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Bettina Burger-Menzel

Environmental Politics and the Human Being:

A New Interdisciplinary Perspective on Motivational Processes and Sustainable Change Behaviour

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Abstract

Never before has the world been globalized to such an extent, which results in a rapid exploitation of global commons and natural resources and has cross-border effects on biological diversity and climate change. As a consequence, there is a new urgency in making global cooperation in environmental politics work. Although there is a broad consensus that systemic change is needed, progress towards the latter—first, through corresponding global agreements and, second, through effective implementation of those policies at home—seems to lag behind expectations. How can these gaps be explained? And how can new scientific insights help to make environmental politics more effective? Notwithstanding the importance of non-behavioural factors as explanations from the 'outside', the author argues that explanations also have to focus on the 'inside', i.e. individual motivation. The key interest is to better understand the motivational process of individuals who are willing to undergo sustainable change behaviour and to conceptualize the results for further research. This turns human behaviour into an important risk factor in global cooperation and cognition into its relevant feature. This work is on conceptualization with a qualitative methodology and is structured as follows: In order to better grasp the meaning of 'poor' systemic change through environmental politics, the introductory part describes global cooperation as a system and identifies three cognitive blindspots, which need further analysis. As a corresponding literature review proves rich in insights but is too implicit for the further analysis, the author provides her own scheme through which the motivational process is sequenced and linked to the system around the individual. This allows new perspectives on how to discuss change behaviour in globally initiated knowledge production, learning and trial and error adaptations. The conclusions consider what the results obtained so far imply for further research on environmental politics.

Keywords

Global environmental politics, human motivation, cognition, sustainability, systemic change

Author

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Environmental Politics and the Human Being: A New Interdisciplinary Perspective on Motivational Processes and Sustainable Change Behaviour

Bettina Burger-Menzel

1 'The future we want for all' OR the Story of (still) Poor Systemic Change

Convention on Biological Diversity (Article 5):
Each Contracting Party shall, as far as possible and as appropriate, cooperate with other Contracting Parties, directly or where appropriate, through competent international organizations, in respect of areas beyond national jurisdiction and on other matters of mutual interest, for the conservation and sustainable use of biological diversity.
UN (1992)

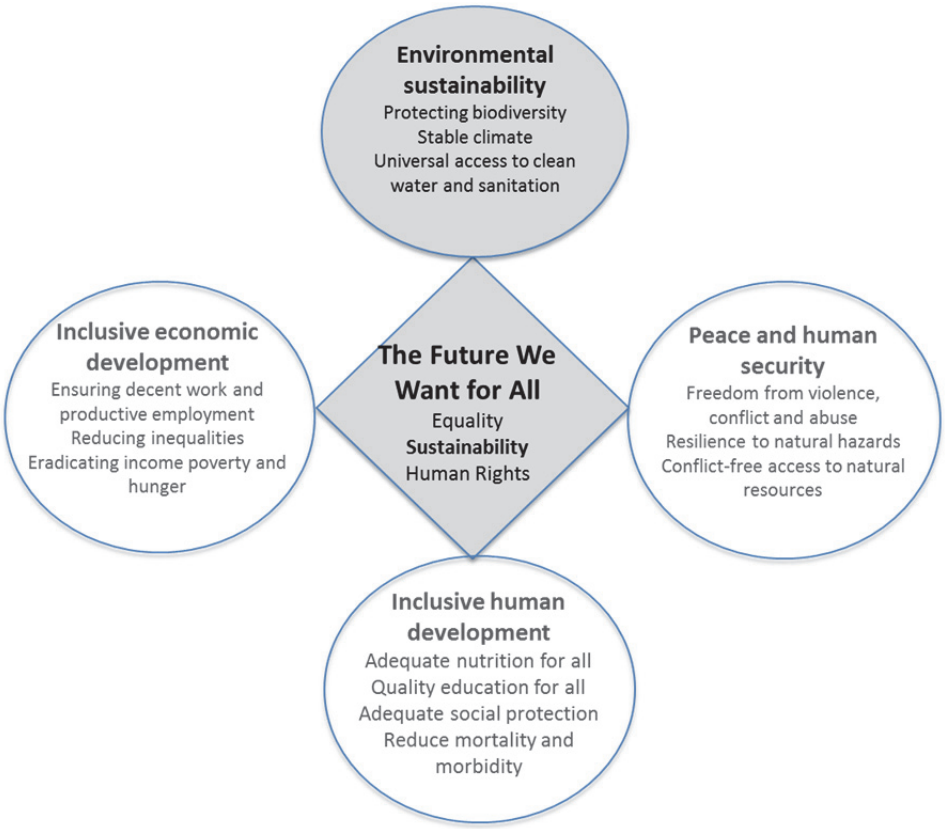
The human mind is something of an embarrassment to certain disciplines, notably economics, decision theory and others that have found the model of the rational consumer to be a powerfully productive one ... It is like a complex piece of machinery that has a mind of its own, and is not disposed to be our obedient servant.
Schelling (1986)

Technical progress and economic and geopolitical dynamics have globalized our world and its environmental challenges, which are the exploitation of global commons such as the high seas, transboundary pollution or the local cumulative effects of reduced natural resources. Global problems are not new. But their scale, scope and complexity have increased and more than justify international actions that aim at sustainable development and environmental change, thereby contributing to human security.

Apart from equality and human rights, the United Nations (UN 2013) therefore names sustainability as one of the three principles which constitute the post-2015

Development Agenda; environmental sustainability itself is one of the four dimensions of development where progress is needed (grey-coded in Figure 1).

Figure 1: 'The future we want for all'



Based on UN (2013)

Well-defined multi-stakeholder partnerships should then be mainstreamed under each thematic goal in order to 'better reflect the contributions of voluntary and purpose-specific partnerships, which could be coordinated and linked to the priority needs of developing countries in a more systematic manner' (UN 2013).

Despite a broad consensus that governments and other stakeholders should act to reach 'the future we want for all', progress towards the latter—through global agreements and their effective implementation at home—seems to lag behind expectations.

The UN (2013) itself points out that '[d]espite the ability of partnerships to mobilize resources, advocate for important issues and share knowledge, they have a poor record of promoting systemic change'. And for the UN Convention on Biological Diversity (CBD), which tackles the conservation of species and ecosystems, Zelli, Gupta and van Asselt (2012) state that 'interlinkage management efforts to the biodiversity convention have yielded little effect to date'.

Yet providing scientific answers to the 'why' question does not come easy. Due to the given context's complexities, global cooperation research spawns a huge variety of disciplines to cover all angles. There is primatology research on key

contexts like aggression, reconciliation, third party alliance or intervention (e.g. Thierry 2000), cognitive anthropology with issues like knowledge structures and cultural stereotyping (e.g. Medin, Ross et al. 2006), experimental economics on cooperation, offer behaviour, trust and risk preferences (e.g. Henrich 2000), evolutionary sociology dealing with altruism in humans (e.g. Bowles and Gintis 2013) and, last but not least, political science ranging from topics like the perception of power, historical memory and negotiation procedures to compliance and enforcement (e.g. von Stein 2010).

Notwithstanding the value of each disciplinary contribution, such a scientific landscape bears the risk of fragmentation and specialization where the human being might even get ignored as a decisive factor. Messner, Guarín and Haun (2013) therefore suggest a 'behaviourally-sound theory' when analyzing global cooperation.

This paper tries to link disciplines as well as to integrate human behaviour in a qualitative way. Its key interest is to better understand the motivational process of those individuals who are willing to practice sustainable behaviour and to conceptualize the results for further research. Let me suggest the following lead questions for structuring the paper:

Chapter 2: *How does human behaviour relate to systemic change and what turns it into a risk factor*? In this introductory part, the goal is to underline the need to discuss global cooperation as a system, thereby offering new perspectives on actors, relationships and the scaling-up of change. Analogies will be drawn from innovation-system research, which has a rich and interdisciplinary tradition and acknowledges human nature as an impact factor. With reference to the real world of biodiversity-related politics, three motivational challenges are identified and defined as cognitive blindspots in order to highlight how difficult it is to get an individual's change behaviour started and to make it ongoing and even sustainable.

Chapter 3: *How does science explain motivational challenges to sustainable change behaviour and which solutions are offered?* The goal is to take stock of that part of literature which discusses the human motivation to undergo behavioural changes. I draw from a wealth of interdisciplinary contributions on the human being to show that the dominant discussion is either context-related but deals with motivational processes rather implicitly or it describes the individual as someone motivationally complex but lacks in context-specificity.

Chapter 4: *What does this outcome mean for the conceptualization of human behaviour in environmental politics?* The goal is to create a context-specific understanding of the human motivation to undergo learning and adaptations over time even if the system around the individual increases in complexity. Because all humans are 'run' by cognition, I argue in favour of using cognition as the basic descriptor for all global cooperation stakeholders regardless of how different they are from each other. The motivational process itself is conceptualized as a sequential arrangement with two subparts, i.e. a basic motivational process and a motivational feedback loop. Both subparts relate to those challenges which come with increased system complexity.

The final chapter offers conclusions on the results. Empirically relevant aspects will be highlighted and interpreted for the further study of global cooperation.

2 The Context: Human Behaviour as a Risk Factor in Global Environmental Politics

Studying group membership as having a uniform influence on members only makes sense if membership itself is uniform: if every group member shares the same relation to the group. This is rarely the case. Even when something that would be recognised as a 'group' exists, some members are more or less committed, more or less tied to other group members, more or less identified with the group or more or less recognised by others as co-members of the group.
Marin and Wellman (2011)

2. 1 Global Environmental Politics as a System

Systemic performance largely depends on how actors 'tick' and 'relate' to each other as elements of a collective system of knowledge creation, learning and adaptation. Incorporating such a perspective into the analysis of global cooperation tracks the mentioned 'poor record of promoting systemic change' back to the actor itself and to the relevant questions of how to get individuals involved in real own change behaviour. Such a perspective can help to enrich corresponding (policy) strategies through aspects that include motivational structures and personal multi-role environments and their changes over time.

Global cooperation research commonly focuses on determinants like power distribution, external constraints, extrinsic incentive systems and strategies. Thus, 'in theorizing international relations and global governance the insights gained by the behavioural sciences beyond rational choice have been so far largely ignored' (Messner, Guarín et al. 2013).

Richerzhagen (2014), who provides an interesting analysis of the architecture of biodiversity governance, additionally states: 'So far, much research has been done on the conditions under which multilateral agreements were established or how they function. Only little research has addressed the question of how such agreements evolve over time ...'.

Yet it is not only agreements which change in an evolutionary way; so do people, their interrelationships, choices and actions. Therefore, global cooperation requires a deeper understanding of the human being.

People are sources and sinks of new (embodied) knowledge and are connected by corresponding flows. This is highlighted in policy dialogues like the G20's Action Plan for knowledge sharing and mutual learning (G20 2013). Knowledge sharing itself is linked to 'the provision of task information and know-how to help others and to collaborate with others to solve problems, develop new ideas, or implement

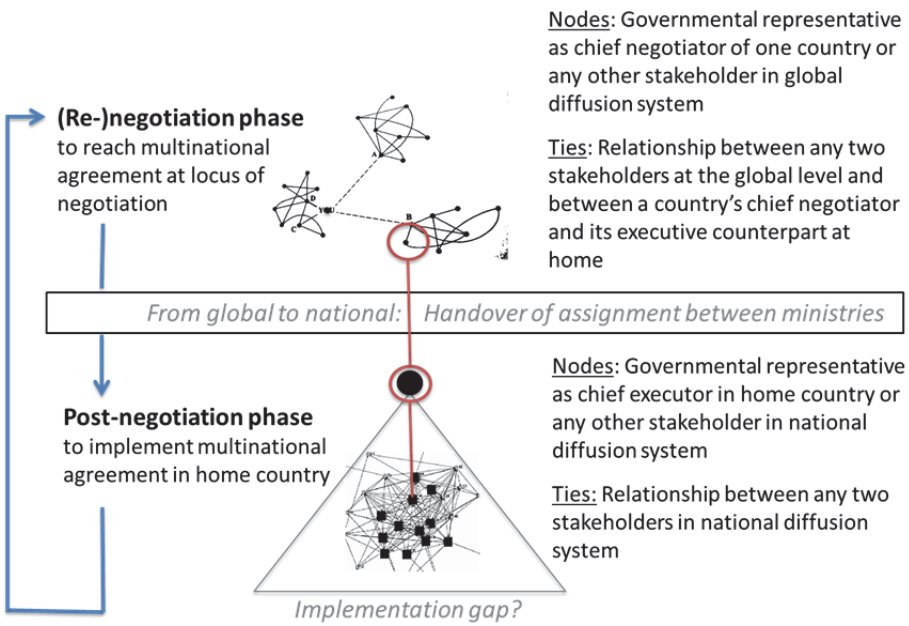
policies and procedures' (Wang and Noe 2009). Who are these actors of global cooperation?

At the international level, governments usually make it the task of their experienced chief diplomats to prepare corresponding meetings (pre-negotiation phase) and to bargain over the contractual content (negotiation phase) at the locus of negotiation, which is often organized by multilateral entities like the United Nations and its Secretariat. These actors 'gather information, exchange ideas, formulate proposals, and meet in informal and formal sessions to negotiate, prepare legal documents, and vote whether or not to accept new responsibilities, including taxing themselves to cover the costs of monitoring their global environmental management efforts. They meet periodically to review how well they have done and determine whether or not to take further action' (Susskind 1994).

At a national and lower level, assignments are then handed over to governmental representatives from topic-related ministries in order to make ratification and implementation happen (post-negotiation phase). If contractual gaps need to be filled, a renegotiation process will take place.

Figure 2 provides a simplified scheme of the proposed diffusion system. It visualizes the (re-)negotiation and post-negotiation phases, between which a global agreement turns into a national assignment and back. At all levels, stakeholders relate with each other to help to establish and diffuse those behavioural changes which are intended by an international agreement. Stakeholders can be governmental bodies as well as actors from outside government such as (multi-) national companies, universities, interest groups including environmental action groups and local (traditional) communities.

Figure 2: Global cooperation as a diffusion system



Based on Burger-Menzel (2014a)

Change behaviour would occur when all relevant actors start to think and behave differently. But what does this mean in a systemic context? And can it be described through compliance, as in international law?

