define them for analysis. Instead of hypothesizing relationships between items in advance and testing that structure, the researcher gleans the relationship between the items only once the sort has been complemented. (Swedeen 2005; Donner 2001; McKeown and Thomas 1988). The factors "obtained" are not "analytically distinct traits synthesized within the researcher's frame of reference, but, rather, "operant representations of whole perspectives" (McKeown and Thomas 1988 : 24). According to Swedeen (2005, inspired by Dryzek 1990), what follows is that the researcher himself or herself can be considered as a subject by participating in a *Q* study, along with the respondents, and that there is thus not the structural power imbalance inherent in the subject/object duality of survey research. "*Q* methodology is therefore epistemologically consistent with the intent for researchers to contribute to high quality decision processes with fair outcomes […] and with the role of scientists as participants in public discussion." (Swedeen 2005: 192).

3 Construction of communication concourse

In *Q*, the flow of communicability surrounding any topic is referred to as a "concourse", and it is from this concourse that a sample of statements is subsequently drawn for administration in a *Q* sort. Concourses are not restricted to words, but can incorporate virtually all manifestations of human life, all means of expression (paintings, pictures, videos, music, objects …). They can be obtained in a number of ways: a verbal concourse, for example, may be obtained through interviews, participant observation, popular literature (e.g. media reports, newspapers, magazines, novels) and scientific literature (papers, essays, books…).

In Consentsus, the concourse was composed of all the possible discourses existing around the three strategies. A part of this concourse had already been gathered during the scenario workshops, and was thus available through the minutes of those meetings, as well as through the scenarios themselves. However, since we knew this material, because of its form (either too 'sketchy' or too 'narrative') would not necessarily be easily usable for the constitution of the *Q* sample, we also gathered some material from internet, from websites we knew would be close to each strategy (e.g. Slow food movement, voluntary simplicity, local supported agriculture, bio-engeneering, …)

4 Selection of the *Q* sample

Once the concourse has been gathered, the task becomes one of selection, organization, and analysis, so as to draw a subset of statements, the *Q* sample (usually 20 to 60 items), which is eventually presented to participants in the form of a *Q* sort.

The main goal of selecting a *Q* sample, is to provide "a miniature which, in major respects, contains the comprehensiveness of the larger process being modelled" (Brown 1980), i.e. a set that is representative of the wide range of existing opinions about the topic. Usually, a structure (called "design principle") is used in order to avoid the under- or over-sampling of certain components, and, consequently, the incorporation of a bias into the final *Q* sample. Such a structure may be imposed on the concourse, based on *a priori* hypothetical or theoretical considerations (deductive structure) or may emerge from patterns that are observed thanks to further examination and analysis of the concourse (inductive structure). Be it "emergent or imposed", however, this artificial categorization of statements has to be considered as a mere way for the observer to organize the concourse from the standpoint of what appears to him the most useful way of thinking, in order to facilitate the selection of items for the *Q* sample. It is much less important than how the subjects themselves will later perceive and react to the statements in the set: "Ultimately, this artificiality is replaced by categories that are operant, i.e., that represent functional as opposed to merely logical distinctions" (Brown 1980: 189)

Usually, to make it easier, the researcher builds his design as a two dimensions matrix, distributing the concourse between the different cells, and then selecting a number of statements for each cell.

Here, the *Q* sample was drawn according to the following design principle[1]:
The columns obviously represent the three strategies: Eco-efficiency, Decomodification and Sufficency (with a subdivision for this latter: "health-oriented" or "hedonistic"). For the categories in rows, we selected the three actions from the POPED structure the most directly associated to the consumption practices, i.e. obtain, prepare and eat.

[1] Please refer to the annexes (*Q* sample FR and *Q* sample NL) or to Table 3 to have the full statements corresponding to the numbers displayed in this table.

Table 1. *Q* sample design principle

	EE	**DC**	**S**		***Total***
Obtain	1; 2; 3; 4; 5	6;7;8;9;10	**(health)** 11;12;13	**(hedonistic)** 14	
	5 statements	*5 statements*	*4 statements*		*14*
Prepare	15;16;17	18;19;20	21;22	23;24	
	3 statements	*3 statements*	*4 statements*		*10*
Eat	25;26;27;28	29;30;31;32	33;34;35;36	37	
	4 statements	*4 statements*	*5 statements*		*13*
Total	*12*	*12*	*13*		***37 statements***

5 Participants selection (P sample)

A *Q* methodological study needs only a limited number of respondents, since "(...) all that is required are enough subjects to establish the existence of a factor for purposes of comparing one factor with another (…)." (Brown 1980: 192). What really matters is not the number of respondents, nor the statistical representativeness of the sample: the results of a *Q* methodological study are the distinct subjectivities about a topic that are operant, not the percentage of the sample (or the general population) that adheres to any of them. The important thing is thus to select people who are theoretically relevant to the problem under consideration. Therefore, as in the theoretical structuring of a set of *Q* statements, experimental design principles can be drawn upon for purpose of composing a *P* set that is thus more theoretical or dimensional than random or accidental.

In the case of the Consentsus *Q* exercise, aiming at discovering different ways of combining elements of three distinctive strategies for sustainable consumption, we thought that inviting mainly "sustainability experts" would be the most "economic" solution. Indeed, it was easier to address our question to people already used to think in terms of long term issues and sustainability, and who were, moreover, consumers themselves. We knew from the beginning that, anyway, the most interesting results of the *Q* for us would be groups of statements (i.e. discourses around sustainable food consumption) rather than groups of people.

Invitations were thus sent to three groups of people: people appearing on the participants' list of the "Forum Energy 2050" organized by CFDD/FRDO (on the13th of November 2008); the members of the CFDD/FRDO themselves; and the experts having participated in our scenario workshops.

Finally, our P-sample was composed of 45 participants distributed as follows :

- Linguistic group :
  - 24 French speaking (53%)
  - 21 Flemish speaking (47%)
- Gender
  - 19 women (42%)
  - 22 men (48%)
  - 4 undefined (10%)
- Age :
  - 13 aged between 19 and 29 years old (29%)
  - 21 aged between 30 and 49 years old (46%)
  - 7 aged between 50 and 64 years old (15%)
  - 4 undefined (10%)
- 30 persons working in the sustainable development field (67%)
- 12 persons working about or within the food sector (27%), amongst whom 5 persons also working in the sustainable development field (11%) (2 for the industry, 2 in the administration and 1 in a NGO). Amongst the 7 remaining persons, 3 are working for the industry, 1 in the distribution sector, 1 in research (human sciences) and1 in another field.

6 Execution of the *Q* sort

The execution of the *Q* sort by the participants was made possible and easy thanks to a free software, FlashQ, a user friendly Flash application for performing *Q* sorts online, developed by Christian Hackert and Gernot Braehler (2007).[2] In a first step, the participants were asked to read carefully all the statements and to split them up into three piles: a pile for statements they tended to disagree with, a pile for those they tended to agree with, and, in the middle, a pile for those about which they were either neutral, ambivalent, or uncertain.

In a second step, they were asked to take the cards from the "agree"-pile, to read them again and, in conformity with the distribution[3] (see table 2), to select the two statements they most agreed with and to drag and drop them on the “score scale”, below the "+4" header. They did the same for the statements they most disagreed with, under the “-4” header. Next, they selected those they second most agreed/disagreed with and placed them under "+3"/"-3"… They followed this procedure, back and forth, for all cards alternatively in the "agree"- and "disagree"-pile. Finally, reading the "neutral"-cards again, they arranged them in the remaining open boxes of the score sheet.

Table 2. *Q* study sorting scheme

Statement rank	**-4**	**-3**	**-2**	**-1**	**0**	**+1**	**+2**	**+3**	**+4**
Number of statements	2	3	4	6	7	6	4	3	2

[2] http://www.hackert.biz/flashq/
We would also like to warmly thank Stephanie Burns, doctoral student at Kent State University, for having created and sent us a precious file in order to make the program compatible with the latest version of Flash Player.

[3] “In mathematical terms, a forced distribution is used to produce sorts that have equal means and variance, thereby conforming the assumptions underpinning the factor analysis […]. Additionnally (at least attempting), a forced distribution improves the quality of the data […] because participants are required to consider the relative merit of statements in order to form their positions” (Niemeyer, Petts and Hobson 2005, 1448)

In a next step, they were asked to explain why they agreed most or disagreed most with the statements they had placed in the "+4" and "-4" columns.
Finally, they were enjoined to answer certain questions regarding their personal characteristics: sex; age; whether they were working in the sustainable development field or not; in/about the food sector or not and if yes, in which domain in particular.

7 Statistical analysis[4]

There is nothing special in the way *Q* methodology uses statistical analysis. The only and very specificity of *Q* methodology lies in the nature of the data matrix on which the analysis is applied. Whereas "traditional" statistical analysis (called *R* analysis by *Q* methodologists) extracts factors from the correlation between variables, *Q* methodology starts from the correlation between individuals. In other words, whereas in the *R* analysis, "attention focuses on the relationship between traits, with scores being expressions of individual differences for the various traits in a sample of persons" (Brown 1980: 12), in *Q*, the variables under consideration are the persons having performed the *Q* sort, and not the *Q* sample statements. *Q* methodology calls thus for the correlation and factoring of persons (and not of traits, tests, etc.) as statistical means to observe how they are grouped (or, more accurately, how they group themselves) through the process of *Q* sorting.

The analysis of the data from *Q* sorts involves the sequential application of several statistical procedures:

First, correlations among *Q* Sorts are computed, which are then factor-analysed, with the objective to identify a number of significant natural groupings of *Q* sorts, each one shared by groups of people with similar points of view. This set of factors is then submitted to one or several rotations (either atheroretical, usually using the Varimax method, or judgmental) thanks to which a set of factors is selected. The final step of the data treatment as such, before describing and interpreting the factors, is the calculation of factor scores, i.e. the normalised weighted average statement score of respondents that define each factor.

8 *Q* Methodology analysis of the "Consentsus" *Q* Sorts

Before coming to the real *Q* analysis of the sortings, it is important to recall what were our main objectives, or the kind of results we expected to raise from the analysis.
If we were aware that looking for elements that could help us to build integrated scenarios would be too ambitious, still, what we expected to find were elements, "themes" that garnered either contention or consensus amongst the participants. Those would be the important themes to highlight when working on the future of food.

[4] The statistical analysis was made thanks to "PQmethod", a free statistical program designed by Peter Schmolck to fit specifically the requirements of *Q* studies see http://www.lrz-muenchen.de/~schmolck/qmethod/)

a. Varimax rotation

Looking at the correlation matrix between sorts, at first sight, we could expect rather good results from factor analysis. Of course, we knew it was hopeless to analyze in detail a 45*45 matrix, but a rapid overview showed that a sufficient amount of correlations between the sorts were quite high (around 0,60). Yet, the higher the correlations between the variables (here the *Q* Sorts), the more common dimensions they share and the less factors are necessary to account for the variations in the data.

A principal components analysis confirmed this impression. In order to find the simplest structure in the data set that could explain the greatest amount of variability, i.e. to maximize the purity of saturation of as many *Q* sorts as possible on one or the other of the factors extracted, we started by applying the Varimax method of orthogonal rotations. Rotations do not affect the relationship among the facts (i.e. the data points are not moved around) but only the vantage point from which the relationships are observed. We then decided to take only the three first factors into consideration.

Eventually, the three factors identified enabled us to classify 51% of our P sample. After rotation, they accounted respectively for 23%, 11% and 9% of the variance, hence for 43% of total variation with 14 sortings allocated to the first one, 11 to the second one and 9 to the third one.

Once we had identified those three significant factors, we then gave the original statements a "model" factor score in order to examine the sort predicted by the factor model for each factor.

The "factor arrays", or "model *Q* sorts" for each factor are calculated by computing the *Q* sorts that have been allocated to them according to their different loadings. However, all allocated *Q* sorts are not associated with the same strength to their factor. Some are closer than others to it because their loading is higher. Therefore, the contribution of the allocated *Q* sorts to the definition of the model or ideal *Q* sort (factor array) was weighted according to their closeness to the factor. The weight (w) is calculated as follow: $w = f / 1\text{-}f^2$, where f is the factor loading. The higher the weight, the more the associated *Q* score contributes to the factor array. The weighted scores for each statement are summed and, for purposes of comparability, each item total is converted to a normalized score. This removes the arbitrary effect if the number of subjects associated with each factor and makes possible direct comparisons with the scores for the same statements in all factors.
Finally, those normalized factor scores are rounded and assigned a score so as to conform the form in which the data were originally collected: here, the two items with the highest scores were selected and given the value +4, the three next-highest items the value +3, etc … (cf. Table 2)

Table 3 shows the rounded factor arrays for the 3 selected factors. For each factor, we underlined, with a bold line, the highest and, with a dotted line, the lowest factor arrays, indicating, on one hand the statements with which the persons respectively loaded on factor A, B and C would disagree the most (i.e. the lowest scores), and on the other hand, the statements with which they would agree the most (i.e. the highest scores).

Table 3. Factors scores of three factors extracted after Varimax rotation

No	Statement	Factor Scores A	B	C
1	A well functioning market suffices to guarantee sustainable food consumption, provided that the right incentives are ensured (product norms, labels, tax incentives).	-2	4	2
2	Technological innovation (for example a smart fridge that automatically manages its contents thus preventing any waste) is an important element for sustainable food consumption.	-2	3	1
3	The consumer must be able to obtain his food through the easiest, the most anonymous, and the least time-consuming way possible.	-4	-1	0
4	It is possible to enjoy as much freedom of choice in the context of sustainable food consumption as in the context of non sustainable food consumption.	-1	2	1
5	In the context of a sustainable consumption, the heaviest impact food has on the environment, the most expensive it must be.	3	1	4
6	In 2050, the distinction between consumers and producers will have disappeared: everyone will be participating somewhat in the production of his food.	-1	-3	-1
7	Sustainable food consumption can be achieved through direct relationships between producers and consumers.	2	-3	1
8	Food cannot be compared to any other good. It has a particular character, even a sacred one.	3	0	0
9	Both the production and the consumption of meat should be entrusted to the State.	-1	-3	-4
10	I would find it normal to have rationing tickets for products which are too harmful for the environment.	0	-2	-2
11	The way I get my food is of little importance, as long as I can be sure the food is healthy.	-2	0	-1
12	It is normal, in the context of a sustainable food consumption, to pay more attention to food expenses, to make sure to buy only what is strictly necessary.	1	0	-1
13	The best place to get one's food should be the small local market, where the seller knows his products.	1	-4	1
14	Sustainable food consumption can be achieved through the promotion of gastronomic-quality food and the safeguard of traditional food.	2	-1	1
15	Pre-prepared meals are environmentally more efficient, for instance because they allow economies of scale.	-3	3	-3
16	In 2050, my kitchen will be minimally equipped; I will use it only to defreeze and warm up already prepared meals.	-4	-2	0
17	A sustainable consumption doesn't necessarily imply a deeper knowledge of food and the way it can be prepared.	-1	-1	-1
18	Children should acquire knowledge and skills about food (kitchen garden, preparation, cooking) since primary school.	4	2	4
19	In the context of a sustainable food consumption, it is normal that households should devote more time to preparing and cooking their food.	1	-1	-3
20	To be more environmentally efficient, meals should be prepared collectively, for instance in neighbourhood kitchens.	0	1	-4
21	What really matters in food preparation methods is their impact on health.	0	2	-1
22	In 2050, there will hardly remain any case of mismanagement of food through overconsuming or wasting.	0	0	3
23	It is a pity to spoil good products by through inadequate preparation.	1	1	0
24	Carefully preparing a meal is already enjoying it.	1	2	0
25	In 2050, GMO's will be will be present in my everyday food, as long as their production is motivated by less heavy environmental impacts (less fertilizers, pesticides and water consumption).	-3	1	0
26	I would eat out more often (restaurants, snacks, fast food, …) if I knew the ecological footprint of my meal was lesser there than when I'm eating at home.	0	-1	0
27	According to me, food safety and food traceability are fundamental.	1	4	2
28	It is very likely that the food from tomorrow's sustainable consumption will be completely different from today's products.	0	-2	2
29	In 2050, I'll mainly eat local products.	2	-1	3

30	Diversity is to be seen as rediscovering "forgotten" local products rather than as being offered exotic products.	3	0	1
31	In 2050, the main daily meal will be taken in canteens (at work, at schools, …) in order to reduce wastes as well as energy and water consumption.	-1	1	-2
32	In 2050, the food-processing industry will almost have entirely disappeared: people will mainly eat fresh and artisanal products.	0	-4	3
33	Sustainable food consumption implies that every individual should make a personal effort in order to watch his/her consumption.	4	3	2
34	One should only eat what is strictly necessary to a healthy diet (concerning quantities and nutrients)	-1	-2	-3
35	It would be useful to have a device that would help to manage the food intake by controlling the nutritional supply, regarding to objective individual needs according to age, sex, health status, activities, etc.	-2	0	-2
36	In 2050, the distinction between food and medicines will almost have disappeared: I will eat in order not to be ill, and I'll heal myself through eating.	-3	0	-2
37	In order to fully enjoy our food, it really matters to create a good atmosphere around eating moments (company, location, meals presentation …)	2	1	-1

The most interesting fact to notice here is that the two first factors, i.e. the two main types of discourses about possible future sustainable food consumption among the sample, are respectively composed of elements that we had previously classified as being part either of the Decommodification strategy (factor A) or of the Eco-efficiency strategy (factor B). This already means that those two strategies are really operant in people's mind: they are well two different ways of conceiving the future of food consumption. Factor C won't be looked at into more details here, in this first step of the analysis. It doesn't correspond to the sufficiency strategy but is rather a mix between the three strategies.

After this first step, giving us first insights about the results, the analysis focused on what would happen if the three first factors were corresponding, in the 'purest' way possible, to the three strategies. What would be the consensus elements? The contention elements? In order to discover it, a first graphical (or judgemental) rotation has been applied.

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b. Judgmental rotation (1) : the "extreme" positions

The aim here was first to find in the sample the persons who seemed to be the most linked respectively to the Eco-Efficiency, Decommodification and Sufficiency strategies, in order to maximise their respective loadings with one of the 3 selected factors and to end up with one DC factor, one EE factor, and one S factor.

Here is the way we proceeded concretely:
First, we looked at the mean of the scores given by each respondent to the statements respectively coming from the EE, DC or S strategy (according to the initial design, cf Table 1). We then selected the persons with the highest means respectively for each group of statements, and ended up with three (surprisingly equilibrate) clusters: 11 persons (24% of the P sample) had given the "DC" statements particularly high scores, 10 (22% of the sample) had ranked particularly highly the "EE" statements and 8 (17% of the sample) had shown a similar preference for the "S" statements. This could already enable us to note that, among the whole sample, 29 persons in total (i.e. 64% of the sample) seemed to show a particular preference for either one or another strategy.

Thanks to a graphical rotation, we tried to associate each of these groups with a specific factor, Factor A' for DC, Factor B' for EE and Factor C' for S. Last but not least, we flagged

the persons of each group on their respective factor, in order to give them a specific weight for the calculation of the factors' rankings.

Here are the results:

Table 4. Factor scores for three factors extracted after a first judgmental rotation

No	Statement	Factor Scores A'	B'	C'
1	A well functioning market suffices to guarantee sustainable food consumption, provided that the right incentives are ensured (product norms, labels, tax incentives).	-3	2	-1
2	Technological innovation (for example a smart fridge that automatically manages its contents thus preventing any waste) is an important element for sustainable food consumption.	-1	2	1
3	The consumer must be able to obtain his food through the easiest, the most anonymous, and the least time-consuming way possible.	-2	2	-4
4	It is possible to enjoy as much freedom of choice in the context of sustainable food consumption as in the context of non sustainable food consumption.	0	4	-3
5	In the context of a sustainable consumption, the heaviest impact food has on the environment, the most expensive it must be.	4	3	4
6	In 2050, the distinction between consumers and producers will have disappeared: everyone will be participating somewhat in the production of his food.	-1	-3	-3
7	Sustainable food consumption can be achieved through direct relationships between producers and consumers.	2	-2	0
8	Food cannot be compared to any other good. It has a particular character, even a sacred one.	2	-1	0
9	Both the production and the consumption of meat should be entrusted to the State.	-1	-4	-4
10	I would find it normal to have rationing tickets for products which are too harmful for the environment.	0	-4	2
11	The way I get my food is of little importance, as long as I can be sure the food is healthy.	-2	-1	-3
12	It is normal, in the context of a sustainable food consumption, to pay more attention to food expenses, to make sure to buy only what is strictly necessary.	1	1	3
13	The best place to get one's food should be the small local market, where the seller knows his products.	2	-2	2
14	Sustainable food consumption can be achieved through the promotion of gastronomic-quality food and the safeguard of traditional food.	3	0	0
15	Pre-prepared meals are environmentally more efficient, for instance because they allow economies of scale.	-2	1	-2
16	In 2050, my kitchen will be minimally equipped; I will use it only to defreeze and warm up already prepared meals.	-4	-1	-1
17	A sustainable consumption doesn't necessarily imply a deeper knowledge of food and the way it can be prepared.	-1	1	-2
18	Children should acquire knowledge and skills about food (kitchen garden, preparation, cooking) since primary school.	3	3	3
19	In the context of a sustainable food consumption, it is normal that households should devote more time to preparing and cooking their food.	1	-2	0
20	To be more environmentally efficient, meals should be prepared collectively, for instance in neighbourhood kitchens.	0	0	-1
21	What really matters in food preparation methods is their impact on health.	0	0	1
22	In 2050, there will hardly remain any case of mismanagement of food through overconsuming or wasting.	0	1	0
23	It is a pity to spoil good products by through inadequate preparation.	0	0	2
24	Carefully preparing a meal is already enjoying it.	1	2	3
25	In 2050, GMO's will be will be present in my everyday food, as long as their production is motivated by less heavy environmental impacts (less fertilizers, pesticides and water consumption).	-3	0	-2
26	I would eat out more often (restaurants, snacks, fast food, …) if I knew the ecological	-1	-1	0

	footprint of my meal was lesser there than when I'm eating at home.			
27	According to me, food safety and food traceability are fundamental.	1	4	1
28	It is very likely that the food from tomorrow's sustainable consumption will be completely different from today's products.	0	1	0
29	In 2050, I'll mainly eat local products.	3	-1	1
30	Diversity is to be seen as rediscovering "forgotten" local products rather than as being offered exotic products.	4	1	1
31	In 2050, the main daily meal will be taken in canteens (at work, at schools, …) in order to reduce wastes as well as energy and water consumption.	-1	0	-1
32	In 2050, the food-processing industry will almost have entirely disappeared: people will mainly eat fresh and artisanal products.	1	-3	-2
33	Sustainable food consumption implies that every individual should make a personal effort in order to watch his/her consumption.	2	3	4
34	One should only eat what is strictly necessary to a healthy diet (concerning quantities and nutrients)	-2	-2	-1
35	It would be useful to have a device that would help to manage the food intake by controlling the nutritional supply, regarding to objective individual needs according to age, sex, health status, activities, etc.	-4	-1	1
36	In 2050, the distinction between food and medicines will almost have disappeared: I will eat in order not to be ill, and I'll heal myself through eating.	-3	-3	-1
37	In order to fully enjoy our food, it really matters to create a good atmosphere around eating moments (company, location, meals presentation …)	1	0	2

Looking at the statements in the highest and lowest positions for each factor, we can easily see how the factors are well representing one of the strategies.

What characterizes Factor A' is the importance given to the local aspect, and to short food circuit: people loading on factor A' agree with the fact that forgotten species should be rediscovered, as well as local and traditional food. They see the local market as the best place to obtain food, and they give an importance to the direct relationship between the producers and the consumers. For them, food has a sacred character, and it is important to devote time, skills and energy to obtaining and preparing it. It is unconceivable to imagine not having the possibility to cook anymore (by eating more pre-prepared meals or eating out more often). Amongst the statements which were ranked with the highest scores, one can also find some elements of the sufficiency strategy, in his 'hedonistic' side, through the importance given to the atmosphere around the food intake, the gastronomic aspect of the food and the enjoyment of the preparation. On the other hand, the factor A' seems to reject the 'health' side of the sufficiency strategy: the ideas of the food as a medicine or of a controlling device appear as two of the statements with the highest negative scores. It is also interesting to note that the sentences referring to the intervention of the State (through rationing tickets or control of meat production and distribution), even if belonging to the DC strategy, are ranked quite low in the list.

Not surprisingly, what characterizes factor B' is the confidence in the market and the technological innovation. The market itself can ensure a sustainable consumption, through the system of prices, without reducing the freedom of choice. A shorter food chain is not needed for sustainable food consumption. The pre-prepared meals are considered as being more efficient and they are quite welcomed since it's not so important to spend time in the preparation of food. There is no real reluctance towards GMO's (contrarily to factor A'!). Nonetheless, it is interesting to notice that factor B' has some characteristics in common with factor A': it reckons, for example, the importance of an individual effort in order to come to sustainable consumption, as well as the importance of the education about food since the

primary school. It also shares with factor A' a repulsion for the intervention of the State and for food seen as medicine.

