TRANSGOVERNANCE

The Quest for Governance of
Sustainable Development

Roeland J. in 't Veld

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Napolitano, Alexander Perez-Carmona
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Colophon

This report results from the project *Science for Sustainable Transformations: Towards Effective Governance* (TransGov), at the IASS Institute for Advanced Sustainability Studies Potsdam. It presents TransGov's main considerations and recommendations to decision makers.

The report is composed by *Roeland J. in 't Veld*, with input from the other project participants: the TransGov Steering group members *Klaus Töpfer*, *Louis Meuleman* (project director) and *Günther Bachmann*, and the research fellows *Stefan Jungcurt*, *Jamel Napolitano*, *Alexander Perez-Carmona* and *Falk Schmidt*.

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Prologue

Prof. Dr. Dr. h. c. mult. Klaus Töpfer

We live, as we always have, in turbulent times. Social systems are reflexive in nature and can and will change pathways step by step, be it over time or instantly and abruptly. These changes may occur because of learning processes in a society or in the political culture, or may result from changing power structures. These processes may be smooth and incremental or disruptive and powerful.

Two main changes have altered this already challenging social fabric of the twentieth century. First, we live in the era of the anthropocene (Paul Crutzen). This means: Humankind has become a quasi-planetary force, as the first symposium of Nobel laureates organised in Potsdam/Germany stated in its declaration in 2007. This immensely productive first symposium has also provided the seat for the Institute for Advanced Sustainability Studies (IASS).

Second, changes at a planetary level take place increasingly often, ever faster than before and with increasing amplitude. Indeed, it is becoming more difficult to differentiate between changes and disasters caused by natural forces and man-made catastrophes, as the reasons are overlapping. The terminology of a "great acceleration" is no longer reserved for special moments in human history. This situation seems to be a companion of our times. Such accelerations are linked with a variety of different reasons. There is of course the increase of greenhouse gases in the atmosphere which are irreversibly threatening the climate stability of the earth system. Such regular accelerations are linked with the extinction of species and entire ecosystems. It also seems to be part and parcel of globally interwoven systems ranging from grass woods activities turning into mass movements to financial systems which are currently in a state of despair.

The main question we are confronted with is: Will we be able to respond to these challenges effectively? Even more fundamentally: Are we able to understand the driving forces, and are we in a situation to reduce the complexity of these interwoven interdependencies as a precondition for concrete and targeted policy making? Do we make sense of what we witness in the reality of life or is it just happening to us? Will it be possible to transform the wealth of knowledge available into actions and will we be able to take full advantage of the breath of engaged citizens? Do we have to complement the acceleration of changes humankind is facing nowadays with an acceleration of ideas and solutions as well as ever larger systematic and holistic changes? Or do we have the chance to implement processes of change reducing the complexity of change to realise a piece meal engineering procedure

with the chance to react to new insights and knowledge and to new or changing values in an open democratic society?

At the same time: What can we learn from the puzzling fact that some 20 years of sustainability governance – the overarching frame for our considerations – has not led us very far, to say it politely? Should we consider slowing down our actions and reactions and taking time to reflect in order to move forward more effectively? Are we aware of the recommendation formulated by the Spanish philosopher Balthasar Gracian in the sixteenth century: *"The most difficult part in running is to stand still"*. Are we running too fast whilst not sufficiently questioning the direction in which we are running?

The foundation of the IASS and its cluster "Global Contract for Sustainability" exists to address questions like this. As a consequence, the TransGov project was started in the summer of 2010 as the first fully-fledged research project of IASS. Its aim is ambitious and manifold:

First, to bring together new and existing ideas on governance for sustainable development and to develop new, that is, "advanced" insights from them.

Second, to provide a platform for exchange for scientists, including four research fellows forming the forerunners at the IASS literally, and practitioners. Indeed, two main workshops integrating scientists, politicians, and members of NGOs from the national and international level with a maximum of thirty participants who follow the Chatham House Rules were crucial intellectual building blocks for the research process of TransGov. Several other meetings and consultations were held. Providing such space is not only key to "test" our hypothesis, it "practices what we preach": to have a co-evolution of relevant knowledge stemming from both science and practice and trying to address real-world problems.

Third, in addressing "Science for Sustainable Transformations: Towards Effective Governance", TransGov has laid out a conceptional matrix for further projects at the IASS in order to find effective ways for science-society collaborations.

This report summarises the finding of the TransGov project team. It is written for researchers and decision makers alike, in government, business and civil society who are interested in being prepared to face the challenges of our time, keeping our responsibility for next generations. It is also for our fellow citizens who live with us but who are far away in other regions of the world, especially in the developing countries. The IASS, including TransGov, has been set up to provide orientations for this daunting quest.

We are facing enormous environmental, social and economic challenges as well as opportunities at all levels. These are often not identified early enough, not analysed deeply enough

or not systematically integrated into actions. The problems are interconnected, but the levels at which solutions may occur are also linked. People in modern societies are increasingly concerned that they are living in a "Nebenfolgengesellschaft". The fact that science and technology are constantly cultivating deeper insights into the construction patterns of nature and life means that there are far reaching future consequences both in time and space which are not adequately considered. For instance, there is a suspicion that the economic increase measured via the GNP is mainly due to overcoming the previous negative consequences of the growth.

As we go forward towards the Conference on Sustainable Development in Rio de Janeiro 2012 it remains essential to address a huge implementation gap with regards to agreed-upon goals and targets. One approach would be to define a new set of goals and targets, which fit the purpose and are better than those implemented 20 years ago. These considerations lead to the proposal to work out in Rio+20 additional Millennium **Sustainability** Development Goals (MSDGs) correcting the failure to concentrate at the UN Millennium Assembly on millennium goals more or less globalising the "Western way of development" to the developing countries as well. The integration of the sustainable component in the MSDGs would put forward rights and obligations both for developed and developing countries to a culturally diversified "development".

Another way of addressing the gap between knowledge and action or between words on paper – constituting numerous declarations and Calls for Action – and practice, is to define new approaches such as green economy or even more important and challenging, a green society. The challenge is to design new institutional arrangements for governing sustainable development, changing technology and behaviour, and asking for efficiency as intensively as for sufficiency.

However, even if I still consider these as necessary steps, the world since Rio 1992 has changed more profoundly. Fine-tuning of well-known concepts and approaches is a must; to think outside the box is also a must– the latter perhaps being even more important.

One of the main building blocks of TransGov has been the concept of "Knowledge Democracy" which addresses these changes and new dimensions, providing for example a better understanding as to why different traditional ways of developing solutions are frequently not suited to the problem for which they were created. TransGov has studied the complex interrelationship between politics and media as well as science and civil society. It focuses on the complex internal relationships within each of these domains. These relationships are characterised by tensions between classic or "modern" forms of government, such as disciplinary sciences or top-down media, with new emerging forms of governance, such as transdiscipli-

narity or social media. Taking Ulrich Beck`s approach regarding Second Modernity reveals that classic institutions and approaches will not just disappear, but will co-exist with new forms. How to handle such transformation processes within the conditions of open democratic societies concerns me a great deal. In addition, meeting the sustainability challenge is certainly a precondition for good life on Earth, but is one of several challenges which decision-makers are facing today.

Depicting the "global" is key. "Think global, act local" was indeed wisdom some 20 years ago. Global problems such as climate change or a globally aggregated degradation of fertile soils may need global solutions and global remediation technologies, but these solutions will have to build on insights and contributions from people at the local to regional levels, taking into account the cultural diversity reflected in the different agricultural technologies and soil related procedures.

In the meantime, the nation state must continuously re-invent itself in order to maintain its relevance and problem-solving capacity. Equally important is the fact that sense-making mechanisms let alone chains in economy and in modern technologies as well as scientific findings are also increasingly global in nature. At the same time – and this is something I have been following for years from a distance and from "within" – a renaissance of "culture" or "traditions" can be observed. Thus, how can we incorporate "post-traditional traditions" into our social fabric as a most important contribution to social stability and environment responsibility in a more and more globalised world? This is the question which arises; we must frame it paradoxically as our times are framed increasingly in paradoxes.

Success in maintaining and further building open democratic and culturally diverse systems is not guaranteed. It is Certainty not a feature of social systems in general and knowledge democracies in particular. However, rigidity in thinking and acting, for example favouring one- dimensional concepts instead of accepting if not appreciating diversity, will certainly not succeed in bringing us closer to sustainable societies.

We must change course significantly and transform practices across different sectors of society as clearly stated by the 2011 report of the WBGU. With this said, the question still remains, how do we think and initiate such transformations? TransGov makes the case that many transformation processes will have to occur, more often than not, simultaneously, partially overlapping, at different places at the same time, and exercised by people who are multiply engaged in different forums, roles and levels. "Intraventions" instead of interventions is the consequence which TransGov helps to understand. Hence, "the Global" does not take centre stage at TransGov in order to tackle large-scale problems successfully. For example, the emergence of new and powerful citizens' initiatives comes to mind.

The 'Stuttgart 21' case in Germany kept us busy thinking throughout the implementation of the project. Participation of the general public, as integrated in modern regional planning and building legislation is no longer able to stabilise the peace-making function of legally based processes. Recently there seems to be an increasing urgency to organise a profound integration process of civil society, of the citizens in knowledge democracy in science and the development of political decisions with the most relevant objective to create and to allow alternatives which can be discussed and decided upon.

Processes leading to a transformation of the German energy system, the so-called "Energiewende" after Japan's nuclear disaster of Fukushima at the beginning of 2011, are another case in point. This has resulted in a call for a "Gemeinschaftswerk", a common effort. In times of knowledge democracies, it is less of an issue whether or not citizens are allowed to participate and to raise concerns. Their active engagement, namely intraventions, in domains covered by governmental actors is thus far a necessary condition for effective governance towards sustainable development. Meeting these necessary conditions makes the result of the decision more stable and more resistant, stabilising democracy by integrating civil society in singling out alternatives for solutions.

This report provides some but not all of the answers, and also raises important questions. One of its central questions is: Would it not be wise to base more effective sustainability governance on principles such as solidarity and social integration, on plurality, diversity and reflexivity, rather than continuing to strive for simplicity, assimilation of differences, and rigidity? To have less linear approaches for a non-linear challenge such for differentially shaped sustainable developments may indeed be a good starting point for renewed action.

Second, both the concept of intraventions and the very nature of transdisciplinarity itself require the active participation of producers and users in the scientific field, but also so-called traditional knowledge in joint research activities. If co-evolution of science and practice is meant to be not just another fancy term which refers to thinking about the science-practice interface, is it the only way to put successfully put forth knowledge-based solutions towards sustainability? Answering this question positively is an easy task. To transform science and practice accordingly – that is, production of useful knowledge here and knowledge-based decision-making there – difficulties are faced with regards to implementation. However, since providing a platform or interface for science and societal interaction is the mission of the IASS, it was a logical consequence to put TransGov first, in order to reflect on such challenges in more conceptional terms in the first place.

Thus, this report raises interesting questions and provides some answers and hence orientation for those interested in meeting "The Quest for Governance of Sustainable Development" as a joint effort of all of us.

Finally, TransGov is without any doubt the beginning rather than the end of our work on governance for sustainable development. Follow on activities on governance research will be implemented in a next step by focussing on concrete issue areas. For example, IASS is expanding its work on soils – almost a "forgotten" resource despite its paramount importance – and will set-up a knowledge-based monitoring process for the "Energiewende". Insights from TransGov will help to design these research activities, inform knowledge exchange platforms therein, and put forward recommendations concerning the "how to" of these challenges.