Compliance is defined 'as the degree to which state behaviour conforms to what the agreement prescribes or proscribes. This is straightforward enough, but it is important to differentiate compliance from *effectiveness*—the degree to which the agreement has an impact on state behaviour. It is possible for a state to abide fully by the terms of the agreement, but for reasons that have nothing to do with the agreement itself' (von Stein 2010).

Against that background, it seems helpful to create an understanding of systemic change processes through a complementary research field that provides a stronger focus on cause-effect relationships, i.e. innovation-system research. Innovation-system research offers useful heuristics because it analyses actors (nodes), their interactions (ties) and contextual environments (especially institutions and knowledge base) as an interrelated whole. It is here that the author's understanding as an economist is rooted (e.g. Burger-Menzel 2011; Burger-Menzel and Huyoff 2015).

Such technical progress has been conceptualized as 'technological trajectories', 'techno-economic paradigms', 'diffusion systems of innovation' or 'systems of interactive learning' (e.g. Nelson and Winter 1977; Dosi 1982; Freeman and Perez 1984; Porter 1990; Rogers 2003; Freeman and Soete 2004; Fagerberg, Mowery et al. 2005; Perez 2009; Malerba and Nelson 2010; Lundvall 2010).

The following analogies in causal challenges and context complexities can be identified between innovation systems and global cooperation:

- Innovation systems are built around technical novelties (e.g. computers) that start as breakthrough inventions and—after often lengthy and costly research and development—are successfully commercialized and diffused in markets. Global agreements, too, aim at the adoption of *something relatively new* when compared with the corresponding status quo in the target countries (e.g. technical standards or legal regulations).
- There is only diffusion if individuals are or become convinced that the adoption of a specific change (new product or process) is of value to them. Such a decision might be followed by cognitive dissonance. In the case of continued change behaviour, diffusion scales up through activities which create consensus and collective action. And adaptive problems make it necessary to find new reliable and resourceful partners. The implementation of global policies is also directed towards *change behaviour of individuals and groups* and therefore needs an understanding of the underlying motivational and network processes.
- As 'new destroys old', i.e. creative destruction in the Schumpeterian sense, innovations meet resistance. Not only are 'hard factors' like established production systems and value-added chains challenged in their organizational structures and processes. 'Soft factors' like established management cultures, relationships of collaboration, consumer behaviour and lifestyles also face substantial changes. Globally

intended change behaviour also leads to 'new destroys old'. Thus, there will be *opposing social forces or inert institutional frameworks* in the target countries that must be tackled while collaborative knowledge production, learning and forgetting as well as trial and error adaptations (should) take place.

- Diffusion is successful within an innovation system when, at the end, not only has the productive sphere been transformed but people have started to think and behave differently. Thus, there is a new common sense in the economy and society as well as in corresponding socio-institutional frameworks. The implementation of global agreements also involves a management of change that needs to be based on a *new shared sense*, thereby expressing that (more than) a critical mass in society has accepted what was aspired to reach.
- And finally, given the complex historical, political and social realities in the countries concerned, there will be informational insecurity during the whole process of diffusion. During their lifecycle, innovations undergo basic processes of trial and error, imitation and variation, selection and retention for uses across sector borders and diverse user groups. There are constant risks to (the perception of) utilities and profit gains, also due to technical path dependencies. Only if individual and cumulative experience can be identified, measured and explained is it easier, in principle, to predict likely future system patterns and their consequences. Negotiation and implementation of global goals are a form of *risk management*, as is the diffusion of innovations.

Apart from these analogies, there are topic overlaps. Most innovation systems are cross-border systems and therefore subject to global agreements. One example is the biotechnological sector, which is affected by two global agreements (Soria López and Burger-Menzel 2014), i.e. the Convention on Biological Diversity (CBD), which tackles biodiversity loss and conservation including related traditional knowledge, and the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS).

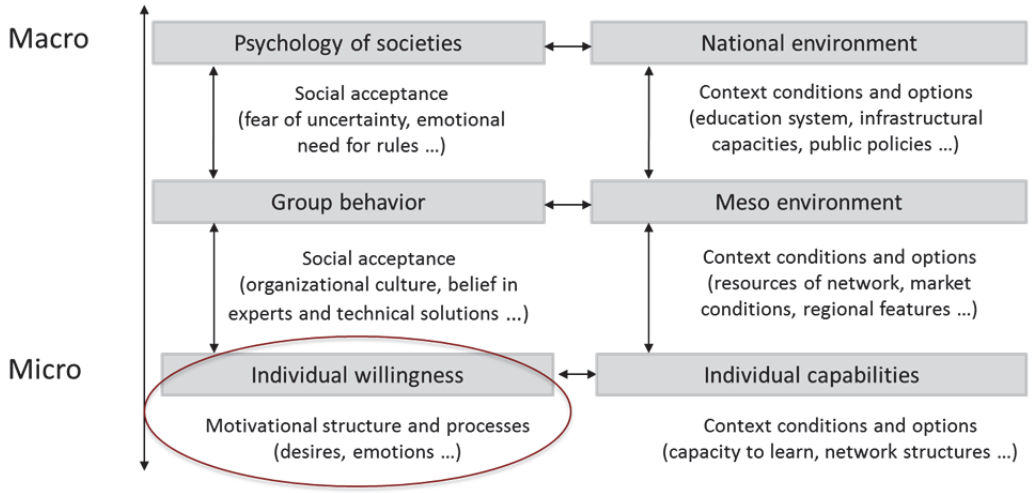
To sum up, global cooperation can be interpreted as a diffusion system for something which is relatively new for its actors. And as innovation-system research, it can profit from 'thinking in systems', i.e. there is a substantial willingness among researchers to cover analytical levels from micro to macro as well as to collaborate across disciplines (e.g. evolutionary economics) and to see human behaviour and its patterns as being 'in flux'.

In all these approaches, contextualism means reflecting on the agential milieu because the latter affects how networks are mobilized and evolve along technological development paths. This is valid for the whole variety of actors such as firms, universities, research institutes, user groups and governments and their embeddedness in broad societal structures.

Figure 3 focuses on human behaviour as a precondition for systemic change. It does so by separating behavioural aspects (e.g. attitudes, values, needs) from environmental conditions and options (e.g. absorption and reform capacities, financial support). It thus stresses that the understanding of systemic change must

come not only from non-behavioural factors, i.e. explanations from the 'outside', but also from psychology, i.e. explanations from the 'inside' on all levels (individual, group, society).

Figure 3: Human behaviour as a precondition for systemic change



Based on Burger-Menzel and Assadi (2012: 256)

In this paper, the sole focus is on the *individual willingness* to undergo behavioural challenges in favour of global environmental policies. A future research paper will pick up from here and deal with those *individual capabilities* that are needed to scale up change behaviour in networks.

2.2 Introducing Cognitive Blindspots as a Risk Factor

Let me now point out those individual(ly intended) 'cognitive blindspots' in global cooperation, which have triggered this research. In what follows, negotiation and implementation processes are no longer distinguished because they basically create the same types of cognitive blindspots.

As to theory, I will use the transaction-cost approach, which offers a comprehensive reflection on (non-)cooperative behaviour and belongs to the heterodox body of thought connected with innovation systems. Although much of this academic discussion concentrates on private entities (e.g. companies), it can also be applied to non-private entities, such as governments. The reason is that the latter qualifies as a kind of 'super-firm' with power of a special kind because 'government has at its disposal the police and the other law enforcement agencies to make sure that its regulations are carried out' (Coase 1960).

The context of environmental politics will be illustrated with reference to the Convention on Biological Diversity (UN 1992). There is a variety of international frameworks, which tackle the conservation of species and ecosystems. However, the CBD with its follow-up protocols is the most comprehensive and inclusive international agreement (O'Neill 2009) with currently 196 parties (UN 2015). Its

latest supplementary agreement is the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization (UN 2011).

The parties to the CBD are extremely diverse. A basic distinction can be made between provider and user countries. While provider countries are relatively rich in biodiversity, user countries are relatively dependent on the providers' input. This input consists of genetic resources from animals, plants and microorganisms and is valuable because it can be used to develop specialty enzymes, enhanced genes, or small molecules, which can then be exploited for crop protection, drug development, the production of specialized chemicals or in industrial processing (Parayil 2003; Soria López and Burger-Menzel 2014). Finding a practical way to share these benefits has been of particular concern to biodiversity-rich developing countries.

Providers and users which cooperate with good intentions ideally proceed as follows: The countries ratify the Convention and set up legally binding frameworks, which help users to access genetic resources for biotechnology research, development and market-related activities in return for a fair and equitable share of any benefits from their use (ABS). If traditional knowledge is associated with genetic resources, its value is respected and transformed into benefits for the indigenous and local communities where the knowledge stems from. The idea behind this approach is a bilateral system of 'specialized payments for an ecosystem services... scheme that attempts to monetize the commercial value of biodiversity' (Richerzhagen 2014).

The CBD therefore entails a great deal of organizational and procedural effort on behalf of all governmental bodies and third parties involved. In an online factsheet on the Nagoya Protocol, the Australian Government (2012) describes it as follows:

> *Each Party to the Protocol must establish rules that genetic resources and associated traditional knowledge used in their jurisdiction have been acquired legally. Each Party must also establish one or more 'checkpoints' to gather information on the source of the genetic resources, the establishment of mutually agreed terms and the use of the genetic resources. In several countries such checkpoints already exist in public funding processes, in import regulations or in patent offices. Australia has yet to decide how to implement its checkpoint. Users will need to demonstrate at Protocol checkpoints that the genetic resources they use were legally acquired. Permits issued by Australia meet these standards ...*
>
> *A 'competent national authority' authorised to make a decision on access must be publicly identified for each country—and they must provide a decision in writing in a cost effective manner and within a reasonable time. Where access is granted, a permit must be issued to enable researchers to demonstrate their compliance with the access rules. When the permit is lodged on*

> *the [United Nation's, the author] International Access and Benefit-Sharing Clearing House, it becomes an internationally recognised certificate... Where scientific research and development on genetic resources uses indigenous traditional knowledge, countries have to make sure that the knowledge was acquired in accordance with the rules of the country where those indigenous people live. The knowledge should be accessed with the prior informed consent of the indigenous community providing the knowledge, and on mutually agreed terms ...*
>
> *The Australian Government is consulting with the research community, indigenous people, industry partners and state and territory governments to find the best way to implement the Protocol in Australia ...*

What qualifies such relationships between actors as 'cooperative'? Cooperation can be understood as 'engaging with others in a mutually beneficial activity' (Bowles and Gintis 2013), a behavioural phenomenon that is valid for all types of biological beings that voluntarily act together in a symbiotic, prosocial or non-selfish way. The opposite of cooperative behaviour is competition, where individuals or groups of individuals work against each other for selfish reasons (Schmidt 2001).

But the world of cooperative actors is not simply black and white, i.e. either they cooperate or not. Social psychologists like Deutsch (2012) point to self-destructive tendencies that are inherent in cooperation and reduce contributions which otherwise would be made; at the same time competition can be contributing in a beneficial way by providing win-win situations.

A cooperative pattern can therefore fall (back) into competition and vice versa. Profiting from game-theoretical insights, economic theory has given this transitional character between cooperation and competition a solid form by calling it 'coopetition' (Brandenburger and Nalebuff 1996). Through this neologism, composed of *coo*peration and com*petition*, a cooperative competition is described where individuals or groups of individuals interact with an only partial congruence of interests, which makes them cooperate and compete at the same time in order to reach their strategic goals (Schmidtchen 2005).

Against that background, three cognitive blindspots in cooperation can be identified and described as (i) the motivational challenge to start a certain change behaviour (short-term impact on behaviour); (ii) the motivational challenge to keep the chosen change behaviour ongoing (mid-term impact on behaviour); (iii) and the motivational challenge to undergo learning and adaptation despite internal and/or external complexity (long-term impact on behaviour).

(i) The motivational challenge to start a certain change behaviour

Ideally, at the international level as well as within all signature countries, the diverse actor groups are motivated to work in the spirit of the CBD and to put the Convention into practice through an increasingly shared and new common sense. Against that background, every cooperation is a social arrangement or—as Williamson (1979) calls it—'relational contracting'.

In every social arrangement, transactions are needed to connect people for joint tasks (e.g. sharing of information) and to bridge separate processes to avoid frictions (e.g. how to hand over an assignment). The more recurrent transactions are, the more some form of joint governance is stimulated and expressed—not only through organizational charts and process manuals but also through codes of conduct.

Yet as indicated above, social arrangements do not necessarily imply that the officially intended change behaviour is actually adopted. On the one hand, individuals act as representatives of organizations like governments. As countries substantially differ (e.g. natural resources, economic structure, historical development, political factors), not every party might assess a cooperative outcome as a gain in utility. 'Sometimes, to get countries with significantly different needs or priorities to sign a treaty, a lowest-common-denominator or compromise approach is adopted. Such halfway agreements, not surprisingly, are often insufficient to achieve the intended results' (Susskind 1994). Acknowledging a state's sovereign rights to determine how to implement agreements at home—as stated in Article 3 of the CBD (UN 1992)—might then indicate a risk rather than an opportunity.

> Article 3. Principle: *States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.*

On the other hand, the same individuals might also abstain from goal-oriented behaviour because the features of the given situation do not support their personal motivation. Thus, inherited and learned behaviour has an additional impact on decision-making due to human nature (e.g. ability to feel fear or shame), personality traits (e.g. strong intrinsic motivation) and culture. The latter 'influences participants' views regarding what a relationship is: its goals, what goes into making a good one, norms and expectations for exchanges and reciprocity, appropriate interactions, activities and rituals involved, and things that damage or destroy them. It also defines what relationships are appropriate for negotiations' (Moore 2010).

All the named factors can lead to inadequate goal descriptions at the global and lower level. Thus, there may be a lack of information on what should be reached

(intentionality) and/or on what the final status quo should look like (finality) and/or on how the acting party wants to reach the intended finality (cause-effect relationship) (Stein 2005). In the end and as described by political psychologists, 'the goals, abilities, and foibles of individuals are crucial to the intentions, capabilities, and strategies of a state' (Byman and Pollack 2001 in Winter 2013). A relative independence of partners, which allows resources to be pooled in a flexible way, also makes it easier to only 'officially' adopt a certain change behaviour and/or to break away from the cooperative setting in the future. In both cases, there will be, at most, a short-term effect on change behaviour.