Finally, Factor C' is well characterized by a 'sufficiency' perspective, even if it is not really pure. Indeed, it also encloses, in a moderate way, some elements from the Decommodification strategy (the importance given to the local dimension for example) even if there is not a strong refutation of the market, as well as from the Eco-Efficiency strategy (the importance given to technologies). What specifically characterizes Factor C' is the idea of checking and/or controlling the food intake, either by paying attention to the food expenses, or thanks to rationing tickets, or even through the means of technological devices (be it an intelligent fridge or a 'chip in the belly'). On the other hand, the food has to be enjoyed, carefully prepared, and eaten in a convivial atmosphere.

Even more interesting than describing the three factors separately is to look at the elements of consensus and the elements of contention between the 3 factors.

Table 5 shows the statements that garnered real split decision amongst the respondents respectively loaded either on Factor A', B', or C'.

Table 5. Elements of disagreement

No.	Statement	Factor Scores		
		A' (DC)	B' (EE)	C' (S)
4	It is possible to enjoy as much freedom of choice in the context of a sustainable food consumption as in the context of a non sustainable food consumption.	0	4	-3
10	I would find it normal to have rationing tickets for products which are too harmful for the environment.	0	-4	2
3	The consumer must be able to obtain his food through the easiest, the most anonymous, and the least time-consuming way possible.	-3	2	-4
1	A well functioning market suffices to guarantee sustainable food consumption, provided that the right incentives are ensured (product norms, labels, tax incentives).	-3	2	-1
13	The best place to get one's food should be the small local market, where the seller knows his products.	2	-2	2
35	It would be useful to have a device that would help to manage the food intake by controlling the nutritional supply, regarding to objective individual needs according to age, sex, health status, activities, etc.	-4	-1	1

First of all, it is important to notice that the way the factor scores are distributed amongst the three factors is completely logical and consistent, and tells us something about each strategy.

Next, it is interesting to have a closer look to each of the statements that garnered contention among the P sample.

- About the possibility of freedom of choice (4)

Factor B' (EE) strongly agrees with the possibility of maintaining the freedom of choice in the context of sustainable food consumption, contrarily to Factor C' (S) which shows a strong disagreement, and Factor A' (DC) which seems neutral on the question. This can be illustrated by the justifications some respondents gave while writing comments on the statements they disagreed or agreed the most with:

An example of EE (+) justification[5] : " *le choix que fait un individu est étroitement lié aux valeurs qu'il porte, la consommation durable n'enlève rien à la liberté de choix, n'entraîne*

[5] NB : All the comments quoted here are considered as being only illustrative. They just give an example of possible kinds of justifications!

aucune frustration ou limitation*, mais au contraire, permet à l'individu d'entrer en accord avec lui-même dans ses choix alimentaires aussi.* "
An example of S(-) justification : " *Pouvoir profiter de tout en toute saison est* ***un luxe que la planète ne peut s'offrir*** ".
One hypothesis concerning the 'neutral' position of the 'advocates' of DC concerning the freedom of choice may be that they can have a radically different idea on the question, depending on whether they see the diversity as the one which is proposed today, as stated in this comment: *"Ce choix pléthorique de biens d'alimentation est élargi en dépit de l'impact écologique. Le monde entier cultive et élève en fonction des exigences des distributeurs et consommateurs occidentaux. Un tel mode de raisonnement n'est pas extensible à l'ensemble de la planète*", or as it could be in the future *" Les choix sont tout aussi nombreux même s'ils ne sont pas les même… la diversité des légumes par exemple est en fait plus grande quand on mange 'bio' car on prend aussi en compte toute une série de légumes oubliés.. donc la liberté de choix est là. Par contre, les choix ne sont pas les mêmes, il est clair qu'il ne sera pas possible de choisir certains aliments dans certaines saisons* ".

- About rationing tickets (10)
Again, we can observe the same pattern: Factor EE shows a strong disagreement about the idea of the possible existence of rationing tickets (*"C'est contraire aux libertés individuelles", " Het is aan de consument om uit te maken waar zijn/haar prioriteiten liggen. Duidelijke (maar correcte !) informatie over milieu-impact moet beschikbaar zijn, zodat de consument een geïnformeerde keuze kan maken."*), although Factor S shows a strong agreement (" *om te vermijden dat consumptie van bepaalde producten enkel voor rijkeren zou zijn weggelegd, zouden coupons een sociale maatregel kunnen zijn*"), and Factor DC remains neutral about it.

- About an anonymous, easy, and 'non time-consuming' way of obtaining food (3)
Here, Factor DC ("*le côté anonyme est une très mauvaise idée, il ne permet pas de responsabiliser le consommateur*") and S *(" als voeding zo belangrijk is, dan moet ik tijd voor maken"*) disagree strongly with the idea, although, not surprisingly, EE strongly agrees with it.

- About the market as being able to ensure sustainable consumption (1)
Again, it is not surprising at all to notice that both Factor A' and C' disagree with the statement; Factor A' to a higher extent than Factor C' ("*Duurzame consumptie heeft mijns inziens niet te maken met de 'markt'.. In de eerste plaats omdat voedsel niet mag gezien worden als een koopbaar, maar als een basisrecht"*). On the other hand, Factor B' obviously shows a great agreement with it. (" *Si on donne de bons signaux aux consommateurs, ceux-ci influenceront les producteurs pour une consommation durable et diversifiée"*)

- About the local market as the best place to get one's food (13)
One can observe the same pattern again: agreement from Factors DC and S, and disagreement from Factor EE ("*geloof in technologie and schaalvoordelen")*

- About the idea of a technological device that would control the food intake (35)
This statement garners a strong disagreement from the factors DC,, a moderate disagreement from the factor EE, and a moderate agreement from the Factor S .

Finally, the most interesting element to note here about those disagreements statements is probably the contested place of, and relationship to the market. This will be discussed further in the following part.

Table 6. Elements of consensus

No.	Statement	Factor Scores A' (EE)	B' (DC)	C' (S)
18	Children should acquire knowledge and skills about food (kitchen garden, preparation, cooking) since primary school.	3	3	3
21	What really matters in food preparation methods is their impact on health	0	0	1
22	In 2050, there will hardly remain any case of mismanagement of food through overconsuming or wasting.	0	1	0
24	Carefully preparing a meal is already enjoying it.	1	2	3
26	I would eat out more often (restaurants, snacks, fast food, …) if I knew the ecological footprint of my meal was lesser there than when I'm eating at home.	-1	-1	0
31	In 2050, the main daily meal will be taken in canteens (at work, at schools, …) in order to reduce wastes as well as energy and water consumption.	-1	0	-1

The consensus statements give us an idea of the themes that should surely be taken into account by policy makers. Unfortunately, this only table gives a very limited idea of elements on which the advocates of the three strategies would, altogether, strongly disagree or strongly agree. Indeed, most of the statements in the table (s21, s22, s26 and s31) appear well as being ranked more or less the same by the three factors, but in a neutral way (with scores as -1, +1 or 0). Surprisingly, none of the statements garner disagreement amongst all three of factors. Statement 24 doesn't bring a lot in terms of policy. Finally, only one statement can give us an insight about a positive attitude from the three groups, since all recognize the fundamental aspect of the education.

Another way to analyse the three positions and how they relate to each other, is to highlight potential integrated mixes of statements stemming from the three discourses. This has been analysed with the second judgmental rotation.

c. Judgmental rotation (2): the "mixed" positions

Having extracted three "pure" factors was interesting, on one hand, in order to confirm the existence of three types of discourses corresponding more or less to the three strategies, EE, DC and S, and on the other hand, in order to highlight, through the consensus and contention elements, interesting themes to work on in a policy perspective.

Nonetheless, we decided to go a little bit further by trying another kind of judgmental rotation: instead of selecting in the sample the persons who were the most "extreme", being mostly "associated" with only one strategy, we rather decided to select the most "mixed", "nuanced" sortings in order to analyse the factor(s) they would compose, after rotation.

Just as during the previous step, we selected some respondents in the sample, according to the mean of their sortings for each group of statements (EE, DC, or S). Nonetheless, this time, rather to select people whose rankings' mean was very high for only one kind of statements, we selected people who had an "average" mean, for the three groups, i.e., who didn't seem to show a true preference for either one or another strategy. Again, thanks to a graphical rotation, we tried to associate those people and their sorts to one factor (we called it A''), which turned out to be the only significant one.

Table 8 shows the result of this last rotation:

Table 8: Factor scores the factor extracted after a second judgmental rotation

No.	Statement	Factor A'' Scores unrounded	Factor A'' Scores rounded
5	In the context of a sustainable consumption, the heaviest impact food has on the environment, the most expensive it must be.	2.094	+4
33	Sustainable food consumption implies that every individual should make a personal effort in order to watch his/her consumption.	1.816	+4
30	Diversity is to be seen as rediscovering "forgotten" local products rather than as being offered exotic products.	1.719	+3
7	Sustainable food consumption can be achieved through direct relationships between producers and consumers.	1.029	+3
8	Food cannot be compared to any other good. It has a particular character, even a sacred one.	1.022	+3
29	In 2050, I'll mainly eat local products.	0.904	+2
18	Children should acquire knowledge and skills about food (kitchen garden, preparation, cooking) since primary school.	0.902	+2
27	According to me, food safety and food traceability are fundamental.	0.880	+2
24	Carefully preparing a meal is already enjoying it.	0.728	+2
12	It is normal, in the context of a sustainable food consumption, to pay more attention to food expenses, to make sure to buy only what is strictly necessary.	0.719	+1
23	It is a pity to spoil good products by through inadequate preparation.	0.710	+1
1	A well functioning market suffices to guarantee sustainable food consumption, provided that the right incentives are ensured (product norms, labels, tax incentives)	0.602	+1
13	The best place to get one's food should be the small local market, where the seller knows his products.	0.541	+1
37	In order to fully enjoy our food, it really matters to create a good atmosphere around eating moments (company, location, meals presentation …)	0.529	+1
21	What really matters in food preparation methods is their impact on health.	0.519	+1
28	It is very likely that the food from tomorrow's sustainable consumption will be completely different from today's products.	0.317	0
19	In the context of a sustainable food consumption, it is normal that households should devote more time to preparing and cooking their food.	0.060	0
4	It is possible to enjoy as much freedom of choice in the context of a sustainable food consumption as in the context of a non sustainable food consumption.	0.037	0
14	Sustainable food consumption can be achieved through the promotion of gastronomic-quality food and the safeguard of traditional food.	-0.013	0
20	To be more environmentally efficient, meals should be prepared collectively, for instance in neighbourhood kitchens.	-0.088	0
22	In 2050, there will hardly remain any case of mismanagement of food through overconsuming or wasting.	-0.105	0
26	I would eat out more often (restaurants, snacks, fast food, …) if I knew the ecological footprint of my meal was lesser there than when I'm eating at home.	-0.170	0
32	In 2050, the food-processing industry will almost have entirely disappeared: people will mainly eat fresh and artisanal products.	-0.268	-1
17	A sustainable consumption doesn't necessarily imply a deeper knowledge of food and the way it can be prepared.	-0.324	-1
10	I would find it normal to have rationing tickets for products which are too harmful for the environment.	-0.422	-1
25	In 2050, GMO's will be will be present in my everyday food, as long as their production is motivated by less heavy environmental impacts (less fertilizers, pesticides and water consumption)	-0.539	-1

2	Technological innovation (for example a smart fridge that automatically manages its contents thus preventing any waste) is an important element for a sustainable food consumption.	-0.683	-1
11	The way I get my food is of little importance, as long as I can be sure the food is healthy.	-0.764	-1
3	The consumer must be able to obtain his food through the easiest, the most anonymous, and the least time-consuming way possible.	-0.864	-2
9	Both the production and the consumption of meat should be entrusted to the State.	-0.984	-2
31	In 2050, the main daily meal will be taken in canteens (at work, at schools, …) in order to reduce wastes as well as energy and water consumption.	-1.073	-2
34	One should only eat what is strictly necessary to a healthy diet (concerning quantities and nutrients)	-1.112	-2
6	In 2050, the distinction between consumers and producers will have disappeared: everyone will be participating somewhat in the production of his food.	-1.138	-3
35	It would be useful to have a device that would help to manage the food intake by controlling the nutritional supply, regarding to objective individual needs according to age, sex, health status, activities, etc.	-1.577	-3
16	In 2050, my kitchen will be minimally equipped; I will use it only to defreeze and warm up already prepared meals.	-1.597	-3
15	Pre-prepared meals are environmentally more efficient, for instance because they allow economies of scale.	-1.647	-4
36	In 2050, the distinction between food and medicines will almost have disappeared: I will eat in order not to be ill, and I'll heal myself through eating.	-1.762	-4

Looking, in the table, at the nine first statements (with a rounded factor score between +4 and +2) and the nine last statements (factor scores between -4 and -2) and enlightening those elements thanks to the comments made by some respondents enables us to make interesting comments about this "mixed factors".

At first sight, amongst the highly ranked statements, a majority seems to come from the Decommodification strategy. But, looking a little bit closer, one can notice that the place given to the market in Factor A'' is not so clear. Indeed, the most highly ranked statement comes from the EE strategy and proposes a regulation through the price system (statement 5, +4). Moreover, the sentence stating that a well-functioning market is able to ensure a sustainable consumption comes in a rather high place, on the middle-top part of the list (s1, +1). On the other hand, what is clearly rejected from the EE strategy (together with the use of technologies (s2, -1) and the efficiency of pre-prepared meals (s16, -3 and s15, -4), seen as cancelling the pleasure of preparing and cooking (s24, +2), cf. infra.) is the idea that the consumer should be able to obtain his food through the easiest, the most anonymous, and the least time-consuming way possible (s3, -2).

This reflexion about the market leads to have a closer look to the decommodification elements, as Factor A'' strongly agrees with the idea that food is not a mere commodity, but has even a sacred character (s8, +3). Yet, in some respondent's comments about this statement, this means that : "*L'alimentation est un droit, et, à la limite,* ***ne devrait pas relever du secteur marchand*** " or "*Voedsel heeft direct te maakt met het instandhouden van het leven en het mag net als water* ***geen puur koopwaar zijn***. "

Looking at other decommodification elements, one can notice that what is clearly «kept» from this strategy is the importance given to the local dimension (s30, +3), the rediscovery of forgotten species, the knowledge and the education about food (s30, +3 and s18, +2) but

certainly not a possible intervention from the State (s9, -2 and, to a lesser extent -s10,-1) "*Nog meer Staat? Helemaal niet akkoord. Reguleren kan door prikkels of zware incentives te geven"*, a too active participation from the consumer in the production task (s6, -3) or the idea, maybe too 'collective' of eating the main meal at work or school (s31,-2): *"Le noyau familial et par conséquent les repas de famille constitueront toujours un des socles de la vie en communauté*"

Some respondents' comments appeared to be very enlightening in order to discover what can make the link between the eco-efficiency elements and the decommodification elements, and could be synthesized as follows: as far as sustainable consumption is concerned, every individual, thanks to the education he received (s18, +2), and guided by 'real prices' reflecting the external impacts of each product (s5, +4), has to make the choices of a responsible citizen-consumer.

About (s33, +4) : *"Chacun doit agir à tous les niveaux de la chaîne alimentaire, mais les consommateurs doivent aussi changer leur comportement… **avec des outils d'aide à la décision comme le prix vérité !*** " ; *" Duurzaamheid begint met **eigen verantwoordelikheid***. " ; «*Il faut avant tout que la consommation passe par des **choix conscients d'individus éduqués*** "

About (s3, -2) :*" Le côté anonyme est une très mauvaise idée, il ne permet pas une responsabilisation du consommateur. De plus, le fait d'obtenir sa nourriture le plus rapidement possible empêche le consommateur de **s'interroger sur ses choix et surtout de prendre du plaisir à faire son choix et finalement en toute connaissance de cause***. *Et pour cela, la facilité est un point important, le consommateur doit facilement **repérer les impacts environnementaux de son achat** (origine, mode de production, …)* "

Finally, as far as Sufficiency elements are concerned, one can easily notice that what is kept in the first instance is the 'hedonistic' dimension of the strategy. This appears as such in the high position of sentences such as "Carefully preparing a meal is already enjoying it" (s24, +2) or "In order to fully enjoy our food, it really matters to create a good atmosphere around eating moments (company, location, meals presentation …)" (s37, +1), but also indirectly in the reject of elements (technological device (s35, -3), food as medicine (s36, -4), health as an absolute priority (s34, -2), eating mostly pre-prepared meals (s16, -3 and s15, -4)) that could annihilate the pleasure in the acts of cooking and eating. This appears particularly when reading the comments of the respondents.

About (s34, -2): " *Eten moet ook lekker and plezierig zijn*" or "*Limiter le discours alimentaire à sa seule function nutritive et scientifique est un écueil à éviter. L'assiette est éminemment culturelle et sociale et est le reflet du fonctionnement de notre société. En outre, le goût et le plaisir sont nécessaires à l'appétit et à la fonction humaine et relationelle ! La santé est un facteur essentiel, mais à considérer de manière holistique et non nutritionnelle pure* ".
About (s35, -3) : " *Et que fait-on de la qualité de vie, du plaisir gustatif, de la joie de goûter des saveurs variées ?* " or " *Les problèmes de santé devraient pouvoir se résoudre par une politique d'éducation mieux pensée, qui permet notamment aux êtres humains de mieux évaluer leurs besoins et de savoir comment y répondre en alliant par exemple plaisir et diététique.* "
About (s36, -4) : " *L'alimentation n'est pas un médicament mais doit rester un plaisir* ", " *Manger est et doit rester un plaisir* ", " *Voeding moet een plezier blijven* ".

9 Conclusions

Three main conclusions can be drawn from the whole *Q* exercise and analysis.

1. From the results, it is clear that the three strategies identified and developed through the scenarios (namely Eco-efficiency, Decommodification and Sufficiency) are obviously existing and operant in the representations of sustainable food consumption. Amongst our P-sample, groups of people that really 'think' one should follow either an EE, DC or S strategy in order to lead the future of food consumption towards more sustainability could be identified. This analysis therefore confirms that the performed scenario exercise is not pure fantasizing, but definitely has an anchorage into reality.
2. The first judgmental rotation enabled to highlight themes which garner either consensus or disagreement among the 3 strategies. Those can be potentially relevant to inform policy makers. Moreover, they will be precious tools to spark off debates and discussions on the occasion of the dissemination process. Finally, those themes and the discussions they raised will for sure be taken along in the development of the second phase.
3. Finally, the second judgmental rotation highlighted how the three strategies could possibly combine, i.e. on which elements people «belonging» to the three pure factors would probably agree if they had to find a common way of seeing the future of food consumption.

This statistical analysis highlights thus how the three strategies are actually a relevant way to classify the options towards sustainable food consumption. However, it also highlights the specificity of the sufficiency strategy, which is maybe less operant in people's mind. Further, sufficiency has been structured in the *Q* analysis (based on the results of the scenario workshops) as a combination of hedonistic and rational (health-oriented) perspective on food: it turned out that the first aspect is also quite significantly associated to the DC discourse (and the second, in a limited extent to the EE discourse). The specificity of the sufficiency, as it surfaces in this analysis, is a bigger acceptation of the finitude of the resources and of the necessity of limits, whatever through self-imposed or through external mechanisms of limitations. This position is clearly rejected in the EE discourse, and more or less not addressed (neutral) in the DC discourse. In this latter, the issue is not defined in terms of limitation, but rather in terms of responsibility, whether individual or collective; this can provide an explanation of the neutral position of the DC discourse with regard to state intervention considered as one answer among other levels of action (individual and community).

This supports the idea that, if, at first sight, one could think the three strategies could be associated to specific ideological trends, it appears from the ranking of the statements that the three strategies' discourses as outlined here cross transversally across ideological demarcation lines with e.g. the role of the individual quite spread across the three discourses, nevertheless coloured in different ways and associated to different elements; or radical state intervention being clearly rejected in the EE discourse as expected, but neutral in the DC discourse, where one could have expected a high score.

The clearest point of agreement is the recognition by all of education as a fundamental aspect for sustainable consumption (giving statement 18 a high score: +3). Apart from this latter, it is interesting to note that the three groups only agree on issues with neutral scores, i.e. low stakes. Unlike the elements of disagreement which gather more 'extreme' scores. Thus one

conclusion can be that, striving towards one integrated strategy will result in a supported but rather limited consensus. The integrated strategy resulting from the last statistical rotation can illustrate such a minimum consensus stating that individual, based on a robust and relevant education and guided by 'real prices' reflecting the external impacts of each product will have to make choices and behave as responsible citizen-consumers. Beyond this rather mainstream statement, deciders, on the one hand, will inevitably have to make political choices among contrasting options, but on the other hand, as promoted by system innovation theory, this results argue for the parallel development of various options stemming from diverging, but not antithetic, discourses, at least from the sustainable (food) consumption perspective.

Finally, beyond those thrilling findings, we would like to recall, with Donner, that *Q* methodology is, after all, "more explorative than confirmatory, more of an opener than a conclusion" (Donner 2001, 26). Therefore, the conclusions we drawn here can certainly not be considered as definitive conclusions, but only as supporting some hypotheses and opening the way towards further investigations and discussions.

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ANNEX I : *Q* SAMPLE FRENCH

1. Un marché qui fonctionne normalement est capable d'assurer à lui seul une consommation alimentaire durable si on lui injecte les bons « signaux » (normes de produits, labels, incitants fiscaux,…)

2. L'innovation technologique (par exemple un frigo intelligent qui gère automatiquement son contenu et évite le gaspillage) est un élément important d'une consommation alimentaire durable.

3. Le consommateur doit pouvoir obtenir sa nourriture de la manière la plus facile, anonyme qui soit, en y consacrant le moins de temps possible.

4. Il est possible de jouir de la même liberté de choix dans le cadre d'une consommation alimentaire durable que dans le cadre d'une consommation alimentaire non durable.

5. Dans le cadre d'une consommation durable, plus un aliment a un impact sur l'environnement, plus il doit être cher.

6. En 2050, la distinction entre consommateurs et producteurs aura disparu: tout le monde participera peu ou prou à la production de sa nourriture.

7. Une consommation alimentaire durable passe par des relations directes entre producteurs et consommateurs.

8. La nourriture n'est pas un bien comme un autre, elle a un caractère particulier, voire sacré.

9. La production et la distribution de viande devraient être confiées à l'état.

10. Je trouverais normal qu'il existe des tickets de rationnement pour les produits trop nuisibles à l'environnement.

11. La façon dont je m'approvisionne en nourriture a peu d'importance, du moment que j'aie l'assurance que celle-ci soit saine.

12. Il est normal, dans le cadre d'une consommation durable, de faire plus attention aux dépenses alimentaires, de veiller à n'acheter que le strict nécessaire.

13. La voie privilégiée d'approvisionnement en nourriture devrait être le petit marché local où le vendeur connaît ses produits.

14. Une consommation alimentaire durable passe par la promotion d'aliments de qualité gastronomique et la sauvegarde d'aliments traditionnels.

15. Les aliments pré-préparés sont plus efficaces sur un plan environnemental, par exemple parce qu'ils permettent des économies d'échelle.

16. En 2050, ma cuisine sera minimalement équipée, je ne ferai plus qu'y décongeler et réchauffer des produits préparés.

17. Une consommation durable ne passe pas nécessairement par une connaissance plus approfondie des aliments et de la façon dont on les prépare.

18. Dès l'école primaire, les enfants devraient acquérir des connaissances et des compétences liées à l'alimentation (potager, préparation, cuisine,...).

19. Il est normal, dans le cadre d'une alimentation durable, que les ménages consacrent plus de temps à la préparation des repas.

20. Il est plus efficace d'un point de vue environnemental que les repas soient préparés collectivement, par exemple dans des cuisines de quartier.

21. Ce qui compte dans les méthodes de préparation, c'est leur impact sur la santé.

22. En 2050, une mauvaise gestion des denrées alimentaires, via une surconsommation ou du gaspillage, aura quasiment disparu.

23. C'est dommage de gâcher des bons produits en les préparant n'importe comment.

24. Préparer un repas avec soin, c'est déjà un peu le déguster.

25. En 2050, ma nourriture quotidienne pourra comporter des OGM's, pourvu que leur production soit motivée par une réduction d'impacts environnementaux (diminution des engrais, des pesticides et de la consommation d'eau).

26. Je mangerais plus souvent à l'extérieur (restaurants, snacks, fast food,...) si je savais que l'empreinte écologique de mon repas y était moindre qu'à la maison.

27. Pour moi, la sécurité et la traçabilité alimentaire sont primordiales.

28. Il y a de fortes chances pour que les aliments d'une consommation durable en 2050 soient complètement différents de ceux d'aujourd'hui.