The importance of culture will continue to play a major role in our work. In doing so, Culture and Governance will alter their roles as "dependent" resp. "independent" variables, if one wishes to phrase it this way. We will ask where and how cultural conditions will limit or enable effective governance options and vice versa. Collaborating across clusters at the Institute adds to this list of recipients for the TransGov "seeds". Topics such as short lived climate forcers present straightforward governance challenges if one addresses their drivers and possible response options. In addition, it goes without saying that any critical assessment of climate-engineering has at its core a governance challenge as well.

Sustainable development as decided upon at the UN Conference on Environment and Development in Rio de Janeiro in 1992 is not an ecological concept. The challenge raised by this concept is concerned with the integration of social stability and economic welfare with the stability of the natural system, and of the creation. At this very time we are confronted with a financial architecture which is far from sustainable, and which is even threatening to destroy the sustainable fundament for social stability and environmental responsibility. The massive financial turbulences we are witnessing are irrefutable evidence of the fact that modern societies are living under the dictatorship of short-termism, externalising social and environmental costs due to the prices we are currently paying for goods and services. The financial disaster is nothing less than the oath of disclosure of this short-termism. We are confronted with this disaster of short-termism in all the other crises of our world, mentioning only the huge climate change threat to humankind or the food crisis. It is therefore a must that we also think out of the box with regards to reshaping the financial architecture in a way which ensures it meets the conditions for sustainability. It is also vital to internalise costs, to overcome the division between risk and liability, and to prolongate the time scale whilst identifying and integrating the medium and long-term consequences of our actions.

Finally, theories of sustainable development, historical analysis, regional comparisons, and reflections on transdisciplinarity more generally will continue as cross-cutting themes of the IASS and its clusters. TransGov and its findings provide a jump-start and I am convinced that it will be interwoven with new activities, in fact, this is already the case. Hence, I hope that the IASS with this report is able to present a modest but at the same time bold contribution to the discussion on how to improve governance for sustainable development – for the planet, as well as for people and their homes.

Klaus Töpfer is founding director of the Institute for Advanced Sustainability Studies in Potsdam, Germany.

Introduction to the character of this report and main messages

Prof. Dr. Roeland J. in 't Veld

THIS REPORT IS SUBTLE, NOT BOLD

It represents the view that irreversible positive fundamental change in human communities towards sustainability will be brought about by gradual, incremental innovations. In addition, natural, biosphere systems change slowly; they tend towards a stable equilibrium and radical change is the exception, for example when certain tipping points are reached. Although technological and economic change can be sometimes swift and abrupt, our view is that social change in this phase of human development will be characterised by addition, complementarities and even redundancies. Sustainable development relates to all different dimensions of this globe. This report however is addressed to human actors, not to molecules or market prices. It is based on the premise that human values are the building blocks of our futures.

THIS REPORT IS AN ATTEMPT TO CONVINCE, NOT TO COMMAND

We present a new combination of existing approaches and theoretical viewpoints. The report reflects the view that social systems are essentially reflexive in nature. Therefore, sustainable social change will be based upon profound learning. Internalisation is a necessary and essential element of such learning. Consistent collective action will only be produced by institutions which are also able to learn. Therefore, this report does not contain generally applicable recipes: Each responsible actor is invited to decide on future action him or herself after having internalised the argumentation in this report.

THIS REPORT IS URGING, BUT NOT ALARMIST

Striving for a better existence of current and future generations demands collective action by many societies, based upon knowledge, insights and viewpoints. The urgency of many sustainability challenges demands well-considered strategies in the first place. In an environment of high complexity and uncertainty, collective action demands repertoires which reflect maturity and resilience, more than fashions and hypes. Single mindedness is a bad recipe. In the hindsight of the 2009 Copenhagen Climate summit, one might conclude that the backlash of alarmist approaches is a hindrance to resilience.

THIS REPORT CONSIDERS VARIETY AS A TREASURE, NOT AS A BURDEN

Although standardisation is a mighty tool in order to bring about further progress in technological and other systems, it also inevitably destroys variety. Cultural diversity however is one of the majestic treasures of humanity. Sustainable development therefore should also aim to protect cultural diversity. Governance can bring about checks and balances, but can also often standardise, and therefore destroy variety. The debate on governance therefore always contains the tensions of necessary trade-offs between the benefits and disadvantages of standardisation.

THIS REPORT PROPOSES A NEW APPROACH TO SUSTAINABILITY GOVERNANCE

Governance has long been expected of being the only key with which to run the world smoothly. This conventional concept of governance has been proven wrong, both with regard to governing mainstream developments, and to governing sustainable development:

- Globalisation limits national governance, but we have not yet conceptualised regional and subnational governance. Global corporatism limits regional governance. Short termism limits long run governance, and so on.
- Development is being driven by a variety of factors, and the patterns of power influencing it are changing over time and location. Governance is (only) one part of development.

The overall motive of our work on the TransGov project is to find an appropriate approach in order to understand and exploit the new relevance of governance in a world which has never really been apt to comprehensive governance; an issue which will only become more pronounced if we continue to apply the governance features which have been applied in the last century.

THIS REPORT POINTS AT IMPORTANT MISCONCEPTIONS BEHIND SUSTAINABILITY GOVERNANCE

The available arrangements for collective decisions often fail to produce sustainable policies. Change is needed. This is the governance question. Our findings are that failure can be explained as a consequence of important misconceptions behind the existing sustainability governance, such as:

- The belief that centralised and legal arrangements are the only/best option.

- That cultural diversity is a hindrance to sustainability and that hegemonic thinking presented as strong hierarchical leadership is preferable over pluralist and tolerant attitudes towards other values.
- That there is no alternative to mainstream thinking on economic growth.
- That science can and should always be objective and undisputable.
- That public participation and involvement of business is only a fashion.
- That institutions are the same as organisations, instead of sense-making arrangements, the rules of the games, with formal or informal shapes.

THIS REPORT RECONCILES THE CONCEPTS OF REFLEXIVITY, KNOWLEDGE DEMOCRACY AND SECOND MODERNITY

Much of the mainstream governance discussions seem to be disconnected from the complexities of our time. The question we ask is, how can the times we live in be characterised? We combine three methods of looking at contemporary societies:

- The first is *reflexivity*. We recognise that social systems are reflexive in nature, and that any attempt to forecast futures has to take this into account. A high degree of uncertainty is therefore a normal circumstance.
- The second is *knowledge democracy*: we experience increasing tensions between old and new forms of politics, science and media. While representative democracy is increasingly mixed with participatory democracy, while classical media and social media co-exist but do not co-operate, and while the application of disciplinary science is only beginning to be part of transdisciplinary trajectories. There is turbulence, volatility, overflow of unchecked and unreliable data, and unpredictability, and we have to deal with them.
- The third concept is that of *second modernity*: we live in a world in which the "and" formula works better than "or". It is impossible to design a structure, institution or instrument which can guarantee successful roads towards sustainability. Hence, the complexity of problems requires plurality of solutions, institutions, arrangements and solutions. A certain amount of redundancy is recommendable.

Our advice to decision makers in the political, business, science, media and civil society organisations is to work together and create governance arrangements that cross traditional borders, fixations and stereotypes. Sustainability requires *transgovernance*, which means that action should be based on thinking:

- Beyond classical governance style and towards a culturally sensitive metagovernance for sustainable development.
- Beyond disciplinary scientific research, towards more transdisciplinarity.
- Beyond borders formed by states and other institutions, towards trans-border approaches.
- Beyond conventional means to measuring progress, towards new and more interactive measuring methods.
- Beyond linear forms of innovation, towards open innovation.
- Beyond cultural integration or assimilation, towards looking for compatibility.

Governance of sustainable development is extremely complex because it has to deal with all of the tensions described above and their dynamics, while at the same time it is subject to reflexivity itself. Aiming for cultural compatibility instead of assimilation appears to be a useful recipe. Our look at organisations indicates that we should no longer rely on interventions from outside, but concentrate on intraventions. Social complexity enhances multiple inclusions of organisations and individuals but especially enables innovation.

Transgovernance is an approach rather than a recipe. In using this approach, solutions may differ. We have suggested a number of solutions, such as global innovation networks of governments and corporations, innovation tournaments for small and medium enterprises, nation states in a new role as process architect, and a new diplomacy for international agreements.

The challenges for sustainability governance leadership go beyond designing solutions. It is essential to have a long-term orientation, to understand the complexity of our time and to understand the lesson that changes of real-world configurations often come from inside (*intra*ventions). Leadership needs sustainability skills. The conventional hard skill / soft skill approach should be challenged.

Roel in 't Veld is professor at the Open University of the Netherlands and professor of Governance and Sustainability at the University of Tilburg.

GUIDANCE FOR THE READER

A series of more concrete proposals in the report is based upon these general messages. Readers who are mainly practice oriented should read **Part I (Summary and recommendations).** In order to understand the lines of argumentation we develop, the reading of **Part II** (main text) will also be useful.

PART I:

SUMMARY AND RECOMMENDATIONS

1. Summary: Rethinking sustainability governance

1.1 POINTS OF DEPARTURE

This report aims for innovation by adopting and amalgamating advanced insights in order to add value to the debate on the governance of sustainable development. We adapt a specific view on the present patterns of evolution of the world using the term *knowledge democracy* (In 't Veld 2010). We interpret the recently developed theories on transitions and transformations with respect to governance, and accept thinking on *second modernity* (Beck 1992) as a background idea. Moreover, we concentrate on dynamics, because the term development necessitates a dynamic view, and because each societal phenomenon or system is simultaneously influenced by endogenous and exogenous dynamics. Furthermore, we add ideas from *reflexivity theory*, *configuration theory* and *governance theory*. We will argue that the proposed combination of these advanced concepts leads to a new approach of sustainability governance which we call *transgovernance* (Figure 1).
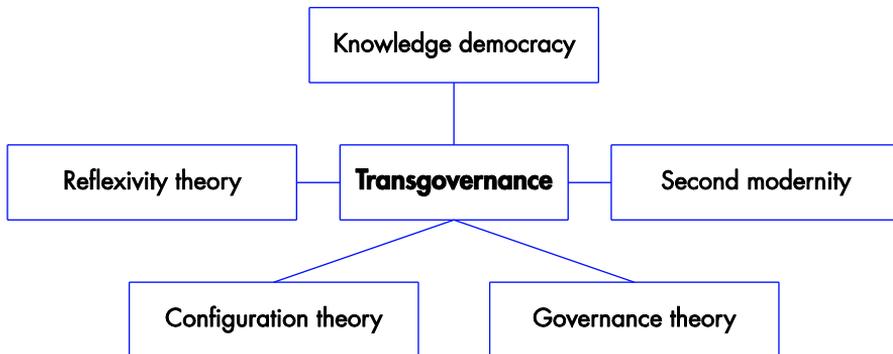
Figure 1. Combination of theories and concepts leading to transgovernance**.**

1.1.1 Knowledge democracy

We refer to the evolutionary pattern of democracy as knowledge democracy because the interactions between politics, media and science have adapted a new shape with far reaching consequences, in many nations, regions and localities and on a global level. Representative democracy, as the dominant concept, appears to be in decay. Its ability to govern the present complex problems is met with wide spread scepticism. The mediatisation of both politics and science has changed the character of both, but also their interaction. As a consequence, the problem-solving potential of societies is affected.

The curse of success?

