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## **The Babel Fish Toolkit: Understanding and using behavioural mechanisms and interventions in landscape planning**

A better understanding of the general mechanisms influencing individual choices and of the specific rationales of politicians could help to put greater emphasis on environmental planning information in political decision making. The aim of this paper is to show, in the context of landscape planning, how the uptake of environmental concerns could be improved by better understanding the behavioural mechanisms of politicians and by preparing environmental findings in a way that it directly addresses the ‘language’ and behavioural patterns of politicians. By adapting findings from behavioural sciences to the field of landscape planning, we can identify the following ways of how the use of environmental planning information could be enhanced in policy making processes: First, to design the planning and decision process by differentiating the decisions according to whether they can be taken in an intuitive or analytical way, and by expanding the role of planning to accompany the decision maker in the decision process. Second, to propose a behavioural toolkit that allows landscape planning to process the planning content into a system that encourages the uptake of landscape planning objectives by (i) setting defaults, (ii) simplification and competition, (iii) disclosure of information, (iv) splitting complex decisions, (v) reframing consequences in terms people care about and (vi) ownership.

### **1 Introduction**

In Douglas Adams’ book, “The Hitchhiker’s Guide to the Galaxy”, the Babel fish is a small slick creature that you insert into your ear in order to instantly understand foreign languages. It seems that such a Babel fish could be helpful for improving the

joint understanding of landscape planning on the one side and political decision makers on the other.

Landscape planning, as understood here, widely overlaps in concerns to tasks and content with the term environmental planning. We follow the Council of Europe (2000: art. 1) who defined landscape planning as a “strong forward-looking action to enhance, restore and create landscapes”. This includes preparation and advisement on policies and strategies. As a public planning tool, landscape planning assessment and advice draws primarily from legitimate norms found in legal frameworks (national laws, European directives etc.), supranational agreements (e.g., The Paris Agreement) and through the involvement of stakeholders and the public. However, in landscape planning decisions are prepared and not taken. The latter needs to consider also other societal demands beside landscape and environment. In the different EU member states, there are common denominators concerning the task of landscape planning, even if it is not always developed as a distinct plan, separate from spatial planning, or if it follows unique priorities. Such common ground is, for example, the production of place-based environmental information, reconciliation of competing land uses, protection, redevelopment, management and monitoring of natural and cultural assets and the preparation of respective decisions about land use management which are often taken in the context of comprehensive spatial planning (Ogrin 2010: 64, Leitão and Ahern 2002: 65, Sell and Zube 1986).

The assessments and projections of landscape planning usually entail unspecified data and valuation uncertainties (Neuendorf et al. 2017). This makes it easy for politicians to neglect or underestimate the environmental risks of otherwise comfortable decisions. Landscape planners are still struggling with the challenges of communicating complex and uncertain information. Landscape plans or strategies, do

not address politicians' decision-making standards or behavioural patterns. This also means that landscape planning has only little to offer politicians, specifically when referring to the delivery of stimulating impulses for decision makers to incorporate environmental issues constantly and systematically in their considerations and choices. However, this seems to be a key resource in order to strengthen environmental issues in political decision making processes, meaning that landscape planners should more carefully consider "what information to present, how to present it, when to reach out with the information and when to remind people of it" (Yoeli et al. 2017: 70). But how can landscape planning information and objectives be translated into the 'language' of decision makers? How can landscape planners succeed in integrating environmental issues more systematically into political processes? A systematic and comprehensive analysis of behavioural mechanisms of politicians towards environmental issues is not available yet. This is where this article starts, with the intention to identify various behavioural interventions that can be used to reframe information in landscape planning by better addressing the behavioural patterns of politicians. The intention is to improve the communication between landscape planners and politicians and help the integration of environmental concerns in political decision-making processes.

Whereas economic sciences explore and national governments apply these mechanisms (e.g. Behavioural Insights Team UK 2015-16), landscape planners and environmental planners have not yet systematically taken advantage of these principles to understand political decision making concerning environmental issues. Behavioural science is focussing on intuitive mechanisms as a reaction to the dominance of rational choice theory in former times. For the same reason, in this paper we also concentrate on intuitive patterns though it is undeniable that choices of people in general and politicians in particular are also taken in a rational mode. However, rational decision

theory has been dominating in landscape planning and a new, supplementary perspective is needed.

Therefore, we conducted a literature survey on behavioural patterns (in particular meta-studies from behavioural economics) to understand which behavioural mechanisms may hamper or foster the uptake of landscape planning objectives and information in political decision-making processes (section 2). As we assume that decision makers usually behave like other people but are subject to particular institutional contexts, this includes general mechanisms of individual, intuitive decision making and specific behavioural mechanisms influencing politicians' decision making. By proposing a behavioural landscape planning "toolkit" (Yoeli et al. 2017) we then present behavioural interventions which could be used to translate landscape planning objectives and results into a 'language' that may support environmentally concerned decisions (section 3). The concluding part (section 4) reflects upon the presented findings.

## **2 Behavioral mechanisms influencing politicians' decision making about environmental issues**

A better understanding of the general mechanisms influencing individual choices and of the specific rationales of politicians (e.g. Axelrod 2015) could help to put greater emphasis on environmental information in political decision-making and to improve the communication between landscape planners and politicians.