29. En 2050, mon alimentation quotidienne se composera principalement de produits locaux.

30. La diversité se concrétise au travers de la redécouverte de produits locaux "oubliés", plutôt qu'à travers l'offre de produits "exotiques".

31. En 2050, le repas principal de la journée se prendra sur le lieu de travail, à l'école, ... en vue de réduire les gaspillages et la consommation d'eau et d'énergie.

32. En 2050, l'industrie agro-alimentaire aura pratiquement disparu: on consommera des produits frais ou artisanaux.

33. La consommation durable suppose que chaque individu fasse un effort personnel pour surveiller sa consommation.

34. Il faudrait ne manger ce qui est strictement nécessaire à la santé (point de vue quantités et contenu en nutriments).

35. Ce serait bien de disposer d'un appareil qui aiderait à gérer la prise de nourriture en contrôlant les apports nutritionnels, en fonction des besoins personnels objectifs, suivant l'âge, le sexe, l'état de santé, les activités, etc.

36. En 2050, la distinction entre aliments et médicaments aura presque disparu: je mangerai pour ne pas être malade, et me soignerai en mangeant.

37. Pour tirer pleinement profit des aliments que nous consommons, il importe de créer une atmosphère de repas conviviale (compagnie, lieu, présentation des mets, ...).

ANNEX II : Q SAMPLE FLEMISH

1. Een markt die normaal functioneert garandeert een duurzame consumptie, als men haar de juiste signalen injecteert (productnormen, labels, fiscale prikkels).

2. Technologische innovatie (bijvoorbeeld een intelligente frigo die haar inhoud automatisch beheert en verspilling vermijdt) is een belangrijk element van een duurzame consumptie.

3. De consument moet zijn voeding kunnen verkrijgen op de meest comfortabele, anonieme manier, zo weinig tijd in beslag nemend als mogelijk.

4. Het is mogelijk om op identieke wijze keuzevrijheid te kunnen uitoefenen in het kader van een duurzame consumptie dan in het kader van een niet duurzame consumptie.

5. In het kader van een duurzame consumptie geldt: hoe groter de milieudruk van een voedingsmiddel, hoe hoger de prijs moet zijn.

6. In 2050 zal het onderscheid tussen producent en consument grotendeels verdwenen zijn: iedereen zal tot op zekere hoogte deelnemen aan de productie van zijn voedsel.

7. Een duurzame voedselconsumptie gebeurt door middel van directe banden tussen lokale producenten en consumenten.

8. Voedsel is geen goed zoals een ander, het heeft een particulier, in zeker zin zelfs sacraal karakter.

9. De productie en distributie van vlees zou moeten toevertrouwd worden door de staat.

10. Ik vind het normaal dat er voedingscoupons (rationeringsbonnen) zijn voor de producten die het meest vervuilend zijn.

11. De manier waarop ik mij van voedsel voorzie is van weinig belang, als ik maar de zekerheid heb dat het echt gezond is wat ik eet.

12. Het is normaal, in een kader van duurzame consumptie, om meer aandacht te vestigen op ons eigen aankoopgedrag van voedsel, om erover te waken dat we enkel het strikt noodzakelijke kopen.

13. Het geprefereerde aanbodskanaal van voedsel zou de kleine lokale winkel moeten zijn, waar de verkoper een gedegen kennis van zijn producten heeft.

14. Een duurzame voeding gebeurt via de bevordering van voedingsstoffen met een gastronomische kwaliteit en het behoud van traditionele voeding.

15. Uiteindelijk is het zo dat (voor)bereide maaltijden efficiënter zijn ten opzichte van het milieu, bijvoorbeeld omdat zij een schaaleconomie mogelijk maken.

16. In 2050, in het algemeen, in de keuken, ontdooi en verwarm ik mijn voedsel, en heb ik bijgevolg zo weinig mogelijk afval.

17. Een duurzame consumptie hoeft niet noodzakelijk te gebeuren door middel van een bredere kennis over voedingmiddelen en de manier waarop zij geproduceerd worden.
18. In de basisschool is het essentieel dat kinderen kennis nemen en competenties ontwikkelen gerelateerd aan voedsel (planten, groeien, koken, keuken, etc.).

19. Het is evident (normaal), in het kader van een duurzame voeding, dat huishoudens meer tijd spenderen aan de bereiding van het voedsel.

20. Vanuit een milieuperspectief is het meer efficiënt om maaltijden collectief te bereiden, bijvoorbeeld in een buurtkeuken.

21. Wat van belang is bij de manier (methode) waarop eten klaargemaakt wordt, is de impact op de gezondheid.

22. In 2050, zal een slecht beheer van etenswaren, via overconsumptie of verspilling, quasi verdwenen zijn.

23. Het is zeer jammer om goede ingedriënten te verspillen en ze gelijk hoe klaar te maken.

24. Een maaltijd met zorg klaarmaken is al een deeltje van de degustatie.

25. In 2050 is het zo dat mijn voeding ten dele uit ggo's mag bestaan, maar enkel op voorwaarde dat hun productie wordt gemotiveerd door het bekomen van verminderde milieudruk (minder bemesting, pesticiden en waterverbruik).

26. Ik zou meer uit eten gaan (restaurant, snacks, fast food) als ik zou weten dat de ecologische voetafdruk van mijn maaltijd dan kleiner is dan thuis.

27. Voor mij is de voedselveiligheid en de traceerbaarheid van voedsel absoluut primordiaal.

28. Er is een grote kans dat de voedselartikelen van een duurzame consumptie in 2050, volledig anders zijn dan deze van vandaag.

29. In 2050 zal mijn gemiddelde voeding voornamelijk bestaan uit lokale producten.

30. De diversiteit concretiseert zich eerder door de herontdekking van vergeten producten, dan door middel van exotische producten.

31. In 2050 zal men de hoofdmaaltijd nemen op het werk , de school…om zodoende de verspilling van water en energie substantieel te verminderen.

32. In 2050, zal de agro-industrie praktisch verdwenen zijn: men zal verse en artisanale producten consumeren.

33. Een duurzame consumptie veronderstelt dat elk individu een persoonlijke inspanning doet om over zijn cosumptie te waken.

34. Ik eet enkel en alleen wat noodzakelijk is voor mijn gezondheid (in termen van hoeveelheden en voedingswaarde).

35. Het zou een revelatie zijn om te beschikken over een apparaat dat mijn persoonlijke voedselinname analyseert in termen van objectieve voedselnoden , naar gelang leeftijd, geslacht, specifieke gezondheidstoestand, enz.

36. In 2050 zal het onderscheid tussen voedingsmiddelen en medicijnen bijna geheel verdwenen zijn: ik zal eten om niet meer ziek te worden, en om mij te verzorgen zal ik eten.

37. Om op voldoende wijze te profiteren (ten volle genieten) van het eten dat we consumeren is het belangrijk dat we een sfeer van 'gezellig samen zijn' creëeren (het gezelschap, de plaats , de presentatie van de maaltijden…).

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Long Term Strategizing for Sustainable Development: Discussing the difficult linkage between prospective and planning endeavors

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Our contemporary societal context is characterized by a profound ambiguity when it comes to long-term policy making: we observe an acceleration of technological, cultural, economic and societal developments, while we simultaneously have to cope with individual patterns of behavior and institutional mechanisms which reveal an inertia to adapt to changing conditions. Coupled with growing interdependencies between the systems and dimensions of public action, activities linked to planning, programming and strategizing have (re)gained[1] importance and prominence with public authorities (Barbieri 2000). The growing interest for planning exercises is apparent at many levels from local to global and in conjunction with many themes and sectors, but has more particularly grown in matters linked to multidimensional environmental management (e.g. such as in the domain of climate change (see for instance Rotmans *et alii* 2000) or transport (see for instance Elzen *et alii* 2002)). Consequently, a very large importance, both by academics and public authorities, is given today to issues linked to planning for sustainable development (Voss *et al.* 2005).

Typical planning exercises in the domain of Sustainable Development (SD), such as for instance the European Union's Strategy for SD (EUSDS), have active time horizons of 4 to 6 years, meaning that they develop public policy priorities and actions for the next 4 to 6 years to come. Given the many long-term challenges in the realm of SD, such short- to mid-term planning is felt as unsatisfactory when it comes to providing the necessary structure, coherence and guidance for deeper institutional and societal change. Alternative processes and concepts (e.g. Transition Management, Adaptive Management…) have thus recently grown on this ground, trying to develop contemporary long-term planning in the realm of SD by including stakes such as participation, integrated assessments, envisioning, scenario building, knowledge assessments. From this it follows, that long-term planning for SD is intensively linked to, and is meant to include, large scale prospective exercises (such as futures studies, foresight initiatives, backcasting exercises…).

However, such (long-term) prospective exercises are not easily integrated into the public authorities' planning activities. The reasons are many, but on the foreground public planning authorities seem to remain suspicious towards prospective exercises, because even if such

[1] We recall here that planning, and especially long-term planning, was very strongly developed in many countries during the 1950s, 1960s and 1970s, but fell out of disgrace with the stumbling of the Soviet Union. For some civil servants, of the older generation, the current revival of planification exercises, even if these are conducted very differently and with a different background, is thus highly suspicious, or alternatively is looked at cynically.

prospective exercises *"start from the causal relationships judged relevant, their combination and connections rely on a hypothetical model which cannot be scientifically validated (…). What matters is that the statements on the future are structured along and shown by following a scientific construct, i.e. that the structure of reasoning is clarified, transparent and submitted to critic and review."* (De Jouvenel, quoted in Theys 2005 : 407, *our translation*). More pragmatically, prospective endeavors have been described as consisting *"essentially of a way to combine into a working procedure, different tools (or methods) to develop facts and discuss ideas."* (Mermet 2003, *our translation*). Prospective exercises, such as long-term envisioning, seem to be felt as being only weakly robust in scientific terms, because they are relying mostly on procedural robustness and are value-laden. As a matter of fact, the terms of reference of a prospective exercise may quickly reveal what has been described as *baroque complexity* (Theys 2005), i.e. a combination of objectives which are unrealistic or even antagonistic: *"ideally, one strives towards a prospective, which relies on validated scientific knowledge – while allowing to question them; which enounces clearly the plurality of world visions – while developing consensual trends; (…), which does not mirror the simple opinions of the moment – while being participatory (…)"* (Theys 2005 : 408, *our translation*).

On the basis of the results of a study developed for the federal Belgian authorities, we discuss in the present paper the linkages between the necessary prospective and envisioning exercises, and the processes for long-term strategy development for SD. In the study, both 'phases' (i.e. the prospective and the planning phases) have been analytically decomposed for 7 long-term, large-scale, multidimensional and participatory planning exercises. This analysis has revealed patterns and schemes (e.g. feedback loops, dead ends, mutual reinforcements…) which will be discussed.

In the second part of the paper, we report on the constraints, limits and opportunities (of linking long-term planning to prospective exercises) as they were identified during the study with a stakeholder group, composed of members of the public federal authorities and civil society.

Finally, we present and discuss what could be termed 'linkage-scenarios', meaning a variety of procedures, with their strengths and weaknesses, which allow for an improved linkage and articulation of prospective studies (i.e. envisioning) and long-term planning for SD.

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The Impact of Long-Term Scenario Exercises on Sustainable Development Policy-Making

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Abstract

Scenarios, and scenario planning, are repetitively promoted as tools to trigger thinking about sustainable development and sustainable development policies. The use of scenarios and prospective exercises is typically recommended in situations where complexity, uncertainty, cross-scale and cross-sector interactions, long-time horizons, non-linear dynamics and heterogeneity are the rule. Successful scenario exercises cannot eliminate these uncertainties and complexities, but can provide to specific user groups some order and coherence in their perceptions of future pathways. However, in policy-making, ineffectiveness, and a general failure to impact on strategic decisions, have been depicted as recurrent outcomes of scenario exercises, even if they are integrated into long-term planning processes. In the present paper, we address conceptually and empirically the impact of scenario exercises on SD policy-making, with an emphasis on the influence of the mode of integration of scenario exercises into planning and strategizing activities. This linkage, which appears as central to the definition of the impact of scenarios, is especially interesting today as 'new' forms of SD-policy approaches (e.g. Transition Management, Adaptive Governance…) emerged recently with the aim to rethink this linkage.

Scenario exercises are occasionally analyzed for their 'technical' and 'procedural' robustness, but only few approaches integrate the question of adequacy and applicability of the scenario exercises' outcomes and processes for policy-making. Generally, scenario utilization is described with two different stances; i) participating to institutional and organizational 'strategizing' (e.g. contribute to the development of long-term, strategic policy pathways), ii) generate 'policy learning' and 'institutional capacity development' (e.g. contribute to 'policy change for sustainable development', 'reflexive governance'…). On a conceptual level, we will discuss both issues; i) scenario exercises as *policy instruments* in strategic thinking, ii) scenario exercises as operationalizations for *policy learning*. The paper will furthermore analyze the results of a qualitative exploration of the felt impact of scenario exercises, led with policy agents (e.g. policy-makers, decision-makers, stakeholder groups…).

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Sustainability Evaluations in the Context of Long-Term Strategizing. Crossing Insights from Urban Development and Transition Management.

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Confronted with increasing socio-environmental uncertainties coupled to a socio-political inertia to anticipate and adapt to challenges in the domain of *Sustainable Development* (SD), public authorities re-emphasize since years the importance of *Planning and Strategizing* (P&S) activities. More recently, some innovative P&S exercises saw their time horizons extended from the typical 5 years to 50 years (and more), partially in order to cope with the obvious long-term challenges in SD such as climate change, biodiversity loss, (peri-)urbanization, adaptation of consumption patterns… While these P&S activities are very different from traditional P&S (even from the typical SD-Strategy), a series of innovative approaches to public P&S have transcended recently, based notably on new interpretations of the interactions between stakeholders and public authorities. We propose to discuss in this paper the widely ignored relationship between such innovative long term P&S and *Sustainability Evaluations* (SE) on the hand of two different contexts: *strategic planning in urban development* (SP-UD) and *transition management* (TM).

The generic nature of evaluations in the context of P&S is at least quadruple: 1) monitor real-world evolutions with regard to the desired and conceptualized pathways; 2) assess given P&S activities in order to adapt them to emerging realities and new challenges; 3) question given P&S processes for their effectiveness, efficiency…; 4) consider the adequacy of P&S instruments in comparison to other public policy instruments which allow to integrate the (very) long term.

More particularly, because these new forms of P&S intend to participate to SD, the assigned evaluations should be discussed with reference to SE-principles and –criteria. The discussed P&S contexts present both challenges and constraints in this regard, for instance the time dimension becomes increasingly challenging as a longer term is set as a reference: issues that have traditionally been addressed in sustainability-oriented evaluations might gain momentum (e.g. accounting for intra-generational equity) or require innovations on the cognitive side (e.g. deal with uncertainty).

Strategic planning in urban development (SP-UD) and *transition management* (TM) are fundamentally different P&S activities in domain, scope and scale. However, while SP-UD has traditionally been dominated by planning and undergoes a transformation towards new ways of coping with SD and the long-term challenges, TM has been transposed from innovation management onto social, SD-innovation. SP-UD forces planning practices to adapt over time, while TM has been specifically configured to cope with SD-challenges. Both are highly adaptable, flexible, participative, procedural… approaches to P&S, which makes them very relevant for SD policy-making and a perfect ground to apply SE-principles and –criteria.

On the basis of case study analyses, we propose for the present paper to scrutinize both forms of P&S approaches for their evaluation-practice and -moments, then to critically discuss these elements with respect to criteria and principles of *Sustainability Evaluations*. In a second step, both analyses (on TM and on SP-UD) will be confronted in order to cross-fertilize a series of recommendations for a better integration of SE into such P&S approaches.

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CONSOMMER MIEUX, AUTREMENT, MOINS[1]

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Le développement durable consiste à faire en sorte que nos activités produisent le plus de bien-être possible pour le plus grand nombre d'être humains d'aujourd'hui et de demain et par conséquent qu'elles fassent un usage optimal des ressources naturelles. Maximiser la contribution au bien-être de nos activités en en minimisant l'impact environnemental suppose qu'on s'interroge d'abord sur ce qui dans ces activités est générateur net de bien-être. Notre société dite « de consommation » se caractérise par la priorité donnée à la consommation dans la définition du bien-être. Évidemment, c'est oublier qu'avant de consommer, il faut d'abord produire, que nos modes de consommation sont aussi des modes de production et que l'ensemble n'a pas seulement un coût environnemental mais aussi un coût humain (travail, fatigue, risques). Il reste que la consommation marchande demeure le critère dominant de définition du bien-être dans notre société et que la stratégie

de développement durable prônée majoritairement par les acteurs publics et les entreprises consiste exclusivement à diminuer la pression environnementale de la production et de la consommation de marchandises. C'est, grosso modo, ce qu'on entend couramment par « modernisation écologique ».

L'avantage de cette stratégie est qu'elle ne remet pas en cause les fondamentaux de notre mode de vie : elle donne une impulsion nouvelle à la recherche scientifique et technologique dans le sens d'une recherche de rendements énergétiques et en matières premières toujours plus élevés ainsi que de substituts artificiels aux ressources naturelles et constitue un stimulant à la croissance économique et à l'emploi. En revanche, le bénéfice environnemental de cette stratégie peut se révéler beaucoup plus faible qu'espéré, si pas nul voire même négatif du fait de ce qu'on appelle l'« effet rebond ». En effet, l'amélioration de l'efficience environnementale d'un produit ou d'un service se traduit généralement par une diminution de son prix, ce qui a pour effet soit d'en augmenter la consommation, soit d'utiliser la part de revenu ainsi épargnée pour une autre consommation peut-être plus néfaste encore pour l'environnement. Les exemples sont nombreux : les économies obtenues par la réduction de la consommation au km des voitures sont perdues du fait de l'augmentation du nombre de kilomètres parcourus; l'épargne réalisée grâce à l'isolation de la maison et l'installation d'une chaudière à haut rendement est dépensée en vacances en avion, etc. On le voit, au bout du compte, la demande totale repart à la hausse et les gains d'efficience sont partiellement ou totalement absorbés.

A cette stratégie de l'**efficience**, les objecteurs de croissance et les adeptes de la simplicité volontaire opposent une stratégie de la **suffisance**. Ils insistent sur la nécessité de découpler bien-être et consommation matérielle, faisant valoir qu'il est possible et souhaitable, dans nos pays sur-consommateurs, d'atteindre un niveau de bien-être au moins équivalent avec une consommation moindre.

Evidemment, il s'agit-là d'une autre conception du bien-être moins dépendante de biens matériels, plus attentive à la qualité qu'à la quantité et plus libre vis-à-vis des diktats de la publicité et du marketing. Quels que soient les mérites intrinsèques de cette stratégie - que chacun appréciera en fonction de sa conception de la vie bonne - son adoption sur une grande échelle ne conduirait probablement pas non plus à elle seule à une diminution suffisante de la pression environnementale. En effet, la suffisance a aussi ses effets rebonds et, en partie, pour les mêmes raisons que la stratégie de modernisation écologique. Une réduction significative de la demande dans les pays riches entraînerait probablement une baisse des coûts dont pourraient profiter les moins bien lotis des pays pauvres - ce qui constitue bien un des objectifs du développement durable - mais, si toutes choses restent égales par ailleurs, sans grand profit pour l'environnement et, donc, pour les générations futures. Un exemple d'effet rebond de ce type serait l'impact probable d'une baisse significative de la consommation de viande par les ménages des pays occidentaux (et par les nouvelles classes moyennes dans les pays émergents). Il en résulterait vraisemblablement une baisse du prix des céréales et/ou de la viande qui profiterait aux populations plus pauvres de la planète mais sans bénéfice environnemental notable si les modes de production restent inchangés.

Il faut bien comprendre que les deux effets rebonds, de l'efficience et de la suffisance, résultent de mécanismes de marchés qui font qu'à revenu constant la diminution du prix d'un bien de consommation se traduit, grâce au revenu libéré, soit par la consommation d'un plus grand nombre d'unités de ce même bien soit par la consommation d'autres biens et services en plus grande quantité. Pour maîtriser les effets rebonds indésirables, il convient donc de limiter l'action de ces mécanismes. Une des façons de faire est d'accompagner la montée en puissance de l'efficience et de la suffisance de mesures fiscales aptes à neutraliser, ou à limiter suffisamment, ces effets prix et revenu. Cependant, une telle politique ne serait

efficace sur le plan environnemental qu'à la condition que les sommes prélevées par l'Etat ne se retrouvent pas en fin de parcours, que ce soit de façon directe ou indirecte, dans la consommation marchande.

C'est pourquoi, à côté des stratégies d'efficience et de suffisance, il faut envisager une troisième stratégie, de « **démarchandisation** » qui consiste à augmenter la proportion des biens et services consommés en dehors de la sphère du marché, et donc dans la sphère étatique (services publics) ou dans la sphère dite « autonome » (économie domestique, systèmes d'échanges locaux, modes de production et de consommation communautaire, etc.). Cette stratégie est nécessaire pour deux raisons : pour limiter les effets rebond, certes, mais aussi à cause des effets délétères sur le bien-être final de l'homme, considéré dans sa totalité et pas uniquement comme consommateur, de l'extension incontrôlée de la sphère marchande.

Une politique cohérente de consommation durable, à la mesure des enjeux, passe à mon sens par le recours simultané (en proportion différente selon les domaines de consommation) à ces trois stratégies. Par exemple, dans le domaine du jouet et du jeu pour enfants, on recherchera à la fois à réduire l'empreinte écologique des jouets produits pour le marché (logique de l'efficience), à encourager le partage, l'échange et la réutilisation de ces jouets au moyen de ludothèques formelles ou informelles, publiques ou communautaires (logique de démarchandisation) tout en veillant à ce que l'enfant se satisfasse d'un nombre plus limité de jouets dont il tirerait alors un meilleur parti et qui l'inciterait à utiliser les ressources de son imagination pour transformer en jouets les objets de son environnement (logique de la suffisance). Dans le domaine alimentaire, les trois stratégies consisteraient à améliorer l'efficacité environnementale de la production et de la consommation alimentaires mais aussi à diminuer l'impact de la consommation marchande dans l'alimentation par le recours à des formes alternatives

de production, de transformation et de consommation (potagers communautaires, circuits courts, cantines de quartier, production et transformation domestique, etc.) tout en encourageant la substitution de la qualité gustative, diététique et culturelle à la quantité (notamment de sucres et de graisses), trois préoccupations que l'on retrouve d'ailleurs au cœur du mouvement Slow Food. En somme, pour diminuer l'impact environnemental de notre recherche du bonheur et afin que les générations futures puissent poursuivre la leur, il faudrait supprimer tout apport d'énergie et de matière qui n'y contribue pas réellement, traquer inlassablement toutes les inefficiences dans la production et l'usage des biens et services marchands mais aussi limiter la part de marchandises dans notre consommation matérielle.

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Strategies and scenarios for managing transition to sustainable food consumption: elements from the "Consentsus" project[1].

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1 Introduction: scenarios in transition management

Despite some criticisms (Berkhout, Smith and Stirling 2004, Meadowcroft 2005, Smith and Kern 2007) the new paradigm of system innovation and transition management has gained much popularity in Netherlands (Kemp and Loorbach 2006, Smith and Kern 2007), Great-Britain (with the ESRC Sustainable Technologies Program) and Belgium (Paredis 2007, Nevens & al. 2008) where it has been considered a convenient framework for designing and steering process of social and technological innovations geared at sustainable development. The approach stems form the observation that past socio-technical innovations have generally been necessarily altogether multi-actor, multi-factor and multi-level.

- Multi-factor: they involved governments, firms, NGOs, research institutes, trade unions and consumers;
- Multi-factor: they were the outcome of the interplay of many factors in interaction (technological, economical, demographical, social, regulatory, etc.);
- Multi-level: they implied changes at several levels of social and political reality. The system innovation and transition management literature generally refers to three levels of change: a micro-level of niches, a meso-level of structuring paradigms and rules (regimes) and a macro-level called landscape. comprising wider societal and cultural trends and characteristics such as individualization, globalization, etc.

"The socio-technical landscape relates to material and immaterial elements at the macro level: material infrastructure, political culture and coalitions, social values, worldviews and paradigms, the macro economy, demography and the natural environment. The second level, that of regimes (meso level), relates to dominant practices, rules and shared assumptions. At the meso level are the interests, rules and beliefs that guide private action and public policy - for the most part geared towards optimising rather than transforming systems. The niche level (micro level) relates to individual actors and technologies, and local practices. At this level, variations to and deviations from the status quo can occur, such as new techniques, alternative technologies and social practices." (Rotmans, Kemp and van Asselt, 2001, p.19).

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Transition management is a deliberate attempt to bring about such long terms changes in terms both of system improvements (improvements of an existing trajectory) and system innovations (influencing or triggering new trajectories) mainly by helping innovations still confined to the niche level reaching the higher (regime) one.