During the last decade, an influential debate has been conducted on the "knowledge-based economy". This concept has even become the main policy objective of the European Union, the Lisbon Strategy. However, there are signs that the strength of the argument for the knowledge-based economy is weakening rapidly.

The current worldwide economic crisis leads to new, very challenging questions. These questions refer mainly to the institutional frameworks of today's societies. It is therefore time for a transition to a new concept which concentrates on institutional and functional innovation. As the industrial economy has been combined with mass democracy through universal suffrage and later by the rise of mass media, one might suggest that the logical successor of knowledge economy is a new type of governance context, which has been called *knowledge democracy* (In 't Veld 2010) (Figure 2).
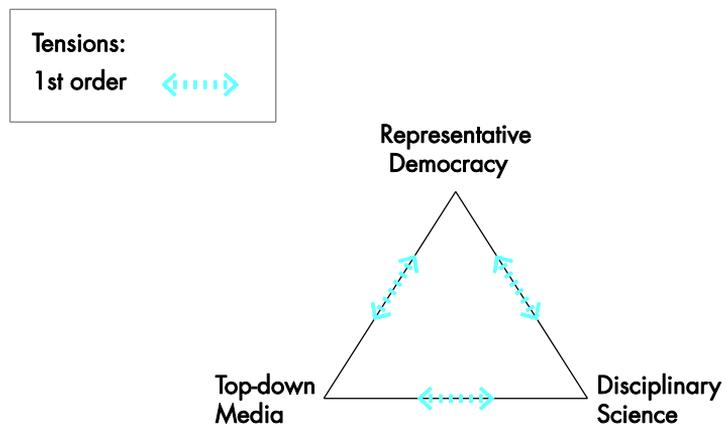
Figure 2. Twentieth century relationships between politics, science and media.

Knowledge democracy is an emerging concept with political, ideological and persuasive meaning. The relations between politics, science and media in the twentieth century, the corners in the triangle, are prone to profound change, indicated in second-order relationships (Figure 3):

- The bottom-up media do not only supplement the classical media, but also compete with them.
- Participatory democracy is complementary to representative democracy but is also considered as a threat to the latter.
- Transdisciplinary design or research is not only a bridge between classical science and the real world but also produces deviant knowledge and insights.
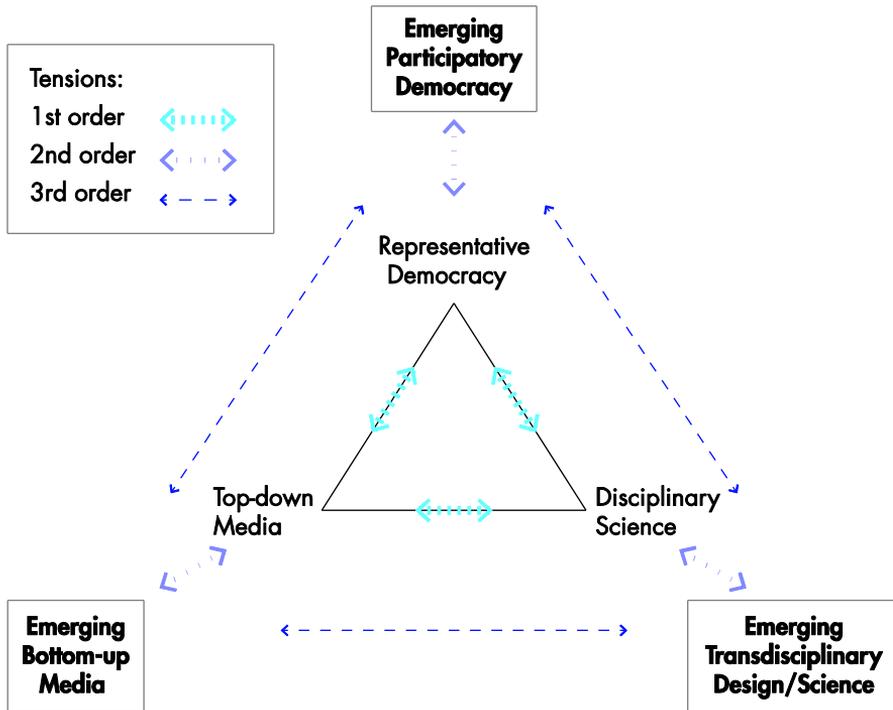
Figure 3. Knowledge democracy: Three orders of tensions (after In 't Veld 2010).

As a consequence we are confronted with tensions, threats and opportunities which are indicated in third-order relationships, also shown in Figure 3. The tensions are those we find in second modernity. Society is enriched by the extensions of the corners of the triangles but it has to cope with the tensions. The first- and second-order tensions do not disappear in a knowledge democracy but do change character in the presence of third-order tensions. With regards to empirical research on this matter, comprehensive studies have not yet been conducted.

As we may observe, the outer points of the extended triangle also strengthen and stimulate each other. Transdisciplinarity nears participatory democracy, and social media play crucial roles in large scale communication processes. With this, the tensions relate mainly to the inside-outside relations in the triangle while the stimuli relate to the outer point of the corners. Moreover, we might observe relations between each inner and each outer corner (Figure 4).
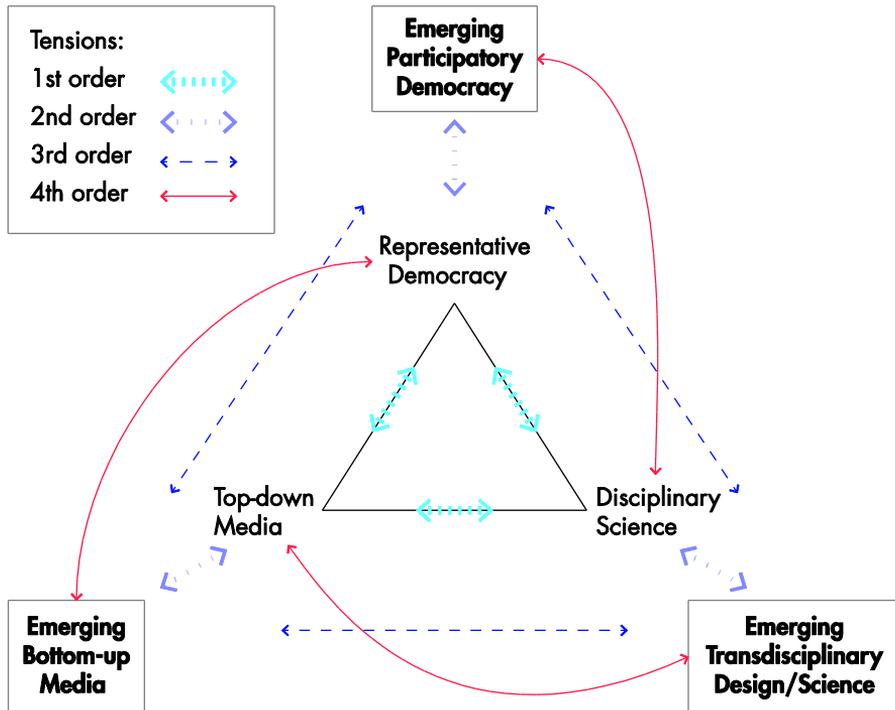
Figure 4. Old and new forms co-exist and influence each other.

This has far reaching consequences for the governance of sustainable development in knowledge democracies. We can combine other insights here. The concept of change from within (*intraventions*, see 1.1.4) is brought into practice both in transdisciplinarity and in participatory democracy. Social change is designed or brought about here bottom-up, out of deliberations between individuals who are concerned.

The fruitful development of relationships between science and policy making has been characterised by co-evolution, but as we shall see the conditions for that are not always met. Indeed, even less than before, the so-called wicked problems which require a "dealing with" approach rather than an approach which defines simple solutions, dominate political and corporate agendas. Knowledge democracy marks the transition of representative democracy to a more mixed political system in which more direct participation in decision-making by citizens and societal groups is introduced. It also sees the appearance of social media as an alternative to the classical media, and the rise of transdisciplinarity to accompany the predominant disciplinary character of science. For the corporate community, knowledge democracy marks the transition of mere business cases (the business of business is business) to a responsible "green economy" business case. This involves stakeholders, and public report-

ing, with a vision towards the future roadmaps of producing and consuming, and a sustainable corporate performance.

These developments cause new societal relationships between old and new institutional arrangements, which are full of tensions. They should neither be ignored nor can they be solved: they have to be dealt with and if possible made productive.

> I think it is the direction in which we all have to go. Whether you call it green economy or sustainable development, basically it is aimed at finding production and consumption patterns that are more in line with the natural limitations of the planet. They are unavoidable. They are a must. We are coming up to relatively short term turnaround points; we must take a U-turn in the next 5 decades. (Karl Falkenberg)[1]

1.1.2 Second modernity: "And" instead of "or"

The second concept we embrace is the *second modernity* viewpoint (Beck 1992)[2]. This notion states that today's societal evolution is characterised by the emergence of tense relationships between contradictory phenomena, by "and" instead of "or". We accept the viewpoints of Ulrich Beck and others, that the specific character of the era we live in is no longer determined by the substitution of the former institution by a new one, but by the emerging tense coexistence of both. They need each other although there are controversies, and continuous tense relationships. Rosenau's (2005) definition of *fragmegration*, identifying sustainability both as fragmentation and integration, is a typical example of that character. Another instance of this is glocalisation, which on the one hand describes the simultaneous enlargement of scales of economies, of institutional arrangements and of thinking, whilst also arguing for local identities and intimacy. In order to properly understand the meaning of this observation we must digress on globalisation. This phenomenon, made possible by technological innovations, has led to unknown potentials to influence economic and other developments elsewhere in a massive manner within a split-second by transactions on capital markets and others.

Knowledge democracy also has second modernity characteristics: representative democracy does not disappear because of the rise of participatory democracy. The classical media stay alive while social media grow, and disciplinary science goes on, while transdisciplinarity

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[1] This is the first of a series of quotations taken from interviews with influential decision makers or experts, held for the TransGov project in May/June 2011. The list of interviewees can be found in Annex 1 to this report.

[2] Beck's research focus is "reflexive modernization" (1992), which explores the complexities and uncertainties of the process of transformation from "first" to "second" modernity.

begins to flourish. The relationships however are full of tensions, and governance in the context of sustainable development will either be effective or ineffective depending on its ability to handle such tensions.

1.1.3 Techno-social systems: reflexivity

We have organised our worlds in order to master technologies, to produce goods and services according to human preferences, to enable people to pursue happiness, and to avoid as well as fight disagreeable actions and events. The patterns of organisation are immensely varied and interconnected.

People have organised themselves in stable social systems like tribes, villages, cities, regions and states, but can be observed also as flows of fugitives, masses, publics, crowds and other temporary shapes. Moreover, people live in a technological manner, that is, they are surrounded by applications of technologies in nearly every aspect of their activities, and themselves are increasingly becoming parts of technological systems. Moreover, people are (parts of) ecological-biological systems, or at least are surrounded by such systems.

All systems are due to change over time, but they evolve in very different ways. Some seem to change according to an S-curve, while others show tipping points. We may be able to analyse the change of ecological-biological systems with the support of natural sciences which lean heavily on regularities, often formulated as causalities. These regularities shape bodies of knowledge. This type of knowledge is accumulative in nature: our knowledge about stars nowadays is better than it was a century ago. Indeed, it can be utilised to forecast, to steer, and to develop.