Looking at mechanisms that affect decision making processes and the environmental behaviour of individuals and groups, (1) rational choices, (2) cognitive mechanisms and patterns, and (3) physical or contextual factors can be identified (for example, Barr 2003; Davoudi et al. 2014; Solek 2014). Rational Choices assume that

decisions are based on rationally ordered preferences, meaning that people make decisions by selecting systematically among possible choices that are based on reason and facts or costs and benefits (Davoudi et al. 2014; Wilson & Dowlatabadi 2007, Solek 2014). However, “rationality is bounded by certain limiting cognitive characteristics and patterns” (Davoudi et al. 2014: 13), including psychological variables, cognitive choices, and personal values concerning environmental issues (Barr 2003; Wilson & Dowlatabadi 2007). These intuitive mechanisms often overrule rational considerations as they act as kinds of simplifying mechanisms and allow us to make quick comfortable decisions in complex and uncertain situations (Davoudi et al 2014; Kahnemann 2011).

Following Kahneman (2011), intuitive feelings and reactions present the normal state of mind. He calls this state “system 1 mode” (for “automatic system”) which is a largely unconscious, affect-driven fashion. System 1 usually drives our first reaction as most individuals find intuitive decisions easier, faster and more creative. Intuitive decisions are associated with repeated experiences, a primed idea, clear presentation, and a good mood: All these factors put us at ease and lead to feelings of familiarity, truth and effortlessness about our decisions (Kahneman 2011: 60). In contrast, the “system 2 mode” (“effortful system”) represents the rational side of the human mind, which is combined with analysing and thinking more thoroughly (Kahneman 2011: 29).

However, we are not vigilant in the system 1 mode (Camerer 2014: 867), indicating that intuition can also result in thought traps, i.e. in unreasonable or disadvantageous decision making that might lead to both economic losses and to unfavorable decisions concerning the environment. In these situations, it becomes visible that people’s rationality is not only limited by cognitive characteristics and patterns, but also by the physical or social contexts in which they operate (Davoudi et al. 2014: 15; Wilson/Dowlatabadi 2007: 169). People may find themselves compelled to

respond to certain social pressures inducing them to act against their own benefit or against environmental objectives in the long term, in order to avoid social sanctions or to earn social rewards.

These behavioural mechanisms influence both individual and group decisions (Kahneman 2011) and can also be observed in political decision making. This chapter explores how behavioral mechanisms may influence politicians' decision making with regard to environmental issues. In general, politicians follow the same behavioural mechanisms as everybody else, including selective memories, simplifications, uncertainty blindness or short-termism of actions (see table 1). However, there are some behavioural features that are even enforced in the context of political decision making.

### ***Politicians prefer personal experience, anecdotes and simplifications***

In many situations, politicians decide to remain ignorant to environmental issues such as climate change, even when they have the knowledge to deal with these issues in the long-term (Coyne and Leeson 2008). This 'rational ignorance', i.e. the ignorance of statistical data and scientific knowledge, is based on three inter-related mechanisms: First, individuals in general and politicians in particular ignore uncertainties because uncertainty is the domain of the effortful system 2 (Kahneman 2011: 80, Samson 2015: 1). As environmental data and information is both simultaneously complex and uncertain it makes political decision makers uneasy, pushing them to decisions based on system 1 modes. Consequently, politicians ignore environmental issues by using uncertainty and imperfect knowledge on cause and effects of environmental changes as an excuse for non-acting (uncertainty blindness). Nevertheless, no response may be more fatal than a response that includes some uncertainty. Second, we remember extreme, recent or last events better than frequent ones (selective memory). Humans' risk perceptions do not correspond with statistical calculations but are very much

influenced by intuitions hampering our projections and judgement (Solek 2014: 35). This also affects politicians, increasing their reluctance to solve unobtrusive but serious problems of environmental changes. These changes often have more severe consequences than single spectacular disasters but politicians often underestimate these challenges (for example posed by climate change) in contrast to more dramatic but actuarial remote risks (Kahan 2013: 3). This means that rare but vivid risks are felt more strongly than more common risks: “Forlorn polar bears drifting on shrinking patches of ice are less emotionally gripping than an airliner fuselage embedded in a flaming high rise” (Camerer 2014: 868; see also Solek 2014: 40).

Third, and related to the first two mechanisms, individual decisions strongly rely on personal experience, anecdotes and stories rather than statistics (anecdotalism and simplification bias) (Achenbach 2015). Landscape planners, for example, often try to present comprehensive and scientific information and are somehow reluctant to provide simplified analyses or solutions. However, anecdotes are more credible to politicians than statistics and scientific evidence. This is supported by findings that people agree on the importance of personal observation of local weather as an indicator of climate change (Kahan 2015: 8), even though personal observation is selective and influenced by the world view of individuals (Goebbert et al. 2012). For political decision-making this means that anecdotalism and simplification can block “system 2 mode” decisions on environmental issues as these are often too complex, not perceivable and change very slowly without being observable (e.g. forms of air pollution, water pollution, soil degradation). Furthermore, individuals in general and politicians in particular tend to replace a difficult question with a simple one (Kahneman 2011) and thus avoid difficult decisions. For instance, the difficult question of how we can live more sustainably is

usually replaced by a selection of sub questions that are simple to solve, for example, the question of how to separate waste.