This is where I assume a first cognitive blindspot in cooperation. Exemplary questions are: When are people really willing to cooperate in favour of a new techno-economic and socio-institutional paradigm? What does a non-existing or small overlap of interests mean for people's predisposition to listen carefully to communication messages and to act upon them? How much 'noise' in the cooperation channel stems from subjectively perceived (cultural) context gaps? Can individual preferences change over time? And if yes, what does that mean with regard to the stability of behavioural solutions?

(ii) The motivation to keep a chosen change behaviour ongoing

Usually, relational contracts are incomplete. Gaps in such relational contracts can be 'faultlessly filled in an adaptive, sequential way' (Williamson 1979). According to Williamson, contract-specific investment will be higher if there is

- a lack of alternative uses (lock-in);
- specialized training and learning-by-doing in operations (asset specificity);
- successful contract adaptation to unfolding events and periodic contract renewals (transaction-cost savings);
- evolving familiarity (communication economies);
- responsibility with an increasing personal and organizational stake (institutional and personal trust relations);
- a personal integrity that becomes operative (moral behaviour).

In the case of the CBD, all contractual gaps are supposed to be filled by the Conference of the Parties (CBD Article 23), which holds ordinary meetings at regular intervals; has extraordinary meetings when deemed necessary by at least one third of the Parties; agrees upon rules of procedure and financial rules in a consensual way; reviews the implementation of the Convention; and admits observers and allows their participation, subject to the adopted rules.

Up to now, ten Conferences of the Parties have taken place. The last one—after more than six years of renegotiation—led to the above-mentioned Nagoya Protocol, which was adopted in 2010. Thus, over the years the Parties seem to have invested a lot of time and resources in improving organizational, procedural and communicative routines. Additionally, they have tried to foresee all kind of options

to solve disputes among the Parties (CBD Article 27), which include solutions such as negotiation; the good offices of or mediation by a third party; arbitration or submission to the International Court of Justice in unresolved disputes; or submission to conciliation.

Conferences of the Parties and dispute settlements generally cover all measures defined as obligatory in the CBD (UN 1992), such as

- General Measures for Conservation and Sustainable Use (Article 6);
- Identification and Monitoring (Article 7);
- In-situ Conservation (Article 8);
- Ex-situ Conservation (Article 9);
- Sustainable Use of Components of Biological Diversity (Article 10);
- Incentive Measures (Article 11);
- Research and Training (Article 12);
- Public Education and Awareness (Article 13);
- Impact Assessment and Minimizing Adverse Impacts (Article 14);
- Access to Genetic Resources (Article 15);
- Access to and Transfer of Technology (Article 16);
- Exchange of Information (Article 17);
- Technical and Scientific Cooperation (Article 18);
- Handling of Biotechnology and Distribution of its Benefits (Article 19);
- Financial Resources (Article 20);
- Financial Mechanism (Article 21).

As can be seen from all theoretical and real-world enumerations, contractual repair involves substantial learning and adaptation; it also requires a personal and social morality to be put into practice and maintained over a long time. Exposure to such a world of cooperation is like a steady and huge flow of incoming data, especially in environmental politics with its continuous production of new knowledge and needs. Thus, apart from the challenge of given preferences, there seem to be other bounds. People might simply feel overwhelmed when taking up new responsibilities in this field.

This is where I assume a second cognitive blindspot. Exemplary questions are: What happens if continuous adaptation leads to information overload and cognitive stress? Can decision-relevant categories change in such situations or the way in which decisions are taken? What happens if decision-making affects the 'moral mind' as well? How does the mind deal with all these challenges, especially in a world which has huge context gaps between stakeholders, e.g. between an industrial lobbyist and a member of an indigenous community?

(iii) The motivational challenge to transform change behaviour into a sustainable one

Relational contracting is challenged by an additional phenomenon. Williamson (1981) also points to the fact that humans can be subject to opportunism, i.e. either principals or agents 'are dishonest (or, more generally, disguise attributes or preferences, distort data, obfuscate issues, and otherwise confuse transactions), and it is very costly to distinguish opportunistic from non-opportunistic types ex ante'. These humans look for opportunities to pursue undisclosed personal advantages and, by doing so, to cover up their tracks.

This is enabled by information asymmetries (Fritsch, Wein et al. 1999), which increase in complex environments and offer room for hidden motives and actions. 'Biopiracy' can serve as such a case, when patent-protected 'novel' traits of biological varieties turn out to have existed prior to the filing of corresponding patents, with the result that traditional farming communities could have a claim to benefit-sharing (Lea 2008; Soria López and Burger-Menzel 2014).

In the real world, the CBD seems to come with increased frustration, especially among providers of biodiversity. The Australian Government (2012) confirms:

> *… Until now, the lack of a coherent standard has resulted in a high level of mistrust and obstacles to biodiversity research and its potentially valuable outcomes …*

Apart from an opportunistic interest, humans can also have an interest in their own being, i.e. an interest not only to 'have' but also to 'be' (Taylor 1987; Nozick 1989). A person then gains complexity through his or her own features and their lifelong changes (self) as well as through more diverse social factors and group dynamics (me and the others).

In global cooperation, this certainly includes the need to tackle cultural stereotypes, when, for example, 'negotiators from collectivistic cultures, far from always being cooperative, tend to be more competitive when they have strong egoistic motives and high aspirations' (Chen, Mannix, and Okumura 2003, quoted in Imai and Gelfand 2009).

Cooperative relationships evolve over time and adaptation needs motivational conditions which are sufficient to overcome (informational) challenges and their consequences. Against that background, mistrust would qualify as an adaptive problem that makes it necessary to find new reliable and resourceful cooperation partners. But mistrust does not only point to clues on opportunistic behaviour; it also draws attention to emotional determinations or motivational conflicts, which might cast an individual into roles which contradict original intentions. Or as Hocker (2008) puts it: 'The "incompleteness" of contracts has increased with globalization, radical uncertainty and self-referential complexity'.

This is where I assume a third and final cognitive blindspot. Exemplary questions are: What are needs of a cognitive self who has increased moral hazards and self-referential complexity? Is there a tension between the 'self' and those manifold pragmatic expectations that dynamically evolve in (global) cooperation? Do minds

and a continuously changing world really fit together? Or does the mind rather escape from such challenges through strategies that are automatically or unconsciously employed?

Let me finish with the introductory part on global cooperation and its three cognitive blindspots. In its 2006 resolution, the UN's General Assembly stressed the importance of multi-stakeholder partnerships at all levels (global, national, regional) and defined them 'as voluntary relationships between various parties, both public and non-public, in which all participants agree to work together to achieve a common purpose or undertake a specific task, and, as mutually agreed, to share risks and responsibilities, resources and benefits'; however, it also stressed that

> *[d]espite the ability of partnerships to mobilize resources, advocate for important issues and share knowledge, they have a poor record of promoting systemic change* (UN 2013).

Usually, all these actors are diverse, as are their context conditions. As a consequence, there are goal-related context gaps, hidden motives and actions, and self-referential needs. Such challenges increase as a system becomes more complex. I have attempted to illustrate this problem by linking theoretical reasoning with the CBD's real world. Three motivational challenges were identified and defined as cognitive blindspots in order to highlight how difficult it is to get an individual's change behaviour started and to keep it ongoing and even sustainable.

The following chapter attempts to find answers on how to deal with the human risk factor, based on a review of a rich body of interdisciplinary literature. Only some of these contributions stem from innovation system research because the latter, too, is still a learner with regard to human behaviour.

3 The Input: A Review of Interdisciplinary Literature on Human Behaviour

We are not students of some subject matter, but students of problems. And problems may cut right across the borders of any subject matter or discipline.
Popper (1963)

3.1 Selected Approaches on Motivation, Cognition and Environmental Sustainability

The literature on the human being is overwhelmingly dense and rich, in its century-spanning tradition as well as in its interdisciplinary perspectives. Broadly speaking, it falls into two domains. The first domain comprises a philosophical debate on topics such as human needs and morality, intentionality and compassion (e.g. Nussbaum 2001).

The second domain is less general. As Huddy, Sears and Levy (2013) put it: 'Individuals do not act within a vacuum. Their behaviour varies with, and responds to, differences in political institutions, political cultures, leadership styles, and social norms'. In particular, proposals for governance modes need to be context-related; how otherwise to interpret early Utilitarians like Thomas Hobbes (Hobbes 1651, reprint 1966) who perceived the human existence as a fight of all against all and called for an authoritarian sovereign? Liberal counterparts like John Locke (Locke 1690, reprint 1989) rather assumed a precarious peace among men and a government which could therefore act with the consent and goodwill of the governed. Last but not least, the Scottish moral philosopher Adam Smith (Smith 1776, reprint 1994) reasoned that there is an interpersonal value system, which makes free-market mechanisms between people workable.

Approaches with a functional view are called '*ideas of the human being*' (in non-gendered times: 'ideas of man'). These ideas are constructions by other human beings and can be defined as all assumptions on the nature of the individual and its actions which are explicitly or implicitly made by a person or a theory (Siebenhüner 2001). Due to their explanatory function, such ideas should be consistent, plausible and—if possible—accessible for empirical research. And they have become an appreciated academic tool in numerous disciplines, as is evident from their names, such as *homo oeconomicus*, *homo politicus*, *homo psychologicus* and *homo sociologicus*.

Described through its attributes, the idealized human is then integrated into models which try to consistently explain context-related behaviour and are additionally used in academic training or as a frame of reference for policy-making and corresponding goal-setting.

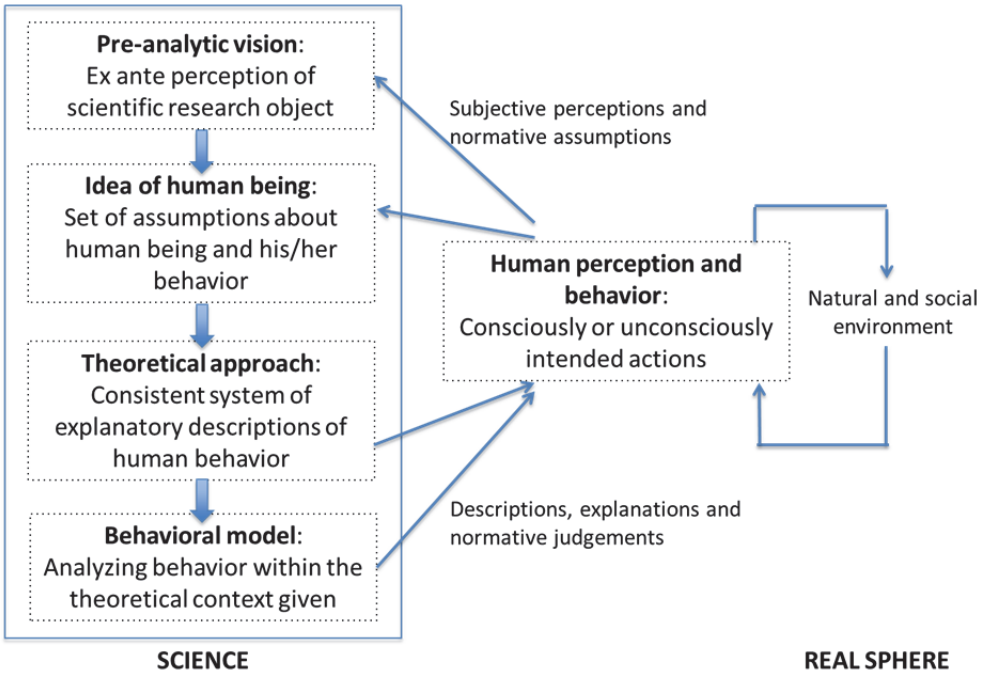
However, the use of such ideas needs an awareness of its consequences. First, the researcher's prescientific vision has to be made explicit because it entails subjective perceptions and normative assumptions about the research object which otherwise could put limits to any person's understanding (Siebenhüner 2001; Kirsch 2004). A

famous example is the *homo oeconomicus* who is assumed to be purely rational and 'mechanically' inclined towards optimizing its own utility (Saßmannshausen 2009).

Second, methodological designs such as the *homo oeconomicus* are often based on assumptions that are so restrictive that they become inadequate as interpretations of reality, which makes Sedlacek (2011) ask: 'How did morality disappear from economics, which was originally a branch of moral science?' And he claims '... not to forget that economic thought is much richer than just applied math and we should try to understand it all if we want to talk about all human behaviour'.

Third, applying behavioural models has effects, too. Siebenhüner points to evidence by Frank, Gilovich and Regan and to evidence by Streeten. Their studies show that economics graduates, who were educated with the dominant idea of a rational and self-centered *homo oeconomicus,* tended to behave less cooperatively than graduates of other disciplines (Frank, Gilovich et al. 1993). Such behaviour might have societal consequences if executed in leadership positions (Streeten 1997). If it were political minds, such a purely rational formation could produce biased views on the world: 'The prevailing view among globalization's supporters is that markets and democracy are a kind of universal prescription for the multiple ills of underdevelopment. ... Working hand in hand, markets and democracy will gradually transform the world into a community of prosperous, war-shunning nations, and individuals into liberal, civic-minded citizens and consumers. In the process, ethnic hatred, religious zealotry, and other 'backward' aspects of underdevelopment will be swept away' (Chua 2004). How would somebody else perceive, judge and act if there were additional motivations like empathy?

Figure 4: From pre-analytic visions to behavioural models and real human behaviour



Siebenhüner 2001: 22; own translation

Figure 4 sums up the recursive relationship between pre-analytic visions, ideas of human beings, behavioural models and real-world behaviour. It shows how scientific explanations of human behaviour are built up through a researcher's pre-analytic vision, interpersonally comparable assumptions and a theoretical framework which links attributes to incentive systems.

Since the mid-1980s, there has been increasing pressure on mainstream approaches which idealize and model the human being. These approaches were neither able to lower uncertainties in policy issues of risk. Nor did they work as explanatory guides in times of crisis while environmental challenges made perspectives in politics shift, e.g. from 'output orientation and environmental repair' towards 'input orientation and care'.

Pressure has also been added through technological and scientific progress. Fields such as cognitive neuroscience see the brain 'naked' and provide new insights into human perception and decision-making (e.g. Edelman and Tononi 2000; Andreasen 2005; Restak 2006).

As a consequence, there have been substantial advances in the idealization and modelling of the human being, which sometimes turns literature searches into breath-taking journeys. Yet there is no sole approach which fits all the needs of this research. This is due to the fact that all interdisciplinary developments vary in their goal, scope, depth, cognition-relatedness and contextual reference to environmental politics.