Social systems however are functioning according to the way in which reflexivity, as we refer to it, operates. This concept is concerned with human competence to learn, and to adapt. This competence enables people to learn from any source, experience, practice, information, knowledge, theory, and so on, and to re-orientate behaviour subsequently. The inner logic of this learning process is unknown to any outside observer. As a consequence, the future behaviour of a social system in general cannot be forecast properly. It is doubtful whether knowledge regarding social systems can be characterised as accumulative: social systems will learn from any knowledge known to them. As a consequence, the knowledge may lose its validity. Knowledge on social systems is volatile in principle.

These considerations about the reflexive nature of social systems and interactions shed more light on one point addressed further (1.4) under the rubric of configurations theory. Systems can often be influenced from outside. We call a purposeful attempt to influence a system from outside an *intervention* (or steering action). We call an attempt to influence a

system from inside an *intravention*. The volatility of knowledge concerning social systems provides a major hindrance in attempts to formulate adequate outside policies for interventions pointing at change, because the knowledge base is not trustworthy as far as the functions and characteristics of social systems are concerned. Reflexivity, or in Giddens' (1991) terminology reflexive monitoring, leads to intraventions.

1.1.4 Configuration theory and intraventions

In order to grasp the way in which actions of a certain actor may influence other actors, we can build on configuration theory (e.g. Van Twist & Termeer 1991). This theory offers a profound insight into the essential aspects of organising, and the specific approach of organisations. It helps us to develop a more satisfactory vision on multi-level governance. Organising, according to this theory, takes place via reflexive processes of argumentation and communication. These processes are taking place repeatedly and intensely between the members of a group. They gradually shape a common understanding, a common sense, a common frame, a common view on reality, and moreover a common idea of meaning within the group. We call the result of such processes a configuration. A configuration develops along two dimensions, the social and the cognitive dimension and thus truth claims emerge with regards to both substance and social relations.

As argumentation and communication decrease in intensity because of the internal consensus found, fixation begins. The configuration has grown up, but the danger of a standstill starts to grow. The disappearance of reflection creates stability but learning stops. Innovation becomes problematic. Inclusion and exclusion go hand in hand.

How can grown-up configurations still then innovate? Not by steering from outside, but also not primarily by impulses from the leader, the centre, because the centre is the centre due to social fixation – firm beliefs, vision, leadership, and so on. The centre, to a certain degree, could even be called the least plausible source of innovation.

People however live in different configurations: the peer group, the firm, the church, and so on. They are *multiply included* in several configurations. Multiple inclusion may be a "burden", however, it also enables the multiply included actor to introduce ideas existing in configuration A and also in configuration B. He or she will be more credible in this role as he or she is engaged in both worlds and hence in a position to "transfer" meaning. The fact that such an actor may be more often than not a marginal actor in both configurations may rather contribute to his or her capacity to bridge divides rather than hindering them. Configuration theory teaches us to abstain from naïve classical planning, steering or instructing, because the overwhelming majority of configurations live in the phase of fixation.

> We have to reform the existing institutions from within. That is a slow and gradual approach which requires leadership – and at the moment there is no leadership – but that is what we need to do. […] The pressure to reform and strengthen existing international institutions is necessary, and needs to come from civil society too, with a call for reform through the merger of existing organisations. We have for example the UNEP and the UN's Commission on Sustainable Development– and governments can play these two organisations off against each other. At the UNEP they say that it is not the forum to discuss this issue, we have the Sustainability Commission for that – and they do the same the other way round. And they are running around, fooling themselves and the electorate when they do so. (Jan Pronk)

More advanced intervention approaches, leaning on the awareness of multiple inclusion as a device for change, are necessary. Successful steering takes place from within configurations, not from outside interventions. Therefore we need "*intra*ventions" more than *inter*ventions.

1.1.5 Governance theory

We can define governance as a collection of normative insights into the organisation of influence, steering, power, checks and balances in human societies. With this said, "good governance" is a pleonasm. Governance relates to social systems. These are reflexive in nature. They learn continuously, with the support of experience, knowledge, revelation and so on. Creating governance means shaping and influencing social systems, so governance should be reflexive in itself. Moreover, reflexivity is the engine of learning, and therefore of dynamics, so governance should be formulated in terms of dynamics. Any governance which hampers learning, intentionally or not, is doomed to fail in the realm of sustainable development.

Metagovernance in the definition of Meuleman (2008), is an approach which aims to design and manage a – situational – preference for a mix of institutions, consisting of elements of hierarchical, market and network governance. Each of these exists on its own, but metagovernance can help understand how they should be related. It is important to note that metagovernance is not exclusively a state approach: each societal actor can develop a metagovernance attitude.

We are confronted with the well-known puzzle of infinite regress once we raise the question of how to realise ideas on metagovernance: we would have to decide first, how to decide on governance, but in order to do so we must first decide how to decide on metagovernance, and so on. In our world the production of goods and services is realised by enterprises. The

governance of societies is partially governed by governments, or better parliamentary democracies, and other institutional arrangements. Governance is also not solely government.

> We have not yet found a solution for how they [companies and NGOs] could be more directly involved. There are open sessions in which NGOs and stakeholders can be present, so that is certainly a plus. But when the real decisions are made, it is hard to see how you can involve all of them. (Jos Delbeke)

According to transition theory (see 1.2.6) it is necessary that during transitions changes at each of the relevant levels "landscape", "regime/structure", and "niches", reinforce each other. The focal term is re-structuration. Learning is conditional for each actor. Fruitful developments are possible once the actors reach a certain degree of congruency: "Restructuration not only involves a co-evolution between innovative practices and structural change, but also includes the emergence and evolution of new normative orientations" (Grin et al 2010: 319).

In order to learn, iteration is crucial. Iteration should be indicated as a necessary activity of policy makers. Thus, governance of transitions/transformations is all about dealing with interactions, asymmetries, congruency, unforeseeable emergencies, and co-evolution of politics and science in informed debates.

1.2 THE CHALLENGE OF SUSTAINABILITY GOVERNANCE

1.2.1 Sustainable development

Sustainable development is all over the place. The concept is broad and vague. The vagueness of the concept has a Janus face. It has been called a unifying concept because its vagueness breeds a consensus which might be utilised later. Vagueness is an asset if it triggers action.

It has been generally accepted nowadays that humankind is able to bring about irreversible change which partially diminishes the options of future generations. "Sustainability", in this context, is thought to be an answer to the exhausting and devastating way economies and societies are predominantly using social and ecological resources, in contemporary times. The normative insight derived from this notion of sustainability is formulated as the precautionary principle. This principle leads to the norm that we should abstain from action that reduces the valuable future options for choice. This norm refers to intergenerational justice.

The concept of sustainability concerns the three major dimensions of human societies: the economic, social and ecological dimension, also known as the three P's of people, planet,

profit or prosperity. The reconciliatory character of the concept raises specific questions as to the judgement on changes which lead to the improvement of two dimensions but to a deterioration in the third. Until now we have lacked a satisfactory multidimensional measuring rod in order to pass judgement on these types of changes.

Sustainable development is a container notion. The use of the singular form fits with holistic viewpoints. The supporters of these viewpoints speak about *the* climate, *the* earth system, *the* emissions, *the* planetary boundaries. All of these are at stake, and global disasters are a constant threat. Such constructs enable us subsequently to deal with a *global* challenge that should be met in a well-coordinated manner. So the normative construction, or better the predominant framing, of the *problematique* leads to a specific line of argumentation on governance. The supporters of this view may be found in international organisations which make continuous efforts to produce agreement on international binding agreements, in order to prevent disasters. Basic metaphors like the exhaustion of the earth are then very useful.

However, people do not experience *the* climate but a climate in the neighbourhood. They pursue a good life according to their own values and in many cases try to find a satisfactory relationship with the surrounding nature. Their visible world is not abstract or systemic but specific and concrete. Entrepreneurs make attempts to design and apply more sustainable technologies. These are also specific.

Therefore, major discrepancies may exist between views on the systemic world on one hand and the daily life world on the other. In governance concepts both views are legitimate, and both should be taken care of. Transgovernance, in the context of sustainable development and transformations (plural), must also embrace the human view and must not restrict itself to the systemic view. Restricting governance notions to the latter might prohibit people and other societal actors from utilising their competences in order to change the path of development.

We are more aware of what sustainable development is than what it is not. We feel more comfortable with judgements on improvements of unsustainable technologies than with notions of optimal sustainability. In some theories on social integration, the core of social integration is understood as shared unvalues, more than values. Sharing unvalues, give recommendations as to what should not been done, and leave more space for variety than the necessity of consensus on necessary action. The analogy is clear: getting rid of unsustainable technologies leaves room for varied roads (and roadmaps) towards sustainability.

1.2.2 Values

Values are social and psychological concepts. They are rooted in cognition and emotion, and they can be informed by various sources, including insights. They concern the beautiful, the good, the true, and the trustworthy. Values urge for reflection, interventions and intraventions. Socialised values lead to norms that regulate human behaviour. People live values. Values that are lived, albeit in the shape of explicit norms, constitute culture. The specific culture of a certain social system is its identity. Cultures and identities may change over time. This change however takes place in a reflexive manner. Developments in accordance with values make sense.

Well-understood self-interest might lead to collective action which respects ecosystem services and social welfare, and may even produce collective goods. Egocentricity and free-rider behaviour however demand violence monopoly over a group in order to ensure sufficient collective goods production.

1.2.3 Cultural diversity

Views on sustainable development vary with cultural backgrounds. How should we deal with cultural diversity in relation to sustainability, and in particular to the precautionary principle?

Culture is the production of meaning, and meaning relates to values. Without values there is no meaning, and no culture. Humankind has brought forward many varied cultures. In a certain normative orientation we experience cultural variety as richness. However, our basic attitude to cultural diversity is more critical than our attitude towards biodiversity. Nature does not produce horrible species, but we occasionally experience components of human culture which are just as monstrous. A society needs a certain cohesion, which is produced as a moral order, based on consensus on some fundamental values and norms. Indeed, culture within a society is also sharing some common substantial and relational values. A society consists of configurations. A configuration possesses a specific culture but as observed earlier, this leads to outside walls and thus tensions arise. In particular, the tensions between emerging identities on one side, accompanied necessarily by outer walls, and the need for cohesion and collective action on the other will never disappear. Shaping governance therefore, is walking a high wire.

We may conclude that biodiversity and cultural diversity are both components of sustainability. We may mourn the loss of a language somewhere on this planet as much as we may about the loss of a species. However, this does not represent our general insight. We do not believe that each culture is intrinsically good. On the contrary, some cultures are horrifying to many. As sustainability also implies the economic and social dimension, we realise that

"diversity always is a bedfellow of inequality" (Van Londen en De Ruijter 2011: 14). Inequality might be a threat to sustainable development and thus our attitude towards cultural diversity is ambiguous.

> I think that what is missing is a clear regional and culturally rooted process of development management. It is not the same to do something for the Arctic people as for people in El Salvador. Both have the same problems but have very different outcomes. (…) At the local level one of the key issues is to involve women, especially as they are directly related to survival, and especially in the very poor countries. The World Bank has understood that in the micro credit system they have a better return rate if they do it with women than with men. (Úrsula Oswald Spring)

According to *second modernity* it is probable that from the tense relations between emerging opposites, variety further increases. Striving for sustainable development urges us to take these tensions fully into account when dealing with governance. Governance is a relational concept. Hierarchy needs dependent subjects, network governance requires interdependency between partners, and market governance necessitates independent relationships.

Hence, it is fair to assume that different governance styles also reveal how people consider other people's values. Complex metagovernance combines the different archetypes, so that different patterns of relational values are also assembled. In system theory it is held that diversity promotes resilience, while uniformity breeds fragility. This may also be the case regarding cultural diversity. Diversity alone leads to chaos; what is probably needed is institutional redundancy, similar to redundancy in ecosystems.