***Politicians' actions are bound to voter desires and lobby groups***

Politicians' actions are bound to voter desires, meaning that political actors have to consider social desires and contexts to become elected (Coyne and Leeson 2008: 729-730). Here, politicians respond to social pressures (Davoudi et al 2014: 15) in the form of social rewards (being elected when meeting the requirements of the majority) or sanctions (not being elected when the political agenda does not meet the expectations of the majority). With regard to environmental issues, one example of this bond can be found in the German nuclear power phase-out. After the nuclear disaster in Chernobyl in 1986 and more recently after the catastrophe in Fukushima in 2011, the majority of the German population was and still is very sceptical towards nuclear power use. In response to this social pressure, politicians opted for the phase-out of nuclear power to win the goodwill of the voters. Maybe they also fostered the nuclear power phase-out because of their own personal impressions of the very extreme events – in this case they would also have been highly influenced by mechanisms of system 1 thinking (see above). However, political action often results only in vague success, making politicians more prone to avoid failures (principle of least effort, Zipf 1949) than to proactively pursue a difficult subject (Solek 2014). According to Coyne and Leeson (2008: 729), this is only natural as politicians pursue not only social but also individual goals.

Additionally, politicians – similar to ordinary people – are prone to believe statements that are often repeated (repetition yielding) (Kahneman 2011; Solek 2014). However, this gives lobby groups with high capacities for public relations a competitive advantage as they can massively influence the opinions of decision makers and the

public. If environmental concerns conflict with economic interests, this mechanism often represents a structural disadvantage for environmental issues.

### ***Politicians' intrinsic motivations***

Political decision makers try to address their self-affirmation and to pursue individual benefits “such as power, ego, fame, reputation, revenge, and the ability to pursue ideological missions” (Coyne and Leeson 2008: 736). These intrinsic motivations, addressing the habitual, ritual and conventional bases of human behaviour (Barr 2003; Davoudi et al. 2014; Wilson and Dowlatabadi 2007), “are just as important in determining political decision maker choice as monetary costs and benefits” or the bond to voters desires (Coyne and Leeson 2008: 736). Even when environmental concerns are promoted by a large group of voters they can be structurally less attractive for political profiling compared to other policy issues such as economic growth, labour market etc. This is due to the fact that environmental issues are often not considered suitable for enhancing the status or social dominance of a politician (which seems to be a strong motive for different reasons; e.g. Eisenegger et al. 2011).

This behaviour of politicians is apparently inherent for groups as well: Our strong desire to belong to a group results in behavioural patterns and actions that comply with the social norms of that group (peer dependency). Groups can stimulate our regard for social norms, altruism and reciprocity, stimulating the politicians’ behaviour to act in favour of society and against their immediate self-interest (Camerer 2014: 870, Sommer 2016). This, of course, could be a favourable mechanism for environmental decisions such as biodiversity and its impacts on future generations. However, when it comes to decision making processes, the same group affinity may hamper the uptake of environmental information. As Kahan (2013: 11) points out, our scientific knowledge on environmental issues (system 2 mode) competes with culturally

formed beliefs that are shared in groups (system 1 mode), preferring decisions based on system 1 thinking (Kahan 2015, see also Achenbach 2015). This might lead to decisions that are inconsistent with generally stated environmentally objectives (Kahan et al. 2012), especially when politicians do not believe that the uptake of environmental issues help achieve their intrinsic motivations. The persuasive power of scientific knowledge (system 2 mode) is very limited in this context.

### ***Short term action modus of politicians***

*Political short-termism* (Garri 2010; Arieli 2015) might have serious impacts on the environment as, for example, the New Orleans disaster in 2005 has shown. With regard to the Hurricane Katrina and its impacts on New Orleans, Shughart (2006: 33-40) argues that politicians' and bureaucrats' myopia has hindered the building of levees that could have protected the city from flooding, despite forewarnings of the weaknesses of the levee system. Obviously, "[r]e-election concerns induced Louisiana politicians to invest in visible public goods (development of two marinas and construction of parks and other amenities at Lake Pontchartrain, for example) rather than in invisible infrastructure maintenance" (Garri 2010: 198). One explanation for this political behavior is that politicians, by investing in short term public goods, want to show their competence and to increase their re-election chances (Garri 2010: 200). Consequently, long-term challenges, including the most severe environmental problems such as climate change or the loss of biodiversity, are often neglected in political decision making processes. The rewards from climate or biodiversity protection, for example, will be reaped by future generations, which make current debates and decisions about this issue difficult, as they do not correspond to the election periods of politicians. The short-term action modus of politicians (Geyer and Luhmann 2013) is

reinforced by the short-term political memory of voters and the difficulties to assign vague political success in the future to an individual politician (see above).

Furthermore, politicians are constantly challenged by choices that are unpleasant now and valuable later meaning that they – as most people – underrate future rewards in comparison to current ones (Camerer 2014: 868, Samson 2015: 3). People are in particular reluctant to accept losses (e.g. investments) in order to generate future rewards (*loss aversion*) (Solek 2014: 36; Wilson & Dowlatabadi 2007: 174). It is the tragedy of many environmental problems that they only become obvious when restoration is impossible or very expensive – as in the case of a lake that surpasses its tipping point.