The management transition process is guided by long term (at least one generation but can go up to three generations) goals and visions. The goals refer to broad social objectives and the 'visions' represent particular ideas on how these goals could be achieved. They consist of "inspiring images" of the future state of the sector or domain. Goals and visions are defined in the context of "transition arenas", social settings gathering actors and stakeholders. This perspective has been put to work on several socio-technical systems such as energy (Correlje and Verbong 2004), mobility (Kemp and Rotmans 2004), housing (Paredis 2007), etc. The (still ongoing but effective) transition of the Swiss agri-food chain towards sustainability has also been analysed with the system innovation and system transition concepts by F-M Belz (2004).

It isn't unfair to consider that, so far, the transition management approach has been more production-oriented than consumer-oriented and that it has given more attention to innovations on the supply side than on the demand side of consumption. The Consentsus project aims at testing and assessing the potential of the transition management approach in focusing from start on the consumption side of sustainable development. Its main objectives are:

- to appraise from a scientific point of view the characteristics of scenarios and transition management, amongst others through an analysis from a substantive point of view (what futures do they show us, which driving forces…), a methodological (what methods and tools were used) and a political point of view (what consequences for policy-making);
- to evaluate their usefulness as tools for decision-making, and assess how the Belgian political community welcomes such approaches;
- to develop validated sketches of scenarios and transitions for Belgium in the field of sustainable consumption, relying amongst others on a panel of experts to help develop scenarios, the time horizon chosen being 2050;
- to contribute to the study of the field of sustainable consumption, by choosing consumption patterns – one of the most important drivers of development patterns in the industrialised world – as case study for scenarios and transition management.

For different reasons –among which the ambition to complement an already ongoing transition management process on sustainable agriculture in Flanders (Nevens & al. 2008) – it has been decided to take sustainable food consumption as case study. As we have already stressed, an important stage in the transition management process consists in working out –in a participatory way - a vision (or several ones) of the future from which to "backcast" to the current situation. This scenario-building process has just started and at the time of writing, the first expert workshop has still to be held[2]. Therefore, we will not be able to discuss original visions or scenarios. However, in order to get the most from the expensive sessions of "visioning" and scenarios building, it has seemed preferable to prepare the exercise by identifying beforehand some general abstract "strategies" or discourses" that would help elaborating alternative concrete, imaginative and inspiring scenarios and such that the visions

[2]Though it will have taken place at the time of the conference so we will probably give some first results during the oral presentation.

could boil down to concrete, fleshed out interpretations of these general high level and abstract discourses on sustainable consumption in general. This can be called a "top-down" approach to visions building. The paper will give a presentation of this top-down approach.
It is organized as follow. We begin with a short presentation of visions and scenarios in terms of Weberian ideal-types. We then proceed to the demonstration that a synthetic and formal approach to sustainable development, when interpreted in terms of consumption, leads logically to three main not mutually exclusive "strategies" or discourses, which we called the "efficiency" strategy, the "sufficiency" (or cultural dematerialization) strategy and the "de-commoditization" strategy. The three strategies are then briefly discussed from a general sustainable development point of view and also, but in a very tentative and purely illustrative way, in the perspective of food consumption. We proceed then with an analysis of what we call "eating events" and suggest a way to construct scenarios on "food consumption regimes" by combining different structural elements of the eating events in various possible ideal-typical original eating events, themselves being aggregated in diets, the different strategies being then characterized by the modal split of ideal-typical diets. We conclude with a short discussion of what seems to us a drawback of the SusHouse project and why we believe a top-down, structural approach could help preserving us from this kind of peril.

2 Scenarios as ideal types

There is a wide consensus on the fact that sustainable development calls for a new kind of applied scientific research characterized by interdisciplinarity, an adequate acknowledgment and handling of risks and uncertainties, a long term (or mixed time) perspective, the capability to connect the local to the global and the integration of different kinds of knowledge and different axiological standpoints through participation. We have looked elsewhere on the potential of different strands of applied modelling methods and tools with respect to these requirements (Boulanger & Bréchet 2006). Scenarios can be considered either as complements or as substitutes to these classical decision-making tools. As complementary tools, they could help preparing the construction of a quantitative model by guiding the selection and classification of variables (i.e. as target, control or exogenous variables), the representation of their relationships and by dictating the kind of experiments (simulation) to be run with the model. As substitute, they would offer an alternative when the system to analyse or to steer is too complex and insufficiently known to be reduced to mathematical or algorithmic formulas, an alternative acceptable as second best insofar as it allows dealing – albeit in a less secure and reproducible way- with complexity, non-linearity, uncertainty, etc.

As cognitive and/or normative representations of the future, scenarios are utopia and as such very close to Weberian ideal-types. Indeed, and to make use of another famous Weberian concept, there are many elective affinities between scenarios and Weberian ideal types as the following definition shows:

"*An ideal type is formed by the one-sided accentuation of one or more points of view and by the synthesis of a great many diffuse, discrete, more or less present and occasionally absent concrete individual phenomena, which are arranged according to those one-sidedly emphasized viewpoints into a unified analytical construct...*" And Weber adds: **"***In its*

conceptual purity, this mental construct cannot be found empirically anywhere in reality. It is a utopia. » (Weber, 1997 [1903-1917], p. 88)[3].

In the Consentsus project we will start from given, theoretically based a priori point of views "one-sidedly accentuated" and make them "fleshed out" by experts during a couple of workshops. As already indicated in the introduction, these points of views consist of three strategies or discourses on sustainable development, namely the eco-efficiency, the de-commoditisation and the cultural de-materialisation strategies. Therefore, our approach is the exact reverse of Weber's one in building his ideal types. While he synthesises and abstracts from the "*great many diffuse, discrete, more or less present and occasionally absent concrete individual phenomena"* to form his unified analytical (and purely logical) construct we start from a normative unified abstract construct (e.g. "the eco-efficient society") and flesh it out in order to see with what kind of diffuse, concrete individual phenomena it is compatible with or will engender. Eventually, it is on basis of these individual phenomena that the plausibility, feasibility and desirability of social discourses and proposed strategies are to be assessed. This, scenarios are made of the same building blocs than ideal-types but their construction's process is exactly the reverse of the one used in the ideal-type formation. More precisely, whereas the ideal-type is a synthesis formed through a process of generalization, of induction from the individual phenomena, in the scenarios building process, the synthesis is given a priori and the individual phenomena are deduced (with additional assumptions) from this synthesis.

The identity Weber sees between the ideal type and the utopia is particularly relevant for a discussion of scenarios. In Weber's mind, utopia doesn't necessarily refer to the future nor even to a desirable state of the world. Weber explains, for example, that the idea of handicraft can be worked into a utopia, even without any idea of temporal dimension, just by:

"*….arranging certain traits, actually found in an unclear, confused state in the industrial enterprises of the most diverse epochs and countries, into a consistent ideal-construct by an accentuation of their essential tendencies. This ideal-type is then related to the idea which one finds expressed there. One can further delineate a society in which all branches of economic and even intellectual activity are governed by maxims which appear to be applications of the same principle which characterizes the ideal-typical "handicraft" system*."

Likewise, even if our scenarios are meant to help defining future desirable states, they could as well refer to the present; let us say other possible presents. Time as such has no role to play here except for the fact that the transition will take time but the delineated society in which "all branches of economic and even intellectual activity" would be governed by the maxims of eco-efficiency, de-commoditization or sufficiency could as well be contemporary would-be worlds. Furthermore, in the same way that it is possible to build several scenarios of the same ideal type of eco-efficiency, for example, "*It is possible or rather, it must be accepted as certain*" writes Weber, "*that numerous, indeed a very great many, utopias of this sort can be worked out, of which none is like another, and none of which can be observed in empirical reality as an actually existing economic system, but each of which however claims that it is a representation of the "idea.."*

[3]. "Objectivity in Social Science" from which the definition is taken has been published with others papers in the volume "The Methodology of the Social Sciences" published in 1997 by Edward Shils. From now on we will refer to the online edition of this text at the following address :

http://www.ne.jp/asahi/moriyuki/abukuma/weber/method/obje/objectivity_frame.html

Hence, visions and scenarios are mental simulations, thought experiments through which we check the plausibility, consistency, feasibility and desirability (on basis of some clearly identified values) of strategies presented by advocacy coalitions or by experts as solutions to our most pressing issues on basis of many mundane and trivial consequences, but which are of the utmost importance for our happiness and wellbeing insofar as they shape our everyday life..

3 Towards efficiency in development: a decomposition analysis

The environmental objectives of sustainable consumption can be summarised in two concepts: dematerialization and detoxification. Dematerialization means reducing the amount of material required to satisfy social needs or, otherwise stated, increasing the productiveness of the used materials (Geiser 2001, p.204). Less material used means less natural capital drawn up, less resource depletion, and less material released as waste. Practically, this can be achieved by different means:

- Recycling,
- Reusing,
- Designing products that use fewer materials;
- Substituting non-material services for material intensive services.

Detoxification means reducing the toxic characteristics of materials used in products and processes. Practically this can be achieved by:

- Reducing the volume of toxic materials used in a process or a product;
- Reducing the toxicity of materials used by changing their chemical characteristics;
- Substituting more benign substances for toxic chemicals.

Dematerialization and detoxification are the environmental requirements of intergenerational equity because they preserve the environmental basis of future human activities if not the very existence of humans in the future. They are also fundamental conditions of the preservation of biodiversity.

Sustainability could thus be measured by an indicator of productivity of valuable resources (or of material efficiency) in producing human well-being.
This is the road taken by M. Common (2007) in measuring national economic performance without using prices. More precisely, he proposed to use as indicator of sustainable development the following ratio:

$$\mathbf{S_{it} = WB_{it} / GHG_{it}}$$

Where:

- S_{it} : the sustainability of country *i* at time *t*
- WB_{it} = the level of well-being in country *i* at time *t;*
- GHG_{it} = Green House gas emissions of country *i* at time *t*.

As indicator of well-being, Common uses the product of life expectancy at birth with the reported level of subjective well-being of the population. We will not discuss here this interesting (but debatable) idea and leave open for the moment the problem of measuring and evaluating well-being. On the other hand, we prefer to use the general idea of "Ecological Footprint" (without necessarily endorsing the way it is currently measured and used) as indicator of environmental pressure rather than the more limited GHG. We propose therefore to start with the following formula, where EF for "Ecological Footprint" replaces "GHG" and the time subscripts have been dropped:

S = WB/EF (1)

This formulation can be put in parallel with Nørgärd's (2006) decomposition of what he calls the "overall efficiency" of the production and consumption patterns. He demonstrates that "overall-efficiency" is the interplay of 4 "local" efficiencies: satisfaction efficiency, service efficiency, maintenance efficiency and throughput efficiency. The overall efficiency ratio between the final output (satisfaction) and the primary input ("eco-sacrifice") is thus disaggregated in a succession of interrelated intermediary ratios, as follows:

Overall-Efficiency
= Satisfaction/ Eco-sacrifice
= Satisfaction/Service * Service/Stock * Stock/Throughput * Throughput/Eco-sacrifice

The formula is best understood by starting from the last ratio, the **Throughput/Eco-sacrifice** ratio or throughput efficiency which expresses the productivity of the production process with respect to environmental resources. Then comes what Nørgärd calls the "maintenance efficiency" which refers to the durability, reparability, etc. of the stock of goods. The **Stock/Throughput** ratio is the converse of the goods replacement rate, i.e. the number of new goods entering the stock with respect to the size of the existing stock. The service efficiency refers to the number of services provided by a given stock of goods. This has mainly to do with the way the goods are appropriated and used. For instance, the **Service/Stock** ratio is higher for a taxi than for an individual car, because the former is used the whole day long by many customers, while the latter is most often used only twice a day by one customer only. Finally, the satisfaction efficiency refers to the satisfaction brought by the service. For instance, in the current traffic conditions in town, the mobility service brought by the individual car is less and less satisfying. As Nørgärd (2006, 18) observes:
"The reason for adding satisfaction efficiency … is that in the affluent part of the world, *marginal* satisfaction of increasing services from the market seems to be very low and declining, maybe even below zero."
Nørgärd's analysis of consumption efficiency shows how limited and partial are public and business policies that focus exclusively on the throughput efficiency ratio by aiming only at *decreasing the mass of materials in products*. This is only one part, and perhaps not the most important one, of the answer to the issue of sustainability of our production and consumption patterns. However it is probably the easiest to put at work in a capitalist and technology-driven economy (and culture) because it doesn't challenge their fundamental growth and production orientation. Actually, the more you go from the right of the formula to the left, the more you move away from what is taken-for-granted in our industrial societies and bring into question their deepest and unconscious cultural underpinnings. Indeed, going one step further than the eco-efficiency or "decoupling" policy, a more demanding ecological modernization approach would act also upon the "Stock/Throughput" ratio by encouraging more durable goods and struggling against the "planned obsolescence" of many so-called "durable" goods. This means (Geiser 2001) extending the useful life of multi-uses products[4], designing products for upgrading and adaptation but also for reconditioning and remanufacture and for repair and reuse.
Service efficiency expresses the rate of service acquired from the consumer's stock of goods (durable and non-durable). One effective way to increase service efficiency is to substitute services for products, like in the above mentioned example of the taxi vs. the individual car.

4 On the contrary, one-use products are those that are totally exhausted (except for wastes and pollutions) in the act of consuming, like food, fuel, drugs, etc.

Another strategy in this respect is to foster the sharing of products, as for instance in car sharing. More generally, where the use pattern of a product involves long periods of disuse or the acquisition costs are high, products may be shared among multiple users. Examples are numerous (Geiser 2001, 324): ladders, lawnmowers, washing and drying machines in residential areas; tool and equipment rental stores allowing customers to share the services of hardware and avoid individual purchases; video rental stores giving customers a wide choice of films by sharing the services provided by the individual DVD machines, etc.
Finally, the satisfaction/service ratio expresses the fact that the ultimate goal of consumption is well-being, happiness or needs satisfaction. Clearly, some satisfiers are more efficient than others in bringing satisfaction, or well-being. We will come to this in detail later.

Bringing together Common's and Nørgärd's analysis, we propose to decompose formula 1 in:

S= (WB/C) * (C/EF) (2)

Where **C** = Commodities. Thus **(WB/C)** refers to the productivity of commodities in terms of well-being and **(C/EF)** to the intensity of commodities in natural resources.

Formula (2) shows that sustainability can be improved by increasing **(WB/C),** by increasing **(C/EF)** or both, that is by decreasing the intensity[5] in commodities of well-being, by decreasing the intensity in resources of commodities or both.
Things can be disaggregated further. The term **(WB/C)** can be expressed as:

(**WB/Se) * (Se/C)**

"Se" refers to the notion of service as used by Nørgärd (like in the context of energy and not as used in the national accounting context). Indeed, what matters for the energy consumer is not energy as such (Kw/h) but the lighting, mechanical power, etc. brought by energy. Likewise, what matters for the user of a TV-set is not the TV-set as a thing but the services it provides in terms of TV-programs, etc. One way to define the notion of service in a need-satisfier framework is to define it as the interface between the satisfier and the need or as the "satisfying virtue" of the satisfier. **WB/Se** stands for the productivity of the services in terms of well-being and (Se/C) for "consumption efficiency", the productivity of commodities in producing services**.** The full formula then becomes:

S = (WB/Se) * (Se/C) * (C/EF) (3)

Formula 3 shows that there are three "pure" strategies to enhance sustainability:

1. Increasing the (WB/Se) ratio by decreasing Se while maintaining or increasing WB. This amounts to partly disconnecting well-being from services. It could be called the *sufficiency* strategy.
2. Increasing the ratio (Se/C) by decreasing C. It could be called the *de-commoditization* of services strategy.
3. Increasing the (C/EF) ratio by decreasing EF[6.] This strategy aims at decreasing the energy and materials content of commodities consumption. It is the well-known *eco-efficiency* strategy.

5 The intensity in resource R of a production P is the inverse of the productivity of the resource R in production P. In others words, productivity is measured by the ratio P/R and intensity by the ratio R/P. The more productivity, the less intensity and vice versa.

6 Note that Nørgård's last two ratios are aggregated in our (C/EF) formulation. This means that we don't make a distinction between Nørgård's maintenance efficiency and throughput efficiency.

Before discussing them, it is necessary to note that formula 3 is not complete. It leaves aside the ecological footprint of the consumption of non-commercial satisfiers. Indeed, the proposed decomposition makes a partition between two kinds of satisfiers, commodities and non-commodities, but takes only into account the environmental load of commodities, as if non-commodities were necessarily environmentally neutral. Of course this is an oversimplification and it must be stressed that in the future, if non-commodities consumption should gain in importance, one should certainly scrutinize the tacit assumption that it is in fact as eco-efficient as required.

4 The Three strategies

4.1 The eco-efficiency strategy

If the three strategies have the potential of contributing to more efficiency in the use of natural resources in the wellbeing production process, we limit the extension of the eco-efficiency strategy to those actions taken to decrease directly the intensity in materials (including the non-renewable sources of energy) of the production, use and disposal of *commodities*, all other things remaining equal. By "commodity" we mean "goods, services and experiences which have been produced solely in order to be sold on the market to consumers…(and) produced by institutions which are not interested in need or cultural values but in profit and economic values." (Slater, 1997, p. 25).

The concept of **eco-efficiency** was coined by the World Business Council for Sustainable Development (WBCSD) in its 1992 publication "Changing Course". The WBCSD objective was (and still is) to produce and consume more goods and services while using fewer resources and creating less waste and pollution.
According to the WBCSD, eco-efficiency is achieved through the delivery of "competitively priced goods and services that satisfy human needs and bring quality of life while progressively reducing environmental impacts of goods and resource intensity throughout the entire life-cycle to a level at least in line with the Earth's estimated carrying capacity."

Eco-efficiency is what mottos such as "Factor 4"(Von Weizsäcker, Lovins and Lovins 1998) which calls for halving the use of resources whilst doubling wealth, or "Factor 10" (a 90% reduction of resources uses) are about. The fact that the eco-efficiency strategy claims to be compatible with capitalism is made clear by the choice of "Natural Capitalism"((Hawken, Lovins and Lovins 1999) as title for the book published one year after "Factor 4" by two of its authors. In "Natural Capitalism" they criticized Factor 4 for focusing too narrowly on eco-efficiency, i.e. "only a small part of a richer and more complex web of ideas and solution" (p. *x*). They argued that "Without a fundamental rethinking of the structure and the reward system of commerce, narrowly focused eco-efficiency could be a disaster for the environment by overwhelming resource savings with even larger growth in the production of the wrong products, produced by the wrong process, from the wrong materials, in the wrong place, at the wrong scale, and delivered using the wrong business models" (p.*x-xi*).

"Natural capitalism", they said, is based on four strategies:

1. Radical resource productivity: as in former eco-efficiency but at a larger scale;
2. Biomimicry: redesigning industrial system by imitating the functioning of natural eco-systems organised as closed-loop systems where materials are constantly reused;

3. Service and flow economy: changing the relationship between producer and consumer and shifting from an economy of goods and purchases to an economy of services and flows.
4. Investing in natural capital.

With the introduction of a strategy of "service and flow", natural capitalism puts on the agenda an important principle which was lacking in Factor 4. In some way, this strategy can be seen as a kind of embryo of a full-fledged "de-commoditization" strategy. However, let us repeat that the proposal doesn't constitute a departure from capitalism but its reorientation of notably by "making markets work" (title of chapter 13).

The "natural capitalism" concept has been warmly received amongst engineers and firms managers concerned with environment or with their public image. It has given rise to further developments in engineering, design, etc. For example, the closed-loop model of the natural eco-systems is at the core of the "industrial ecology" concept and the idea of biomimicry is nowadays being pushed as far as possible in "green chemistry and engineering" (Doble and Kruthiventi 2007) where former chemical process that needed high temperatures and pressures (and therefore consumed much energy) are progressively replaced with bio-transformation and catalyse occurring at ambient temperature and pressure. Still more spectacular are recent innovations in chemistry based on the imitation of the way living organisms make basic materials such as teeth, hair, skin, shells, bones, tusks, etc.

One recent and popular expression of the eco-efficiency strategy is to be found in the "cradle-to-cradle" movement which claims to go beyond eco-efficiency and "leave aside the old model of product-and-waste, and its dour offspring 'efficiency' and embrace the challenge of being not efficient but effective with respect to a rich mix of considerations and desires" (McDonough and Braungart, 2002, p.72). The fundamental concept of "cradle-to-cradle" is the abolition of the very idea of "waste" by making the case that what was once a waste to dispose off in a way or another, now becomes food for some living system.

This shows that the idea of eco-efficiency has evolved since its adoption by the WBCSB. The level of demands has increased steadily going from simple end-of-pipe solutions (if not mere "greenwashing"), to greening (eco-efficiency, product stewardship) and now beyond greening to "cradle-to-cradle", eco-effectiveness, etc. Of course, it remains to be seen if actual practices have followed tat the same pace…
The important thing is that, whatever their differences, all versions of the eco-efficiency strategy share the following characteristics:

- Confidence in technological innovation;
- Business as the principal actor of transformation. The emphasis is on firms designing new products, shifting to new production processes, investing in R&D, etc. more than on the retailer or the consumer, let alone the citizen.
- Trust in markets (if functioning well);
- "Growthphilia": there is nothing wrong with growth as such. Moreover, with "cradle-to-cradle", growth is *per se* conducive of sustainability.
- No special role for the state except for making market function as they should do (removing barriers to market efficiency) and for providing the right incentives through taxes, subsidies, etc. Actually, the role of the state varies according to the version of the eco-efficiency discourse. It can be as minimal as just guaranteeing optimal functioning of markets or a bit more active by engaging in "smart regulation"(Jänicke 2008). It is in the "transition management" approach to ecological modernization, that

the government has the most important role but in a context of general "reflexive governance".

The eco-efficiency strategy in food consumption would mean maximum dematerialization and detoxification at the different stages of the food chain, which implies considering (Green 2003):

- Inputs to farming (water, chemical, seeds and machinery);
- The agricultural production sector (including fishing),
- The food processing industries and the associated packaging industries;
- Food distribution (including wholesaling and retailing and the transport associated with them);
- Equipment for food storage and preparation;
- Food 'services" (restaurants, canteens and take-away);
- The households activities of shopping, cooking and clearing-up;
- The disposal and recycling of food packaging wastes.

At every stage, the strategy would look for more reducing, reusing, recycling, repairing, and substitution. This would be left to the different actors provided that the state gives the right incentives and information to do so and remove the market barriers which prevent the realization of a technico-economical optimum taking external costs into account.
It is most likely that the eco-efficiency policies from the middle of the food chain upwards will be largely dependent on the kind of food production system that will emerge. Green (2003) distinguish three (the magic number three !) possible system of food production in the future: the ongoing of the 'conventional industrial' system based on advanced breeding techniques and major inputs of chemical fertilizers and pesticides; a "new industrial" system based on crop management using genomics and other resource productivity enhancing technologies; the "organic" system with low capital and inputs intensity but high labour intensity. Actually, only the two last systems have the potential of meeting the eco-efficiency requirement. Pure eco-efficiency strategies at the distribution and consumption stages of the food chain would consists of e.g. biodegradable (if not even eatable) packaging, intelligent storing and cooking enabling more energy and resource efficiency (less waste), virtual shopping (les travelling), etc.

4.2 The de-commoditization (or de-commodification) strategy

De-commoditization of consumption consists in substituting non-commercial goods for commercial ones and non-commercial services for commercial ones. In short it means substituting wherever possible non-commodity satisfiers for commodities. De-commoditization is the reverse of the "commoditization" process described by Manno (2002:70) as the "tendency to preferentially develop things most suited to functioning as commodities – things with qualities that facilitates buying and selling – as the answer to each and every type of human want and need". It is also slightly equivalent to what Hirsch called the "commercial bias" or "commercialization effect" characterized by the fact that "an excessive proportion of individual activity is channelled through the market so that the commercialized sector of our lives is unduly large."(Hirsch 1977, p.84).

Manno operates a useful distinction between goods and services with high commodity potential (HCP) and those with low commodity potential (LCP). The commodity potential is a

measure of the degree to which a good or service carries the qualities that are associated with and that define a commodity. As an example, Manno considers the need children have for playing. At the most commercial end of the scale, it can be satisfied with mass-marketed toys such as Barbie dolls which are inexpensive, marketed worldwide, whose production and distribution is energy and waste intensive. In the middle of the scale, one finds locally produced, handcrafted toys, dolls and games usually made from renewable materials and with local or culturally idiosyncratic designs. Finally, at the far-end of the commodity-potential scale are activities and games that don't necessitate commercial objects.

Table 1 shows some if the main differences between HCP and LCP goods and services as well as the negative and positive effects of commoditization.