Reflexivity is the strongest engine of social dynamics. It also relates to governance. The interaction of the general laws of diminishing effectiveness and of subsequent policy accumulation as indicated above, lead to crises which enable a phoenix to arise from the ashes, and to invent new governance arrangements. We are aware of the inevitability that government as a major component of governance will consciously destroy variety according to predominant substantial values, but also profoundly influence social relations and relational values. How the latter evaluate is due to reflexivity. We may better observe, with the support of the foregoing schemes, how these evolutions emerge. We will realise in shaping governance that tensions are not going to disappear but tend to intensify as governance solidifies. We understand that the precautionary principle sometimes demands the destruction of cultural variety. We know that biodiversity and cultural diversity have similarities but also major differences.

Governance of sustainable development is extremely complex as it must deal with all the tensions described above and their dynamics, while at the same time it is itself subject to reflexivity. Aiming at compatibility instead of assimilation appears to be a useful recipe.

Putting all your eggs in one basket and relying on government seems dangerous - I think you have to find other ways to do this. Maybe social media will help here – I think the private sector can be very helpful here – but they can cause a backlash – but then again they can't do it all on their own either. So you have to try all of these things in the absence of strong government and of institutions that aren't that effective – you need a multidimensional, multi-track approach. (Eileen Claussen)

1.2.4 Planetary boundaries

Recently a powerful new concept about global developments has been published: the idea about planetary boundaries. How to deal with the governance implications of this concept? The major difficulties that the concept causes are the following (Schmidt 2012):

- The boundaries are solely formulated in one of the three dimensions.
- The aggregate level of the truth claims seems to necessitate central decision-making.
- It remains unclear how to disaggregate the boundaries in order to create a frame of reference for other, de-central decision-makers.

Regarding the first cause, it is worthwhile, or maybe even necessary, to identify planetary boundaries in the other dimensions of sustainability, in order to restore equilibrium again. In economics for instance, the concept of a "positional good" resembles the boundary concept. The core idea here is that the utility of certain goods and services decreases once the supply enables mass consumption. This decrease may be gradual, but the loss of sociability which Hirsch forecasts as a fatal consequence of the expansion of the relative share of positional goods in total consumption, might bear a tipping point character.

When dealing with cultural diversity we have already concluded that a minimum of social cohesion within a society is needed in order to produce the worthwhile public goods. This cohesion may be protected by the existence of a democratic nation-state, but the minimum condition is valid in other regimes too. With this in mind, loss of social cohesion as it is described in the literature on social capital, also leads to the awareness that we trespass a critical boundary if we lose too much cohesion, for instance either by intense individualisation or by the predominance of greed in economic affairs.

The third cause should be seen as challenging scientific excellence: The concept of co-evolution between decision making and science must be focussed on this cause. Further

research is required as well as think pieces which dig deep into the question of whether and how global boundaries would be derived from local and regional boundaries. Transgovernance (as a concept, a method, as a dialogue-style policy) is again the key here. Geopolitical stratification (the world of a nine billion population with emerging economies, and new alliances, a multipolar power system) will be in desperate need for this kind of – as we suggest calling it in line with our transgovernance concept – mosaic-style way of putting planetary boundaries together and making them useful for policies.

1.2.5 Dealing with emergencies

Uncertainty prevails in long term decisions. The consciousness of threats or emergencies creates the sense of urgency which is often necessary to take decisions at all. As Bachmann (2012) points out, historically emergency response action has been one of the prime "sources" of environmentalism. However, here the distinction between the two categories of long term problems is also decisive for the kind of action to be taken. If the objectives of actions to meet threats are formulated too roughly, like greening the economy or a change of less than two degrees in mean global temperature, it remains unclear which measures should be taken, and whether one should aim at resilience or at persistent interventions.

Adoption of the resilience approach might lead to delay of decision as the best approach, because in the case of a long lead time between action and effect we may delay as long as we respect the lead time.

The whole domain of sustainable development is filled with dangers, threats, risks, emergencies, and related phenomena, but also with options, opportunities, chances, beginnings and stories of success and progress. Often, environmental emergencies may serve in a lens-like way to clarify options and problems. In conventional governance systems – due to their focus on institutions and regulations – the "sudden chance" and the unforeseen impact are frequently excluded.

In addition, here we should examine both sides of the coin: on the one hand these phenomena produce a sense of urgency, a momentum for action. This may be important and precious because many political systems in general are rather lethargic as the transaction costs of action appear high or are deliberately perceived as high even when, in fact, they are not higher than the costs of non-action.

On the other hand, hypes, momentum, and the like, are volatile: "they do not keep longer than fish". Additionally, the transaction costs of regaining momentum are often considerably higher. Indeed, unless the emergency is gradually converted in more fundamental components of value patterns and competences in knowledge and responsible action, the net

result of an emergency as far as sustainable development is concerned might still be nega-tive. This, again, is a field for transgovernance concepts which bring knowledge and action, responsibility and awareness, engagement and reasoning together. Letting options for transforming pass by unused is the worst result of a crisis or an emergency.

1.2.6 Transformations

Sustainable development is often described as a great transformation in Polanyi's (1944) terminology. Our insights into the nature of profound change are deepened by recognising the insights produced by the advanced transition/transformation theory – as developed, for example, by Grin, Rotmans & Schot (2010). It deals with the multi-level and multi-scale evolution of technical and social systems utilising a multi-level approach along the distinction landscape-regime-niche. What happens in the niches is not altogether separated from re-gime changes, but the relationships are loose and complex.

We suggest using the term transformation in its plural form. In a world of high complexity and multifactor drivers of development it seems reasonable not to single down transfor-mation into a one-size-fits-all approach. The notion of "wicked problems" supports concepts for transformations that always include a variety of pathways and features. Furthermore, by using the singular, a large-scale perspective is often applied or suggested. Yet many if not most of transformative changes are taking place at a very small-scale level ranging from technological innovations in niche-markets to adjustments in individual behavioural patterns leading to profound changes if aggregated. Transgovernance is rather about finding and nurturing such small-scale transformative changes instead of neglecting them for the sake of large-scale systemic interventions.

1.2.7 Towards transgovernance: beyond conventional governance

How does sustainability governance look when we recognise the concepts of knowledge democracy and second modernity? The best answer might be that we do not need a new paradigm, a new orthodoxy, but should develop the sensitivity to look beyond governance conventions. This implies an approach beyond traditional forms of governance, beyond disciplinary scientific research, towards more transdisciplinarity; beyond borders formed by states and other institutions, towards trans-border approaches; beyond conventional means to measuring progress, towards new and more interactive measuring methods; beyond linear forms of innovation, towards open innovation; beyond cultural integration or assimila-tion, towards looking for compatibility. In other words, governance for sustainable transfor-mations requires thinking beyond standardised governance recipes, towards a culturally

sensitive metagovernance for sustainable development. The combination of these steps beyond familiar sustainability governance, we call *transgovernance*.

Transgovernance is an approach rather than a recipe. Using this approach, solutions may differ. We have suggested a number of these possible solutions, such as global innovation networks of governments and corporations, innovation tournaments for small and medium enterprises, nation states in a new role as process architect, and a new diplomacy for inter-national agreements.

The challenges for sustainability governance leadership go beyond designing solutions. It is essential to have a long-term orientation, in order to understand the complexity of our time and to understand the lesson that changes of real-world configurations often come from inside (*intra*ventions). Leadership needs sustainability skills. The conventional hard skill / soft skill approach is being challenged.

> We see today that individuals play a big role. There are a few leaders in their countries making a difference. I also think it cannot be just individuals. We need to make sure that all the things we talked about there is proper information, we organize structures, discus-sions we collectively set frameworks that behaviour is moving in a more knowledgeable, knowledge-based direction. We do need leaders. Leaders dependent on polling results are not what we need for the fundamental change. (Karl Falkenberg)

2. Recommendations

Our Summary introduces several concepts which are crucial for rethinking sustainability governance: knowledge democracy, cultural diversity, planetary boundaries and reflexivity, as well as structural changes through emergencies. Below, examples are provided of possible consequences of using and linking these conceptual cornerstones. These insights are formulated as recommendations and are presented on ten sustainability governance themes:

- Developing societal networks that trespass the traditional boundaries of governance arrangements, involving private and public actors: "co-decentral" arrangements.
- Conditions for better long-term decisions.
- A new diplomacy for international agreements.
- Conditions for a more transdisciplinary science system.
- Checks and balances in science communication.
- Upgrading the relevance of city initiatives.
- Nation states in a new role of process architect.
- Crowds sourcing and volatile publics.
- Creating space for new institutions, and allowing for old institutions to be phased out or to be transformed into new ones.
- Measuring progress through metrics which are to be found in dialogue-style search procedures.

2.1 NEW PRIVATE-PUBLIC NETWORKS: CO-DECENTRAL ARRANGEMENTS FOR TECHNOLOGICAL EVOLUTION

Conventional governance respects boundaries between public and private actors. Hierarchy and regulatory power are reserved for public actors. Our insights into reflexivity bring the observation that many conventional arrangements are useless as far as fundamental change is concerned. In order to further this we need new, semi-horizontal relationships. We call these relationships co-decentral. It is possible to design a private-public network, consisting of corporations, citizen groups and scientific bodies, that will further sustainable technologies, while public bodies ensure a level playing field.

Technology and sustainable development have complex and crucial relationships. On one hand, the precautionary principle produces critical attitudes towards technological develop-

ments that may bring with them considerable risks and possibly produce irreversible and unfavourable effects. On the other hand, new technologies may enable humankind to take production in a far more sustainable direction. An important example is renewable energy.

The technological development in a number of domains lies mainly in the hands of large enterprises, but in other less mature developments multitudes of very small firms are responsible for innovations.

> Big business has a huge role – the Walmarts of this world – they have a huge possibility of putting demands down the whole demand chain, the whole structure. And by that – in combination with what politicians do, in combination with the right price structure, in combination with civil society and the awareness rising among citizens – they start to just do things differently to what they did only 5 years back. (Connie Hedegaard)

We design two institutional arrangements which cope with this diversity:

Proposal 1: A global sustainable innovation network

Most technology driven markets for consumer goods and services are worldwide oligopolies. Because of this a limited number of enterprises are in a leading position. Although they cooperate with universities and other scientific centres, they themselves provide the leadership for the direction in which the technological development moves. In many cases they operate in business to business chains with suppliers and subcontractors. Nowadays they report to the public at large about their general position towards sustainable development.

The employees in the higher ranks within large companies are - more than on the average - sensitive to sustainability issues. Within R&D departments, professionals develop value patterns which are often closely linked to those of important NGOs in the same domain. Therefore employers with a high sustainability profile are very attractive to conscious and competent professionals, and vice versa. Thus such a profile is rewarding in at least two relationships, with clients and with employees.

Public authorities may regulate broadly, in attempts to prohibit unsustainable developments or to further innovations, but they can hardly influence the paths of technological evolution chosen by large companies because governments neither sufficiently understand the most advanced elements of technologies nor the crucial trade-offs which entrepreneurs are confronted with. Moreover, in large parts of the world, public authorities cannot dispose of policy instruments which force entrepreneurs to select a specific critical path for their technological innovation.