### ***Politicians act opportunistically and somehow irrationally***

Interestingly, as politicians want to be re-elected there is always a tendency that politicians act opportunistically and somehow irrationally, particularly “if they believe other politicians are more likely to behave opportunistically” (Beniers and Dur 2007: 50). This might also help explain why environmental issues are often only subordinately considered: If many politicians behave opportunistically and focus on the most obvious socially or economically relevant issues to become re-elected (e.g. avoiding unemployment or increasing the economic competitiveness), other politicians might follow (concentration on most popular topics) due to certain social contexts or pressures (Davoudi et al. 2014). The mechanism works, sometimes even against a personal belief that environmental issues are also highly relevant. This behaviour seems to be inherent for decision-making in groups. It increases the collective willingness to take risks because individual members of a group do not feel ‘responsible’ for the decision and the related implications (*collective irresponsibility*) (Kahneman 2011). This is illustrated, for example, in political decisions concerning risky infrastructure projects that affect the

environment. The political board is likely to overrate the expected benefits and may delegate the responsibility for environmental issues to an environmental authority or NGO. A city council thus may externalize environmental issues of overall responsibility, meaning that environmental goals are largely ignored in the political decision-making processes.

Insert Table 1 here

Table 1: General behavioural mechanisms in the context of environmental political decision-making (according to Kahneman 2011, Cialdini 2011, Dolan et al. 2010)

	<b>general behavioural mechanisms</b>		<b>more pronounced in the context of political decision making</b>
i	anecdotalism, simplification bias	relying on personal experience, anecdotes and stories rather than statistics; tending to replace a difficult question with a simple one	rational ignorance of politicians towards (complex) environmental issues even when they have the scientific knowledge to deal with these issues in the long run; complex environmental issues are hard to communicate to voters
ii	coherence bias	trying always to construct a coherent story	politicians have to communicate to a wide spectrum of voters, they use the simplest story
iii	selective memory	remembering extreme and recent events better than frequent ones	rational ignorance of politicians towards (complex) environmental issues even when they have the scientific knowledge to deal with these issues in the long run; thus

			neglect of 'ordinary' environmental challenges or of environmental conditions that change very slowly
iv	uncertainty-blindness	ignoring uncertainties, knowledge gaps	ignoring environmental issues by using uncertainty and imperfect knowledge as an excuse for not acting
v	repetition yielding	believing statements that are often repeated	structural disadvantage for environmental issues when lobby groups put other issues on the political agenda by influencing the opinions of politicians and the public
vi	loss aversion	loss of something is strongly linked to unpleasant feelings, which weigh relatively more than a positive future reward	politicians try to avoid failures rather than proactively pursue a difficult subject
vii	short-termism	underrating future rewards in comparison to current ones (short-termism)	Political short-termism (4-5 years): success in environmental issues is often not to be expected in time of electoral terms; environmental issues often become obvious when

			restoration is impossible or very expensive
	<b>group mechanisms</b>		<b>even more pronounced in the context of political decision making</b>
viii	collective irresponsibility	group increases the collective willingness to take risks and to act irrational	political decisions are usually taken in a group context; environmental issues are often only subordinately considered, as individual members of a group do not feel 'responsible' for the decision and the related implications
ix	peer dependency	tendency to use scientific knowledge to underpin the world views we share with our peers	environmental issues are often idealized; political decisions often become emotionalized
		groups can stimulate our regard for social norms, altruism and reciprocity; wish to conform with the social norms in our peer group	politicians are particularly prone to power, ego, fame, reputation, and the ability to pursue ideological missions; environmental issues are often not considered suitable for enhancing the status or social dominance of a politician; group affinity may hamper the uptake of environmental

			<p>information especially when politicians do not believe that the uptake of environmental issues helps achieve their intrinsic motivations</p>
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We can conclude that politicians are strongly affected by various behavioural mechanisms, especially by intuitive decisions that meet the self-affirmation of politicians, address former positive experiences and consider the short time action modus of politicians (see also table 1). By addressing system 1 thinking, behavioural interventions aim at getting people's and in particular politicians' attention; engaging their "desire to contribute to the social good; making complex information more accessible; and facilitating accurate assessment of risks, costs, and benefits" (Yoeli et al. 2017). Consequently, we are convinced that behavioural interventions, which are supposed to complement regulatory and market based approaches, have the potential to improve the general uptake of environmental information and proposals in political decision-making processes. Therefore, we present a first approach for improving the translation of landscape planning information and objectives into the 'language' of decision makers in the following section. In particular, we explore when and how behavioural interventions can be used to reframe information from demanding mode 2 decisions (complex, slow, analytical) to mode 1 decisions (fast, intuitive).

3 A landscape planning behavioural toolkit to translate landscape planning information. In view of the described findings, it is not enough to simply give decision makers the right information and to expect that they will make good decisions in favour of the environment. Instead, we propose a behavioural toolkit for landscape planning,

consisting of various behavioural interventions (Table 2) and reacting to the decision mechanisms described above. A basic principle of behavioural interventions is that system 1 mechanisms are particularly used for “improving decisions about health, wealth and happiness” (Thaler and Sunstein 2009). Behavioural interventions make it easier to package such desirable decisions into a form that triggers system 1 modes of politicians by simultaneously recognizing the complexity of environmental issues (see also Thaler and Sunstein 2009; Sunstein 2014 for the concept of nudges).