Let me briefly outline some of the most valuable findings on selected approaches. Selection criteria were motivation, cognition and environmentally sustainable behaviour, which can be described as follows:

- 'Motivation refers to the initiation, choice, or persistence in specific, goal-oriented behaviour' (Weiner 1992) while motives are certain types of incentives which are preferred by individuals. In order to directly influence behaviour and performance, an individual's motive structure has to match with the motivational characteristics of a given situation (current-state motivation). As motives differ between individuals, incentives might trigger different levels of state motivation (Reiss and Havercamp 1998). Thus, motivation is a process in which motives are embedded and scanned for relevance.
- Cognition deals with those abilities and processes which determine how a sensory input is transformed, reduced, elaborated, stored or recovered in the brain (Andreasen 2005). Even if the term's usage varies across disciplines, the larger field of cognitive science helps to achieve a better understanding of how people think, perceive, remember and learn and why motivation affects behavioural outcomes.
- 'Whatever the precise definition, sustainability science is mostly about complex social-ecological systems' (de Vries 2012). For their survival, humans depend on favourable conditions on Earth. Climate change and biodiversity losses therefore affect integral parts of the human existence and need to be tackled. This is especially true in a world which has turned from 'human-empty to a human-full world' (Folke 2013) and where the anthropogenic impact on planetary boundaries is accelerating and is not

> an independent issue but interrelated with human existence. Environmental sustainability then describes a behaviour which aims to reduce the negative human impact on ecosystems within a broader societal context.

How do recent approaches on the human being deal with these key contexts? Below, a basic distinction is made between approaches which are based on pre=scientific visions and those which are not, although this distinction is not always clear-cut.

(i) Approaches without pre-scientific visions

A first idealization which tries to comprise the human being in its totality and has also made its way into global cooperation research (Gadinger, Jarzebski et al. 2014) is the *homo narrans*. The approach is based on the anthropological understanding that each individual acquires a growing verbal and symbolic lexicon through social interaction. Narratives then provide a unique source which should be protected from the external power of interpretation. Such a '"narrative turn" in social studies' has an interest in texts as such and perceives them as a form of social life, a form of knowledge and a form of communication (Czarniawska 2004). Even analytical methods like 'signifier mapping' try to be a 'means to see the Other as Self, and the Self as Other' because they leave narratives within their contextual situatedness (Meriam 2010). Or as Schelling (2006) observes: 'Language is an almost completely adaptive behaviour. What language a person speaks depends on what languages he encounters, particularly within his own family... Accent, grammar and vocabulary are even more individualist in origin, slang being an outstanding example'.

Another approach is to categorize *ideal types of personalities* based on empirical observations, i.e. personality traits which indicate a relative willingness in favour of change behaviour. Rogers (2003) describes people who are quicker than others to adopt an innovation (early adopters). The underlying process consists of five stages: Exposure to an innovation and understanding of how it works (knowledge); forming of a favourable or non-favourable attitude towards the proposed change (persuasion); attitude-driven adoption or rejection (decision); practicing of change behaviour (implementation); seeking of reinforcement when exposed to conflicting messages during adoption of and adaptation to the new practice (confirmation). At the last stage, a dissonant individual will feel motivated to reduce his or her condition of an uncomfortable state of mind through a change in his or her own knowledge, attitudes, or actions. As a result, an early or late adopter might not actually continue a certain change behaviour. According to Rogers, early adopters have greater empathy; have an rather open set of beliefs; are able to adopt new ideas on the basis of rather abstract stimuli; have greater rationality; have more intelligence; have more favourable attitudes towards change; are better able to cope with uncertainty and risk; have a more favourable attitude towards science; have more self-efficacy and believe that they are in control of their future; have higher aspirations and seek them through formal education, higher status or more attractive occupations. The importance of personality traits is confirmed by creativity research because it helps to achieve a better understanding of how

creative people 'tick' (e.g. Andreasen 2005) and can be used to adapt incentive systems to foster the creativity of employees (e.g. Frey and Osterloh 2002; Kirchler 2008) or to improve the match between policy instruments and their target groups (e.g. Burger-Menzel 2011).

(ii) Approaches with pre-scientific visions

Modern approaches which are more strongly associated with pre-scientific visions aspire to no longer treat human behaviour as something of artificial security. In dealing with human behaviour, then, the goal is not to predict the future 'but to tell you what you need to know to take meaningful action in the present' (Saffo 2007).

Let me sketch some examples from economics, where for a long time 'the psychological study of motivation has paralleled rather than complemented the economic one' (Ainslie 1986). Since the mid-1980s, an increasing number of interdisciplinary inputs from psychology, sociology, cognitive science and others has enriched the *homo oeconomicus* or inspired new ideas from a highly integrative perspective, although none of them ever made it into the mainstream:

- The intrinsically motivated being, i.e. *homo oeconomicus maturus* (Frey 1997; Frey and Neckermann 2008): This human being is still dominantly rational and optimizes its own utility under conditions of scarcity. But now, there are motivational reflections. Motivation is triggered through incentives, which are set by a third party (e.g. monetary or reputational gain), as well as intrinsically. In such a case, the being is driven by a continuous impulse to grow personally, a sensation of complete devotion and a reward due to the action itself (Heckhausen 1989).
- Simons's *boundedly rational being* (Simon 1976), who experiences informational bounds: Related to bounds through informational scarcity or overload, there can also be cognitive bounds and stress when decisions have to be taken (Lindstädt 2006). In such situations, humans tend towards decisions, which can be described as cognitive shortcuts, such as ecological heuristics (e.g. Todd and Gigerenzer 2007).
- The cognitively competent and socially related being, i.e. *homo culturalis* (Goldschmidt, Nutzinger et al. 2009): Culture—due to cognition—becomes an open and unstable process that interrelates cognitively competent actors with different interests. These actors negotiate interpretations and evaluations of their world and conclude by compromising on their own social boundaries.
- The *multiple self* as a result of impressive transdisciplinary efforts (Elster 1986): The concept was developed by an international workgroup on rationality and social change comprising psychologists, philosophers, economists and mathematicians, and describes the individual as someone highly complex. With emotions, weakness of will and self-deception, the individual is therefore liable to make contradictory decisions and be affected by motivational conflicts. Along with this comes the plea to accept ambivalence in human behaviour (Rorty 2010).

Although these approaches are highly diverse, they all stress the fact that the need structure of humans is complex (needs relating to existence, needs for social relatedness, self-referential needs) as is cognition itself. There is intrinsic motivation (especially *homo oeconomicus maturus*, *multiple self*), cognitive decision-making (especially *cognitively bounded rationality*, *homo culturalis*, *multiple self*) and cognitive adaptation (especially *cognitively bounded rationality*, *homo culturalis*, *multiple self*).

Yet none of these approaches explicitly relates to the context of environmental politics. The multiple self might even perceive such reflections as cognitive puzzles. Kaebnick (2014) puts it as follows: '"Nature" can refer to the world prior to or independent of human meddling, or to a state of human life prior to the complications of civilization, or to the realm of things suitable for scientific investigation, or to the typical make-up of kinds of things... the understanding of nature [itself, the author] might be a cultural construction. Another issue is nature as a topic within morality'. So is there no potential for the *multiple self* and the others to practice environmentally sustainable behaviour?

Let me follow Siebenhüner (2001), who contrasts—in a very interesting and detailed comparison—the *homo oeconomicus*, the *boundedly rational being/ resourceful evaluative maximizing man* and the *multiple self*. He uses attributes (Table 1) which he classes as important for environmentally sustainable behaviour.

Siebenhüner's consistent 'story board' in more detail: Environmentally sustainable behaviour is based on an ethical claim, which can only be met by a self who is capable of free-will choices, thereby having the option to overcome external and internal restrictions (development of self). Yet sustainability cannot be reached by the human being alone. Therefore, it must also be able to care for others and nature (responsibility) and to grasp the corresponding complexity (cognitive abilities). Problem-solving of such a scale requires active consent to solutions (cooperation), sensitivity to the situation of others (empathy) and the ability to reach consensus through critical discourse (communication). As context-based solutions must aim to save scarce resources as well as to satisfy needs, the individual must be willing to undergo trial-and-error processes (learning) and be able to embrace new approaches if they offer a better fit (creativity). Needs have not only a personal and social dimension but also an ecological one (nature) and can be material or immaterial; one example is an aesthetical enjoyment of nature (emotion).

Table 1: Ideas of the human being and their potential for environmental sustainability

	General Economics *Source: Compare Siebenhüner 2001: 163-164, 179-180 (own translation)*		
	Homo oeconomicus (Savage 1954, McKenzie/Tullock 1978, Becker 1982, Kirchgässner 1991)	**Bounded rationality / REMM*** (Simon 1957, 1979, 1983, Meckling 1976)	**Multiple Self** (Elster 1986)
Autonomous will	Autonomous will not explicitly excluded but deterministic approach	Deterministic but not pure machine-like reaction	Non deterministic approach incl. contradictory free-will decisions
Freedom of action	Freedom of action restricted through budget constraints	Behavioral restrictions due to budget, informational and cognitive deficits	Behavioral restrictions due to internal challenges (weakness of will, contradictory cognitions)
Responsibility for other human beings and nature	Dominance of self-interest	Satisficing-hypothesis with moments of frugality, REMM based on own-utility maximization	Responsibility for others as one of behavioral motives; existence of inner conflicts
Cross-linked thinking and anticipation of future	Assumption of myopic behavior, no need for cross-linked thinking	Dominance of linearity, cognitive restrictions when anticipating future events	Complexity of cognitive structure through multiple selves, ability to anticipate based on 'successive selves'
Potential for cooperation	Cooperation only if contributing to own utility	Dominance of self-utility orientation with reference to claim level	Option of altruistic behavior
Communication and ability to be empathetic	Communication restricted to signals of willingness to barter, no empathy given in decision-making behavior	Communication as means for gathering of information, empathy not important	Individual as reference point, empathy as one behavioral option
Ability to learn and for creativity	Learning restricted to behavioral options, creativity only refers to derive at preferences	Information gathering as process of learning, step-by-step learning with regard to own need structure and options to satisfy needs	Learning might fundamentally change personality
Emotionality and explicit reflection of nature	Reflection of nature only as part of preference-building, no emotions in decision-making	Emotions relevant as restrictions to cognitive capabilities, no explicit reflection of nature	Inclusion of emotional and unconscious motives for action, no explicit reflection of nature

**REMM: Resourceful Evaluative Maximizing Man*

Among the contrasted ideas, only the *multiple self* seems to have the potential to learn sustainable behaviour. However, due to its limitations (e.g. contradictory cognition, lacking conscious relationship with nature), it will fail to do so.

Against that background, there is a need for more context-related approaches because the human being is the essential actor to keep the earth system – and therefore his or her own security – safe. Or as Messner, Guarín and Haun (2013) put it: 'Avoiding catastrophic climate change that can threaten human civilization as we know it may be the ultimate cooperation challenge that our species has yet faced'. Let me mention some additional interdisciplinary examples:

- Siebenhüner (2001) himself proposes the *homo sustinens*, who incorporates attributes of the *multiple self* but is able to act according to the 'storyboard' described above. It draws from earlier approaches like the *homo oecologicus* (Meinberg 1995) and the *sustainers* (Dobb 1995). The goal is to constitute an idea for the science and management of environmental sustainability.
- The *homo cooperativus* (Debiel, Leggewie et al. 2014) and, more specified, the *homo reciprocans* (Messner, Guarín et al. 2013) is a complex and cooperative person whose preferences might shift with situations and

> (cultural) contexts. Behavioural outcomes can result from self-interested instrumental rationality, enlightened self-interest, altruism, and emotions. The individual is able to be reflective, which stimulates learning and adaptation through trial and error.

Apart from their context-relatedness, how are these approaches different from the others? The *homo sustinens* and the *homo reciprocans* concentrate on behavioural mechanisms: For the societal and political sphere, Siebenhüner proposes the mechanisms of a Western learning society and analyses how the latter support the transformation of an individual into a sustainable self during his or her span of life. This makes societal structures and strategies as well as education itself with its policies, cultures and concepts extremely important. The pedagogical concept includes elements such as enlargement of the subjective capability to decide and act; ethical-moral education; systemic thinking; emotional learning; reflections on an idealized human being; social education; and learning to be creative. The transformation ends when the acting self has learnt how to learn and is able to not only adapt his or her actions and goals (double-loop learning) but also his or her cognitive processes, if need be, for improved sustainable behaviour (deutero learning).

While Siebenhüner seeks to transform the individual via education and training, Messner, Guarín and Haun already assume that humans are naturally cooperative beings and propose seven basic mechanisms that have proved to maintain cooperation in small groups over time. The proposed 'cooperation hexagon'—with reciprocity at its core—is based on four necessary mechanisms: Communication as a means to develop trust; reputation as a means to determine trustworthiness; fairness as a prominent feature of ethically acceptable interactions; and trust itself as a belief about a highly probable reciprocation. Especially in larger groups, two additional mechanisms are needed: Enforcement and we-identity. Punishment enhances cooperation when reputation-building is not possible and rewards promote it. We-identity refers to a similarity that helps to identify and find potential cooperation partners and is either based on a given homogeneity between people or is constructed through language and joint narratives.

Messner, Guarín and Haun argue that these mechanisms are 'underprovisioned' for the interface between interpersonal and interorganizational interests when not only individuals and small groups but also larger political and societal networks are concerned. Adapting the named mechanisms for such a context could then not only theoretically but also practically help to tackle global governance challenges more effectively.

In the case of the *homo sustinens* and the *homo cooperativus,* there is relatedness with nature and a dedicated and context-based discussion of mechanisms and policies. Nevertheless, for the problem at hand, they are rather complementary. This is because both of them neglect motivational processes. To put it in a simplified way: While Siebenhüner sees an ethical claim as the starting point for the development of self and further actions, Messner, Guarín and Haun take motivation as given in a person who is naturally cooperative.

3.2 Assessing the Input from Literature for Further Analysis

Let me reflect on what has been discussed so far. I argued that the implementation of global environmental politics needs individual change behaviour and therefore an understanding of corresponding motivational processes. The challenge itself was described through three 'cognitive blindspots'. The latter refer to the motivation to adopt a certain change behaviour; to keep it going despite informational and cognitive bounds; and to make it overcome challenges from self-referential and systemic complexity. If successful, change behaviour produces knowledge sharing, mutual learning and systemic adaptations.

What conclusions can be drawn for the problem at hand?