> Sustainability is one of the main challenges for the decades ahead and the market will not produce sustainable outcomes – so then there is a major task for international institutions – for international institutions, for national government, but also for local government to set standards and to issue laws within which and on the basis of which sustainability can advance. The market itself will not produce sustainability to the extent that is necessary. (Jan Pronk)

However, the competitors and subcontractors, and even remote enterprises which utilise either identical or related technology, in general have a far better understanding of these positions.

Generally speaking there are various roads towards more sustainable technologies. Competitors and scientific partners can make reasonable judgements with regards to the direction which a certain company chooses.

Consumers, clients – also being citizens - are increasingly sensitive in the long run to matters of sustainable development. They organise themselves in numerous ways. These consumer organisations could be powerful allies in the combat for sustainable development.

> We need a regulatory framework in which individual companies function. We all want market economies, but we all know that they don't work without rules. Environmental collateral damage needs to be taken into account. There are cost-producing damages that society is not capable of shouldering anymore. We have to stop polluting in the way we have so far, and there are only two ways of getting there: (1) regulate what emissions are acceptable, and (2) put a price in order to incentivise innovation, in order to better accommodate the limits of the planet. (Karl Falkenberg)

If we consider the aforementioned chains, networks and other relevant relationships as a potential landscape for the evolution of governance, we might envisage the following scenario, which is of course not a blueprint:

- Public authorities may design a regulatory regime which ensures level playing fields for enterprises that strive for sustainable technological evolution. That means among other things the following: the competitive advantage that is collected by entrepreneurs utilising a less sustainable technology should be considered as false competition. The public market regulators could be enabled to burden these entrepreneurs with fines, or peculiar taxes.

- The 250 largest companies in the world will set up a co-decentral network in order to make judgements regarding the preferable patterns of technological evolution in many different sectors. They will promote the erection of networks within each sector which encourage the empathic cooperation of suppliers, manufacturers and subcontractors in sustainable directions. The (global) network will provide a system of communication that produces possibilities for naming, faming and blaming.
- The existing national and international competition authorities spend the income they collect on fining to fund prizes and rewards for excellent entrepreneurial performances in sustainable solutions.
- The network is connected with communities of clients and NGOs who contribute to dialogues and the collection of information on entrepreneurial practices. Crowd sourcing is not only used in order to detect data on facts, but is also utilised to discover fraud. The power of clients and consumers then is fully mobilised.
- Research institutes all over the world will be stimulated to select their patterns of cooperation with companies in such a way that they will be connected with the strongest sustainability directed networks and chains.

In this manner the consumer and the citizen would be reunited in a governance arrangement which combines the value structures of entrepreneurs with the moral standards of citizens/consumers in a knowledge democracy landscape.

> (…) if we are all together in this – citizens, business, municipalities, government - then in the UN structure you should also have more formal representation of for example the business community; yes I believe that they should be there. (…) But I just want to emphasise that in the end, and that also goes at the UN level, governments, elected governments have the responsibility. (…) You can include business, you can hear them, you can do a lot of things, but you cannot – I cannot foresee – a system where you have one country here and you have this huge top 50 company over here – sitting on a par – no I don't think that. You should also in the UN system have somebody who is accountable to people in the end. (Connie Hedegaard)

This proposal could get the kick start it requires at the UN Rio + 20 conference in 2012. The existing differences inside the corporate community will shift in direction and the forerunners will join forces, which will in turn stimulate the mainstream in the direction of jumping on the bandwagon of sustainability. It would help to enrich the governance of already existing policies such as the 10 year Framework programme on sustainable production and consumption. Moreover, links should be created with existing innovative ideas and initiatives

like the Vision 2050 report of the World Business Council for Sustainable Development (WBCSD).

> "I think it is an inevitable development because we have a world that is increasingly re-source and pollution constrained. The only way to deal with that is by pushing resource efficiency and less polluting solutions. That is what is happening. At the same time, though, in a world which is constrained like that you see competition for resources and for who is going to be the leading supplier of solutions. There is a race – a green race – and the leading actors are some of the Asian countries like China. If you want to win the green race you have to change your domestic market to build scale and demand and skills – that is what China is doing with its next 5 Year Plan. It is a game plan for the green race. (Björn Stigson)

Proposal 2. Sustainable innovations tournaments for SMEs

The above formulated recommendation will also concern those small and medium size companies which function as subcontractors for the large oligopolists that shape the network. However, in many domains small companies will contribute to new technologies without such strings. It will be worthwhile to organise on a global scale large tournaments for sustainable innovations domain by domain, where small companies and groups from knowledge institutions may compete for considerable prizes to be offered by the UN. The already existing networks of cities could play major roles here too. When compared to many others they are more aware of rising small stars in the world of sustainable entrepreneurs.

> [Collaborations on sustainability] are happening in large corporations across the globe, but primarily in developed economies. Small and medium size enterprises, which account for over 90% of the world's businesses and 50% to 70% of national GDPs, are not there yet. (Juan José Daboub)

2.2 BETTER CONDITIONS FOR LONG-TERM DECISIONS

Sustainability governance has an intergenerational dimension, which implies that long-term decisions should play an important role. Such decisions require specific governance conditions (Meuleman and in 't Veld 2010) which should be addressed in an innovative way. Transitions such as the typology of developments influenced by long term decisions are societal reconfigurations. The main conditions are:

- Take into account that different types of long-term decisions require different approaches. We should distinguish at least two types of long-term decisions:

- — Cases with a relatively long period between the policy intervention and the intended effects: a long lead time. This type demands firm leadership in order to collect sufficient momentum for the focal decision.
- — Cases that demand a long-lasting series of interventions that as a whole is necessary to cause a favourable effect, following the "drop in the bucket" - metaphor. This type asks for perseverance, consistency, continuity and reflexivity.

- Sustainable development requires the consideration of long-term futures; uncertainty and complexity prevail. In some cases we are able to forecast to a considerable degree, then we may anticipate. In the majority of cases we must meet the existing uncertainty by concentrating on the acquirement of resilience.

> I think we need to come to this broader societal consensus so politicians can take longer term perspectives. The funny thing for politicians is, these short term conditions make it easier for them to make longer term commitments. [Example Obama] It's going to be 10 presidents down the line in terms of fulfilling targets they have made. So it goes both ways. We need collectively to make sure that they are politically responsible people, that what we get from them is not only income tomorrow morning and income in 50 years. (Karl Falkenberg)

- Long-term decision making therefore requires governance which is primarily reflexive and resilient, supported by (legal) safeguards to keep issues on track longer than one or two political cycle(s), and to maintain a certain level of reliability and stability. In many cases it requires some dominance of network governance, with hierarchical and market governance "running in the background". Such a governance mixture presupposes that institutions involved in long-term decision-making are able to act in a resilient way. This implies investing in flexibility and in alertness (creating "watchdog capacity"), without making the institutions unstable and unreliable.
- Furthermore, it is important to recognise that long-term impacts of decisions may become underestimated, because the problems which lead to the decisions have reached the end of their policy life cycle. Long-term decision-making may require policy mechanisms that prolong the policy lifecycle of policy issues.
- It is also important to be transparent and realistic about the limitations of decision support systems, and to ensure that ethical and political assumptions in decision support systems are chosen in the political arena.

- The knowledge basis for long-term decisions requires a comprehensive approach. Knowledge production for long-term decision-making should be a combination of future orientation, design and research (F-ODR[3]) bearing many elements of transdisciplinarity. This demands different process requirements than the requirements for "normal research" and conventional "future-oriented research". Participation of actors is one of the key requirements.

- Investing in increasing the long-term oriented values of citizens may make long-term decision-making more politically feasible: it will be less risky in terms of losing support from voters.

- The consequences of using the wrong "best practices" in long-term decision making processes may be even more damaging then in short-term decisions. Instead of copying "best practices" it is better to translate them into a form which works in a specific situation, tradition and culture. The crucial question is: What works where and why?

> Whether we like it or not, we are locked into each other going forward in a way were not in the past. When we look at these partnerships, there is the question of the role of civil society. I see civil society as the supplier of trust for these solutions. Even if we are in agreement in government and business about what should be done, none of us enjoy a high degree of trust. So we need cooperations with civil society to provide trust for the solutions and to gain political acceptance of some of the solutions going forward. (Björn Stigson)

2.3 A NEW DIPLOMACY FOR INTERNATIONAL AGREEMENTS

Until recently, international agreements have played a major role in the furthering of sustainable development. It seems, however, that the past years have hardly shown any further progress.

> The tempo by which climate agreements are reached at is determined by the slowest player. For that reason I think that measures at the national level also have to take place in parallel to these international agreements for us to make progress. (Bärbel Dieckmann)

Widespread dissatisfaction on the effectiveness of many treaties and other international agreements is one explanation for the stagnation. Our second possible explanation is that the reflexivity on behalf of the younger nation-states as to the predominant approaches,

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[3] See Meuleman & in 't Veld 2009.

concepts, methods and instruments which are put into practice in international relations has founded the sentiment of being victims of hegemony.

> There is this discussion if we should, every time we have a new convention, create a new institution around it. For biodiversity, for Montreal, for climate, for whatever…The tricky thing is: if we spend a lot of time fighting over these institutional things, while we really need to get some action done, how do we balance these things? … I think that what will bring us most is a structure that supports the mainstreaming and [does] not isolate. (Connie Hedegaard)

With this in mind, the call for institutional but also cultural variety in governance is increasing. Indeed, the attempt at agreeing on percentages of reduction of emissions must resemble a postcolonial hegemonic gesture for those former colonies which had earlier experienced a delay in economic development and are only now seeing their economic growth percentages increase. This has produced a lot of resistance to continuation of the routines leading to yet another binding treaty. The second modernity viewpoint does not allow the recommendation that from now on we should abstain from efforts on the global stage to reach agreements, but that they need to be modified considerably in the following directions:

- Because we have to deal with wicked problems, the complexity of solutions should match the complexity of the problems, as Hoogeveen & Verkooijen (2010) rightly argue. This is because such complexity may be better met by a variety of arrangements working towards a common goal rather than a monolithic, holistic arrangement which tries to capture every aspect of it itself.
- Each party has to realise that cultural variety does not only relate to the substance of sustainable development but also to the scope, shape and instruments of binding arrangements themselves; also with respect to these components fear of hegemony might cause stagnation.
- If on a global scale the differences are too considerable in order to reach unanimous agreements, it might be wise to concentrate on regional agreements which would unite a number of more homogenous countries. These differences may be between actors, which includes culture variety, differences in their stages of "development", differences in power, or belongings to powerful sub-groups such as the EU or G77/China.
- Each international agreement must be accompanied by efforts of nation-states to bring about national and sub-national complementary and synergetic additional arrangements.

- A new diplomacy is needed, because the variety of relevant actors has increased, and because the complexity exceeds the competences of traditional diplomats. In addition, here transdisciplinary trajectories are indispensable, leading both to cooperation between policy-makers and scientists, as well as between policy-makers and stakeholders.
- A single treaty, a single instrument is in many cases inferior to a portfolio approach, if the portfolio successfully arranges for a level playing field.
- Under certain conditions, voluntary agreements with a strong moral appeal, accompanied by effective naming, blaming and faming mechanisms, might be at least equivalent to legally binding agreements.

2.4 THE ORGANISATION OF THE SCIENTIFIC SYSTEM

> One thing that troubles or occupies me greatly is how one can have uncontested knowledge and information – and yet not act upon it. (Bärbel Dieckmann)

Has science lost public authority? If so, than the support for action perspectives based upon knowledge has lost its legitimacy. Maybe it is too easy to argue that public authority as such has disappeared in any societal domain to a considerable degree. Some specific explanations are offered here.