Insert Table 2 here

Table 2: Behavioural interventions referring to system 1 mechanisms (Yoeli et al. 2017, Shogren 2012, Jakob et al. 2017, Thaler and Sunstein 2009)

Behavioural interventions:	Setting <b>Defaults</b> : Predefining response steps
System I mechanisms:	<b>Simplification</b> and competition: Using simple intuitive metrics and repetition of messages, triggering comparison
	<b>Information</b> : Disclosure of information
	<b>Splitting</b> complex decision: Small and/or meaningful partial decision (with regard to space and time)
	<b>Reframing</b> consequences in terms people care about: Communicating norms, demonstrating personal consequences and engaging peers
	<b>Ownership</b> : Strengthening belief of decision makers to make a change, giving ownership over the issues/success, observability of achievements

i) 'Anecdotalism', simplification bias	x	x		x	x	
ii) Coherence bias		x			x	
iii) Selective memory	x				x	
iv) Uncertainty- blindness			x	x		x
v) Yielding to repetition		x				
vi) Loss aversion		x				x
vii) Short-terminism		x		x	x	x
viii) Collective irresponsibility	x	x	x			
ix) Peer dependency		x	x		x	x

The common denominator of the interventions proposed in table 2 is that they are supposed to raise attention for the subject and engage the desire of decision makers to contribute to the environmental good (Yoeli et al. 2017: 71).

***Setting Defaults: predefining response steps***

Defaults are options that are pre-selected and pre-set, simplifying decisions in cases in which routines and 'automatic mechanisms' can be applied. Thus, defaults make use of our tendency to "go with the flow" (Dolan et al. 2010). They support easy and convenient decisions even when the choice is not agreeable. Additionally, defaults or choice routines can be used in order to improve planning processes: The pre-set administrative steps spare the politicians the effort of choice and make them less

receptive for anecdotes, personal affiliations, voter desires or lobby groups. An example is the protection of a drinking water catchment area: Under European law there is no real choice about protecting the area and the steps for designing an ordinance directive and for preparing a (local) water-management plan are predefined by legislation. This addresses routinized mechanisms of politicians. Also non-mandatory choices can be integrated more seriously and easily in political decision-making processes by presenting them as a first choice. An example for this mechanism is the translation of ecological landscape planning objectives into the language of mandatory spatial or land use planning by providing an extra ‘translation map’. A translation map converts the relevant content into the planning categories used by the addressees (Wende et al. 2011). This facilitates the uptake of landscape planning information in the political process because the decision makers are well accustomed to mandatory planning categories and often “go with the flow” of what is proposed by spatial planners (Wende et al. 2011).

***Simplification and competition: Simple intuitive metrics and repetition of messages, triggering comparison***

Another option for a better uptake of complex and unappealing environmental objectives is to make it difficult for politicians to ignore environmental challenges or solutions. This can be achieved, for example, by finding a simple, intuitive ‘code’ or metric for the consequences of decisions and for making decision alternatives comparable: The ordinal and cardinal evaluation scales, which have been used in landscape planning for a long time, are one approach for achieving this. On this basis, the decisions and the positive and negative externalities, which are linked to the different decision alternatives, become apparent. By doing so, this behavioural intervention is addressing the simplification bias as one of the central decision-making

mechanisms of politicians (see above). However, at the same time, the ‘code’ or metric overcomes the thought traps of (political) short-termism and anecdotalism as it provides a systematically derived decision basis. An example is given in Figure 2: The matrix shows the trade-offs between different decision alternatives in attaining a certain supply of renewable energies. Figure 2 also illustrates the environmental impacts when implementing renewable energies in regions with different production potentials (presented as metrics) and environmental sensitivities (codified in an ordinal scale). By using behavioural mechanisms such as repetition yielding (see above) it is then possible to ‘nudge’ (influence by a subtle impulse) politicians and their decisions.