- Analyzing narratives helps to get a more realistic picture of the human being. The reason is that approaches like the *homo narrans* relate to body and thought processes and those values that underlie actions. Such approaches can therefore close all 'cognitive blindspots' if an individual is conscious of them. And they offer an increased awareness in cautiously dealing with any pre-analytic scientific vision. *Idealized types of personalities*, too, are helpful for the understanding of actors, their patterns of relationships and processes of interaction. Yet there are limits to the use of personality traits here because every bundle of features looks like a micro-cosmos of its own, prompting Rogers (2003) himself to state: 'Personality variables associated with innovativeness have not yet received full research attention, in part because of difficulties in measuring personality dimensions in field interviews'. And what do comparative degrees such as 'greater rationality' or 'stronger empathy' really mean? Is there always some kind of rationality at work as well as some kind of proper behaviour? Or can strong emotions bypass the rational as well as the moral mind? Thus, who is the human being? While the *homo narrans* deals with motivation too implicitly to turn it into an explanatory factor, adopter categories seem to run into deeper methodological problems once human mind and context gain in complexity.
- Approaches which idealize and model human behaviour help in a structured way to achieve a better understanding of elements within the complexity of the human mind and its (re-)actions: There was the confirmed importance of motivation as behavioural driver (*homo oeconomicus maturus*); informational and cognitive bounds and psychological reactions to the latter (*boundedly rational human being*); cognition with a varying (re-)interpretation of social relationships (*homo culturalis*); and a complex cognitive structure which involves ambivalence and motivational conflicts (*multiple self*). Overall, the *multiple self* seems to be closest to human nature and adequate as a baseline for the further understanding in this paper although it comes with the lack of ecological reflections.
- The *homo sustinens* and the *homo reciprocans* are among the few approaches which explicitly connect the human being with environmental

> politics. And both of them share a fundamental 'belief' in mechanisms which could make practice work towards proposed directions: In a detailed elaboration, Siebenhüner proposes the mechanisms of a Western learning society for his idealized individual, although the question has yet to be discussed whether these mechanisms are universal ones or exclusively belong to the Western 'geography of thoughts' as described by Nisbett (Nisbett 2003); Messner, Guarín and Haun assume a naturally cooperative being for their reciprocity-related mechanisms and thus reduce the complex structure of the *homo cooperativus*. To that extent, all authors tend to discuss how to make an already motivated person act into the right direction and not to explain how to reach the underlying motivation. To give an example: If cooperation is based on reputation as a mechanism to identify trustworthy cooperation partners and to expect a fair solution, do enforcement effects spill over on other motivated actions? Are the same motivational signals perceived differently when context conditions vary? And what does this mean for human cognition, learning and an individual's transformative capacity?

Overall, I found new and inspiring contributions. Yet the review had its own challenges. Not all approaches distinguish between ideas and models. In some, motives and motivation are treated as synonyms and their transformation into cognitive processes remains unclear. In such cases, neuropsychological insights on cognitive processes are 'add-ons' rather than integral parts, although this is not always pointed out. When given as add-ons, the terminology might even cause confusion when meanings mingle; this is the case with beliefs, which, in sociology, for example, are linked with cultural habits (Rogers 2003), whereas in cognitive science, beliefs describe efforts and abilities to reach a goal (Ryan and Deci 2000).

The most promising idea, where all cognitive blindspots are recognized, is the *multiple self*. But if all individuals are so ambivalent and full of motivational conflicts, what is it that breaks the inner motivational circle and provides an opening for enduring change behaviour? Do some people have better chances of escaping cognitive ambivalence and dissonance than others? If so, who are they? After having reviewed a wide array of literature, there was one question in particular which bothered me: Is it really possible to describe human motivation in a way which helps to find answers for eco-sustainable change behaviour?

There is rich evidence, especially from psychological and cognitive research, that motivation is fundamental for the human willingness to transform information into knowledge and the latter into adaptive learning. In the following, I will attempt to find some answers through a sequential arrangement of the motivational process. This may also produce a new awareness of 'what is needed', 'when' and 'how' as input from politics.

Please note: This research had its own time constraints and reached beyond the author's own disciplinary borders, which can limit the depth of a critical analysis. And there are certainly many additional and very useful studies which are still undiscovered by the author. Thus, the following approach is still in its infancy. It needs to be examined, corrected, refined and led into adulthood.

4 The Proposal: Sequencing Human Motivation for New Insights on Eco-sustainable Change Behaviour

… the mind is a wanderer, a source of
fantasy and an easy captive for puzzles,
mysteries and daydreams.
Schelling (1986)

4.1 Human Motivation and its Sub-processes

In the following, human motivation is sequenced through each cognitive stage which it must pass to go from behavioural intentions to actual behaviour. The goal is to gain a new perspective on eco-sustainable change behaviour. How? First, such an approach is a reminder that behavioural outcomes come with the flux of being or rather feeling (re-)motivated as a human being, which goes beyond traditional approaches of fixed behavioural assumptions and incentive systems. Second, letting insights from the previous chapter circulate more freely can help to find new links, showing where and how they fit together if systemic conditions become more complex. As human cognition is (neurobiologically) universal, gained insights can be assumed to be valid for all people and therefore applicable for the whole diffusion system of global cooperation.

The understanding of motivation which has been reached so far is as follows: Motivation is structured through personality and context factors and through its stages. Flows start when an individual recognizes incoming stimuli as something relevant. Once information is selected, processed and linked to anticipated goals or desired end states, the individual develops favourable knowledge or attitudes, which after internal and/or external confirmation stimulate learning and adaptive behaviour. One can easily imagine that throughout this process, cognitive capabilities (e.g. attention, perception, introspection, problem-solving) are needed and accompanied by manifestations like sensory experience, emotions, images, thoughts, inner speech or a feeling of will.

As shown in Figure 5, there are two main motivational processes with their sub-parts, which I have identified so far:

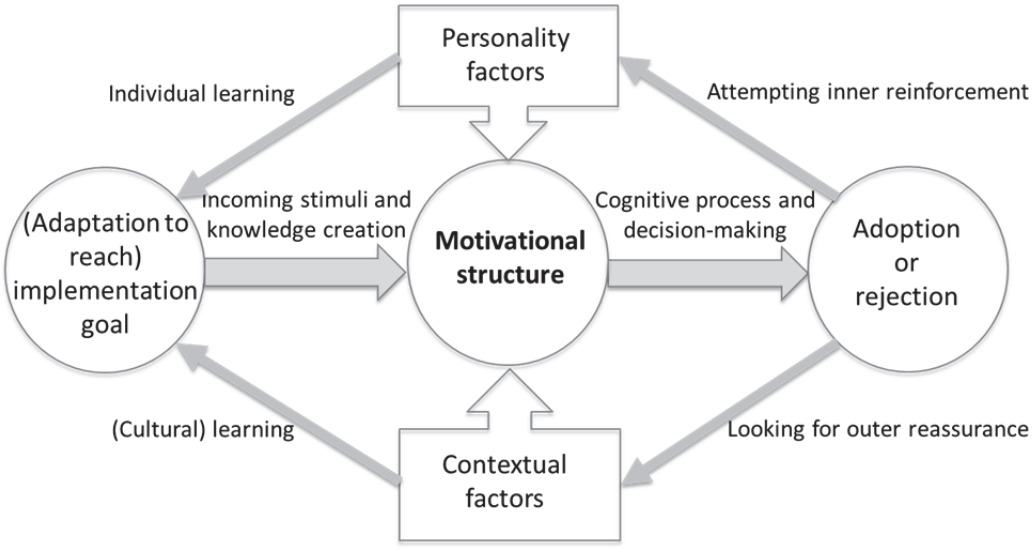
A. Basic motivational processes:

a. Signaling value through incoming stimuli;
b. Screening of stimuli for knowledge creation;
c. Bounds in and direction of decision-making.

B. Motivational feedback loops:

a. Screening for confirming stimuli;
b. Processing of knowledge for learning activities;
c. Bounds in and direction of adaptive behaviour.

Figure 5: Human motivation as structure and flux



Based on Burger-Menzel (2014a)

In order to facilitate these processes, self-regulatory efforts are needed all the time. Evolutionary psychology confirms that very simple learning may be mindless as in classical conditioning but 'value codes within the brain need to be felt if they are going to be optimal heuristics for learning' (Panksepp 2007). Yet, given the scope of this paper, there have to be limits to discussion. Like all analytical frameworks, mine remains an abstraction of reality. Some factors are stressed, others relegated to the background. When focusing on psychological and neurobiological findings on individual cognition and relating them to the socio-economic and political dimension, one must bear in mind that one is not reducible to the other.

4.2 Decoding Cognitive Matchmaking, Knowledge Creation and Decision-taking

a. Signaling value through incoming stimuli

According to Rogers (2003), '[s]ome observers claim that an individual plays a relatively passive role when being exposed to awareness-knowledge about an innovation'. And he concludes that it is the predisposition of an individual which influences his or her behaviour towards a communication message and the effects that such a message is likely to have. Such a predisposition is motivation, which scans (single) motives for their relevance. Motivation grows if an activity is central to the individual and makes an activity interesting and likely to be performed; thus, the 'signal' of the incoming stimulus gets stronger.

Motives are therefore determinants of motivation and they come with needs. An incoming signal, which serves to indicate a strong need, will be more easily recognized in its 'value message' than a stimulus, which is directed towards a relatively weak need. Or as Chong (2013) puts it: 'Instrumental reasoning and self-

interested decision-making are more likely to be manifest when people can see that a policy will have a significant impact on their lives'. A negative value can be expressed as 'costs' (direct costs, indirect costs, opportunity costs). If motivation is lacking, the corresponding activity is not executed or not executed adequately.

The early explanatory focus was on 'basic biological needs or drives connected to survival and procreation (e.g. hunger, thirst, sex) and extrinsic rewards or punishments' (Ryan and Deci 2000) that energize individuals towards reaching a particular goal. Instrumental values, which make an individual perceive nature as something important, are linked, for example, to personal income levels; consumption expenditures and living standard; employment situation; or life expectancy including available medical services and water and air quality (OECD 2000).

Additionally, there are needs for a good life and corresponding stimuli (eudemonic values). A bureaucrat whose professional utility cannot only be described through pecuniary income (e.g. increased salary) and more prestige (e.g. leadership position) but also through a comfortable and conflict-free job life (e.g. slack) and non-pecuniary income (e.g. increasing size of office), as in models of public choice theory (Fritsch, Wein et al. 1999), certainly falls into this category. Eudemonic values, which include nature and go beyond material wealth, are, for example, recreational stays as well as other amenities which positively relate to eco-services. The state of Bhutan names for example the conservation of nature and sustainable development as two pillars of its Gross National Happiness and does regular studies on these matters (McDonald 2010). Nevertheless, a good life can be combined with economic values if the provision of tourism produces regional income, for example.

However, and as discussed before, value categories go beyond instrumental and eudemonic ones. Krebs (1996 in Wiegleb 2003) mentions moral and absolute intrinsic values as complementary categories, which can have pervasive influence on the individual in his or her relationship with nature. Table 2 below gives a brief overview on all value categories.

Table 2: Values with potential as nature-related stimuli

Value category	Origin of value
Instrumental values	Values stemming from direct utility (e.g. food, raw material, medicines) or indirect utility (e.g. ecological function of nature)
Eudemonic values	Values stemming from individual well-being ('the good life'), including aesthetic, emotional and religious values
Moral values	Values stemming from responsibilities for others (including stewardship)
Absolute 'intrinsic values'	Values stemming from an object's features alone (e.g. diversity, individuality)

Based on Wiegleb (2003); own translation

Moral values stem from a need for social relatedness. According to Elster (2007), such moral values include 'the norm to help others in distress, the norm of equal sharing, and the norm of 'everyday Kantianism' (do what would be best if everyone did the same)'. While the first two norms relate to social behaviour alone, the third norm can be interpreted as one with potential for environmental care. But can moral values really be perceived as strong incoming stimuli like instrumental or eudemonic values? Hume (1739, reprint 1978) observes: 'Morals excite passions, and produce or prevent actions. Reason of itself is utterly impotent in this particular. The rules of morality, therefore, are not conclusions of our reason'. Thinking of environmental activists, for example, there certainly can be moral stimuli which trigger passion for the protection of nature.

Absolute intrinsic values can activate those inner needs that make people perform an activity for its own sake rather than as a means to an end. Wrong goal-setting can then be a negative stimulus and lead to demotivation (Frey and Osterloh 2002). Overall, values of intrinsic importance can have impressive consequences when the 'conventional work-play dichotomy does not apply' anymore because people 'don't perceive their work as duty or investment, but play time' (Choe 2006). And they can make people feel passionate about and get engaged in even seemingly impossible tasks that otherwise would not be tackled by them. Such intrinsically relevant stimuli are, for example, a self-satisfying joy of discovery or of one's own competence.

Yet setting the 'right' stimuli is a challenging matter. On the one hand, every person has various value sets at the same time. As Elster (1986) stresses: 'Each of us seems to be split between a private and a public self'. The 'economic man' within us strives for personal hedonic satisfaction. He regards other people as so many means to his own selfish ends—or as constraints and obstacles in his pursuit of happiness. The 'social man', by contrast, is governed by moral and social norms'. Surely, cultural codes change over time, partly in response to changing needs and circumstances. And surely, individuals can rebel against these codes. But Clayton and Radcliffe (1996) confirm: 'As we are a social species, we generally find it hard to exist without group recognition and support. When people reject a given norm, therefore, they usually do it by adopting the behavioural norms of a deviant sub-group with similar views within the larger community'.

On the other hand, and as an additional risk to consistent choices, a stimulus from one value category can be affected and even crowded out by a stimulus from another category. This has been researched for creative people in particular. If extrinsic stimuli are mixed with strict rules, time restrictions and sometimes even material rewards, creators with strong 'ego boundaries' and therefore a dislike of externally imposed rules are likely to feel a conflict of 'control versus autonomy' (Andreasen 2005). Ryan and Deci (2000) describe it as follows: 'Rewards are one important means through which people attempt to control others, but there are numerous other means of control and all of them appear to run the serious risk of undermining people's intrinsic motivation, conceptual learning, problem solving, creativity, and generosity towards others'. And not only instrumental and eudemonic values but also moral values can conflict with intrinsic motivational factors. Ryan and Deci add: 'In a culture that places strong emphasis on rewards, there will be an enticing pull to orient toward external rather than internal cues

and to internalize the importance of rewards and their accompaniments'. An intrinsically motivated person would then feel rather inclined to seek activities, which are occasioned and rewarded by other people's actions and responses like compassion.