Science and media

The first explanation is primarily concerned with the manner in which scientists often behave while appearing in the mass media. Modern science has developed mainly evolutionary patterns of specialisation into disciplines. Disciplines deal with an aspect of the world: economics studies choice under scarcity, astronomy studies the physical and chemical aspects of the universe, and so on. As a consequence, the main product of scientific activity, namely knowledge, is formulated in terms of regularities concerning relations between independent and dependent variables under the condition *ceteris paribus*[4].

> All facts have only a value if they can stand the criticism. So you need validation. The IPCC, which is a huge validation machine and the fact all these researchers wherever they come from talk to each other, and argue, you know it is quite expensive in terms of investment but that needs to be done. (Jos Delbeke)

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[4] Latin: "All other things being equal or held constant".

The validity claim is formulated within the specific methodological constraints agreed upon within the discipline. The methodology serves as an internal tool for communication, but also as a device in order to immunise against outside criticism. Contradictory viewpoints may arise, and are even normal, but will be analysed according to the methodological rules of the game. Among many scientists it is *in confesso*[5], that the roots of scientific knowledge are hypothetical in nature.

Scientific disciplines have outer walls. Representatives of different disciplines may communicate but they will experience language problems. Specific words have specific meanings within a specific discipline. In the political realm however societal problems are dealt with. They never bear a monodisciplinary character and thus monodisciplinary knowledge is never immediately applicable in the solution of a real world problem. Therefore it has to be amalgamated with other scientific insights, and moreover with value judgements.

If a scientist responds to the invitation to present scientific insights to a broader public, he is tempted to leave out all of the complicating remarks about the methodological constraints under which the insight has been formulated. Journalists do not like such considerations. Moreover it is often assumed that the scientist's viewpoint is immediately relevant in relation to the solution of societal problems. Indeed, the scientist is systematically invited to publically exaggerate the unconditional character of the truth claim of his insights. In the scientific world he would make himself vulnerable or even ridiculous by doing so, but in the media realm this behaviour is a condition for survival as a commentator. Contradictory viewpoints then become conflicting truth claims, and even real world controversies. The scientist has entered the world of politics.

Politics is a power game. In politics all weapons are admissible. One of the popular techniques in politics while dealing with wicked problems is to play two-level-games: the fight on the level of substance is supplemented with an additional fight on the truthfulness of the different knowledge sources. In this manner politicians become interested in blaming the quality of the knowledge producers who support the hostile viewpoint. This of course results in a decrease of the public authority of science.

Science and politics: Transdisciplinarity

The second explanation concerns the way in which the scientific system relates to the other actors in the political realm. As explained above, the satisfactory management of so called wicked problems – that nowadays dominate political agendas – demands transdisciplinary

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[5] Latin: "Acknowledged".

trajectories. Sustainable development is the prime wicked problem on this globe. Orthodox scientists hesitate to participate in these exercises, because they hate to move outside of their comfort zones.

The scientific system is organised in such a way that monodisciplinary products earn the highest prestige. Transdisciplinarity is the trajectory performed by scientists and policymakers together in order to develop robust action perspectives by amalgamating scientific and normative political viewpoints. Transdisciplinarity is seldom punished because the participant in the aforementioned trajectories will easily step on hostile political toes. In addition, politicians decide on the allocation of many resources for science.

In some European nation-states we have even observed recently that many interdisciplinary scientific institutes have disappeared. Moreover, many boundary work organisations which have built bridges between science and politics have been abolished.

According to principles of second modernity, the organisation of the scientific system following distinctions in scientific disciplines should not disappear but be supplemented with constructions – not necessarily permanent ones – that could further transdisciplinarity. With this in mind, reorganising the scientific system in the direction of positive incentives for participation in transdisciplinarity is a necessary condition for better fits between science and politics in relation to sustainable development. A number of splendid examples exist which could be multiplied. Jungcurt (2012) suggests complementing the concept of boundary work with a configuration approach based on conceptualisation of the boundary space in international decision-making which allows the positioning of institutions with regard to their degree of politicisation and their position in terms of national and regional representation. Such an approach could be a useful guide in the further conceptualisation and application of the boundary concept.

> The German Ethics Commission on the future of energy was an innovative attempt – I don't think we had something like that ever before. It reminds me a bit of the common programme of unions, business and politicians we had in the 1970s for solving the economic crisis situation. The question is if something like the Ethic Commission can be achieved for other issues. I think that big problems should indeed be tackled by more inclusive deliberation. The Internet can help to connect people with different interests. (Jo Leinen)

Natural and social sciences

The third explanation specifically concerns the way in which physicists, chemists and some biologists frame and formulate their problems. They often seem to assume that such formu-

lations are objective or neutral. As a consequence they are quite offended once an outsider points out that these formulations are far from neutral, and that therefore their positions are political by nature. The earlier discussion in this report on planetary boundaries is a good but by far not the only example. It would be recommendable that the above-mentioned scientists pay some attention to the evolution of the social science discourses during the last century. Neo-positivist claims on objective social science have gradually become the view of a small minority.

2.5 CHECKS AND BALANCES IN SCIENCE TRANSLATION & COMMUNICATION

In the last paragraph we have paid some attention to the roles played by scientists outside their own communities. However, other actors also play major roles in translation and communication of scientific knowledge. If one counts for instance the unnecessary scandals caused by sloppy, careless or stupid communication by politicians (and other public officials without sufficient expert knowledge) regarding scientific matters, one would pay more attention to the division of responsibilities concerning scientific communication.

Close to the heat of political conflicts, emergencies or disasters, the political demand is often to centralise all communication and concentrate it in the hands of politicians or their delegates. As a consequence only politicians or their spin doctors speak up. However, they lack authority in scientific matters, and are often careless in presenting the existing degree of uncertainty. With this in mind, the public mistrusts them, and mentions so in the social media, where any gold digger can speak up with suggested equal authority.

Following this, politicians, disliking the mistrust, look for support, and seek scientists who are willing to state that the politicians are right. In doing so however, these scientists leave out the careful messages about the hypothetical character of their knowledge, nor do they mention the methodological constraints under which their truth claim holds. As a consequence, pointless conflicts between scientists on television destroy the remaining authority of science, and the conflicts have taken a more complex shape as they now they bear a wicked twofold character: dissensus exists in two dimensions, values and knowledge.

Who should speak up in public then? Trustworthy communication should be in the hands of trustworthy people. Politicians are trustworthy in the debates on political choices but in dealing with expert knowledge they only remain trustworthy if they mention very prudently the knowledge base which they rely on.

Experts in public communication should accompany scientists who produce public statements. In general the intermediary bodies between science and politics like the planning bureaus in northern European democracies are the best equipped communicators. However,

even they find themselves under pressure not to mention things which are disagreeable to the power brokers.

Special attention should be paid to the public communication on transdisciplinary trajectories. These bear a specific character: design of action perspectives is the essence! The public should be informed both about the character of the endeavours and their results. In this way the confusion could be avoided which causes citizens to entertain the idea that pure science is at work. "Transdisciplinary Panels" might do the job as long as they remain clear with regards to their character.

In general, it would be worthwhile to pay still more attention to the necessity of checks and balances by establishing Neutral Public Editors of scientific information who receive public resources in order to intervene in public and even political debates once they conclude that the communication on scientific knowledge has been too one-sided. The NPE should be independent from political parties, NGOs, as well as existing corporate or social media and should be rooted in scientific organisations.

Last but not least, scientific knowledge is elitist because most new knowledge and discourse takes place in commercial academic journals which are not accessible for everybody. Sustainability governance would, as any other field in which knowledge and innovation is important, profit from broader application of the open-source method (as used for this report and the accompanying academic book).

2.6 CITY INITIATIVES

The majority of humankind lives in cities nowadays. In 2050, the percentage will be 75. The density of cities is a very important characteristic and the empirical driving forces of real-world reflexivity, knowledge democracy and the phenomenon of the second modernity are at work here specifically. The urban habitat is precious. The urban infrastructure is a crucial factor in energy consumption. Urban agglomerations may transform into energy neutral real estate and transport systems. The quality of air may improve considerably once more sustainable technologies are introduced. The UN has identified cities as a major opportunity for sustainable development, as demonstrated in the Global Report on Human Settlements 2011- Cities and Climate Change, UN Habitat, 2011. Cities appear to be able to develop private-public partnerships in this domain easier and quicker than national governments.

Cities tend to learn from each other faster than many other actors. Sustainable cities are attractive cities and attractive cities are strong cities. Strong cities can be selective with regards to the access granted to new enterprises. Prioritising sustainable new firms will make accumulative progress possible.

> I would say that for challenges on a global level, the bottom up is still important and needed. The local or city level will agree on policy because it is an easier landscape of actors. We see that cities are driving things much more than countries, and countries more than international institutions and agreements. In light of the disillusionment with international processes, that local level is what you have to set your hopes on. […] Activities at that level can help us really move towards sustainability – quickly. (Sören Buttkereit)

City democracy adapts more easily than other public bodies to the new potential of participatory democracy. Moreover cities, when compared to others, may better recognise the niche players who bring real innovation and try to connect these to related actors and "regime" decision makers. Glocalisation is also related to cities. A strong movement is developing that urges food producers to be nearby. Regional and local food gain in popularity and moreover metropolitan agriculture is a winning concept.

It would be a quiet revolution if national governments would be able to redefine their positions towards cities in such a way that they would feel responsible for the optimisation of the constraints under which cities could strive for sustainable development, instead of trying to prescribe to cities how to act. A striking analogy could be found with the position of nation-states in the domain of fair competition aiming at the provision of level playing fields.

2.7 NATIONAL GOVERNMENTS IN TRANSITION

Although nation-states are embedded in trans-, multi-, inter- and supra-national networks, they also still possess a considerable amount of power and discretionary space themselves. They will not disappear as relevant actors, but their functions and duties are complicating: they can no longer behave as the authorities which simply decide either to regulate an aspect of life themselves or to contribute in an international global environment the willingness to close binding treaties which will settle things on a global scale.

The reflexive nation-state will continuously reveal combinations of substantial and relational values that guide the choices as to the metagovernance of sustainable development. These choices concern:

- Where to rely on existing /emerging markets.
- Where and how to encourage or regulate private-public partnerships that concern aspects of sustainability.

- How to improve the implementation of existing international environmental treaties, and how to deal with expiring global environmental treaties, as well as where to support new initiatives.
- Where and when to create or close transnational or regional agreements.
- Where and when to stimulate local internal public programs.
- How to produce a brand of representative and participatory democracy in decision-making.
- How to build transdisciplinary trajectories towards decisions.
- When and where to utilise crowd sourcing and involvement of publics.

The choices are interrelated: once you leave a matter of concern to a private-public partnership you cannot at the same time regulate it one sided in any legal text. With this in mind, the governance arrangements are partially substitutes, but as we will see below they are also complementary, and reinforce each other. The argumentation that should be constructed has at least the following building stones:

- How close will the result of a certain arrangement be to the defined optimum?
- How large is the probability of success in the preparation of a decision?
- How large is the probability of successful implementation of the decision?
- How large are the transaction costs of action and how large are the costs of non-action?
- How synergetic will a certain arrangement function in relation with others?
- Most importantly, who is legitimised to pass judgement on all of this, in particular in transgovernance setups?

Accepting second modernity fully one has to argue that the effectiveness of global institutions is furthered by the simultaneous existence of local and regional institutions. This demands a well thought out division of scarce attention. If agreements between neighbours are generally more effective, the streamlining through a global organisation only would even be harmful.