INSERT Figure 2 here

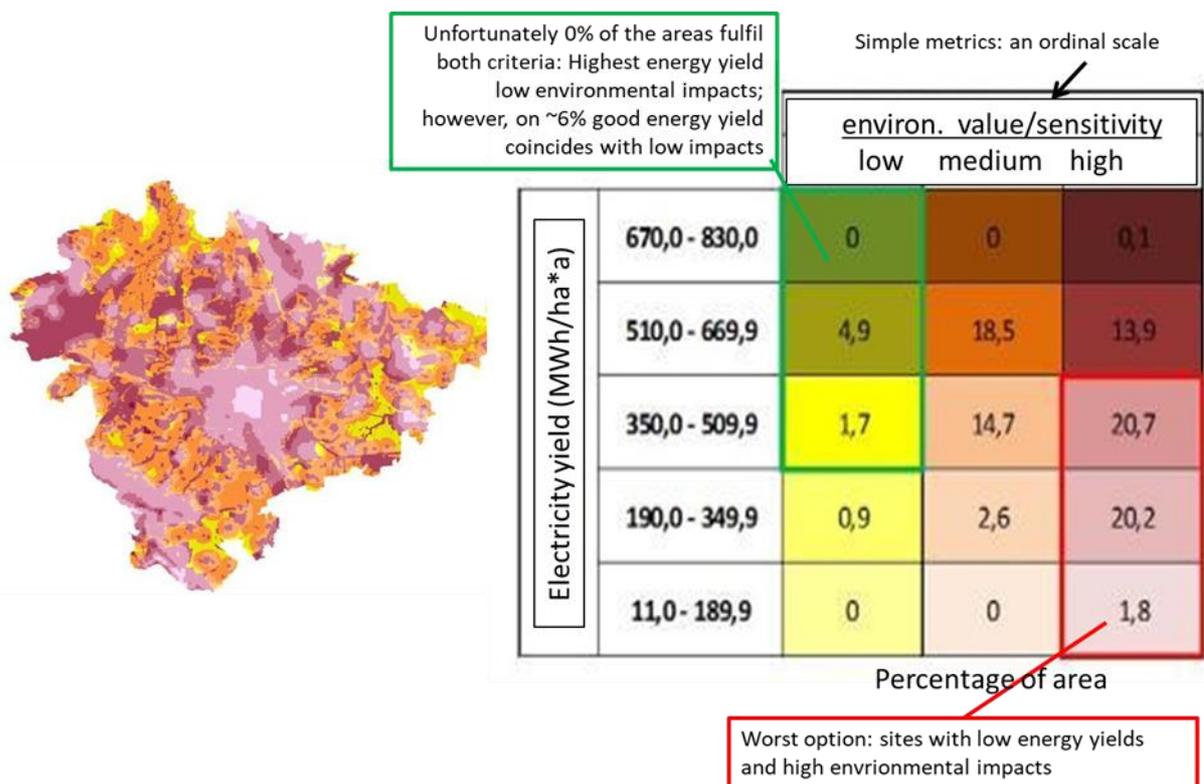


Fig. 2: Framing the decision space and responsibility by using ‘codes’/metrics for illustrating trade-offs and making alternatives comparable: The matrix presents the proportion of areas with wind energy production potential and the environmental sensitivities of the Hannover Region. The behavioural effect may be further enhanced by presenting fewer options. Color = impacts on the environment (green: low, red: high)

and shade of color = dark: High energy harvest, light: Low energy harvest. (from Palmas et al. 2015a, Palmas et al. 2015b: 252, altered). Dark green represents no trade-offs but this unfortunately does not exist in the region. First, the green and dark yellow area should be used. Compromises which give enough space for RE and which still have efficient energy yields can be found in the medium orange area.

Additionally, using simple behavioural mechanisms, such as our tendency to overestimate recent events and to remember extreme events much more than the statistically normal distribution, is helpful for designing attractive narratives in order to make decision makers care. In design, this mechanism can be used, for instance, by placing attention on the end of a proposed walking path. When presented in a virtual reality model, this will make the path more attractive to decision makers,.

The monetarization of findings also offers an opportunity to directly influence decision makers and to foster the uptake of environmental information. Monetary values are familiar to most people and play an important role when people have to decide about (individual) choices. Subsequently, decision makers will probably decide in favor of environmentally friendly alternatives if the proposed solution is profitable in economic terms or if the loss of ecosystem services will result in economic costs (see above). The recent internationally promoted ecosystem service concept (Daily 1997, TEEB 2010) is based on the assumption that the uptake of environmental information is especially impeded because nature's goods and services often lack a market value which constrains the understanding of decision makers (Shogren 2012: 5, Naturkapital Deutschland - TEEB-DE 2016).

By addressing behavioural mechanisms such as loss aversion, self-affirmation, or peer dependency, monetization as a behavioural intervention can contribute to overcome the thought traps of politicians. This particularly refers to the 'rational ignorance' and short-termism of politicians (see above). Against this background, it is

not astonishing that the argument “our wild bees are endangered, please protect them!” will not be fully considered by decision makers. Instead, it might be more promising to present the fact that one third of all dietary products in the US rely on bees and other pollinators. More specifically, the 2.8 billion dollar almond industry in the US could not exist without bees (Calderone 2015: 94). This might offer landscape or environmental planners and environmental lobby groups, together with relevant economic actors, the possibility to influence politicians (principle of repetition yielding). Furthermore, an advantage of monetized consequences is that they can be compared to other loss or gains. However, this can also be achieved by rating information on scales that are not monetary (see above for renewable energy). If such scales are combined with a reference point about what other politicians or people are doing, this could trigger the tendency of most politicians or people to do something good. For instance, people will donate more money for a conservation area when they know what the average donation is and if their donation is seen by others (OECD 2012). Here, the thought traps related to peer dependency or collective irresponsibility can be overcome by providing knowledge on certain (environmental) standards.

### ***Information: Disclosure of information***

Routines that include information disclosure and transparency (Sunstein 2014) can make landscape planning a stabilizing element in decision making processes. For instance, a routine or standard that makes reasons for anti-environmental choices public, is an intervention in favour of environmental objectives as it puts pressure on others to behave according to social standards and norms concerning environmental issues (addressing peer dependency as a behavioural mechanism). Such routines, in combination with public supervision and the right to sue, seem to be favourable for the

inclusion of landscape planning objectives into spatial and urban planning (Wende et al. 2011). A precondition for this is that the information is easy to access and that people do not have to overcome technical or spatial barriers in order to gain insight into planning documents (as satirically described in Adams' book "The hitchhikers guide to the galaxy"). The possibilities of web GIS and visualisations (Lovett et al. 2015) are a great support in such information disclosure interventions, giving citizens the opportunity to access easy to understand information at any time and or place. The potentials of GIS and visualisation in nudging still have to be explored systematically in experiments. In a positive way, benchmarking can lead to pro-environmental choices of individuals or groups when comparative standards are made public. Additionally, reminders may be effective (OECD 2012: 5). For instance, reminding farmers that they may take part in a US-conservation program has considerably boosted participation and pro-environmental choices (Yoeli et al. 2017: 70).