Table 1. Differences between HCP and LCP goods and services

Attributes of goods and services with high commodity potential	*Attributes of goods with low commodity potential*	*Negative effects of commoditization on development*	*Positive effects of commoditization on development*
Alienable, excludable, Patentable Simpler to establish property rights and prices	Openly accessible, inalienable, difficult to establish rights, widely available, difficult to price accurately	Accelerates decline of sense of community Skills and capacity for managing "commons" decline	Release individual and corporate entrepreneurial energy Ability to manage individual property and promote personal gains improve
Standardized, universal, uniform, adaptable to many contexts	Particular, customized, decentralized, diverse, dependent on context	Reduces cultural and geographic diversity Not necessarily suited to particular ecosystems Crowding-out of locally appropriate options	Allows rationalization of production, economies of scale and transfer of skills Greatly increase (human and capital) productivity
Autonomous, depersonalized, Use independent of social relationships, primary relation between consumer and product (product oriented)	Embedded, use or practice occurs in a web of social and ecological relationships (process oriented)	Promotion of individual consumption reduces the efficiency gains made possible by sharing, increases flow of material and energy. Excessive autonomy undermines social relationships	Minimizes the complications of relationships. Advances freedom of individuals
Mobile, transferable, easy to package and transport	Rooted in local ecosystem and community	Propensity for mobility increase flow and export of energy and material	Enhance trading , foster development of markets
Contributes to production efficiency More is produced per unit of currency expended	Contributes to consumption efficiency More satisfaction per unit of material and energy expended	Neglects the potential for achieving sustainability through increased satisfaction with less material	Increased production efficiency create more wealth and greater availability of materials goods and services
High capital intensity, low energy productivity, low labour intensity, high labour productivity	Low capital intensity, high energy productivity, high labour intensity, low labour productivity	Eliminates jobs, encourages replacement of workers with fossil-fuel energy	Increased productivity fees capital to invest in new productivities activities, creating new jobs.
Economically efficient, the most exchange value for a given investment	Sufficient, optimal service for minimal expenditure of material and energy	Reduces capacity to develop low-impact lifestyles	
Contributes to GNP,	Contributes little to GNP	Public policy goals	GNP represents accurate

GNP growth measures commoditization		become tied to growth in size of economy rather than improvement in quality of life	measure of economic activity and is closely related to improved quality of life
Source Manno (1999)			

One would add another crucial difference missing in Manno's analysis: HCP goods and services are demand-oriented. If the corresponding needs are missing they are being created through marketing and advertising. The reverse is true of LCD goods and services: they are needs-oriented, even if the demand doesn't exist because of poverty and destitution. In that case, the demand can be created by public allowance or any social program. So, the poor can be excluded from the consumption of HCP goods and services, which is less the case with LCP ones. The process of commoditization is self-supported. Actually, the market economy acts as a "milieu" exercising selection pressures on satisfiers that are more favourable to commodities than to non-commodities, giving the latter less opportunities to survive. This doesn't mean that one cannot find localized niches for less commoditized ways to satisfy needs but these, by definition, remain marginal.
"Given the selection pressures of commoditization, however, unless public policy deliberately intervenes, HCP goods and services inevitably outcompete LCP goods and services…Commoditization pressures act over time to gradually and inexorably expand the number of commodities available, the geographic spread of their availability, and the range of needs for which commoditized satisfactions exists." (Manno 2002:72-73).

It follows that de-commoditization is more or less synonymous of de-marketisation, a partial decoupling of consumption from demand. According to Harvey and al. (2001, p.4):
"… a useful distinction (is) to be made between demand and consumption, process now too frequently conflated. Demand signifies the concerns of suppliers in markets and thereby focuses upon the possibilities and terms of commodity exchange. Consumption refers to a much broader set of social practices whereby people utilise services and products which are only sometimes acquired by purchase in a market and which are deployed in the context of social values which transcend the confines of instrumental and rational calculation".

Decoupling consumption from demand, limiting the influence of markets amounts to increasing the influence of others systems or organisations through which we satisfy our needs and aspirations, that is, others "modes of provision". A comparison of the different possible modes of provision is given in Table 2. The relative importance of the different systems of provision in society in general and in the production, distribution and consumption of food in particular depends on the technology available, the environment and the cultural system of the society. As is well-known, modernity as described by Marx, Weber, Durkheim, Tönnies and de Tocqueville is characterised by the supremacy of markets and bureaucracies at the expense of communities and families.

Table 2. A typology of modes of provision*. Source: Harvey and al. (2001)*

Mode of provision	*Manner of obtaining service*	*Who does work*	*Who pays (if anyone)*	*Principle over which service is obtained*
Market	Commercial purchase	Paid employees	Consumer	Market exchange
State	Claim to entitlement	Paid employees	State (tax payer)	Citizenship right

Communal (cooperatives LET)	Personal interconnections	Neighbours or acquaintances	No money involved	Reciprocal obligations
Domestic	Household Do-it-yourself	Members if household	No money involved	Family obligation

From a de-commoditization point of view, sustainable consumption would correspond to a shift in the "modal split", the extant distribution of the different modes of provision through population. If we group together the domestic and the communal modes of provision under the general heading of "communal sphere", we may illustrate the de-marketisation (or de-commoditization) strategy with the help of an equilateral triangle as in figure 1.

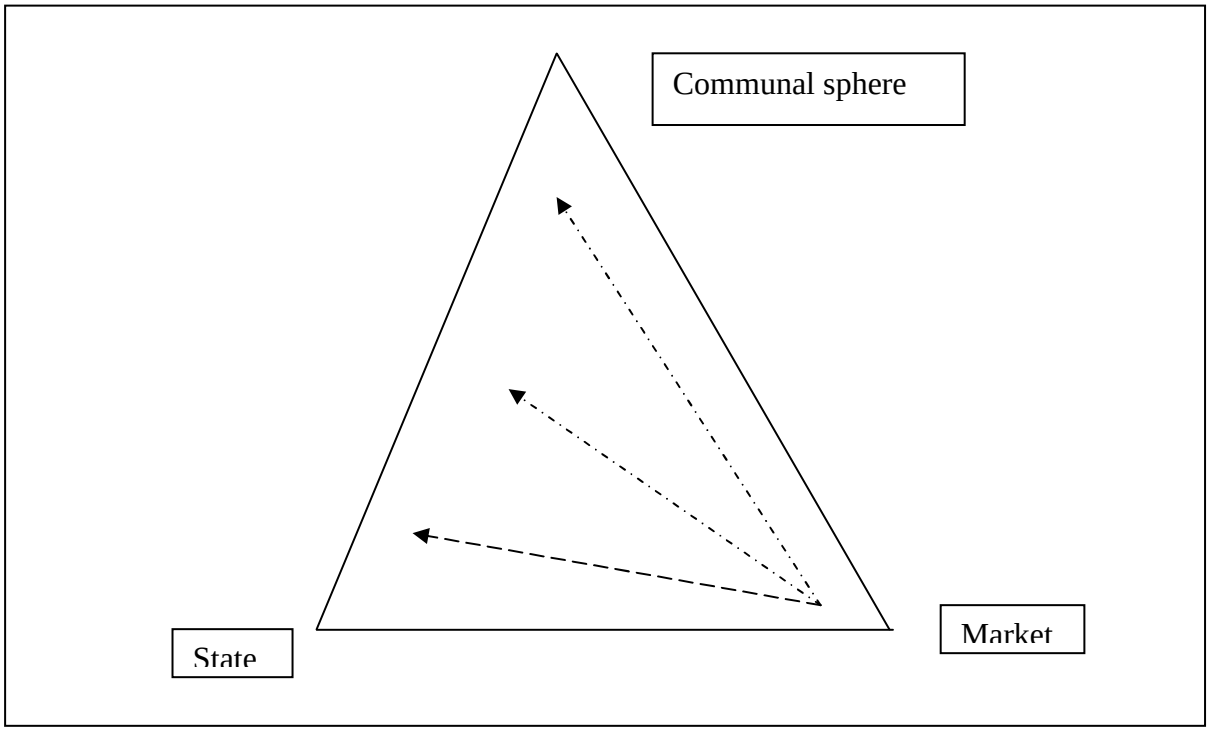

Figure 1. The modes of provision triangle

Let us call "consumption pattern", the proportion of energy and materials services consumed by households (shares of households' time-and-money budgets) respectively in the form of commercial commodities, of public services and goods and of communal goods and services. Every consumption pattern could be symbolized by a point in an equilateral triangle, the distances between each point and the three sides of the triangle expressing the proportions of consumption occurring under the market, the state and the communal mode of provision[7]. Points situated at the angles are pure state, market or communal consumption patterns, all other involve, though in very different proportions market, state and a community components. One calls "modal split" the most frequent consumption pattern in a given society (Gershuny 1983). In consumer societies, the great majority of consumption (hence the modal split) concentrates in the right bottom area.

[7] The idea of using equilateral triangle for this kind of display comes from Kolm (1984). Note also that the same representation can be used for every good and service taken separately. Indeed, pure "commodities" in which there would be no intervention at all of the state are very rare. The same could be said of public or communal goods and services. Therefore, the modes of provision can be said to have a fractal dimension

Indeed, the consumer society resulted from an historical trend (maybe still ongoing) of commoditization, i.e. of transferring the provision of services or goods from non-market systems of provisions to the commercial one. But, as Warde put it:

"The history of consumption might be written as a process whereby activities shift between spheres – from the household to the market, and sometimes back again, from the market to the state, and sometimes back again." (Warde, 1997, p154).

De-commoditization consists in bringing some activities back to the non-market sphere, the public and communal sectors. Needless to say, this will not be an easy strategy to follow in an age of almost religious faith in the virtues of the market and of distrust in those of the state and perhaps still more, of the community. Indeed, much of the activity of the European commission has consisted in taking goods and services away from the public sector and committing them to the market. However, things could have gone otherwise: from the public sector to the communal ones.

4.2.1 Examples of (totally or partly) de-commoditized modes of provision

4.2.1.1 Product Service Systems: a first step towards de-commoditization?

As explained above, the idea of substituting flows of services for stocks of goods can be considered a first step towards a de-commoditization of the production and consumption patterns. The "Product Service Systems" (PSS) program supported by the UNEP (2002) aims at fostering a shift from individual product ownership to a management arrangement of utility provision with a mix of products and services. The PSS "encourage collective activities by advocating systems of leasing, sharing and/or pooling of resources as well as alternative institutional structures that enable these kinds of arrangements. They recommend more intensive use of products and tools for consumption as well as more producer-consumer interaction"(Briceno and Stagl 2006, p.1543). PSS initiatives can be business-led or consumer-led. Not surprisingly, the latter appear to be more concerned with sustainable consumption than the former...
So far, it doesn't seem that the PSS have been really satisfactory from the environmental point of view. Furthermore, they have also proved unsatisfactory from the human and social perspective though they are supposed to take into account the social context of consumption (UNEP 2002).

4.2.1.2 Local Exchange and Trade Systems: what potential?

"Local Exchange Trading Systems (LETS) also known as LETSystem**s** are local, non-profit exchange networks in which goods and services can be traded without the need for printed currency. LETS networks use interest-free local credit so direct swaps do not need to be made. For instance, a member may earn credit by doing childcare for one person and spend it later on carpentry with another person in the same network. In LETS, unlike other local currencies no scrip is issued, but rather transactions are recorded in a central location open to all members. As credit is issued by the network members, for the benefit of the members themselves, LETS are considered mutual credit systems." (Wikipedia).

The potential of LETS (Local Exchange and Trade Systems) as systems of provision has also been assessed by Briceno and Stagl (2006) through a survey of the (unfortunately very limited) empirical literature on these systems. This potential for sustainable consumption can be inferred from facts such as the following:

- For 62% of members of a surveyed LETS, more than 20% of the transactions are innovative ideas, offering new concepts and services. Examples include artwork, health services, repair work, Internet services, house-chore help, etc.
- Seyfang's (2001) survey on the Kwin LETS gave the following information: 91% of participants agreed with the fact that development should involve less consumption but greater quality of life. 77% felt that LETS was a greener economy than the mainstream economy. 40% felt their quality of life had increased with LETS and 31% felt more able to live a greener lifestyle. 23% claimed to have been more environmentally aware of their localities through LETS. 45% of the members bought recycled or second-hand equipment from within the scheme, 25% directly reduced consumption and 37% of traders got property repairs.
- From another LETS, Seyfang (2001) reports that maintenance and repair work was the third largest good or service bought, consumed by 31% of the members.
- In general (Williams 1996), there are many programmes of tools and big-equipment leasing, laundry-machine sharing, car and transport servicing and collective workshops.

In sum, LETS encourage the localisation of the economy, decreases transportation pollution and costs and change consumption patterns. They foster sharing, pooling, reusing, recycling and repairing. Moreover "they promote and develop new skills and self reliance and are thus effective in meeting many needs of humanistic and social nature that have been neglected in the mainstream economy." (Briceno and Stagl 2006).

4.2.1.3 Public Services

Not so a long time ago, an important proportion of households' consumption was provided by public services, or by state-owned or partly state-owned firms. It was the case for electricity, water, telephone, broadcasting, television, etc. Before the reign of the individual car, most if not all, travelling by train, bus, ship and airplane was provided by public enterprises.

Generally, the public services used to be organised and managed at the highest institutional level. But local authorities can also be providers of goods and services to their populations. For instance, it is often the case in cities big enough to need and afford an urban transportation system.

Many public services in Western societies have been dismantled under the pretext that they were less efficient than private, commercial services. However, there is nothing definitive in this and sustainable development might make necessary to reverse the trend, notably because it entails a redefinition of efficiency which takes into account environmental concerns.
On the other hand, many goods and services which cannot be efficiently provided or managed at the state government level could be so at a lower institutional level. Notably the risk of bureaucratisation and of corporatism is more easily controlled when working at the local level. Indeed, there is a tendency to revisit the notion of public service in the perspective of a "new municipalism":

"*A new municipalism is emerging, and characterised by attempts to expand municipal sovereignty, democratise municipal governance, and strengthen the role of municipalities … Municipalities across the country are increasingly taking responsibility for public concerns abandoned by the federal and state governments, and passing local minimum wage laws, employment and housing regulations, bans of the use of pesticides and genetically modified organisms, and establishing public cable, wireless internet, and energy services."(Manski and Peck,p.166)*

In sum, the-commoditization is giving more importance to the public (especially, perhaps, local authorities) and the communal sectors (families, neighbourhoods, communities) in providing for more needs and wants definition and satisfaction. But de-commoditization is not a yes-or-no process. It refers to a whole range of transformations, from the less to the most radical. For instance, the re-settlements of small retailers in the city centres at the expense of big supermarkets at the periphery can already be seen as a weak de-commoditization measure.

Modes of provision can be mixed as if, for example, "rather than providing completed final services, the state might – as for example in the care of the very young and very old people – provide the material equipment and infrastructure, building and furniture, books and toys, and medical equipment, together with 'intermediate services' in the form of professional advice, which would then be used by community groups to provide the final services themselves, using their own direct, unpaid labour." (Gershuny 1983, p.41).

One of the most striking features of the recent transformations in the food sector is its rapid and pervasive commodification. Cheng, Olsen, Southerton and Warde (2007) have analysed through time diaries, the change in patterns of food consumption in UK between 1975 and 2000. From figures on the increase of time passed eating out, the decrease of time devoted to preparing meal and eating at home and the reduction of the allocation of time for entertainment and visiting, they conclude that commodification has indeed increased. Furthermore: "The vast range of alternative sources of a meal, prepared and delivered by paid workers and distributed in accordance with the logic of commercial competition and exchange, is testimony to the rapid generalized development of a mode of food provisioning which has moved beyond the domestic sphere". (Cheng et als. 2007: 54).

Note that if the decrease in the time allocated to cooking and eating at home has been observed in almost every OCDE countries, there exists exception. French households keep on devoting higher proportions of their time to preparing and eating meal at home. Moreover the mean time has not decreased between 1970 and 2000. 95 minutes per day it was in 1970, 96 minutes it still is in 2000. Compared with the 66 minutes in Netherlands, the 54 minutes in UK and the 50 minutes in Norway (Régnier, Lhuissier et Gojard, 2006), this shows there subsist important cultural differences in food consumption patterns. However these data don't account for the huge commoditization process incurred by the products themselves. Referring back to Manno's comparison between HCP and LCP goods, agricultural products have undergone a massive shift from LCP goods to HCP ones. Products that were formerly highly diversified, locally rooted, perishable, non-standardized, hard to transport and non immediately usable have become standardized, universalized, easily transportable, disconnected of ecological and cultural contexts and ready to heat, or to eat. In fact, fresh products are nowadays just one, and perhaps not the most important kind of food available for consuming alongside with appertized tinned food, industrial deep-frozen food, cooked or raw ready-to-use under vacuum, dehydrated, freeze-dried or ionized and industrially cooked ready-to-heat meals. For instance, the market share of ready-to-heat meals has increased with

50% since 1997 (Tischner and Kjaernes 2007). New innovations are steadily arriving on the supermarkets' shelves like finger-food and "drug-food" - called "functional food"[8]- which might be considered the climax of food commoditization, except maybe for the nutritional pill. It is important to remark, however, that the overall environmental impact of all these changes is unclear.[9]

4.3 The sufficiency and cultural de-materialisation strategy

The sufficiency strategy consists in:

a) Getting the maximum well-being from each unit of material service consumed (sufficiency).
b) Minimising the role of material services in the production of our wellbeing. (cultural-dematerialization)

The extant high level of consumption in western societies (and more and more in non-western societies as well) could not stand without a socio-cultural conception of well-being and happiness that foster the pursuit of "materialistic" values ('indulgence', 'pleasure", 'comfort') more than non-materialist values of self-control, spirituality, simplicity, etc. It follows that "…interventions aimed at reducing consumption will be most effective if they bring about higher-level changes in the socio-economic-cognitive system – i.e. by changing cultural values or worldviews." (Brown and Cameron, 2000, p.34).

As Kate Soper (2007) argues, this amount to re-think collectively the "good life" and define together an "alternative hedonism". The kind of value system (and of cultural change) corresponding to the adoption of this "alternative hedonism" discourse might be analysed with Sorokin's typology of "mentalities". In the 4 volumes of its *magnum opus* "Social and Cultural Dynamics" published in 1937-41, the American (formerly Russian) sociologist described and analysed the manifestation through history and across countries of three fundamental "mentalities", i.e. paradigmatic conceptions of:"

a) the nature of reality;
b) the nature of human needs and ends to be satisfied;
c) the extent to which these needs and ends are to be satisfied;
d) the methods of satisfaction". (1957, p.25).

More precisely, he assumed that:

> 1) Reality can be apprehended as nothing more than what the organs of the senses can perceive or, on the contrary, as something behind (or beyond) the perceived world. In the latter case, what the senses perceive is only a misleading appearance (if not pure illusion) hiding the true reality which is immaterial and transcendent.
> 2) Needs may be viewed as purely (or mainly) sensual or mainly as spiritual "like salvation, of one's soul, the performance of sacred duty, service to God, categoric moral obligations and other spiritual demands which exist for their own sake, regardless of any social approval or disapproval" (p.26). But Sorokin considered also the possibility of a mixed conception "like the striving for superiority in scientific, artistic, moral, social and other creative achievements, partly for their own sake and partly for the sake

[8] For a useful discussion of functional food see Lawrence and Germow (2003).

[9] For a synthesis of main trends in food consumption and a discussion of their impacts, see Michaelis & Lorek, 2004, pp15-23.

of human fame, glory, popularity, money, physical security and comfort, and other 'earthly values' of an empirical character" (p.26).
3) Concerning the extent to which needs are to be satisfied, different levels are possible from the most luxurious to the barest minimum.
4) Sorokin distinguished three strategies for satisfying needs: two "pure" strategies and one mixed. The first consists in modifying the milieu in order to yield the means of satisfying needs. The second consists in modifying oneself: "one's body and mind, and their parts – organs, wishes, convictions, or the whole personality- in such a way as to become virtually free from a given need, or to sublimate it through 'readjustment of self'". The mixed strategy consists in acting both on the self and on the environment.

On this basis he distinguished two "pure" mentalities: the "sensate" and the "ideational" one and a mixed type he called "idealistic". These different mentalities manifest themselves in all cultural productions of society: art, science and philosophy, law and justice, and personality.

If Sorokin is right in his typology, the mentality of un-sustainable growth corresponds clearly to the passive sensate "mentality" and the sufficiency and cultural de-materialization strategy would consist in shifting to an active, if not, ascetic ideational one, perhaps after a transition phase of idealistic culture. This is not deny that all human life is based on materialism but as Wilk forceful stated (2001:258): "I certainly agree with Miller that all human life is based on materialism, but I firmly believe that not all materialism is equal".

Table 3 ***Sorokin's theory of mentalities***

The ideational, sensate and idealistic mentalities according to Sorokin					
	Ascetic ideational	Active Ideational	Active Sensate	Passive Sensate	Idealistic
Reality	Ultimate reality, eternal transcendental	Both with emphasis on eternal non-material	Sensate, empirical, material	Sensate, narrow and shallow	Both equally represented
Main needs	Spiritual	Both with predominance of spiritual	Manifold and richly sensate	Narrow sensate	Both equally represented
Extent of satisfaction	Maximum	Great but moderate	Maximum	Maximum for narrow sensate needs	Great but balanced
Method of satisfaction	Mainly self-modification	Both with prevalence of self-modification	Mainly modification of environment	Utilisation (exploitation) of environment	Both ways

The de-materialisation strategy could also be stated in the language of cultural theory. Cultural theory (also known as grid-group theory) has been put at work on several occasions on sustainable development and consumption issues. For instance, Thompson and Rayner (1998) clustered attitudes to sustainable development in terms of Cultural Theory and Dake and Thompson (1999) found from a household survey in Britain that lifestyles and consumption patterns were correlated with these cultural types. Likewise, Jackson and Michaelis (2003) link different attitudes, values and beliefs related to sustainable consumption and the environment to the traditional, individualist and egalitarian types of cultural theory.

Table 4. Cultural theory categories and sustainable consumption

	Traditional/hierarchy	**Individualist/market**	**Egalitarian/community**
Example	20th century civil service or large company	stock exchange, Silicon Valley	monastery, professional association
Goals/moral goods	stability, order, solidarity	liberty, opportunity, efficiency	equality, fairness, solidarity
Social role of consumption	communicate/affirm status/role	self-expression, affirm individual identity	membership of group, affirm collective identity
Problems with consumption	tastelessness of mass consumption; loss of traditional foods, crafts, social structure.	market distortions and barriers constrain freedom of choice: insufficient consumer information/empowerment	inequity between consumers; exploitation of workers; unfair terms of trade.
Diagnosis of environmental problems (Thompson and Rayner, 1998)	population growth, irresponsible behaviour by firms, individuals	lack of market signals reflecting environmental goods/costs	profligate consumption, pursuit of power/self-interest by firms, individuals
Preferred solutions for sustainability	regulation, pollution control, better planning	internalisation of environmental costs, better frameworks for technological/business innovation	public/stakeholder dialogue leading to shared goals/solutions
Preferred mode for sustainable consumption	consuming responsibly	consuming efficiently	consuming less

Source: Jackson and Michaelis, 2003, p.44.

Finally, Michaelis and Lorek (2004) use cultural theory as a heuristic device for categorizing consumption patterns (see figure 2 below) and for structuring scenarios of changes therein.

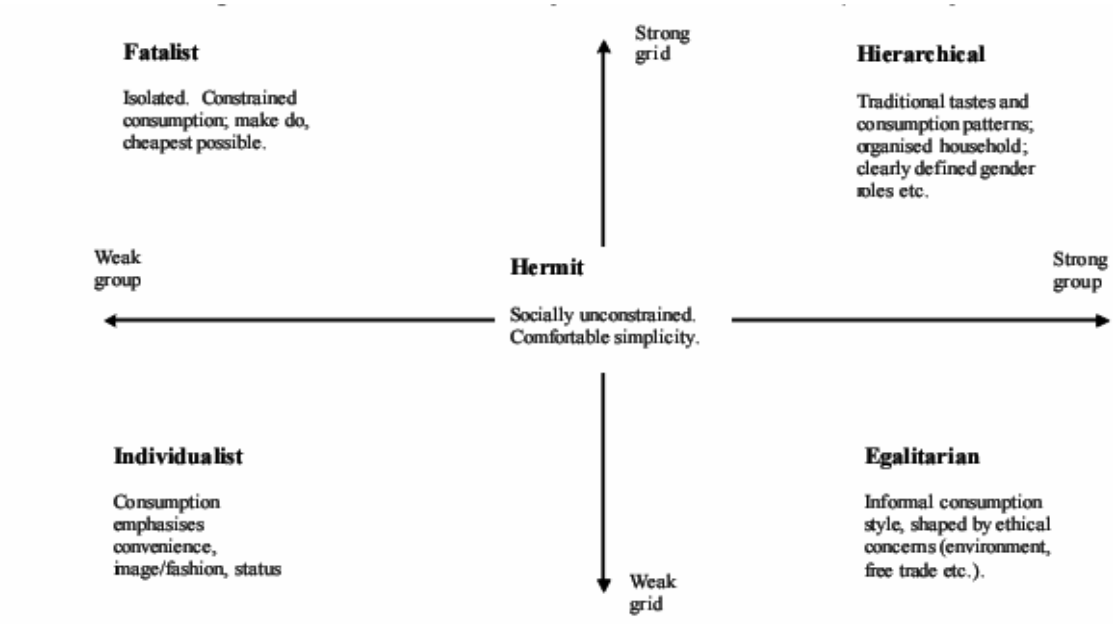

Figure 2. Consumption patterns according to cultural theory. Source: Michaelis and Lorek (2004), p.67.