How does the human mind deal with these challenges? How does it really match motives and values with the motivational features of situations, selecting some information as decision-relevant and other information as not?

b. Screening of stimuli for knowledge creation

Exposure to incoming stimuli can be described as receptiveness to raw sensory data, which must be selected and processed in the brain into knowledge for decision-making. How does cognitive matchmaking work? And what can be derived from that for describing motivated and nature-oriented change behaviour? In the following, the discussion will briefly focus on the composition of preferences and on the consistency and potential instability of their order.

The composition of preferences serves as a filter through which incoming signals are screened. It reflects a person's desires and goals according to given motivational priorities. While substantive preferences 'relate to specific pairs of options, such as a preference for vanilla ice cream over chocolate or for one political candidate over another', formal preferences cover a wider scope and are linked to 'the rate of discounting of the future, risk aversion, loss aversion, and the like' (Elster 2010).

For an individual to act in a way which is most likely to maximize net utility, preferences have to be consistent and the capacity to process all incoming information has to be unlimited. People with whom the individual has social relationships can influence the building of these preferences but not the decision-taking itself (Siebenhüner 2001). A social context is then a field where an individual's personality plays out rather than a disposition within the person.

Yet even seemingly consistent choices to maximize one's own utility need not relate to egoism. Sen (1982) identifies two cases where own-interest orientation has different causes and calls for a clearer formulation of meta preferences. First, revealed preferences might only express that a consistent chooser is concerned with his own interests due to 'the fact that his own consumption bundle—or that of his family—is the only bundle over which he has direct *control* in his acts of choice'. Second, there are two types of preferences. While one type of preferences does not trigger action although the individual is affected by the situation of others (subjective preferences), another type of preferences may even lead to counter-preferential actions in order to change such a situation (moral-based preferences). Sen describes it with the following words: 'If the knowledge of torture of others makes you sick, it is a case of sympathy; if it does not make you feel personally worse off, but you think it is wrong and you are ready to do something to make it stop, it is a case of commitment'.

This turns the discussion of consistent preference orders and their interpretation into a challenge as well. Additionally, preferences must be enlarged by propensities, which stem from the alternative value categories discussed above.

But the more is included into a preference set, the higher the risk of its (unexpected) inconsistencies when there are, for example:

- Motivational conflicts due to multiple goals, as in the case of extrinsic versus intrinsic motivation (Frey and Osterloh 2002);
- Varying risk-utility perceptions, which depend on the informational context, e.g. the net benefit of defection versus the net benefit of cooperation before and after being caught, as in the case of the prisoner's dilemma (Mag 1990);
- Altruism, which is per se non-reciprocal but might be played out as altruistic competition, i.e. people 'compete to behave more altruistically than others and establish an altruistic reputation'; altruism then can be a strategy to find cooperation partners because 'if altruism is to act as a signal that makes the receiver behave preferentially towards the altruist, then it must be a reliable indicator of a person's resources, motivations, and/or intentions' (van Vugt, Roberts et al. 2007);
- An aversion to violating cultural codes, which leads to an inversion of reason where to put self-interest within the motivational hierarchy. An individual might then cover his or her motivation with a motivation that is higher up in the hierarchy of social values, which Elster (2009) calls the 'hypocrisy' within the *multiple self*. Tocqueville (2004 in Elster 2009) illustrates: 'Americans ... are pleased to explain nearly all their actions in terms of self-interest properly understood. They will obligingly demonstrate how enlightened love of themselves regularly leads them to help one another out and makes them ready and willing to sacrifice a portion of their time and wealth for the good of the state. On this point I believe that they often fail to do themselves justice';
- Shifting motivational impulses because motives are 'latent dispositions: over time they wax and wane in response to internal states and external opportunities' (Winter 2013).

Some motives are even harder to detect but can come with a strong motivational effect such as (Ainslie 1986):

- Rewards, which an individual perceives as important but come as unexpected by-products (e.g. laughter);
- Seemingly value-less factors, which make people sometimes fail to maximize their expected incomes or minimize their costs (e.g. irrational value of friendship);
- Temporary preferences for inferior rewards, which even include consenting to undergo pain (e.g. religious rituals);
- An individual’s abstinence in rewarding him- or herself in areas where he or she is freely able to do so (e.g. self-discipline as limiting factor);
- Rewards, which lose their power with delay or repetition (e.g. need for something fashionable).

Rorty (2010) therefore makes a 'plea for ambivalence' when referring to the human being and its 'different priorities in different contexts, without having criteria for distinguishing contexts, let alone well-formed principles for ranking compartmentalized preferences'.

Schelling (1984), Nobel Laureate in Economics in 2005 for his contributions to game theory, which focus on cooperation and conflict behaviour, describes his own cognitive challenges as follows: 'An unavoidable question is whether I could be happier if only I could believe things more favourable, more complimentary, more in line with my hopes and wishes, than what I believe to be true. ... Or it might be accomplished by improving the mix of my beliefs by dropping out—forgetting—some of the things that cause me guilt, grief, remorse, and anxiety. Whether I would be happier, whether my welfare should be deemed greater, with those improved beliefs is one of the questions; another is whether, if I had the choice, I would elect a change in my beliefs. Set aside for the moment the question whether there is any way I could do that. The question whether I would choose to revise the contents of my mental library, so that even in my most rational thinking I would come to more positive conclusions, is independent of whether or not we know the technology by which it might be done.'

Global cooperation needs people who perceive politically set stimuli as a match with their given preferences, regardless of how consistent or complete the latter are. How can politics deal with the ambivalent being who is already struggling with cognitive 'matchmaking' at an early stage? What does all that mean for corresponding decision-making?

c. Bounds in and direction of decision-making

Basic motivational processes end when the cognitive self decides to adopt a certain (global) policy goal or to reject it. As mentioned above, such a decision can only be taken in a frictionless way if there is optimal information as well as limitless cognitive capacity. 'A perfectly rational individual has a complete and coherent set of preferences, gathers an appropriate amount of information depending on the significance of choice, forms beliefs about the alternatives that reflect the relevant information or evidence needed to make the decision, and chooses the action that is optimally related to his beliefs and goals' (Chong 2013).

But what happens to the decision mechanism if the information is too difficult to be understood right away or too much information has to be filtered? Such a procedural rationality results in optimization, which is more satisfying than maximizing (Simon 1976).

According to Lindstädt (2006), informational bounds come in three forms: There can be a lack of information; too much information but appropriate for definite selections; or too much information but too indefinite for selection purposes. Once incoming stimuli match given preferences, information is processed into knowledge for decision-making. This is associated with costs. There can be costs for gaining more information (e.g. information search with time and number of personal contacts) and/or costs for the enlargement of information-processing capacities (IT infrastructure, evaluation of data quality). Such informational bounds and their consequences have stimulated a huge number of scientific contributions

(Mag 1990), e.g. decision rules for situations with imperfect information (uncertainty) or imperfect information with no probability at all (insecurity).

In addition to these categories, Lindstädt discusses indirect costs that occur due to 'physiological, psychological and cognitive stress'. This stress results from a 'misfit' between an individual and the challenge, which has to be handled and might cause threat or harm and loss. People try to avoid such stress, e.g. through premature cognitive closure or a hardening of those decision-relevant categories which can threaten self-esteem. As reasoned by Taylor (1987): 'Self-esteem is the unstable component of self-concept. Threats to self or self-esteem are experienced as anxiety and result in defensive maneuvers'. Thus, decision-making can even challenge how an individual perceives itself (self-concept) because such a self-concept 'is gradually developed and changed through transactions with other persons, and it remains dependent to a large extent on the reflected appraisals of other persons' (Getzels 2008).

It is no surprise that people have developed mechanisms or rules to deal with informational and cognitive stress in decision-making by simplifying tasks. They do so in three ways (Huddy, Sears et al. 2013):

- Through decomposition, i.e. breaking a decision down into components, with each component presumably easier to evaluate than the whole decision;
- Through editing, i.e. ignoring of relevant aspects;
- And through heuristics, i.e. problem-solving strategies that are often automatically or unconsciously employed.

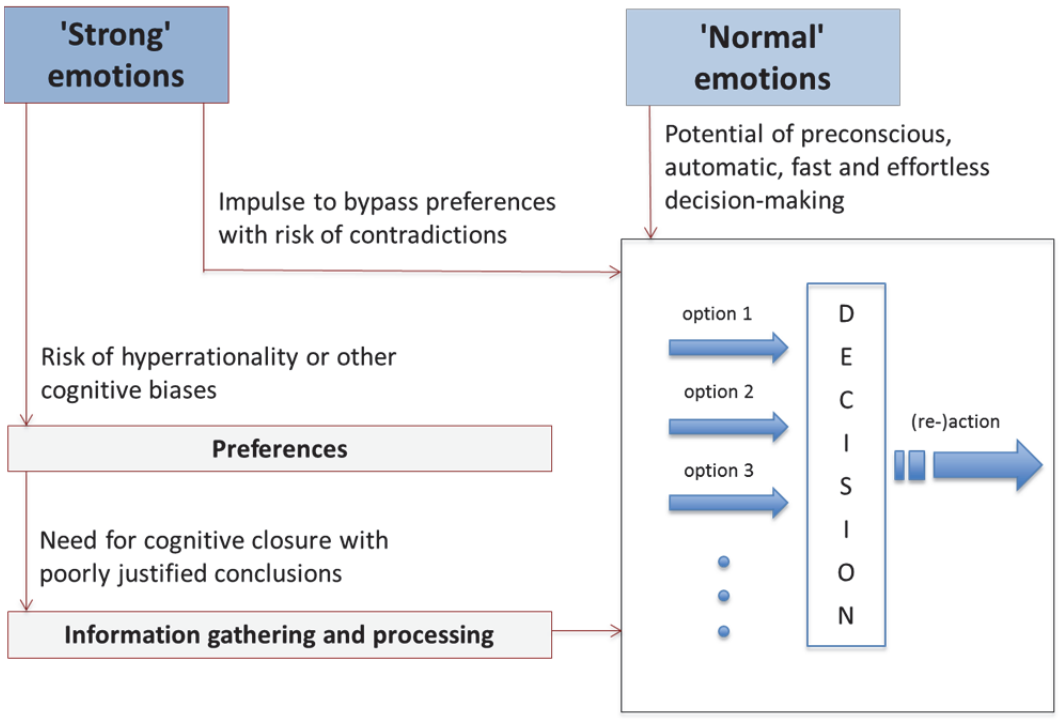
The existence of these decision-making tools is backed by neuroscience. While incoming stimuli are stored and processed in the area of the short-term memory (working memory), formerly selected and processed stimuli are stored in long-term memory. The retrieval from long-term memory is a function of what was associated with the stimulus then, to which pre-existing schemes it was related, or how frequently the individual had been exposed to the same stimulus (Huddy, Sears et al. 2013). Thus, neurobiology mirrors what can be observed as practiced cognitive shortcuts.

Usually, global cooperation increases given complexities because it adds 'new' to 'old' with a tendency to destroy the latter over time. These dynamics come under conditions of risk or insecurity. Additionally, it requires diverse stakeholders to cooperate with each other and thus bridge (cultural) context gaps through communication and knowledge transfer. Does all this support Siebenhüner's proposition to educationally and culturally prepare people for environmental sustainability? Certainly, education and training increase absorption capacities and lower rational bounds. But can they really erase cognitive shortcuts, which undermine sustainable change behaviour? And what about professionals who, even if academically trained, have gotten used to their cognitive 'safe house' and are no longer able to switch perspectives? Can, for example, institutional conditions do to professionals (e.g. bureaucrats) what academic training does to students familiar with the idea of the *homo oeconomicus*?

Additionally, there is a growing consensus in neuroscience that emotions—which have been excluded from idealizations of the 'economic being' for so long—are interdependent with rationality, i.e. they can help to reach quick and presumably rational decisions. Gross Stein argues that it is even intuitive and associative decision-making, based on emotions, that comes first, before reason and rule-governed decision-making kick in. While emotion-based decision-making is preconscious, automatic, fast, effortless but slowly changing due to strong emotional bonds, the second system is conscious, reflective, slow and flexible (Gross Stein 2013). If emotions are strong, they can bypass beliefs (e.g. passionate killing vs. religious belief that killing is sin) or even reverse preferences (e.g. fear-driven desertion by a soldier who volunteered for army service) as Elster (2010) points out.

Consequently, Ainslie (1986) describes a decision-maker as someone who is 'capable of voluntary action', 'certainly of responsible agency' and 'rational, at least by prudential and formal criteria', but also someone who fulfils all these requirements, can follow a large variety of motivational determinations and 'can, in the event, be voluntarily swept, against his better judgment, to follow a charismatic leader, allow himself to be cast into a role that does not coincide with his preferences, to be moved by empathy or by the excitement of crowd behaviour'. The following figure tries to illustrate action tendencies of emotions by differentiating between 'normal' emotions as the first and fast decision-taking mechanism and 'strong' emotions, which point to biased or even contradictory behaviour.

Figure 6: Emotions and their action tendencies



Based on Burger-Menzel (2014b)

Thus, while normal emotions can lead to preconscious, automatic, fast and effortless decision-making, strong emotions tend to send the human mind on 'detours'. Or as Schelling (1986) puts it: '[T]he mind is a wanderer, a source of fantasy and an easy captive for puzzles, mysteries and daydreams'. Can environmental politics pre- or counteract and, if the answer is yes, in which way? Can politics make people not only cognitively less overwhelmed but also emotionally more intrigued by it? Is communication the clue to it all?

4.3 Motivational Feedback Loops, Learning and Adaptive Behaviour in Complex Systems

a. Screening for confirming stimuli

As described by Rogers, there seems to be a decider's need to get her/his choices confirmed. This is especially true in a world of uncertainty and therefore risk and it is all the more relevant if internal motives can shift or even fade away. 'When a person changes, he may regret some of the choices he made before the change. Also, he may find that he does not want to stick to his earlier decisions' (Elster 1986). An individual will then check whether the motives concerned relate to durable interests. This is also confirmed by neuroscience, which describes consciousness as 'a process that is continuous but continually changing' (Edelman and Tononi 2000).

If a decision is confirmed, it may gain weight, which makes it not so easily rejected in the future and better retrieved from memory. Steedman and Krause (1986) point out that 'people do not often change drastically over a very short space of time (which is why one can refer to their characters)... one can say that a "person is constructed by choices he has made sequentially through time"'.