For handling data and value uncertainties, transparency is probably the most effective approach (Neuendorf 2018) in combination with the simplification of the depiction of uncertainties and their consequences for decisions. The degree of uncertainty, which is acceptable for decisions, has to be specified as well as cases, in which the precautionary principle resolves a decision in favour of the environment in spite of high uncertainty. This would help politicians to make fast and easy decisions. A precondition would be, that the normative basis of recommendations are classified in an easy to grasp way in terms of the degree of legitimization. For politicians, it is critical to know whether they have no real choice because of 'hard' law predefining the decision, such as those set by the European Habitat Directive, or whether 'soft' law gives them decision space. Too often, this differentiation is neglected in practical landscape planning, causing the illusion of decision options and later frustration.

***Splitting a complex decision: Small and/or meaningful partial decision (with regard to space and time)***

Splitting very complex contexts or decisions into partial decisions before communicating them to politicians might act as a behavioural intervention as it helps in the presentation of immediate outcomes and thus complies with the system 1 thinking mode of short-termism (Samson 2015: 5, Baumeister and Vohs 2007). In terms of scale, it seems promising to operationalize widespread problems on a local scale.

Framing the decision space and demonstrating what can be decided locally, is important for activating both politicians and the public in planning processes. For example, scaling down the national target for land consumption in Germany (which is 30ha/day by 2020) to the Hannover region would result in a permitted greenfield development rate of ~ 0.4 ha/day (taking the number of inhabitants in the region as a reference). This target is much easier for a local politician to handle and identify with, at least when compared to the national 'abstract' figure, which does not really affect local politics (see also Jakob et al. 2017). By addressing the intrinsic motivations of politicians (power, ego, reputation, etc.) this intervention contributes by supporting decision makers in their belief that they can make a change. At the same time, it also helps overcome the thought trap of (political) short-termism.

In terms of time, small steps, i.e. defining what to achieve in one election period, will be more effective than long-term scenarios, For example, when determining what regional renewable energy and wetland protections measures are necessary in order to reach the goals of the Paris agreement about climate protection in 2050. Nevertheless, in order to make a small task more credible, a long-term scenario is also necessary. In other cases, time horizons have been formally changed to address environmental risks more effectively: Rather than stating that there will be a 1:100 chance of an area being

flooded (one time in a hundred years), US agencies now communicate, that the risk of at least one flood during the next 25 year is greater than 1 in 5 (Yoeli et al. 2017: 70).

***Reframing consequences in terms people care about: Communicating norms, demonstrating personal consequences and engaging peers***

Politicians will more likely support landscape planning objectives if these are combined with recognizable personal benefits, losses or preferences for themselves or their voters (see above). By translating impacts of environmental objectives into human health and happiness (Sachs 2016), landscape planning can make politicians understand that consequences of supra-regional changes may specifically affect their life or that of their voters. Furthermore, conveying or reminding social norms and goals may convince politicians to decide in favour of public environmental goods (OECD 2012: 15).

Decision makers do not seem to be as rational and selfish as is usually expected (OECD 2012: 16, with regard to the “role of moral responsibility”: Jakob et al. 2017). For instance, the protection of biodiversity or environmental assets for future generations can be presented in the form of concrete local goals and improvements in landscape planning, which can be assigned to the municipal council and its committees. The intervention is expected to have a greater impact on people’s behavior when people are unclear about what the norm is (Yoeli et al. 2017: 75). However, reminding people about the gap between their stated objectives and actions may also have an effect (OECD 2012: 18). Combined with a timely feedback (Yoeli et al. 2017: 70) about achievements and the state of implementation, these normative interventions can be combined with interventions to give ownership over the issue (see below).

Addressing personal experiences convinces decision makers more than presenting them with statistics. This indicates that translating environmental issues into personal stories is an effective intervention to overcome, for example, the behavioural

mechanism of loss-aversion. Additionally, here, scenarios about landscape change can address the *consequences of (not) acting* (threat of loss aversion), which seem to affect the motivation of politicians to react more strongly than presenting them with the prospect of future gains (Samson 2015: 4, Dolan et al. 2010: 8).

Another behavioural intervention considers that people are heavily influenced by who is communicating to them (Dolan et al. 2010: 19). Advice may be disregarded simply because it comes from a person that we dislike (Dolan et al. 2010: 19). Farmers are more likely to be convinced about nature conservation objectives when a representative from the farmers union communicates the information to them. To designate the communication of environmental objectives to an external expert or an associate of the decision maker, whether it be a scientist, a technical advisor or a party colleague, can increase the politician's awareness as the information is not provided by the often unpopular environmental authorities, NGOs, or landscape planners. In general, this strategy makes use of the peer dependency behavioural mechanism (see above). Furthermore, subjects such as climate change, which are emotionalized, may be better communicated by reframing them e.g. in terms of renewable energy objectives.

***Ownership: Strengthening belief that decision makers can produce a change, giving ownership of issues/success, observability of achievements***

Strengthening the belief of decision makers that they can create change and improve (environmental) local conditions, can increase their willpower (Samson 2015: 4) to support environmentally concerned decisions. Giving politicians ownership over the issue at stake may enhance this effect. This can be achieved by addressing politicians personally in the (transdisciplinary) co-design and co-production processes, at least if conflicts of interest with other stakeholders are not strong (Kaufmann-Hayoz et al. 2016: 292). This strategic approach also incorporates the fact that the credit for

success – according to the behavioural mechanisms of ‘self-affirmation’ and peer dependency (see above) – has to be attributed to the political decision maker(s).