At present, in western societies, only a small minority is really endorsing the sufficiency principle. It is advocated mainly by very small (even if burgeoning) groups of activists in name of "de-growth" or of voluntary simplicity and also by a handful of scientists be they psychologists (e.g. Kasser), sociologists (A.Etzioni, amongst others), economists (e.g. F. Hirsch, T. Scitovski, R. Frank, R.E. Lane, R. Layard) or philosophers (K. Soper), etc.

But, very recently, it has become an official national strategy in at least one country in the world: Thailand. This country officially fosters what is called a "sufficiency economy philosophy". Its main principles are summarized in the following box.

"Sufficiency Economy" is a philosophy that stresses ***the middle path*** *as an overriding principle for appropriate conduct by the populace at all levels. This applies to conduct starting from the level of the families, communities, as well as the level of nation in development and administration so as to modernize in line with the forces of globalization.*
*"****Sufficiency****" means moderation, reasonableness, and the need of self-immunity mechanism for sufficient protection from impact arising from internal and external changes. To achieve this, an application of knowledge with due consideration and prudence is essential. In particular, great care is needed in the utilization of theories and methodologies for planning and implementation in every step. At the same time, it is essential to strengthen the moral fibre of the nation, so that everyone, particularly public officials, academia, businessmen at all levels, adhere first and foremost to the principle of honesty and integrity. In addition, a way of life based on patience, perseverance, diligence, wisdom and prudence is indispensable to create balance and be able to cope appropriately with critical challenges arising from extensive and rapid socioeconomic, environmental, and cultural changes in the world."*
Source:UNDP Thailand Human Development Report 2007.

Western populations have in general a highly "materialistic" nutrition in the sense that they eat generally too much with respect to their real biological needs considering their lack of physical activities and, in particular, too much meat, fat and sugar in the form of bottled drinks.. Conversely, they under-consume vegetables and fruits. This food consumption pattern lead to public health problems linked to overconsumption of sugar and fat and to spreading overweight and even obesity: high blood pressure, coronary heart diseases, certain types of cancers, diabetes mellitus type II, strokes, tooth decay, osteoporosis.

5 From strategies to scenarios

After having defined these general strategies, the next step is to work out scenarios of alternative food consumption futures based on each of the identified discourse or strategy. So doing we expect uncovering their full potential for sustainable development as well as their internal and external limits and tensions or contradictions. Afterwards, it should be possible to build more realistic scenarios by mixing elements of the three strategies on the basis of the appraisals of the strengths and weaknesses of each strategy taken separately. More precisely, structural elements of the three images will be combined into one or several coherent narratives. The process will be expert driven combining explorative and normative elements.

This approach will hopefully allow us to make valuable conclusions about how 'sustainable' these strategies actually are (or how their logic can be applied in sustainability research).

However, an important question has been left aside, so far. What exactly are we going to envision? The three general strategies must first been translated in the language of food consumption and the language of food consumption itself must been more precisely defined.

5.1 Scenarios of what?

What are we talking about when we talk of sustainable food consumption? Actually, this question is not specific to food consumption, it arises with all kinds of consumption. In fact, it is consumption that poses problem, not food, or clothes, or leisure, etc. Yet, this doesn't imply that all domains of consumption might or should necessarily be dealt with in the same terms, with the same conceptual apparatus.
The concept of practice put forward first by Bourdieu (1980) then by Giddens (1984) and (but in a slightly different meaning and context) McIntyre (1984), has been recently revisited by Schatzki (1996, 2001) and Reckwitz (2002) and is gaining more and more support as unifying concept for all kinds of consumption. Warde (2005), whilst acknowledging the rudimentary and heterogeneous state of theories of practice advocates that they have the potential to help sociologists get out of some pervasive misleading and artificial dilemmas which have plague social sciences, notably the oppositions individualism-holism, homo oeconomicus-homo sociologicus, realism-relativism. Reckwitz (2002, p.249-250) gives the following definition of practice:
".. A 'practice' (…) is a routinized type of behaviour which consists of several elements, interconnected to one another: forms of bodily activities, forms of mental activities, 'things' and their use, a background knowledge in the form of understanding, know-how, states of emotion and motivational knowledge…. A practice is thus a routinized way in which bodies are moved, objects are handled, subjects are treated, things are described and the world is understood".

Therefore, practices are altogether "doings" and "sayings", activities and their (cultural) representations. However, so far, it is unclear how the concept can really help in analysing and understanding consumption. Did we need the concept of practice to be aware that many activities in everyday life are routinized, that as symbolic animals, humans don't just act or behave but talk about their behaviours and develop mental representations about them?
Actually, few- if any- applications of the so-called practice theory in consumption analysis have led to new information, new data, new insights or new hypothesis. Gram-Hanssen (2007) is a good illustration of the fact that the practice's conceptual apparatus doesn't shed new light nor bring new perspectives on already well-known phenomena such as inconspicuous consumption. But, as Warde (2005: 137) observes, consumption as such is not a practice but "a moment in almost every practice". Therefore it would follow that the right subject-matter is not consumption as such but practices, consumption having to be looked at only from the practice of which it is a moment.
Unfortunately, this is not so easy to put at work especially on topics such as food consumption. In their recent analysis of UK time diaries from 1975 to 2000, Cheng, Olsen, Southerton and Warde (2007) and contrarily to Warde's own recommendation, analyse the evolution of eating as a practice *per se*, not as a moment in other practices. By the "eating practice" they understand eating and drinking at home, food preparation, entertaining and visiting, and eating and drinking away from home. So they concentrate on a restricted class of

eating events, generally more or less "traditional" meals and overlook others practices of which eating is only a moment and generally not the most important one, like when dating a girl, or nibbling while watching TV, or receiving colleagues or friends, etc.

Indeed, as Tischner and Kjaernes (2007) put it: "Still, practices that involve eating are also very diverse. They may, for example, include the practices of making and consuming family meals, of maintaining health, strength and functionality as part of doing other things – work or leisure activities, as well as socialising with others, of pausing and resting, of celebrating, etc." Yet, from a sustainable consumption perspective, all these eating moments might be important. For instance, a growing part of calories intake in USA comes from several (up to 20 per day) but very short eating events (almost nibbling one) at work, while waiting for a train or a subway, while watching TV or a movie, etc. As a matter of fact, the latter kind of "eating practice" is considered to be one of the most important factors of obesity for teenagers and housewives.
So, instead of focusing on practices, we would prefer talking of "eating events" understanding by this all occurrences of foods intake during a day.

5.2 From eating events to food regimes

Food consumption is an incredibly complex topic when looked at in a transition management perspective. If one wants to unfold all the environmental impacts of every eating events one would need to know:

- What kinds of agricultural products have been ate and in what quantities (meat, cereals, vegetables, fruits, etc.);
- From what kind of production system they come (referring for instance to Green's typology of 'conventional industry", "organic farming" and "new industry"). In fact, this is already a shortcut for the exact amounts of water, pesticides, fertilizers and fossil fuels used to produce them;
- What kind of transformation they have undergone alongside the food chain from the producer to the final consumer;
- What quantity of waste (including packaging) has been generated from their growing up to their disposal by the final consumer and how they have been disposed of;
- The total distance they travelled during their whole life-cycle and the transportation modes used;
- The total distance travelled by the consumer for its acquisition (going shopping or eating out) and the transportation modes used.

It is probably impossible to build credible scenarios at that level of details and precision. The only solution is to use shortcuts, i.e. qualitative categories to which it is possible to attach crude estimates of environmental impact. We could, for example, propose the following categories for the different attributes of eating events:

1. WHAT[10]:
   a. Animal protein + fat (meat, fish, poultry, egg, milk, cheese)
   b. Starch + plant protein + fibres (rice, pasta, bread, dried legumes, seeds, potatoes)
   c. Starch + carotenoids + ascorbic acid (green vegetables, fruits, berries, roots)
   d. Plant fat + plant protein (nuts, olives, avocado)
   e. Fat (cooking fat, spreads, cream, fatty sauces)

[10] The what category is from Atkins and Bowler 2001, p 299.

f. Sugar + fat + alcohol (sugar, alcohol, ice cream, sweets, chocolate, biscuits, sweet desserts, soft drinks)
g. No nutrients (Water, coffee, tea, unsweetened light beverages)

By combining these basic categories, one could build ideal-types of meals or snacks, for instance:

- a + b + c = complete meal;
- a + b = incomplete meal;
- b + c = vegetarian meal;
- a or b or c = high quality snack;
- e and/or f = low quality snack.

2. FROM WHICH AGRICULTURE
    a. Conventional agriculture;
    b. New industrial agriculture (GMO, Clones…);
    c. Organic agriculture.
    d. Home Grown

3. WHAT FORM?
    a. Fresh product;
    b. Frozen, freeze-dried;
    c. Ready to heat;
    d. Ready to eat.

4. WHERE?
    a. IN
        i. Coming from:
            1. Supermarket,
            2. Local retailer,
            3. Shopping cooperative
            4. Food service,
            5. Producer,
            6. State stores (for instance with meat stamps)
        ii. How?
            1. Taken away;
            2. Home delivered.
    b. OUT:
        i. Not for profit private food service: canteens (workplace, school, hospital, prison..), friends, neighbourhood's restaurants…
        ii. Commercial food service
        iii. State owned restaurant

By combining these categories one can build hundreds of theoretically possible different eating events.
Examples:

- home-delivered ready-to-eat vegetarian meal from new industrial agriculture;
- Low quality snack based on frozen products from the organic agriculture ate at the canteen ;
- Etc.

Of course, some combinations would look less likely than others but in scenario construction one should not too quickly discard logically possible combinations just because they look rather odd today. They could nevertheless present a high sustainability potential and should then be carefully examined. However, practically the scenario-building process will come out with a limited set of ideal-types of different meals and snacks based on some more plausible or more interesting combinations of building blocs.

At a second level, these ideals-types of eating events could in turn be combined together in order to form ideal-types of *diets*, for instance by combining a morning, a noon, and an evening typical events. These types of diets would probably be associated to subgroups of the population like the teenagers, the active single, the two-adult two-children family, the single retired, etc.
Finally, general pictures of whole food regimes (in the sense of transition management) would emerge as "modal splits" of ideal-typical diets. In the context of the Consentsus project we would come with one or several "eco-efficient" food regimes, one or several "de-commoditized" food regimes and one or several "sufficient" ones.

6 Conclusion: drawbacks in scenario building

To conclude, it might be interesting to compare this top-down approach with the one followed in the SusHouse project. The SusHouse project (Quits and al. 1998, Young and al. 2001) is a very ambitious scenario building exercise aimed at creating sustainable households, based on a factor 20 improvements in environmental efficiency by the year 2050. The starting point is the assumption that technological, cultural and structural changes are necessary to have a chance to reach the Factor 20 objective. Three household functions have been studied: clothing care, shelter and "shopping, cooking and eating". Every function has been studied in three European countries. The "shopping, cooking and eating" function has been studied in Hungary, the Netherlands and the UK. The approach was the following: the experts groups helped by stakeholders from industry, government, universities and public interests groups formulated normative scenarios of possible developments of these household functions for the year 2050, including technological, institutional and cultural innovations. The scenarios are then evaluated as to whether they enable to reach the target, whether they are economically credible and are acceptable to European customers. The scenarios have been called 'Design Orienting Scenarios" (DOS). In their final format, they comprise a "vision" (a short overall description of the DOS, a storyboard (sometimes supported by visualizations) intended to provide a snapshot of a household living according to the scenario and proposals for PPS (Product Services Systems). Eventually, five DOS have been identified:

1. Local and green
2. Hi-Tech eating
3. Super-Rant and neighbourhood food centre
4. High-Tech Rural Gardens
5. Virtual Shopping.

Each research group provided its own' 'national' version of all or some of the DOS.
Afterwards, the different versions are synthesised forming a common unique DOS.
Table 5 shows the summary of the final DOS "Local and Green".

Table 5. The « Local and Green » Design Oriented Scenarios from the SusHouse Project.

Core idea	**Local production and consumption of organic food.**
Differences in 2050: shopping	For shopping household members go to the local corner shop for speciality ingredients, but we get regular bulk food from the local food co-operative or direct from the local farm. (The regional wholesalers and food processors supply our local food co-operative and corner shops. Local farms supply them in turn).
Differences in 2050: storing	There is less food imported from abroad, and therefore less need for refrigeration in transit. Food is only available when it is in season. This could lead to more freezing, or to more use of passive storage e.g. cool boxes or cellars for apples and potatoes.
Differences in 2050: cooking	At meal times we either prepare food in our own kitchen, or the households in our street share the cooking, or we eat at the local corner-eating house.
Differences in 2050: eating	The food the household eats is what can be grown locally in our region (no more than 100 miles away). We can only get fresh food that is in season (e.g. apples in Autumn, lamb in the Spring, etc.). This means that some 1999 food products are unavailable but there are locally-grown alternatives (no oranges, lots of blackcurrants). All our food is organic, i.e. grown with high reduction in the use of pesticides, in a way that encourages biodiversity.
Differences in 2050: clearing away and waste	There is less packaging waste because some food is bought direct from the farm. As the food has to travel less, there is less need for protective packaging.
Environmental assessment	· Elimination of pesticide use. · Massive reduction in food transport. · Reduction in home cooking. · Reduction in packaging.
Consumer acceptance	1. Liked: · Seasonality. · Communal arrangement. · Sociability. · Organic. · Locally grown food. 2. Disliked: · Lack of choice.
Economic analysis	· Collapse of pesticide industry. · Localisation of agriculture supply. · Food processing conducted locally/regionally. · Large supermarkets replaced by small local shops. · Market advantage for local organic retailers. · New market for organic 'eating-houses'.
Strategies	**Local – and Seasonal Food** 1. Government Actors: · Bring in distance taxes (different taxes for different modes of transport) and boundary taxes. · Local planning legislation to protect and maintain agricultural land and the move to smaller numerous farms. · Promotional marketing by government. · Place VAT on 'luxury' imported foods · Food Standards Agency should instigate interaction between farming and consumer groups so that both parties became aware of needs and requirements of each other. 2. *Financial/Retailing Actors:* · Establish Local/Regional credit card to local people shopping locally.

(Source: Young and al. 2001, p.125.)

The SusHouse project has really done a genuine pioneer work and brought very interesting and valuable results. There is a lot of positive lessons to be drawn from it. However, it is not always totally convincing. For example, not surprisingly, the "Local and Green" DOS exhibited the highest potential of reduction of environmental impact. But, as the authors confess: "To some degree this was a reflection of the methodology, with several important streams of data either not readily available, or not satisfactorily incorporated in the assessment structure." (Young and al. 2001: 124).

Why "not surprisingly"? Because, from the documentation available, one get the feeling that both the research team and the experts had from start a prejudice in favour of the local and green scenarios. Or, at any rate, they were probably sceptical about market and hi-tech solutions and they didn't even consider the possibility of a more active role of the state or other public authorities in food provisioning. However, if one really assumes that any technological, cultural and institutional plausible innovation likely to bring us to the desired goal is worth considering, there is no reason to neglect *a priori* institutional changes that would bring the public sector back in the provisioning system and playing a role it has already played in the past, at several occasions. The most likely explanation is that they didn't even think about it because of the deeply liberal "Weltanshaung" of our time. Scenario building is an activity particularly vulnerable to unconscious preconceptions, wishful thinking and the defence of vested interests. We are certainly not immunized against these flaws but we believe the best way to avert them is to identify carefully all the logical possibilities and to explore all of them with an equally open mind and critical lucidity. This means giving the same opportunity to the different strategies (and to all the possible modes of provision, not only those for which we have some sympathy) to show up their full potential while being equally critical with all of them.

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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 charachterized 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 exercises[1] 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 consumtpion 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 (Zaccaï, 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 (Geldenhuys, 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 aknowledge 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 factors[3]. 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 generally, 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 possibles 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.

*

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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SCENARIOS AS TRANSITION TOOLS ?

THE CASE OF SUSTAINABLE FOOD CONSUMPTION

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Summary

How do scenario tools and the (policy) domain of sustainable consumption relate to each other? Is the scenario approach a relevant tool for Transition Management-like planning processes which focus on the specific issue of consumption?

Scenarios are an important aspect of a new range of planning approaches focused on innovation, like the Dutch Transition Management (TM) approach (Rotmans, 2001). Indeed, this planning approach relies on the construction of transition scenarios in order to frame under a common guiding 'vision' the objectives and actions proposed by policy actors (Loorbach, 2007, p.116). Efforts are dedicated to develop this type of innovative policy processes, since handling the complex and long-term challenges of SD seem to call for participative, reflexive and adaptive processes to planning (Voss and Kemp, 2006). The CONSENTSUS project aims at exploring the consumption issue through scenario building in the wider context of transition management and system innovation. To do so, sustainable consumption (SC) was disintegrated into three SC strategies, namely eco-efficiency, decommodification and sufficiency, which were then used as axes for the scenario construction.

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INTRODUCTION : ADDRESSING CONSUMPTION THROUGH SCENARIOS

Uncertainties and the apparent urgency of the contemporary environmental and societal stakes generate policy situations where traditional decision-supporting tools reach many of their limits. Policy-makers, civil society organisations and scientists alike are thus looking for new and refined sets of tools which guide policy towards sustainable development objectives. Scenarios and scenario planning are thought to be such tools, notably because they are said to have the potential to generate thinking and creativity about sustainable development and sustainable development policies. Their use is typically recommended in situations where complexity, uncertainty, long-time horizons, cross-scale and cross-sector interactions are the rule (Alcamo et al. 2005). Sustainable issues have exactly these characteristics (Kates, et al, 2000). More specifically, in approaches aiming at 'managing' systemic transitions towards more sustainable patterns, scenario building is becoming a central tool used to generate future visions of the system at hand and foster interactive processes.

The issue of sustainable consumption patterns is one of the important drivers towards sustainable development. Part of the complexity of sustainable consumption is directly linked to the concept of 'consumption' which can be limited to the purchase of goods and services, or on the contrary, understood within a wider socio-economic context of constructing 'exchange' and provision (encompassing also non-commodities) in order to fulfill human needs. This process of opening up the concept to broader socio-cultural aspects results in a more comprehensive picture of what consumer behavior and practice is (and consequently, what needs to be changed).

The CONSENTSUS project ('*CONstruction of ScENarios and exploration of Transition pathways for SUStainable consumption patterns*') is settled within this context. The research aims at exploring the specificity of addressing consumption through scenarios, in the wider context of scenarios for transition management and system innovation. In other words, addressing the question whether or not *scenario approaches could be relevant for Transition Management-like planning processes which focus on the specific issue of consumption?* To generate some insight into this question, the stance taken was to implement during the project a scenario exercise, both in

order to gain insights on the tool's mechanics itself and to identify a series of pathways towards sustainable consumption patterns[1].

In this paper, we present the conclusions drawn from this exercise. We first give an overview of the methodology (Section A). These are structured in two sections. Section B reflects on consumption through scenario construction and specifically on the (re)interpretations which emerge for 'consumption' through presenting the three scenarios (B.1), a first step towards integration (B.2) and conclusions in that regard (B.3). Section C reflects on the implications and specificity of addressing the consumption issue with scenario exercises through structuring the insights of the scenario exercises in terms of scenario 'building blocks' (or mechanics) (C.1) and outcomes (C.2).

A. THE CONSENTSUS METHODOLOGY

1. From discourses to strategies

The challenge of the scenario construction methodology was to translate theoretical accounts on sustainable consumption into a practical structure for scenario design. This has been solved with a '*Decomposition Analysis*'. The method allows deducing three interrelated parameters (i.e. macro-economic 'identities') that encompass the construct of sustainable consumption. *Decomposition Analysis* was initially introduced by Kaya in 1989 in the context of climate change and has recently been used in scenarios for carbon reduction (Agnolucci, et al., 2007).

In a decomposition analysis, a problem (here, sustainable consumption) is split up in various significant (sub-)ratios. This somewhat formal approach starts from the basic assumption that sustainability can be measured by an indicator of productivity of valuable resources (or of material efficiency) in the well-being production process. This can be expressed in the following formula: (1) **S = WB /EF.** The formula is not to be considered as an equation with calculable and interdependent ratios but rather as a meaningful way to formalize a construct and hence to think about its internal causal relationships, hence allowing to organize any discussions on the issues at stake (Agnolucci, et.al., 2007). Formula (1) is then disaggregated in three ratios: **S = (WB/Se) * (Se/C) * (C/EF)**[2]. This latter formula highlights three discourses on sustainable

[1] The other strand of research aimed at appraising the characteristics of scenarios through a theoretical analysis which yielded their underlying mechanics, potential outcomes and factors of use: these aspects have been developed in another IHDP paper (Mutombo, Bauler, "Scenarios and Sustainable Development Governance"); see also Mutombo, Bauler, 2008.

[2] Where: **S** stands for Sustainability; **WB** = the level of well-being; **EF** = the environmental load or ecological footprint; **C** = Commodities and **Se =** service provided by a commodity (e.g. as used by Nørgärd 2006).

consumption: each of the three ratios represents a 'pure' strategy to enhance sustainability (see Boulanger, 2008 or Paredis et al, 2009):.

- **EE: Eco-efficiency (C/EF)** aims at decreasing the intensity in materials of the production, use and disposal of commodities (Industrial Ecology, the Cradle-to-Cradle movement …).
- **DC: De-commodification (Se/C)** aims at decoupling the service provided per commodity from the nature of the commodity, i.e. from their market-centered characteristic, in other words limiting as a consequence the influence of markets and increasing the influence of other 'function providing' systems or organisations through which needs and aspirations can be invariably satisfied too (Local exchange networks, communitarian work…).
- **S: Sufficiency (WB/Se)** aims at disconnecting well-being from the services provided by commodities, i.e. in simplified terms, delinking a product's functions from the wellbeing they generate (Voluntary Simplicity, degrowth …).

These three discourses, or strategies, on sustainable consumption have been at the core of the structure given to the scenario exercise, which was located in the specific case of food consumption. Each of the discourses has been explored through the construction of a scenario illustrating what the world could look like in 2050 if we were to follow strictly the principles of each of these strategies.

2. From strategies to scenarios

Four participative meetings were organized: an introductory workshop to present the project, the methods as well as background information; two scenario workshops to brainstorm on the strategies based on the question "*What happens when great efforts and funds are devoted to the EE, DC or S strategy over the next decennia?",* as well as a feedback meeting to collect reactions on the final product and the whole scenario process. The workshops have generated inputs which were then worked out by the research team, synthesizing and creating coherence among the workshops' results through drafting three images, each describing potential EE, DC or S worlds in 2050. The final output were 3 narratives presenting 3 worlds through daily life examples (for a full methodological account see Paredis et al. 2009).

3. Towards integration of the strategies

Beyond the construction of three scenarios illustrating the main discourses on sustainable consumption, it was necessary to reflect in terms of integration of these three perspectives. The formula presented above shows the logical interconnectedness and complementarities of the

three main discourses in sustainable consumption. Indeed, an effective transition to sustainable consumption will need mixed strategies, acting on the three ratios because each of them taken separately has intrinsic limits. To do this, a statistical analysis, labelled *Q* methodology, was used to highlight elements of consensus and contention among the three discourses on sustainable consumption. Those conclusions were based on a participatory ranking of 37 statements stemming from the three scenarios/discourses by a sample of 45 participants (for a full methodological account see Lefin, 2008).

B. THE RELATIVITY OF CONSUMPTION

1. Three scenarios of sustainable food consumption

Three scenarios have thus been produced along the three strategies. None of them represents a catastrophic, non-sustainable future to be avoided; and opposite, none of the scenarios presents a sustainable world as such. The following discussion wants to show the different stances which can be taken of consumers' perspectives when social change occurs in favour of sustainability.

In the ***Eco-efficiency (EE) scenario***, consumers are defined as decision makers, as autonomous shoppers whose aggregate choices determine the future of food production. The concept of **consumer sovereignty** stands central in this perspective. The market is considered as a mechanism for translating individual preferences, including the eco-efficiency oriented belief-set. The central argument goes that choosing for green products through the market steers society towards sustainable food production, provided that the right incentives are given. Sovereignty implies that a consumer is purposeful and goal oriented. The EE scenario portrays a relatively passive consumer, whose participation and reflexivity in terms of sustainability criteria is integrated at the level of the purchase act, through the types of product and services bought. (S)he trusts technological progress. The EE consumer is in a customer relationship with the retailer, without effective contact with the producer, and as a consequence is in demand for precise, comprehensive and understandable information from firms and authorities to assess food quality.