Confirmations are produced in the inner world (autonomy) and/or through the outer world (interrelationship). Only the most autonomous individuals will not seek outer reinforcement at all. But as discussed above, no person seems to be without membership of some face-to-face or reference group. 'Even the most independent of pure scientists ... publish ... their work' and thereby become liable to group influence from peers and critics (Getzels 2008). Lebow (2005) even states: 'Individual identity is historically conditioned, took millennia to emerge and has been regarded as unnatural by most people for most of its existence' and that '[m]odern society's emphasis on individualism and free choice creates an entrenched predisposition to exaggerate the uniqueness of the inner self'.

As in the basic motivational sequence, confirmation mechanisms entail awareness-building, gathering and processing of information, and remembering or forgetting. Reinforcement itself can happen intentionally or unintentionally. And as in the basic motivational sequence, it is here that the mechanisms of the cooperation hexagon become highly relevant.

Small groups in particular offer shared cultural codes and a transparent environment to rein in their members, e.g. by means of tit-for-tat strategies. In these social environments, reputation matters a great deal, as do emotional enforcement mechanisms, which produce shame, guilt or sensitivity to social

sanctions within an individual and induce him or her to interact in a code-corresponding way. Udéhn (1993 in Siebenhüner 2001) describes the need to communicate as follows: 'One of the most significant and most consistent results of experimentation over the years is that cooperation increases dramatically if people are allowed to communicate before being subjected to a social dilemma'.

Language is also highly important if groups get larger or if boundaries between different groups are spanned because 'language is a capacity that can build alliances in large, dispersed groups', e.g. through gossip about others, which 'tends to revolve around the status, achievements and failures of other people' (van Vugt, Roberts et al. 2007). Rogers (2003) confirms for the diffusion of innovations that '[i]n order to explain the effect of the critical mass on the adoption behaviour of a system's members it is useful to think about micro-level personal communication networks'.

Through communication, confirmation can be sought in overt and verbally direct or in more subtle and non-verbal ways depending on culture (Nisbett 2003). Intercultural management literature describes this difference as the one between low-context communication (explicit language) and high-context communication (implicit language). If cultural differences between people are substantial and cross-cultural awareness is low, there can be cognitive dissonance for those who encode and decode communication messages (Deresky 2000). Both sender and receiver would then tend to ignore differences in attitudes, thought patterns and language features, which are directly or indirectly transported through communication. Creating a 'we-identity' in larger groups, as suggested by Messner, Guarín and Haun (2013), has to take the latter into account.

It is essential for global cooperation to understand the nature of communication flows in and between personal networks and what determines how successfully someone relays a message to someone else. But what follows from the recapturing of minds through confirmation signals? How can communication build up cognitive patterns of recognition and thereby induce learning? What is learning?

b. Processing of knowledge for learning activities

Positive confirmation leads to individual learning, while negative confirmation makes people forget the information that was dealt with. Learning itself produces changes within an individual, which can refer, for example, to a recombination of memory-stored information, the enlargement of knowledge, or the acquisition of new principles or skills.

How do individuals learn and is it easy to reach learning goals? Let me refer back: Learning, which is intrinsically motivated, can be assumed to have its own rewards. Ryan and Deci (2000) point out that in a study by McGraw and McCullers (1979) participants who were rewarded, 'had a harder time thinking flexibly than did those who were not offered a reward'.

But as discussed above, individuals are rarely autonomous. Knowledge creation mainly exists in a social context, which turns knowledge-sharing and learning into social interactions, i.e. knowledge-sharing, too, requires motivation (Quigley, Tesluk et al. 2007). This leads to reflective practices, which are learned and reproduced in communities of practitioners (Schoen 1983). Tomasello (2009)

identifies two cooperative processes that are critical for such a social mechanism: 'First,... [t]eaching is a form of altruism, founded on the motive to help, in which individuals donate information to others for their use. ... Second, humans also have a tendency to imitate others in the group simply in order to be like them'. Panksepp (2007) adds the motive of affection and explains that the 'most effective reinforcers [of individual and cultural learning] are always accompanied by affective experience in humans'.

Limits are set by the individual's cognitive capacity, the type of knowledge, which is learnt, and by the institutional conditions for learning (Burger-Menzel and Assadi 2012). Basically, two types of knowledge can be distinguished: Tacit knowledge includes (technical) know-how and experience and is continuously learned through (professional) activities, most of the time subconsciously. Explicit knowledge is codified (e.g. through letters, numbers, symbols) and eases the perceptibility of knowledge and its exchange through communication. The less restricted knowledge flows are, e.g. through institutions such as traditions, norms and legal rules (e.g. intellectual property rights), the more one type of knowledge can enrich the other and stimulate need- and goal-oriented exploring, searching, selecting, learning, creating, memorizing and adjusting to new knowledge. Linking such interpersonal learning processes creates another diverse net of communication paths.

Against that background, it can be understood that the pedagogical concept of the *homo sustinens* goes beyond elements such as systemic thinking or creativity techniques. It also aims to enlarge the subjective capability to decide and (inter-) act, ethical-moral education, social education and emotional learning (Siebenhüner 2001). The German Advisory Council on Global Change (WBGU 2011), too, stresses the societal need to establish transformation as a new area of research and education ('transformation research and education') and to provide corresponding information, methods and technologies for its application ('transformative research and education').

Many positive and normative endeavours in environmental studies aim to foster such a new paradigm. However, Maniates (2013) points out that there are still 'surprisingly few places' in environmental studies where 'students explore the changing role of science and scientists in the struggle for sustainability. Such exploration might begin with how scientists better communicate their ideas in politically charged environments and then extend to deeper questions about the politics of expertise around contentious environmental issues'. And he identifies a particular challenge in this context: '[d]uring turbulent times, natural scientists and the insight they generate will be greeted with increasing skepticism and hostility'. This is even valid for disputes among scientists, who 'often exhibit human frailty, and issues of jealousy, greed, and the misuse of power may play a role in the fate of theories' (Gell-Mann 1994).

Thus, also learning and knowledge creation can lead to (assumed) failure, cognitive stress and threaten a person's self-esteem. Such a threat will be lower if there are personality traits like intrinsically driven curiosity or a positive attitude towards uncertainty and risk. But how many people really prefer life in an environmental world full of unknowables, risks and crisis over options such as wishful thinking, ignorance or even denial? Can humans really effectively scale up

sustainability in times of constant environmental crisis? And if not, is systemic change out of the question until it is too late?

c. Bounds in and direction of adaptive behaviour within complex systems

The motivational feedback loop ends when politically intended and learnt adaptation is tried out. Evolutionary development could then be described as a pattern of recurrent adaptive behaviour, which is based on trial and error. One challenge is to keep individual motivation going if the inner world is one of ambivalence. Another challenge is to keep it going if the inner world is additionally confronted with increasing outer complexity and less and less predictable (social) consequences. Both are manifestations of the third cognitive blindspot, which determines whether change behaviour really becomes sustainable or not (Chapter 2).

What is meant by system complexity, a term referred to increasingly often in discussions? The analysis of complex adaptive systems is an interdisciplinary science in itself, with contributions from fields such as biology, sociology, neuroscience, computational sciences and physics. Therefore, complexity is a widely used term which can have different meanings for different researchers. The following definition might not find consensus but I consider it useful because it covers all the various elements. Edelman and Tononi (2000) claim that

> *there are two aspects about which every expert on complexity agrees. First, to be complex, something must be composed of many parts that interact in a heterogeneous way. ... Second, it is now generally agreed that something that is completely random is not complex, nor is something that is completely regular. ... Only something that appears to be both orderly and disorderly, regular and irregular, variant and invariant, constant and changing, stable and unstable deserves to be called complex.*

Global cooperation in environmental politics has to cope with huge complexity. There are three layers full of risk- and crisis-related unknowables. The first layer is the earth system itself, which continuously changes in ways which are only partly understood. This concerns the atmosphere, biosphere, lithosphere, hydrosphere and cryosphere and makes our planet—as a single connected system—continuously 'changing on all spatial and temporal scales' (NASA 2014).

The second layer consists of human-induced effects on the earth system with their often unpredictable consequences for human existence. There is, for example, the climate system, where carbon dioxide levels in the atmosphere have increased by 30 % since 1900 (NASA 2013), or the ecological system, where the total number of known species has decreased by 40 % between 1970 and 2000 (DGVN 2014). O'Neill points out: 'Any country can emit greenhouse gases into the atmosphere, or harvest fish from the high seas, without itself tipping the balance of the system's sustainability. However, once we examine the collective impact over time of all states treating the atmosphere or the oceans as their own private sink or source, we can see that these seemingly limited resources are, in fact, vulnerable' (O'Neill 2009).

As discussed in this paper, the third layer is the human being itself with its complex cognitive structure and behavioural ambivalence, which can be 'a sign of intellectual or moral laziness, masking vague or ambiguous judgements, a disinclination to press for clarity and precision in one's attitudes, values, and commitments. Yet even the most earnest moralist acknowledges that we are often conflicted about how to assign priorities among our multiple wholehearted commitments' (Rorty 2010).

As a result of such complexities, perceived regularities might only be regularities among 'blanks' (e.g. overlooked regularities) or even misinterpretations (e.g. random features). With regard to human change behaviour, all three layers of complexity are interrelated. Why? If cognitive shortcuts (e.g. decomposition, editing, heuristics) and their pattern of learning already result from 'normal' cognitive stress, what happens if human nature has to cope with an even bigger complexity, which poses threats to life and even human existence? Does the 'human risk factor' grow alongside environmental unknowables and threats of worst-case scenarios? Is there a point where people start to practice ignorance and even denial instead of adaptation, just to be able to live a 'normal' life?

Notwithstanding an impressive number of eco-sustainable small-scale approaches around the world, let me pick some examples which illustrate this kind of human risk factor. For laypeople, Wibeck and Linnér conclude from their study with Swedish focus groups that the latter seem to be concerned about scientific uncertainty about climate change, uncertainty about effective options for action (especially when related to individual lifestyle changes) and about limits to individual responsibility. And there seem to be attempts to make sense of climate-related uncertainties in various ways by e.g. using the discussion of other environmental issues as a reference point or the credibility of messengers to determine the reliability of information. A past experience, however, where uncertainty was used as an 'excuse for not acting' can demotivate responsible citizens and delay their efforts to scrutinize the effectiveness of existing policies (Wibeck 2014).

Consequently and as Gell-Mann (1994) points out for complex adaptive systems, the present might matter more to people than the future. An idea might be chosen just because it receives more positive feedback and establishes a dominant position, i.e. 'existing ideas entrench themselves and we have a tendency to interpret new information as confirmatory, so that we dig ourselves deeper and deeper into what may be a quite unsuitable hole'. Small acts of 'green' behaviour, which offer room for ambivalence, might then only serve to relieve a guilty ecological conscience and will remain without systemic impact, i.e. there is a 'systemic behavior-impact gap' (Leonard 2013). This seems to match survey results for the USA which show that '[m]ore than 80 percent of Americans fail to consistently practice a small suite of environmentally sound behaviours, like reducing their energy use, driving smaller cars, and buying green products. Almost 25 percent of Americans do not recycle, often because they cannot be bothered or believe that doing so makes little difference. More generally, consumer commitment to environmental practices appears to be waning' (Maniates 2013).

To that extent, the analysis of environmental systems seems to be more challenging than the one of traditional innovation systems. The latter often has a

more restricted focus which is to watch the birth of a promising technology and to track if and how it has a persuasive effect on its diverse user groups due to e.g. productivity increases or better health.

But many eco-behavioural choices do not seem to inspire and mobilize, especially when communicated within a 'science drama frame' (Wibeck 2014) or as 'politics of guilt' (Maniates 2013). Does this mean that multi-stakeholder partnerships in environmental cooperation will always produce an overall 'poor record of promoting systemic change' as stated by the UN (2013)? Or is some kind of systemic change already given but in such a fragmented way that it is hidden and/or misinterpreted as incoherence?

Todd and Gigerenzer (2007) comment rather optimistically on adaptive challenges for the human mind, even if they are answered by heuristics:

> *The adaptive processes of evolution, learning and culture have shaped human minds to be ecologically rational, relying on simple decision heuristics that confer the twin advantages of speed and accuracy in particular environments bearing exploitable patterns of information. Individuals can certainly be led to use heuristics in inappropriate environments and consequently make errors in reasoning, but this serves to show the boundaries of a mechanism's ecological rationality rather than its irrationality. When mind and world fit together, the evolved capacities, building blocks, and simple heuristics in our adaptive toolbox can guide us to make good choices in a fast and frugal manner.*

Using the approach of the *homo narrans* can certainly help to deepen the understanding of why in environmental systems people do what they do in the way they do it. In addition to eco-surveys, it is therefore 'crucial to analyse *how* people talk about their uncertainty' (Wibeck 2014). This is a reminder that humans should be understood in their behavioural totality and that the scientific power of interpretation should be handled with care.

Let me sum up the understanding of the 'human risk factor' in environmental politics as something which can unpredictably shift between polarities such as:

- Individual egoism versus nurturing social behaviour;
- Attitudes dominated by personal autonomy versus hierarchical societies;
- Logic-based action versus intuitive insights and empathic imagination;
- Situational decision-making versus contextual dependency;
- Centrality of temporal reference points (past, present, future) versus low importance of time construction;
- Willingness to learn and change versus guarded identity and styles;
- Direct communication versus an inclination towards more symbolic and interpretive understandings.

Environmental sustainability is long-term adaptation, which means that all basic motivational processes and their feedback loops have to run over and over again while the conditions for doing so continuously change.

It seems that the higher the complexity and its unknowables, the higher the risk that a multiple self might (unconsciously) 'opt out' of sustainable change behaviour. However, one clue may be to better match the human mind with the world around. What could that mean? The last chapter presents conclusions on all the findings and attempts to develop them into first tentative proposals for the research field of environmental politics.

5 (Policy) Conclusions and Outlook

The brain is a selectional system, and matching occurs within enormously varied and complex repertoires... the stimulus acts not so much by adding large amounts of extrinsic information that need to be processed as it does by amplifying the intrinsic information resulting from neural interactions selected and stabilized by memory through previous encounters with the environment.
Edelman and Tononi (2000)

5.1 Drawing Conclusions: Human Potential for Environmental Sustainability

The inner world of the human being is cognitively complex. There are multi-value categories, motivational shifts and conflicts, selective retrievals of supportive memories and limits to data processing with behavioural consequences which can only partly be foreseen, if at all. Elements within the outer complexity can be (un-) consciously fearsome to humans. In this case, the human brain reacts with cognitive shortcuts or motivational swings, which can be spontaneous and inconsistent.