Additionally, by designing environmental solutions and making them (visually) attractive, it is possible to show politicians that future rewards can be more attractive than short-term rewards. This might help to overcome thought traps that occur as result of uncertainty blindness, (political) short-termism or loss aversion (see above). Linking achievements and results (naming, festivities, etc.) to politicians might offer a way to enhance these effects (Camerer 2014: 869). As designs can address the emotions and perceptions of people, it may be a very effective mode of translation. The designed ecologies by Yu Kongjiang, such as the ‘Red ribbon’, are examples of this strategy. In such cases, nature conservation follows the slipstream of a fetching design idea (von Haaren et al. 2014). Such solutions offer politicians fast and tangible results, touching on their self-affirmation, raising their profile and enhancing their chances for being re-elected.

#### **4 Discussion and Conclusion**

In the previous section, we presented a new perspective on presenting the scientific and rational findings of landscape planning in a way that it directly addresses the behavioural mechanisms of politicians. Insights and approaches from behavioural sciences were made productive for landscape planning and examples given for how to translate the planning content to decision makers (behavioural interventions).

Using these insights may lead to a “vast room for improvement” which can be utilized if we “understand where we go wrong” (Ariely 2015: IX). As we have argued, individuals, and thus also politicians, prefer to make decisions in an easy, intuitive mode, which often seems inappropriate for complex environmental decisions. However, we also identified a number of ways for landscape planning to better address

environmental issues in political decision-making processes. This mainly includes approaches for processing the planning content into a system 1 form that encourages the uptake of landscape planning objectives by (i) setting defaults, (ii) simplification and competition, (iii) disclosure of information, (iv) splitting complex decisions, (v) reframing consequences in terms people care about and (vi) ownership.

Consequently, landscape planners should ‘translate’ landscape planning information and objectives consciously into the ‘language’ of politicians by referring to system 1 thinking modes much more than they (often unconsciously) did in the past. For example, by addressing the self-affirmation of politicians, former positive experiences or the short time action modus of politicians, it is possible to influence individual choices and the rationales of politicians. This could, therefore, help put greater emphasis on environmental information in political decision-making. Here, landscape planners also act as policy ‘consultants’ or ‘influencers’, combining a bundle of personal capabilities such as intuitive thinking, societal contacts and their systematic maintenance, the ability to feel whether a subject is politically charged and to anticipate intuitively, rather than intellectually, future developments (Chahoud 2010: 35). One example for behavioural interventions and climate change adaptation can be found in Gartow, located in the Elbe valley biosphere reserve in Northern Germany. Here, the behavioural interventions used by landscape planners (e.g. ownership, disclosure of information, simplification, reframing consequences in terms people care about, competition for the best solution, observability of achievements, and peer dependency) successfully changed attitudes and risk awareness of local decision makers concerning precautionary climate adaptation (Albert et al. 2012).

Nevertheless, landscape planners, in their role between traditional science and policy advice, have to safeguard their trustworthiness and have to be sensitive to their

own biases and fallacies (Kahneman 2011: 310, Magnus 2008, Wilholt 2009, Hustedt et al. 2010, Weingart 2006). For example, they have to keep in mind the temptation to follow personal impressions instead of statistical information or to underrate uncertainties in the planning results.

It is a strength of landscape planning that it conducts scientific analyses; this allows thorough considerations of environmental issues and might assist in slowing down political decisions to a more rational decision 2 mode and to identify thought traps (Kahneman 2011). Put another way: Addressing mode 2 mechanisms is necessary in order to tackle complex and uncertain issues and to initiate appropriate strategies and measures as, for example, the protection of locally relevant drinking water resources. The focus on behavioural interventions (system 1 thinking), that can be used to reframe information by better addressing the behavioural patterns of politicians, does not mean that politicians are not open to system 2 modes. Politicians may be well aware of the importance of long-term and scientifically derived decisions and recognise analytical strength as a central feature of landscape planning. However, as landscape planning has so far mainly concentrated on system 2 modes, we decided to focus particularly on communication patterns beyond those mechanisms, i.e. system 1 modes to improve the integration of environmental concerns into political decision-making processes. Landscape planners have to be good listeners in order to understand the motives of the decision maker, to present ways of how to reconcile with the environmental objectives and to integrate both into a communication strategy (Chahoud 2010: 35). They need to build a relationship with politicians in order to support them in their task of decision making in such a complex field of multiple values and objectives (von Krockow 1992: 324f.).

Furthermore, the ethical implications of using behavioural interventions have to be considered in order to avoid unethical manipulation. Subsequently, landscape planners themselves should set up mechanisms of self-control or supervision. This could include criteria for ensuring maximal transparency of the preconditions, a normative basis of the planning content and recommendations, as well as identifying planning and individual biases. Boundaries of behavioural interventions have to be defined, as guidance in this respect is still missing. Nonetheless, ethical considerations have to be considered but should not lead to complete discard of behavioural interventions, thus leaving environmental concerns in a disadvantaged position. Business interests are already using behavioural mechanisms to a large extent and politicians are increasingly relying on professional policy advice by lobbies who use behavioural routines (Chahoud 2010, Leif 2010: 10).

In the future, landscape planning research will have to test new findings and discuss the limits of translating environmental issues to decision makers. We cannot expect behavioural interventions to be a magic potion against all strong political convictions and interests, which point into another direction. Such limits may be also reassuring. At least in Douglas Adams' book "The Hitchhiker's Guide to the Galaxy", unrestrained understanding and communication turns out to be fatal: "The Babel fish, by effectively removing all barriers to communication between different races and cultures, has caused more and bloodier wars than anything else in the history of creation".

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