In the ***De-commodification (DC) scenario***, the consumer can be seen as a citizen-entrepreneur. This type of consumer has significant influence on the way the food supply is organized outside of the market: both individually as well as in groups, the citizen-consumer shapes the socio-technical food system through local governance systems (consisting of local citizens and

municipal actors). Consumers in a way are 'entrepreneurs', taking actively part in the management of the food system, even in the production of food. In this less commoditized world, a **political consumer** emerges: not a 'voting 'at the check-out consumer' (Jacobsen and Dullard, 2007) but a concerned civic actor. Local, seasonal production and consumption patterns lead to bottom-up partnership-types of relationships. The DC scenario is characterized by co-production, blurring the distinction between consumption and production and empowering the 'consumer' with a high level knowledge and practice of the food system. Responsibility and active engagement are important drivers of action.

In the ***Sufficiency (S) scenario***, the consumer is labelled a **self-reflexive consumer**. The sufficiency scenario features a highly self-conscious consumer, analysing his consumption behaviour through 'cost/benefit' analysis in terms of impact on personal and social well-being, direct and global environment... This consumer has come to question the underpinnings of consumption practices as such. Aware of the cultural relativity of behavioural patterns, this type of consumer debates on how the good life can be defined and operationalized. The consumer in the sufficiency scenario has acknowledged the existence of inevitable underlying complexity (i.e. personal complexity and process-related cultural complexity). Uncertainty, unpredictability, uncontrollability and cultural relativity are concepts that one tries to tackle in decision processes in consumption situations, which calls for an S consumer which is characterised by a high degree of self-knowledge (or reflexivity) as the basic condition to a more efficient relationship between the desired service and the experienced satisfaction.

2. Towards an integration of the three strategies: Q-methodology

Each of the 3 strategies individually is an answer to provide a 'sustainable consumption'-oriented world, but each of them is only a partial response to the challenges of sustainable consumption. A fully sustainable consumption world would need to combine elements of the different scenarios, or combine the 3 worlds. The integration of the 3 scenarios is thus a major question which was addressed by applying a Q-methodology.

Without presenting the details of the process, the final conclusions are summarized below (for a full account of the methodology, process and results, see Lefin, 2008). The Q methodology highlighted themes which garner either consensus or disagreement among the 3 strategies, as well as possible ways of combining elements from the three strategies. The clearest point of agreement is the recognition by all that education is a fundamental aspect for sustainable consumption. The most important outcome of this analysis is a certain form of validation of the

scenario method through the confirmation of the 'discursive' stability of the 3 strategies (and their narratives). The three strategies which we identified and developed in the scenarios are effectively existing and operant in the representations of participants . Amongst our (non representative) sample of participants, groups of people could be identified that really 'think' one should follow either an EE, DC or S strategy in order to lead the future of food consumption towards more sustainability. This analysis confirms that the performed scenario exercise has an anchor in reality.

Based on the on the Q methodology results, the specificity of the three strategies can also be termed as follow. In the eco-efficiency scenario, the belief lies in the human capacity to strive towards well-being and preserve the environment through institutions and a form of societal organization which is able to direct and regulate markets as well as science and technological progress. The decommodification strategy seems to favour the notion of responsibility, of societal inclusiveness and active engagement, while investing in community-based interventions. The sufficiency scenario seems to be characterized by an acceptation of limitations with regard to the finitude of the world and of one's own needs, which highlights the belief in a (rational) human being who constantly activates a highly reflexive behaviour.

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Looking at the issue of consumption, entails to notice that the very concept changes over the three different strategies/discourses derived from the decomposition analysis. Consumption appears to be an equivocal concept when it is considered through alternative discourses of sustainable development. The underpinnings of 'consumption' are particularly different in each scenario. The word 'consumption' implies and reinforces a different meaning in a different discourse (Foucault 1969). In this sense, the term 'consumption' will have highly alternative 'discoursal functions' within this web of (reproducing) interrelationships, hence potentially leading to very different possible realities. This leads us to consider the importance of the argument of how different starting points lead to alternative social arrangements. The alternative meanings of 'consumption' entail a multitude of highly complex societal evolutions and (in some instances) behavioural changes. Working for our own food, incorporating inter-personal wellbeing in our daily decisions or systematically internalizing externalities in business, each of these operationalisations of the three different 'objectives/strategies for sustainable consumption' implies a fundamental change in human organization and/or behaviour. Paradoxically, the question rises whether such multiple natures of the discourse on

consumption are captured by the initial concept when the aim is to link the practices of obtaining, preparing and eating food with the objectives of sustainability.

C. THE SPECIFICITY OF CONSUMPTION

1. Analysing consumption along 'Building Blocks' of scenario construction

In order to discuss the adequacy of using scenarios as transition tools for consumption issues, we analyze the CONSENTSUS scenarios along a theoretical framework which allows to highlight five important dimensions or generic characteristics of scenarios. These five building blocks compose scenario approaches and exercises to different degrees, and allow to assert an identity to individual scenario exercises : ***Future-oriented thinking***, ***Collecting and integrating information***, ***System thinking***, ***Story-like approach***, ***Dialogue interface*** (see also Mutombo and Bauler, 2008).

FUTURE-ORIENTED THINKING

Addressing sustainable consumption has led to an original scenario construction approach in terms of methods and modes of thinking. Indeed, the CONSENTSUS scenario exercise is a hybrid of normative and explorative modes of future-thinking. The approach addresses "*specific targets*", the EE, DC and S worlds, but leaves those targets rather undefined. Simultaneously, it initiates an *exploration* of the possible EE, DC and S worlds by asking the question *"what can happen if we follow the principles of each strategy?"*. An explorative mode of thinking was thus endorsed, but within a predetermined (normative) framework of driving forces, i.e. the three strategies. It is this pre-determined framework that affirms the normative character of the exercise.

One of the differences between our hybrid approach and classic explorative scenarios is that, in the latter, there are no pre-determined driving forces and that the subjective and normative dimensions in the selection of the '*most important and uncertain*' variables (e.g. performed through brainstorming or Delphi exercises) is legitimated by the participation of experts and/or stakeholders. In the CONSENTSUS exercise, this form of initial participatory legitimisation has not been addressed within the process nor with the participants. The choice has been made to rather support the credibility and salience of the exercise on the basis of sustainable consumption literature (i.e. consolidated peer-reviewed knowledge), which highlighted - through decomposition analysis - a scenario approach based along three strategies.

The CONSENTSUS approach used the scenario process as a simulator with regard to pre-determined uncertainties and driving forces, rather than as a revelator of those 'most important and uncertain' variables. What is 'revealed' however, are the underlying assumptions associated to each of the three strategies and moreover the possible and plausible multiplicity of perspectives which coexist around the issue of sustainable food consumption. As a result, the CONSENTSUS approach highlights the ambivalence of SD.

On another level of observation, it is interesting to analyze the nature of the 'futuristic' and intuitive ideas, which were identified during the scenario workshops (like edible packaging, local community barter systems, a technological device measuring food intake…). It is not that these ideas as such were really innovative. Their relevance is related to the different strategies and how identical ideas are coloured differently in each scenario. Simultaneously, while these examples of practices are put forward to illustrate the life in the EE, DC and S worlds within a time horizon of 50 years, these very same practices prove in fact to be deeply linked to present and historical references. For example, the main reference popping out during the scenario brainstorming when exploring non-market policy options remains the very negatively connoted communist practices in the soviet countries' block. All the same, the most innovative elements which were identified are actually 'seeds of change' which are already today on the drawing tables of industry or policy makers. For instance, the 'food delivery mailboxes at household level' identified as central innovation within the EE scenario (e.g. rendering a higher degree of efficiency for transport and delivery of food), have been implemented in a recent architecture realization in Leuven[6] (Belgium) which proposes apartments with minimized kitchens and with external delivery boxes for food. Such anecdotic but recurrent occurrences confirm to a certain extent that scenario construction is more about how ideas are re-structured, than about 'creating future knowledge'.

COLLECTING AND INTEGRATING INFORMATION

The decomposition analysis and the three strategies are the result of a synthesis of sustainable consumption literature and resulted in the integration/disintegration of various elements of information related to discourses around sustainable consumption. The CONSENTSUS scenario process highlighted consumption as being a very wide field of investigation without clear and precise boundaries. Indeed, collecting information on *food* consumption turned out to be highly demanding. It requires researching a vast array of topics and sources of information: from meat consumption, to vegetarianism practices, through artificial meat and protein drinks; from

[6] www.tweewaters.be

agriculture to marketing; from international organizations to national and local data providers. Connecting and integrating these different types of information is necessary, for example, when studying alternative consumption practices (like vegetarianism), and implies to take into account various levels of analysis. Applying the three strategy-discourses resulted in providing some order to integrating these different strands of information.

Second, *Q*-methodology allowed to reach another level of integration of the collected information, namely the configuration of an integrated strategy for sustainable consumption based on the entire set of ideas and perspectives generated during the scenario exercise. The analysis has delivered hints for the integration of the different perspectives through highlighting connections and disjunctions among them.

SYSTEM THINKING

From a *production* point of view, the delineation between production and consumption seems robust and leads to study a rather closed system, from raw material to final product. Often studied from an economic and environmental resources-oriented stance, addressing production also implies the use of rather formalized analytical frameworks, such as Life Cycle Analysis, which endorse a traditional form of system thinking. However, when endorsing the *consumption* perspective, the distinction between production moments and consumption prerogatives suddenly appears artificial. Thinking in terms of consumption asks to open up the investigation field to a vast array of societal and individual practices based on habits, values, standard of living…, which are mirrored in the production and distribution processes and, hence, ask to widen the perspective taken to the entire chain of production-distribution-consumption.

As a consequence, consumption is composed of these various aspects along the production-distribution-consumption chain which are grounded in different sectors and disciplines. Consumption is difficult to apprehend because of the lack of a stabilized analytical multi-disciplinary, multi-sector, multi-actor framework. As a reaction to this situation, the CONSENTSUS research processes mobilized multiple frameworks[7] which helped taking into account the food system as a whole, but did not really lead to systemic analysis across sub-dimensions (in the sense of pinpointing specific interrelations between precise variables).

[7] The Consentsus research processes mobilized multiple frameworks like the '*micro-meso-macro'* framework (individual needs and resources, modes of provision and social values, norms and meanings associated to the current food system (Boulanger, 2007); the multi-level perspective composed of landscape (i.e. contextual environment), regime (i.e. dominant structures) and niches (i.e. alternative innovative elements) stemming from system innovation and transition theory has structured the diagnosis of the current state of food consumption (see among other Loorbach, 2007); and the STEEP(D) framework (Socio-cultural, technological, economic, environmental, political and demographical aspects) has framed the brainstorming on the contextual environment of the three scenarios.

Studying consumption from a systemic point of view revealed thus some difficulties with regard to drawing clear boundaries around a 'food consumption system'. Combined to the multiplicity of perspectives on consumption, understanding and exploring the final act of consuming opens a whole world of knowledge and of potential interrelations.

STORY-LIKE APPROACH

The story like approach, i.e. the elaboration of the scenarios and narratives, has been divided in the CONSENTSUS exercise between (1) the elaboration of the three images as a synthesis of the workshops' brainstorming sessions, and (2) the writing of narratives to illustrate the EE, DC and S worlds through daily life stories.

The elaboration of the images and the writing of the narratives proved useful to highlight and correct some problems in the developed EE, DC or S worlds such as a certain lack of coherence or blind spots in the 'mechanics of the worlds'. However, some of the incoherencies and imprecisions could not be solved in the context of this exercise; for instance, in the DC scenario there remains a blind spot as to the configuration and operationalisation of the coordination mechanism which will help that demand and offer for food are met (in the absence of a monetary exchange system).

DIALOGUE INTERFACE

As a consequence of the difficulty to draw clear boundaries around a 'food consumption system', selecting participants implied to target actors from a variety of sectors in order to favour diversity. From a basic point of view, and like any participative meeting, the scenario workshops allowed of course for interpersonal dialogue. Independently of the consumption perspective, the research nature of the project had implications on this aspect.

Scenario exercises have the potential to be 'boundary organizations' (in their procedural reading) or to generate 'boundary objects' (in their substantive reading). This means that - as other policy-making tools such as indicators for SD or participative evaluation processes - scenarios can act "*as interfaces between a series of interconnected arenas*" (Bauler, 2007, p.161) such as policy, science, society. For example, '*Limits to growth'*, the Meadows&Meadows report of the *Club of Rome* in 1972, has reached the level of boundary object as it became not only a scientific or policy reference, but succeeded in highlighting and linking together different types of discourses generating a number of debates at the societal level. Parallel to the first image of the Earth from space and the oil shocks, this report did help to change the way people in the 1970s were looking at resources and pollution.

The generation of such 'boundary objects' is highly contingent in general and can probably not be expected from a research project. CONSENTSUS is a rather experimental R&Dproject with its own scientific objectives, and despite a participative phase, the project was not driven by societal or political goals. However, CONSENTSUS showed that consumption issues, as complex as they are, can be used as main foci of scenario approaches and can in principle allow the emergence of 'boundary organisations' in order to realize the emergence of the necessary policy arenas to realize a transition at the level of consumption practices.

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The issue of sustainable consumption revealed to be a very specific topic of research when it comes to study it through systemic-oriented tools and approaches as is illustrated through this scenario exercise and as can be extrapolated to the implementation of a transition management process on consumption patterns. The specificities of consumption highlighted here revolve, among others, around the difficult closure of a 'consumption system'. This observation contributes to support the accent given to the second phase of the project, i.e. to question the wider field of system innovation and transition theory including the role that consumers and their daily practices can play in system innovations.

2. Learning and strategizing : the outcomes of the CONSENTSUS scenario exercise

The theoretical framework of scenarios developed in this research allows to characterize scenarios along five building blocks, and link these to two generic scenario outcomes: 'learning' and 'strategizing'. 'Learning' has been interpreted here as a conceptual type of 'policy use' of the scenario exercise. 'Strategising' pertains to an instrumental, direct type of 'policy use' (see also Mutombo and Bauler 2008). In this final section, conclusions are drawn with regard to these potential policy outcomes and policy uses of scenario exercises which investigate sustainable food consumption.

LEARNING

Policy learning, i.e. conceptual use of information for policy processes, implies in our case that scenarios can influence a user's understanding of a problem or situation, even if the information is not used to base decisions in a direct way (Hezri, 2006, pp.134-137). Learning processes are disaggregated in different types (Brown, 2003): ***first order learning*** (i.e. internalizing facts and causal logics) and ***higher order learning*** (i.e. learning with regard to problem definitions,

norms, values, goals of policy actors). The conceptualisation of higher order learning can thus be extended to include ***congruent learning***, which translates in our case the fact that the scenario exercise generates a shared understanding of the issue at hand (Mutombo, Bauler, 2008).

It appeared difficult, in practice, to draw the line between ***first*** and ***higher order learning***, notably because it proved impossible to identify whether or not 'new' factual information has been generated through this exercise. The main innovative piece of information for the participants was linked to conceptualising SC in terms of the three strategies, their logic and driving forces, which potentially contributes to structure their understanding of sustainable consumption-oriented information and actions. This insight on consumer perspectives can be related to ***higher order learning***, i.e. the influence of the scenario exercise on underlying assumptions, norms and beliefs around sustainable food consumption. Indeed, among the three strategies, eco-efficiency is rather well known. 'Discovering' and reflecting on the two other sustainable consumption strategies has proved to change the problem definition related to consumption.

In terms of ***congruent learning***, i.e. of convergence between the participants, few elements could be observed. While the participants did get along during the workshops, they did not report on the creation of 'networking outputs'. Moreover, the CONSENTSUS scenario exercise, as acknowledged in the above discussion of scenarios as '*dialogue interfaces'*, did not aim at a societal objective, e.g. of creating common and shared vision of the future for further policy actions. In fact, the chosen approach probably generated a too low level of ownership with regard to the constructed scenarios, a problem which has been repetitively stated by similar R&D-based scenario projects.

STRATEGIZING

Our approach to scenario building does not yield direct instrumental impacts for strategy-development, for instance in the sense of precise scenarios against which policy strategies could be assessed, nor as a normative desirable vision along which to plan policy actions and measures. Nevertheless, these three scenarios have led to learning elements that could be valuable in a strategy planning exercise.

The *Q*-methodology has been used to configure an open-ended participatory 'sustainability' assessment of the elements which compose the 3 scenarios; participants ranked statements with regard to their own definition of sustainable food consumption, inducing a mapping of their societal values with regard to food practices. The *Q*-analysis was not defined to point to a unique integrated scenario, which could then have been used to lead to concrete policy options. More

importantly, its configuration has confirmed the existence of three different perspectives on sustainable consumption within the policy actors of variable stakeholder backgrounds, as well as elements of junction and disjunction among them. The discussions and reflections around the three strategies and their concrete illustrations through potential images of daily life practices could contribute to redefine the sustainable answers to food-related issues taking into account, not only the drivers of an eco-efficiency scenario, i.e. technological and market-oriented answers (intelligent fridge, GMOs etc.), but also the potential of SD lying in the DC and S drivers, i.e. within the civil society and the community (be it local or global) and within the reflexive stance with regards to the effective needs and limitations of individuals and societies. This could sound trivial with regard to the current state of knowledge within the scientific and stakeholders' communities working with such sustainability issues, but discussions with participants indicate that these perspectives are not widely spread.

Concretely, while some individual elements stemming from the decommodification and sufficiency strategies are starting to reach political arenas (e.g. the degrowth discourse, short food circuits…), it is mainly the 'eco-efficiency' strategy that is given the necessary credibility in political arenas so far. Such an exercise, could be one way not only to inform relevant stakeholders about the accuracy of a tri-folded approach to sustainable consumption, but to really make it part of their personal understanding of the consumption issue.

CONCLUSIONS

The three scenarios and their construction process reveal that scenario exercises provide a framework towards a parallel simplification and 'complexification' of policy discourses (Bauler, 2008 : 70). They provide a general overview of the consumption dimension and, moreover, highlight the complexity of the issue in terms of multiplicity of perspectives and rationalities. Particularly in SD policy-making, it is important to be aware of the ambivalence of objectives and values implied in the now widely used expression of 'sustainable consumption'. The CONSENTSUS scenario exercise illustrates the importance of scenarios to re-emphasize the normative dimension of sustainability issues. Such 'policy problems' require scientific as well as factual answers, but necessitate to highlight the diverse rationalities at stake in sustainable consumption through presenting and questioning perspectives and underlying values. The type of approach pursuit in the CONSENTSUS project contributes to question the quest of scientific a-

contextual truth when the question is, in the strict sense, political and in the wider sense, societal.

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Consumers as actors in Transition Management: the de-commoditization and sufficiency strategies[1]

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Abstract

Transition management is concerned with fostering and steering socio-technical innovations so as to achieve (more) sustainable modes of provision for important societal functions such as energy, transportation, food. It relies on a multi-level model of the social realm as the interplay between regimes, niches and landscape and conceives of social innovations as transformations in dominant modes of provision by incumbents of the regime incorporating innovations initiated in niches or being crowded out by them. Hitherto, the approach has concentrated mainly on technology niches and the supply side of the economy leaving not much for the consumers as plain actors of the transition. We maintain through a decomposition analysis of a measurement model of sustainable development that sustainable consumption depends not only on eco-efficiency and ecological modernization but also on de-commoditization and sufficiency and that de-commoditization in particular is indispensable for controlling rebound effects. Contrary to the eco-efficiency strategy in which markets and firms play the main role, the consumer and the citizen are the principal if not the only actors of the de-commoditization and sufficiency transition. There already exists "niches" of de-commoditization and sufficiency, which are grassroots initiatives but their scaling up and spreading is hindered by important barriers coming from the economic and social context. We argue that the introduction of an innovation such as a basic income scheme would help removing these barriers and foster the transformation of our consumption regimes.

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Introduction

The Transition Management (and system innovation) approaches have greatly contributed to our understanding of the way technical innovations originate, are adopted and eventually pervade society. They equip us with a rich framework not just for conceptualizing socio-technical change but more importantly for steering it in the desired direction of sustainability. It offers a multi-actor multi-level governance model that might represent the only workable avenue to genuine sustainable development. However, the system innovation and transition management approaches have, so far, concentrated mainly on innovations in technological and organizational infrastructures of provision and supply. Though it would be unfair to write that the user and the consumer is totally absent from the system innovation and transition management concerns, it is true that until now the emphasis has been put on changes in the large technological clusters of agriculture, industry and services viewed mainly from the producer point of view. Most historical examples of transitions referred to in the literature focus on the changes that take place on the production and supply side more than in the demand, consumption patterns and lifestyle side of the economy. McMeekin and Southerton (2007) confirm the point:"In the innovation literature as a whole, there has been a significant imbalance between understanding innovation from the production side compared to considerations of final consumption, the ultimate destination of a significant proportion of productive activity (…). Apart from studies of innovation diffusion and social shaping approaches (….) the main emphasis has been stacked in favor of supply relative to demand or production relative to consumption." It is no surprise therefore if the move towards sustainability has been generally defined as a matter of resources management, of higher efficiency in the use of energy and material resources at the production and uses stages of commercial products and services, in a word, as ecological modernization

However, it is more and more obvious that efficiency alone will not suffice to insure sustainability and that innovation and breakthroughs will have to take place not only in the design and use of commodities but also at the more fundamental level of our conceptions of the importance and role of commodities and consumption in a flourishing and satisfying life. This stems out clearly form a decomposition analysis of the concept and measurement of sustainable development from a consumption perspective.

Sustainable development: a decomposition analysis

The point of departure is sustainable development conceived of as the ratio between an input, the consumption of scarce resources (principally, but not exclusively, natural ones), and an output: human welfare and well-being. This is the road taken by M. Common (2007) for measuring national economic performance without using prices. Restricting the scope to environmental resources, his discussion leads to the following formula as synthetic expression of sustainable development:

S = WB/EF (1)

Where:

- S = sustainable development
- WB = human well-being
- EF = Ecological footprint[3]

This formulation can be put in parallel with Nørgärd's (2006) decomposition of what he calls the "overall efficiency" of the production and consumption patterns. He demonstrates that "overall-efficiency" is the interplay of 4 "local" efficiencies: satisfaction efficiency, service efficiency, maintenance efficiency and throughput efficiency. The overall efficiency ratio between the final output (satisfaction) and the primary input ("eco-sacrifice") is thus disaggregated in a succession of interrelated intermediary ratios, as follows:

Overall-Efficiency

= Satisfaction/ Eco-sacrifice

= **Satisfaction/Service * Service/Stock * Stock/Throughput * Throughput/Eco-sacrifice**

The formula is best understood by starting from the last ratio, the **Throughput/Eco-sacrifice** ratio or throughput efficiency which expresses the productivity of the production process with respect to environmental resources. Then comes what Nørgärd calls the "maintenance efficiency" which refers to the durability, reparability, etc., of the stock of goods. The **Stock/Throughput** ratio is the converse of the goods replacement rate, i.e. the number of new

[3] Note that Common prefers GHG (Greenhouse Gases Emissions) as indicator of environmental load. While being uncomfortable with the methodological options underlying the ecological footprint indicator and cautious about its use, we prefer the concept of ecological footprint because its scope is wider than the sole emissions of greenhouse gases.

goods entering the stock with respect to the size of the existing stock. The service efficiency refers to the number of services provided by a given stock of goods. This has mainly to do with the way the goods are appropriated and used. For instance, the **Service/Stock** ratio is higher for a taxi than for an individual car, because the former is used the whole day long by many customers, while the latter is most often used only twice a day by one customer only. Finally, the satisfaction efficiency refers to the satisfaction brought by the service. For instance, in the current traffic conditions in town, the mobility service brought by the individual car is less and less satisfying. As Nørgärd (2006, 18) observes:

"The reason for adding satisfaction efficiency … is that in the affluent part of the world, *marginal* satisfaction of increasing services from the market seems to be very low and declining, maybe even below zero."

Nørgärd's analysis of consumption efficiency shows how limited and partial are public and business policies that focus exclusively on the throughput efficiency ratio by aiming only at *decreasing the mass of materials in products*. This is only one part, and perhaps not the most important one, of the answer to the issue of sustainability of our production and consumption patterns. However it is probably the easiest to put at work in a capitalist and technology-driven economy (and culture) because it doesn't challenge their fundamental growth and production orientation. Actually, the more you go from the right of the formula to the left, the more you move away from what is taken-for-granted in our industrial societies and bring into question their deepest and unconscious cultural underpinnings. Indeed, going one step further than the eco-efficiency or "decoupling" policy, a more demanding ecological modernization approach would act also upon the "Stock/Throughput" ratio by encouraging more durable goods and struggling against the "planned obsolescence" of many so-called "durable" goods. This means (Geiser 2001) extending the useful life of multi-uses products[4], designing products for upgrading and adaptation but also for reconditioning and remanufacture and for repair and reuse.