Against that background, many scientific ideas and models of the human being produce illusions rather than an accurate representation of reality. Nevertheless, they are valuable. They have gradually shifted our understanding of *'us humans and the world'* to the edge of knowledge, only to see that there is another universe to discover and learn about. For someone who was academically educated in math-based economics and operations research at the University of Mannheim, such a journey from a presumably controllable world to the unknown is fascinating and fruitful. Yet my original intention to transfer insights on intrinsic and extrinsic motivation from innovation system research to global cooperation research failed. This was due to the fact that there is not just one group of actors with specific personality traits, such as creators, but an overwhelming diversity of stakeholders, which spans all personal, professional and cultural boundaries. So I went back to review the literature on who is the human being. And when I could not find the answer to my question, I attempted a solution which I called 'sequencing human motivation'. Basic motivational processes and motivational feedback loops were identified as core processes. Both consist of a screening, processing and execution phase.

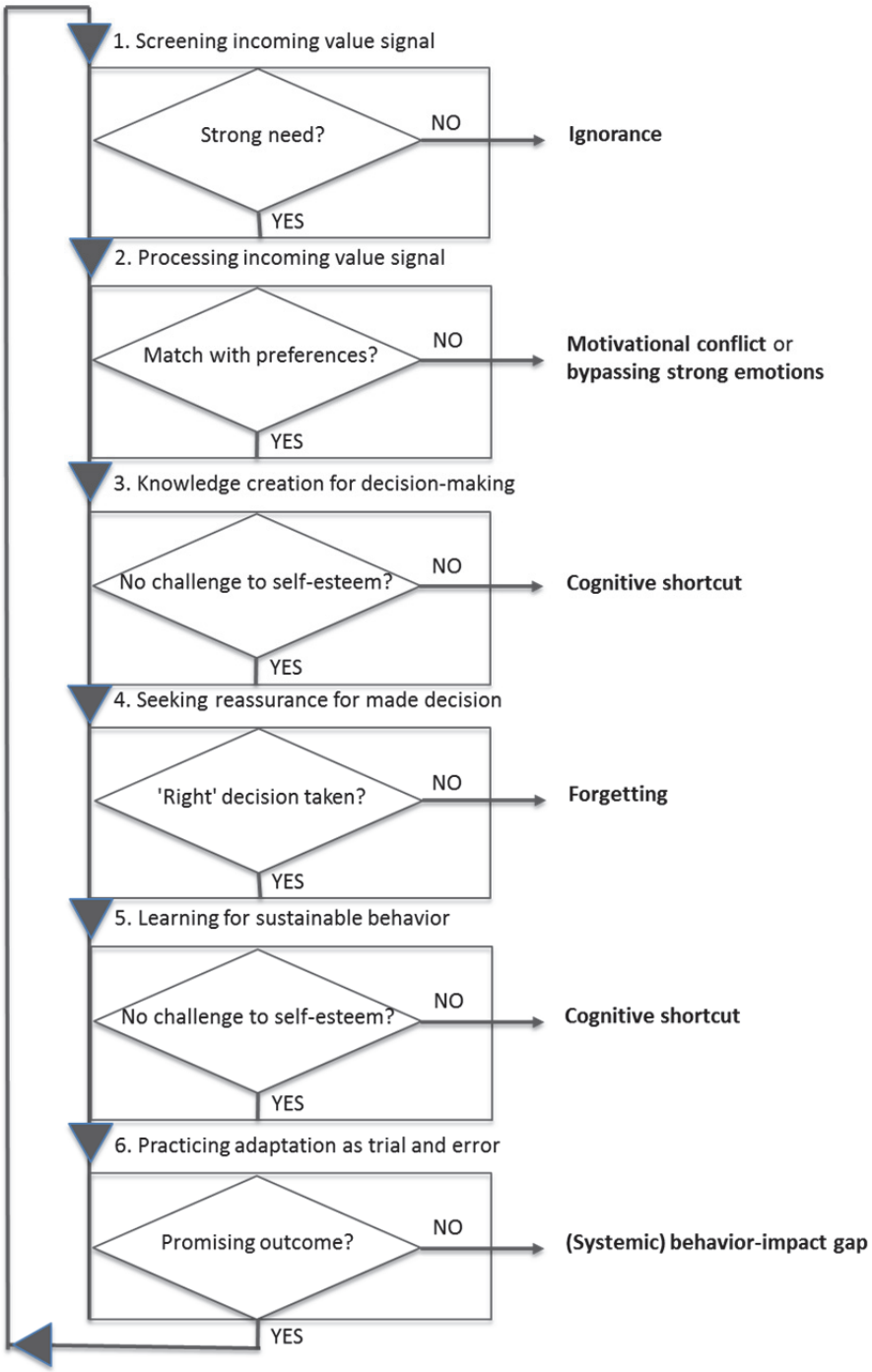
In this chapter, let me summarize what has been achieved so far (conceptual findings):

- Thinking in systemic terms acknowledges that actors are rich in attributes and social arrangements. Integrating this perspective into the analysis of global cooperation creates a new understanding of the human risk factor in complex environmental systems and requires an analysis of who humans really 'are', which is the subject of this paper.

- Going through all stages of sequenced motivation reveals how and to what extent scientific ideas and models were able to approach human complexity and—apart from the *multiple self*—what they (intentionally) left out.
- Existential needs are of the utmost importance, especially if there is poverty. But even then, a lot of behaviour is occasioned and rewarded by other people's responses and/or relates to self-referential needs. In total, the inner world of a human being is more one of ambivalence than one of consistent rational behaviour. There is an individual sense of bounded rationality but it has tension with tacit and impulsively unordered rationales for action. Belief and value systems, which shape human behaviour, undergo contextual shifts because individuals can belong to multiple identity groups at any moment in their life. The emotional structure and dynamics of a person can either support or contradict rationality when expressed in action. Thus, modern ideas and models of the human being have to acknowledge that behavioural choices also involve unconscious incubation, cognitive shortcuts and intuitive interactions.
- All this turns communication into an extremely important matter because it transmits key messages and know-how during the whole process of implementing (global) policies. By means of communication, the sender tries to convince the receiver through non-verbal signals and verbal messages that adopting a specific change is important while being aware of the receiver's needs and context restrictions. The major challenge is to avoid 'noise' in the communication channel, i.e. misunderstandings between sender and receiver due to (cultural) heterogeneity and / or shifting contexts (e.g. co-evolution of actors or new issue-links). Effective communication supports continuous reorganization to find the best fit between mind and environment. Modern studies of human behaviour have to take account of communication as an important mechanism which can support systemic change if practiced adequately. It is here that the methodological approach of the *homo narrans* and its insights could be exploited for corresponding groundwork.
- The goal was to better understand cognitive blindspots, which turn humans into a risk factor in (global) environmental cooperation. The following figure shows the sequence of human motivation and exemplary explanations for such blindspots. The potential for moving from short-term to long-term change behaviour is shown as a cycle. Once learning is executed as adaptation, the entire motivational sequence must be restarted in order to make change behaviour sustainable. If successful, there will be continuous learning through trial and error while the rerun experience becomes rooted in long-term memory for future retrieval. During every motivational cycle, humans can potentially 'opt out' at different stages e.g. through non-action (e.g. ignorance and forgetting), doubts (e.g. motivational conflicts) or some kind of stress (e.g. cognitive shortcuts such as decomposition, editing and heuristics). In order to better deal with cognitive blindspots in global cooperation, modern

studies on human behaviour must apply an interdisciplinary approach, which integrates the 'neurobiological brain' instead of using it as pure add-on. This should also be done at the risk of eclectic approaches, which by nature can only scratch the surface, underneath which there are beautifully elaborated and specialized insights.

Figure 7: Examples of 'cognitive exit points' in human change behaviour



- Higher complexity seems to create a stronger tendency in humans to opt out of sustainable change behaviour. It also seems that scientific worst-case scenarios or politics of guilt are rather weak incentives to heal motivational circuit breaks and fallbacks and might even lead to non-action. Modern approaches which focus on human behaviour in global environmental systems have to reconsider how far laboratory-based conditions (e.g. experimental game theory) match the challenges on which conclusions are drawn. Notwithstanding the importance of all experimental contributions, long-term adaptation needs methodologies which track human behaviour in its totality as far as possible and do so over time (e.g. socio-economic panels combined with narrative research).

Against this background, this paper offers limited contributions. Cognitive exit points can be relevant to different people in different ways and an additional behavioural understanding of professional categories (e.g. politicians, bureaucrats, entrepreneurs, scientists, lobbyists) and of personality traits (e.g. early adopter, late adopter) certainly helps. Nevertheless, as all humans are 'run' by cognition regardless of how stakeholders vary, sequencing human motivation made me understand human behaviour much better and I hope to have adequately communicated it in writing. Let me now close with some ideas for future research agendas.

5.2 Proposals for Future Research Agendas and Final Remarks

What can be derived from the insights presented in this paper for the future analysis of global environmental politics? Here are some initial tentative proposals which may be suitable for transformation into hypotheses for empirical research:

Basic motivational processes

- **Proposal 1**: In order to motivate an individual to embrace environmental sustainability, a set of signals is needed. It must include more than one need category (multi-value set) and be relatively important in the individual's world (strong needs). Context gaps between people must be acknowledged, increasing the importance of decentralized diversity management (localized governance modes). This is especially important for intrinsically motivated change behaviour, which can be crowded out by external factors.
- **Proposal 2**: As human motivation entails intra-personal bargaining situations but is sensitive to social responses, ethical norms help to adjust the subjective evaluation of incoming data and to direct the latter towards long-term interests. These norms should evolve as codes through discourses between stakeholders and be based on lifelong education and training (ethical coding and the moral mind). Violations of ethical codes should come at high social costs for the violator in order to be motivationally powerful (strong sanctioning of misbehaviour).
- **Proposal 3**: The evolution of ethical codes must be supported by key actors (role-model behaviour) in order to shape the normative hierarchy

of motivations, which is given in every society. This is needed to render ethical codes effective and puts credibility issues such as corruption at the top of global agendas.

- **Proposal 4**: People are averse to increasing complexity, both internal and external. Environmental policy therefore needs designs which serve as a conceptual anchor and use non-contradictory clues as stimuli (coherent but robust governance). Governance gaps between different policy fields can render such efforts useless and should be identified and dealt with (reduction of systemic fragmentation).
- **Proposal 5**: Environmental politics can affect individual decision-making better if it services cognitive shortcuts and/or reduces the bounds which trigger them. Cognitive shortcuts, which are identified as opt-outs or contradictions to the system, should be redirected and integrated (considerate but experimental governance). This can be supported by positive emotional messages (political psychology). Bounds should be reduced by making the consequences of policies more visible (policy of early awareness) and the consequences better cognitively accessible (identification and enlargement of given absorptive capacities).
- **Proposal 6**: The basic motivational process can only be influenced from the outside if information is mutually created and shared. As corresponding practices and skills vary between stakeholders and are of self-referential importance, effective communication depends on context-relatedness and peer-group environments (avoidance of 'noise' in the communication channel). This is also valid for all stages of motivational feedback oops.

Motivational feedback loops

There is cognitive dissonance after decision-making. Thus, motivational feedback loops face similar cognitive challenges as basic processes. There can be motivational conflicts, cognitive stress and shortcuts for some individuals and self-rewarding learning and altruistic teaching for others. Additional proposals are:

- **Proposal 7**: Politics can capture the mind positively or negatively. Incoming and confirming signals, which contain clues of value, can build up cognitive patterns of recognition and support so that the receiver of those signals can identify herself/himself with the policy concerned (policy of incremental steps).
- **Proposal 8**: As shown above, humans interpret information in terms of their own attitudes and beliefs but are perceptive to social response. Politics should identify role models in all key areas and stimulate imitation processes through communication or other social signaling (identification and encouragement of imitative practices).
- **Proposal 9**: Education and training can again be seen as an instrument to increase an individual's awareness of problem dimensions and his or her capacity to change behaviour. As cognitive stress can lead to corresponding shortcuts in learning as well, learning must go beyond

knowledge creation and include improved learning techniques to reduce risks to self-esteem (from know-how to learning to learn).

- **Proposal 10**: If information is bounded, as in complex systems, decisions can no longer be predicted simply by drawing conclusions about alternatives and preferences but will be affected by the way decision-makers attend to particular preferences, adaptive strategies and their consequences, as in learning systems. Key political actors therefore need their own learning and adaptation capabilities, an awareness of maladaptation and a willingness to stimulate changes—also in their own behaviour (reform of professional categories and required skills).

There seem to be cognitive features in the human being that allow their transformation within complex systems. The clue seems to lie in matching the individual mind with the world around and to correspondingly reinterpret the performance qualities of decision-making.

Against that background, the last proposal is the most challenging one: There has to be a nucleus of motivated people in order to set the ball rolling, and this nucleus must include public stakeholders, who would have to reform themselves and to put their own, often secure, life conditions at risk. Only if all stakeholders accept environmental policy goals as their priority and act upon it is there a chance of turning the (still) poor systemic change into a satisfactory one.

That brings me to the end of this paper whose lengthy structure is like a narrative of my re-'search' at the Käte Hamburger Kolleg / Centre for Global Cooperation Research. Overall, it has been a challenging and exciting adventure across disciplinary borders, through which I learned how cognition is an integral part of human behaviour and how the latter is embedded in the understanding of systemic change. Although not all conclusions are new, they now derive from a fresh perspective on eco-sustainable change behaviour. And despite the fact that the core analysis had to be relatively abstract, there was context-relatedness throughout the paper which allowed proposals for global environmental policies at the end.

There is no doubt that many relevant questions had to remain untouched. A follow-up paper will therefore pick up from here and put the 'cognitive self' deeper into the world of 'me and the others', with a focus on individual capabilities that are needed to scale up systemic change. This will enable effective policy formulation to be assessed against intra- and inter-diffusion patterns of groups and networks.

Let me close with Ryan and Deci (2000): '... learning, creativity, and prosocial behavior [are] all variables that relate to the proactive qualities of human motivation and behavior'. Against that background, I wish to thank the Käte Hamburger Kolleg / Centre for Global Cooperation Research at the University of Duisburg-Essen for its support and inspiring atmosphere during my six-month senior fellowship in 2014.[*]

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