Service efficiency expresses the rate of service acquired from the consumer's stock of goods (durable and non-durable). One effective way to increase service efficiency is to substitute services for products, like in the above mentioned example of the taxi vs. the individual car. Another strategy in this respect is to foster the sharing of products, as for instance in car

4 On the contrary, one-use products are those that are totally exhausted (except for wastes and pollutions) in the act of consuming, like food, fuel, drugs, etc.

sharing. More generally, where the use pattern of a product involves long periods of disuse or the acquisition costs are high, products may be shared among multiple users. Examples are numerous (Geiser 2001, 324): ladders, lawnmowers, washing and drying machines in residential areas; tool and equipment rental stores allowing customers to share the services of hardware and avoid individual purchases; video rental stores giving customers a wide choice of films by sharing the services provided by the individual DVD machines, etc.

Finally, the satisfaction/service ratio expresses the fact that the ultimate goal of consumption is well-being, happiness or needs satisfaction. Clearly, some satisfiers are more efficient than others in bringing satisfaction, or well-being. Bringing together Common's and Nørgärd's analysis, we propose to decompose formula 1 in:

S= (WB/C) * (C/EF) (2)

Where **C** = Commodities. Thus **(WB/C)** refers to the productivity of commodities in terms of well-being and **(C/EF)** to the intensity of commodities in natural resources.

Formula (2) shows that sustainability can be improved by increasing **(WB/C),** by increasing **(C/EF)** or both, or, putting things the other way round, by decreasing the intensity[5] in commodities of well-being, by decreasing the intensity in resources of commodities or both.

Things can be disaggregated further. The term **(WB/C)** can be expressed as:

(**WB/Se) * (Se/C)**

"Se" refers to the notion of service as used by Nørgärd (like in the context of energy and not as used in the national accounting context). Indeed, what matters for the energy consumer is not energy as such (Kw/h) but the lighting, mechanical power, etc. brought by energy. Likewise, what matters for the user of a TV-set is not the TV-set as a thing but the services it provides in terms of TV-programs, etc. One way to define the notion of service in a need-satisfier framework advocated by Max-Neef (1992) is to define it as the interface between the satisfier and the need or as the "satisfying virtue" of the satisfier. **WB/Se** stands for the productivity of the services in terms of well-being and (Se/C) for "consumption efficiency", the productivity of commodities in producing services**.** The full formula then becomes:

5 The intensity in resource R of a production P is the inverse of the productivity of the resource R in production P. In others words, productivity is measured by the ratio P/R and intensity by the ratio R/P. The more productivity, the less intensity and vice versa.

S = (WB/Se) * (Se/C) * (C/EF) (3)

Formula 3 shows that there are three "pure" strategies to enhance sustainability:

1. Increasing the (WB/Se) ratio by decreasing **Se** while maintaining or increasing **WB**. This amounts to partly disconnecting well-being from services. It could be called the *sufficiency* strategy.
2. Increasing the ratio (**Se/C**) by decreasing **C**. It could be called the *de-commoditization* of services strategy.
3. Increasing the (**C/EF**) ratio by decreasing **EF**[6]. This strategy aims at minimizing the energy and materials content of commodities consumption. It is the well-known *eco-efficiency* strategy, the one privileged in transition management and system innovation.

Actually, formula 3 is incomplete. It leaves aside the ecological footprint of the consumption of non-commercial satisfiers. Indeed, the proposed decomposition makes a partition between two kinds of satisfiers, commodities and non-commodities, but takes only into account the environmental load of commodities, as if non-commodities were necessarily environmentally neutral. Of course this is an oversimplification and it must be stressed that in the future, if non-commodities consumption should gain in importance, one should certainly scrutinize the tacit assumption that it is in fact as eco-efficient as required. However, there are indications that "community-based" goods and services are indeed more environment-friendly than their commodity counterparts (Seyfang 2001).

The eco-efficiency strategy has been at the forefront long enough for needing no more explanation or discussion, even if the last word has still not been said on eco-efficiency in consumption as such. The de-commoditization and sufficiency strategy have received less attention.

The de-commoditization and sufficiency strategies

De-commoditization of consumption consists in substituting non-commercial goods for commercial ones and non-commercial services for commercial ones, i.e. briefly, in

6 Note that Nørgård's last two ratios are aggregated in our (C/EF) formulation. This means that we don't make a distinction between Nørgård's maintenance efficiency and throughput efficiency.

substituting where possible non-commodity satisfiers for commodities, defined as: “goods, services and experiences which have been produced solely in order to be sold on the market to consumers…(and) produced by institutions which are not interested in need or cultural values but in profit and economic values.” (Slater, 1997, p. 25).

De-commoditization is the reverse of the “commoditization” process described by Manno (2002:70) as the “tendency to preferentially develop things most suited to functioning as commodities – things with qualities that facilitates buying and selling – as the answer to each and every type of human want and need”. It is also slightly equivalent to what Hirsch called the “commercial bias” or “commercialization effect” characterized by the fact that “an excessive proportion of individual activity is channelled through the market so that the commercialized sector of our lives is unduly large.”(Hirsch1977,p.84). Therefore, de-commoditization is synonymous of de-marketisation, a partial decoupling of consumption from effective demand. According to Harvey and al. (2001, p.4):

“… a useful distinction (is) to be made between demand and consumption, process now too frequently conflated. Demand signifies the concerns of suppliers in markets and thereby focuses upon the possibilities and terms of commodity exchange. Consumption refers to a much broader set of social practices whereby people utilise services and products which are only sometimes acquired by purchase in a market and which are deployed in the context of social values which transcend the confines of instrumental and rational calculation”.

Decoupling consumption from demand and limiting the influence of markets amounts to increasing the influence of others systems or organisations through which we satisfy our needs and aspirations, that is, others “modes of provision”. Table 2 shows what distinguishes these different “modes of provision”.

Table 2. A typology of modes of provision. *Source: Harvey and al. (2001)*				
Mode of provision	*Manner of obtaining service*	*Who does work*	*Who pays (if anyone)*	*Principle over which service is obtained*
Market	Commercial purchase	Paid employees	Consumer	Market exchange
State	Claim to entitlement	Paid employees	State (tax payer)	Citizenship right
Communal (cooperatives LET)	Personal interconnections	Neighbours or acquaintances	No money involved	Reciprocal obligations
Domestic	Household Do-it-yourself	Members if household	No money involved	Family obligation

If we group together the domestic and the communal modes of provision under the general heading of "communal sphere", we may illustrate the de-marketisation (or de-commoditization) strategy with the help of an equilateral triangle as in figure 2. Let us call "consumption pattern" the proportion of energy and materials services consumed by households (shares of households' budget) respectively in the form of commercial commodities, public services and goods and communal goods and services. Every consumption pattern could be symbolized by a point in an equilateral triangle, the distances between each point and the three sides of the triangle expressing the proportions of consumption occurring under the market, the state and the communal mode of provision[7]. Points situated at the angles are pure state, market or communal consumption patterns, all others involve, though in very different proportions market, state and a community components.

[7] The idea of using equilateral triangle for this kind of display comes from Kolm (1984) but has been mostly developed by Van Parijs (1990).

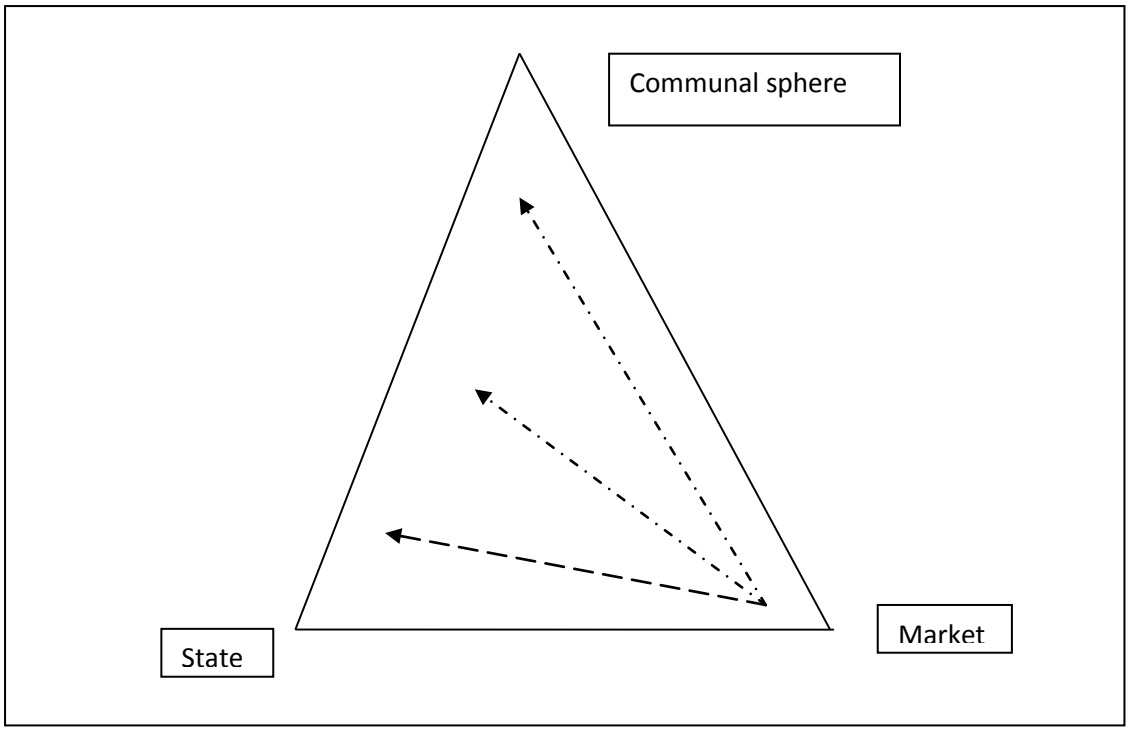

Figure 2. The modes of provision triangle

One calls "modal split" the most frequent consumption pattern in a given society (Gershuny 1983). In consumer societies, the great majority of consumption (hence the modal split) concentrates in the right bottom area. Indeed, the consumer society resulted from an historical trend (still ongoing at a global level since the disruption of European communist regimes) of commoditization, i.e. of transferring the provision of services or goods from non-market systems of provisions to commercial ones. As Warde puts it:

"The history of consumption might be written as a process whereby activities shift between spheres – from the household to the market, and sometimes back again, from the market to the state, and sometimes back again." (Warde, 1997, p154).

De-commoditization consists in bringing some activities back to the non-market sphere, the public and communal sectors. Needless to say, this is not an easy strategy to follow in an age of almost religious faith in the virtues of the market and of distrust in those of the state and perhaps still more, of the community. Recently, much of the business of the European commission has consisted in taking goods and services away from the public sector and committing them to the market. Not such a long time ago, an important proportion of households' consumption was provided by public services, or by state-owned or partly state-owned firms. It was the case for electricity, water, telephone, broadcasting, television, etc.

Before the reign of the individual car, most if not all, travelling by train, bus, ship and airplane was provided by public enterprises. Many public services in Western societies have been dismantled under the pretext that they were less efficient than private, commercial services. However, there is nothing definitive in this and sustainable development might make necessary to reverse the trend, notably because it entails a redefinition of efficiency which takes into account environmental concerns. On the other hand, many goods and services which cannot be efficiently provided or managed at the state government level could be so at a lower institutional level. Generally, the public services used to be organised and managed at the highest institutional level. But local authorities can also be providers of goods and services to their populations. For instance, it is often the case in cities big enough to need and afford an urban transportation system. The risk of bureaucratisation and of corporatism is more easily controlled when working at the local level. Indeed, there is a tendency to revisit the notion of public service in the perspective of a "new municipalism." (Manski and Peck 2006):

The sufficiency strategy consists in two attitudes:

- Minimising the role of material services in the definition and production of our well-being. (cultural-dematerialization)
- Striving to get the maximum well-being from each unit of material service consumed (sufficiency properly said).

This leads necessarily to "downsizing" one's consumption and living standard. Sufficiency can be pursued for various reasons, not all of them necessarily altruistic. Obviously, the sober lifestyle adopted by many environmental and de-growth activists is first of all a manifestation of their concern for the great majority of non-consumers in the world and for the well-being of future generations so that their consumption pattern can be truly characterised as "responsible" if not purely "altruistic". But downsizing or relocating consumers can also be motivated by purely selfish reasons such as improving one's health, avoiding stress, the nostalgia of a "good old time" and so on. In between, we find the "alternative hedonism" advocated by Elizabeth Soper (2007) as a kind of republicanism in consumption:

"...what is here shared across the distinction being drawn between more or less self-interested motives is a distinctively moral form of self-pleasuring or a self-interested form of altruism: that which takes pleasure in committing to a more socially accountable mode of consuming". (Soper, 2007:213).

The function of de-commoditization in the transition to sustainable consumption

There is nothing new in the distinction between efficiency and sufficiency as strategies of sustainable development. In some way, it is as old as Barry Commoner and Holdren and Ehrlich's I = PAT model which shows how environmental load results from the interplay of demographical (P for population), socio-economic (A for affluence) and technological (T) factors. The equation leads naturally at distinguishing policies that act on technology (efficiency policies) from policies that act on population and affluence (sufficiency policies). However, de-commoditization is less often considered an environmental sustainability strategy in its own. When it is advocated, it is usually more for cultural, social or philosophical reasons than for the sake of the environment. However, it is justified in a dematerialization and environmental perspective by the threat of rebound-effects as consequences of efficiency and sufficiency improvements. It is well-known (since Jevons 1865) that eco-efficiency can in some circumstances trigger an increase in overall consumption of energy or raw material instead of the expected diminution if it leads to lower market prices for the concerned goods making the corresponding income available for more consumption of these goods and services or the consumption of others one, equally or even less environment-friendly. Recently, Blake Alcott (2008) argued that the sufficiency strategy could also lead to significant rebound effects by lowering prices of some commodities and therefore opening the market for new customers hitherto unable to afford the concerned goods or services. For instance, it is likely that a significant reduction in meat consumption by affluent populations (from the South as well as from the North) would lead to a decrease in meat and crop prices making these products affordable now for customers from underdeveloped and emerging countries. Even if such a result is felicitous from a global justice point of view, nothing will be gained for the environment if additional measures are not taken. It can be argued that de-commoditization is the right weapon against these rebound effects because, by de-linking the consumption of some goods and services from markets and monetary income, it cuts down the price and income effects responsible for the rebound phenomenon. It follows that, if sustainable consumption is to become reality it will necessarily be a mix of eco-efficiency, de-commoditization and sufficiency, admittedly in varying proportions according to the consumption domain (housing, mobility, food, leisure, health care...), the current level of material well-being, technological efficiency potential and of course, the prospects in terms of likelihood and importance of rebound effects. In these strategies, the consumer and the citizen have an important role to play. Indeed, because it

gives the priority to the eco-efficiency strategy, the ecological modernization approach focuses on firms, technology and markets, leaving not much room for the consumer in sustainability transition. However, insofar as eco-efficiency only will not do, notably because of rebound effects, and as de-commoditization and sufficiency will be needed, the consumer and the citizen come back in the forefront as the main (if not the sole) actor of these alternatives strategies.

De-commoditization and sufficiency niches

The transition management and system innovation approaches highlights the importance of "niches" – as opposed to the incumbent regime – in nurturing innovations and triggering transitions to a new regime. Niches acts as "incubation rooms" where "small networks of dedicated actors, often outsiders or fringe actors" (Geels & Schot 2007:400) can originate and experience innovations, i.e. new system of rules. As already argued the rules usually referred to in the literature are mostly engineering and production rules, but nothing prevents us from considering that innovations can concern other kinds of rules, be they cognitive, behavioural or organizational (social). Therefore, we can, following Seyfang and Smith (2007), consider "grassroots innovations" as niches where new rules of practices and of consumption are experienced. By "grassroots innovations", or "green niches" Seyfang and Smith refer to experiences as diverse as LETS (Local Exchange Trading Systems) and Time Banks (community-building projects quite close to LETS where participants give and receive services in exchange for time credits), Community-Based Agriculture, co-housing, and so on.

These grassroots initiatives can be considered as the de-commoditization and/or sufficiency equivalent of production-technology niches in transition management because they "…represent collective, collaborative efforts to transform not simply the market choices available, but sometimes the entire market system itself. They are collaborative efforts to offer new solutions to the sustainable production and consumption imperative, which overcome the principle problem with an individualized approach to greening the market, namely that acting individually, consumers are powerless to change the rule of the game, they are stuck within current socio-technological regimes." (Seyfang & Smith 2007, 11).

According to our typology of sustainable consumption strategies, it is possible to make a distinction between de-commoditization niches and sufficiency niches. In the former, we

would classify all systems which intend to satisfy people needs with non-commodity goods and services and without using money as a medium of interchange, keeping in mind that, as figure 1 makes clear there is a whole continuum between pure market-based and pure community or public-based satisfiers. In the latter, we would classify all communities, groups or social movements that advocate and practice "de-growth", "voluntary simplicity", "alternative hedonism", etc. In practice, it happens most often that grassroots initiatives combine sufficiency and de-commoditization, in varying proportions.

Despite the noted similitude with niches of technological innovation niches analysed in the system innovation and Transition Management literature, the de-commoditization and sufficiency ones differ from them in (at least) one fundamental aspect: their objectives, cultural underpinnings, organizational rules, etc., can hardly be considered as innovations. As Robert Nisbet (1973, 323) remarked: "Periodically in the history of the West since the fall of the Roman Empire, we find groups turning their backs upon the established social order and withdrawing to more or less remote places in order to seek renewal of what they believe to be man's natural tendency toward genuine community and morality".

What is common to human experiences and intellectual tradition characteristic of what Nisbet called the "ecological community" that he opposed to the "military", "political", "religious", "revolutionary" and "plural" communities and in which he puts pell-mell the monastic order of Saint Benedict of Nurcia, the Utopian tradition opened with Thomas More's Utopia, Proudhon's mutualism, industrial communities launched by Thomas Owen, Saint-Simon and others and even Kropotkine's anarchism? The answer is:

"...the close, cohesive interdependencies symbolized by the small household economy; the interdependencies among organisms and between organisms and environment which are natural in contrast to those which are contrived and artificial; and the profound sense of a web of life existing between man and the rest of nature than man endangers only at his own peril". (324).

Though not being new in their objectives and philosophical underpinnings, current grassroots initiatives can be considered as innovations considering the context in which they take place today. There is a dramatic difference between the grassroots experiences of nascent capitalism, industrialization and globalization which Marx and Engels castigated as "utopic socialism" and the same experiences in a globalised, mature capitalism and nearly post-industrial world obsessed by science and technology but threatened by their very successes.

The problem from a system innovation and transition management perspective is to weight (and enhance) the probabilities for these niches to scale up and/or spread and disseminate enough for engaging a real transition to sustainable development. Currently, as Seyfang and Smith (2007, 13) show, grassroots innovations are facing several challenges in technology, finances and human resources from their very inception and all over their development (if any):.

"The set of challenges faced by grassroots innovations begin with their inception: establishing an initiative requires a particular combination of skills, key individuals and champions, resources and supportive contextual factors. After the start-up phase, the challenge is to survive and keep going, which requires additional skills and people, and which demands that initiatives develop resilience and a resource base. As a result, grassroots innovations spend about 90% of their time simply surviving, and only 10% developing the activity (...). This has major implications for the survival of niches for the following reasons. First, there can be a failure to develop robustness and resilience to shocks. Secondly, if grassroots innovations are short-lived – for any of these reasons and more there is frequently no formally documented institutional learning."

Had alternative modes of provision benefitted from only a tiny, microscopic part of what has been spent in research, thought and creativity by states, corporations, universities, business schools, think tanks etc., during at least a century, to make markets and capitalism – in particular capitalist companies – function more or less, we can be quite confident that they would be less vulnerable, more durable and more efficient than they are now. The history of the capitalist firm has been paved with innumerable failures and bankruptcies without the fundamental viability of its model being seriously questioned, except by radical leftists. Simply, there was a political and social willingness to make it function. In comparison, every pitfall or failure of an alternative production or consumption model, whatever the institutional setting (communal or public) and whatever the reason for failing is taken as an evidence that it must be intrinsically flawed and therefore doomed to failure. One of the greatest weakness of grassroots innovations lies in the fragility of their financial basis linked also to their difficulty (if not plain impossibility) to get bank loans. Furthermore, managing and even participating in grassroots initiatives is time-consuming and rightly so because in many cases their very objective is precisely to substitute time for money. However, only the people who don't need to allocate all of their working time in paid labour to earn the minimum monetary income indispensable for satisfying basic needs have the real freedom to choose the de-commoditization or sufficiency option. It follows that, without some durable, sustained financial support from society, it is very unlikely that green niches scale up and spread enough for inducing changes at the regime level.

Basic income: a social innovation for sustainable consumption transition

It is probable that the simplest and more effective way to support green niches would be by the introduction of a basic income, that is the payment on a regular basis (on a monthly or yearly basis) by the political community of a (monetary or not[8]) income to all its members on an individual basis, without any means test nor working requirements. As apparent, a basic income is not to be confused with the systems of minimum income guarantee already existing – principally – in Europe that are generally household based (or modulated according to family status), conditioned on some means test and/or depending on present or past labour performance or the willingness to accept a job. On the contrary, a basic income would be totally individual and (almost – because of some citizenship requirements) totally unconditional.

Introducing such a reform would certainly be a major social innovation and yet, as for grassroots initiative, the idea as such is far from new. It appeared probably for the first time as early as 1516, the year of publication of "Utopia" by Thomas More, in which Raphael the traveller, recommend it warmly to the bishop of Canterbury. Since then, it has been repeatedly advocated through history notably by Charles Fourier, Thomas Paine, John Stuart Mill, Bertrand Russell, etc. but has really began to burgeon around the nineteen seventies and eighties in several European under different names ("Bürgergeld", "allocation universelle", "renta básica", "reddito di cittadinanza", "basisinkomen", or "borgerlon") as the founding and development of the "Basic Income European Network" – recently renamed "Basic Income Earth Network" to account for its globalising membership – testifies.

The ethical justification and economic soundness of such a system have been thoroughly demonstrated notably by P. Van Parijs (1992, 1995), James Mead (1989), Tony Atkinson (1995), G. Standing (2004) amongst many. Its main strength as weapon against poverty and involuntary unemployment is that, contrary to existing conditional social allowances, it doesn't generate the fiscal or social traps that lock the claimants in poverty and unemployment. Furthermore, a basic income scheme would foster more flexible working patterns helping those willing to devote more time to the informal economy and de-commoditized systems of provision for needs satisfaction. Philippe Van Parijs, after having balanced between confidence and scepticism concerning the necessity of a link between basic

[8] In its most frequent acceptations, the basic income is a payment in cash. However, for sustainability reasons, for example, it can be interesting to consider other forms of payment, including non-monetary numeraires.

income and the development of what he called, after André Gorz the "autonomous sphere" is now convinced that there is indeed a intimate connection between them and Gorz himself, who was first hostile to the idea eventually endorsed it, making it a central piece of his "socio-ecological policy" (Gorz, 2008 (1992), 67-68):

"A socio-ecological policy consists mainly in guaranteeing a sufficient income independently of working time and, at last, of work itself; in redistributing the socially necessary labour so that everyone could have a job and work less and better; in creating spheres of autonomy in which the time made available could be spent in activities freely chosen by individuals, including the self-production of goods and services making them less dependent on market and administrative and professional structures and enabling them to reconstruct a fabric of solidarity and vivid sociability made from networks of reciprocal support, bartering of services and informal cooperatives."[9]

Big societal transitions result from changes occurring simultaneously and in many (if not all) societal domains and reinforcing themselves. Basic income is such an innovation taking place at the level of the taxation, social security and the labour market that would most probably make possible the blossoming of de-commoditization and sufficiency niches and, at last, the transition to sustainable development.

Conclusions

We have tried to show that sustainable development will not result only from technology-driven transitions but also from changes in daily life practices and behaviours. Alongside eco-efficiency improvements in production and consumption patterns, some move in direction of partial de-commoditization of practices and sufficiency-driven lifestyles will have to be made. This can be dealt with in the transition management framework with minor adaptations. As for technological innovations, there already exist niches of 'de-commoditization' and sufficiency that would be scaled up and multiplied in a transition process to a sustainable consumption regime. Unfortunately, these "green consumption niches" are facing many obstacles which will not be removed without changes taking place in the organization of production, income distribution and social security. The setting of a basic income scheme

[9] My translation.

would bring about the suitable changes at these levels and as such should be taken in consideration as part of the transition management kit in the consumption domain.

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