Indeed, the complexity of the position of nation-states is illustrated by this: reasoning in second modernity terms they will continuously ask themselves how a certain arrangement on a certain level, for instance a global treaty, should be accompanied by arrangements on other levels in order to produce synergies. They will accept the need for complementarities. Although the world has become more polycentric than before, nation-states appear to be the natural process architects in order to both operate in a global landscape and combine the complementary efforts on different levels by a varied collection of actors.

> If you look for what could come out of Rio+20 [...] about sustainable development, in the best case you can have some agreements on a general goal, but the real action has to be done on the ground floor – at the level of states and local governments. And as you said of course it's also all about the individuals' behaviour. If each of us uses electric lights or other electric machines – normally we use them because this is what all people need and do. So changing behaviour will be a big step. Just because we still think that what "I" do will not really affect much or anything. (Staffan Nilsson)

2.8 CROWDS/PUBLICS/SOCIAL TIPPING POINTS

The world has become connected, flat, spiky and lateral. Traditionally we speak about levels of governance, ordered by hierarchy, but this type of order is in disarray. The vertical order is not disintegrating altogether but lateral arrangements, enabled by the Internet and communication technology, could possibly mean that a local initiative becomes a global hype within a very short time. Our analysis of societies must therefore also take into account new shapes of social organisation with potential influence like crowds and publics.

The wisdom of crowds may prove to be doubtful as universally characteristic (see Barbara Tuchman's The March of Folly, 1984), but crowd sourcing is often effective. Of course it demands a thorough approach to define the objectives of the search, the nature and size of the crowd, and the method used to select the collected information. A crowd is not necessarily a random crowd. Expertise within the crowd is relevant.

> If you look now, we have spring; there are a lot of observations in the nature of birds, of animals, of the flora, of what is happening. And a government can never, never monitor this without the help of engaged people in organizations looking for the birds' life or walking in the forest reporting, to take just an example or two. So it is really in my view a bottom-up approach which is needed, both when we make and when we implement policies. (Staffan Nilsson)

'Publics' are even more difficult to approach. Publics are event related. As Basten (2010) argues, publics may gain political momentum, once there is an institutional void in the respect that the traditional democratic institutions fail to solve problems. However, it is also possible to utilise publics: the supporters of soccer clubs have convinced many local public authorities that it would be proper to subsidise professional soccer.

Each actor who is interested in sustainable development may attempt to activate the existing or emerging publics in that domain. With this, the repertoire of each actor is enriched but also complicated. The choice of the mix of approaches to apply is a matter of primary

concern: the classical method of building alliances with the well-established actors like governments on different levels, or designing networks can be supplemented with crowd sourcing and the utilisation of publics. In some instances publics – for instance gathering on a large square – mark a social tipping point, and may gain so much political influence that regimes topple down, as can be seen once more in the spring of 2011. It appears that not only governing bodies but also and maybe in particular NGOs should reflect upon the opportunities offered by the potential meetings with crowds and publics.

2.9 NEW INSTITUTIONS AND FADING AWAY OF OLD ONES

> I don't think you have support for new institutions. Not at the moment. I certainly can't see the U.S. subscribing, and it's going to be a struggle to keep up our ability to work within the already existing ones. (Eileen Claussen)

Courts and truth committees

New institutions belong to the dreams of many structuralists in the dialogue. We have already discussed the continuous plea for a global decision-making body which would enable strong coordination. We have also raised doubts about the question of whether such a body would be able to cope with the existing cultural heterogeneity.

Some have formulated ideas on new institutions for conflict resolution. The erection of an international court is one of them[6]. Indeed, in 2002 a large international group of judges had already concluded that "an independent judiciary and judicial process is vital for the implementation, development and enforcement of environmental law". The idea of the Forum is that that the Court could impose sanctions such as declaratory relief, fines and sanctions of restoration and rehabilitation of damaged habitats. Not only states but also NGOS, corporations and citizens would have access to the Court. It appears inevitable however to agree on a treaty that would establish the Court. Every one shares the opinion that it would take quite some time to decide on such a treaty. It is improbable that all nation-states will become Signatory States, which would harm the universal character of the judiciary.

Meanwhile, there is room for other mechanisms of conflict resolution. As the long run future of sustainable development should be characterised by harmony, the installation of truth committees operating according to the South African example would maybe be preferable.

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[6] See for instance www.earthsummit2012.org for the Stakeholder Forum published in February 2011: Environmental Institutions for the twenty-first century: An International Court for the Environment.

The moral authority of such committees would not necessarily be inferior to that of the Courts.

Informal communities

The rapid rise of the social media enables all kinds of new communities. Many of them will be quite volatile, like publics and crowds, but some might become stable and unfold actions, or even programs. In an earlier paragraph we have designed a private-public network, consisting of corporations, citizen groups and scientific bodies, which will further sustainable technologies, while public bodies ensure a level playing field.

> We need an international level playing field for companies – otherwise they will only compete on the basis of cost reduction and not on the basis of sustainability. (Jan Pronk)

The level playing field is, however, not an undisputed concept. Level playing fields are more or less paradoxical because they define equality in conditions in order to enable market actors to cause inequality.

> There are no level playing fields. It is nice to say but it will never happen. When I was in business, I wanted a playing field that was supportive of what I was trying to do – not what others were trying to do. (Björn Stigson)

Building institutions is a slow process. Attempts at acceleration are dangerous. When we deal with long term problems we have already formulated a number of recipes: depending on the character of the problem either persistent or resilient action is needed. The gradual establishment of institutions demands persistency during a longer period of time. As we argued while dealing with configurations, gradual solidification both in the cognitive and in the social dimension takes place.

Such institutions might avoid the usable market failures, but maybe also the non-market failures which states inevitably reproduce. The existing actors should become aware of the possibly benign functioning of such new institutions and create spaces where initiatives could breed.

The dynamic conservatism and the resilience of unsustainable institutions are matters of concern for many observers. Some argue in favour of a crusade against such anomalies. In our approach we would not prepare for external interventions, but would instead aim at the possibility of intraventions, hollowing out such institutions from the inside. Implosion would be the ultimate success.

2.10 GOVERNANCE INDICATORS AND ASSESSMENTS

Many people are fond of performance indicators. They clarify the details of the test which must be passed by accountable decision-makers. They create a transparent dialogue. They specify what it is all about. Alas however, the empirical results are often disappointing because:

- The indicators apparently do not adequately reflect the values of the parties concerned.
- Behavioural reactions and immunising strategies gradually devastate the meaning of the indicators.
- The indicators appear insufficiently flexible, and so became obsolete.

The points mentioned above are only a few of the many explanations for failure. In reaction to the observation of failure some policy designers have returned to the world of principles, and have re-introduced principle based accountability as opposed to indicator or rule based accountability and supervision.

In earlier situations the indicators themselves are decided upon by the highest hierarchical actor. In a knowledge democracy the performance indicators (what counts?) would be decided in societal dialogues. Those would bear an iterative character. Learning experiences would be collected continuously. Relevant changes in values would become visible at the earliest possible moment.

To sustain these dialogues, periodical societal "balance sheets" on aspects of sustainable development would be produced by knowledge brokers such as advisory councils, think tanks and planning bureaus, whereby progress or deterioration would be mentioned. Such balance sheets, sometimes using the metaphor of traffic lights, have already become more popular over the last few years.

Thermometers for the quality of democracy, in particular participatory democracy, could also be designed. Even very specific assessment on the evolution of the green arrows in our knowledge democracy scheme could take place. Timely renewal of all decision support mechanisms would be crucial.

2.11 CONCLUDING REMARKS

We have concentrated on governance, not on domains. By doing so, we do not suggest that the distinction in domains is irrelevant. Of course the situation with regards to forestry differs from the carbon emissions environment. Of course, a contingent approach is necessary

for each domain. However, the interdependencies of all biosphere systems also demand overview and linkages.

We have hardly touched on the myth of urgency, of momentum, and of *opportunita*. Macchiavelli has already said a lot on the latter. It is the genius of leadership, or the collective intuition of communities which will be the decisive factor here.

2.12 WHO SHOULD DO WHAT AND WHEN?

In open societies the reflection upon and creation of governance are a matter for all citizens, and many private and public organisations. In accordance with values and responsibilities each organisation will act in its own way. Firms will accept their responsibilities for fair markets and more sustainable technologies, while public actors will provide level playing fields, collective goods and redistribution in accordance with preferences on distributive justice. Everyone can accept a morally binding obligation, but the monopoly on creation of legally binding arrangements is in the hands of states. Complementary positions demand empathy as relational value all the time.

The complex interactive relationships which characterise transitions necessitate for each actor a high degree of consciousness on possible options for new combinations, and continuous learning capacity. In knowledge democracies, "mindfulness" marks the competence to operate in cultural diversity, and to aim at compatibility and congruence of values and actions. Action perspectives have to be multi-fold.

Transdisciplinarity and participatory democracy contain the intraventions that enable change, transition, and transformation. As sustainable development should be rooted in adequate value patterns and frameworks of competences, the efforts of many should be directed towards learning processes that further these values. The value of setting up time tables and indicators is well understood if those are used a benchmarks and bearing points. Any overestimation and any misunderstanding as absolute physical planning items make them obsolete, because under these circumstances they produce many adverse effects in reflexive environments.

PART II:

TRANSGOVERNANCE - THE QUEST FOR GOVERNANCE OF SUSTAINABLE DEVELOPMENT

3. Introduction to the building blocks of transgovernance

Part II of this report presents a more in-depth discussion of the relations between the scientific and political concepts relevant to sustainability governance. It is inevitable that there are some overlaps between this part of the report and the Summary in part I. However, for a closer understanding of how the transgovernance approach emerges from combining existing and advanced ideas, the reading of part II is recommended.

3.1 THE WHY AND HOW OF THIS REPORT

Sustainable development on a global scale is one of the great issues on many agendas. Global institutions, national governments, numerous NGOs and an infinite number of scientific experts are working on improvements. Inventions are realised. Planning is underway. Decisions are taken. Technologies are implemented. Other matters are neglected. Treaties are agreed upon. Laws are prescribed.

Nearly as popular is the question of adequate governance with regards to all of these matters. How to steer, further, administer, stimulate, enforce, and bring about optimal sustainable developments on this globe? In this report, we deal only with the last question. The content of sustainability itself is not dealt with here.

In this restricted setup a preliminary question must be answered: Why add another report to the long list of stimulating and inspiring studies which are already available? Presenting an answer we attempt to combine modesty with ambition: Because the already published studies do not sufficiently match with our insights into today's world as well as our opinions on adequate governance.

In this report we attempt to add value to the existing studies by amalgamating a number of advanced approaches. We adapt a specific view on the present patterns of evolution of the world under the name of knowledge democracy, and interpret the recently developed theories on transitions and transformations with respect to governance. We also accept thinking on second modernity as a background idea. This provides a Neue Kombination, in Schumpeter's terminology, which produces added value. We explain these viewpoints later on.

Moreover, we concentrate on processes, because the term development necessitates a dynamic view, and because each societal phenomenon or system is simultaneously influenced by endogenous and exogenous dynamics. It is necessary to observe both dynamics in

order to understand their complex interaction, and to derive conclusions for the phenomenon or system under consideration. Public policies for instance aim to steer or at least influence systems, and thus are part of the dynamics. We try to grasp the essentials of the relevant dynamics with advanced theoretical concepts. Turbulence and volatility are relevant elements of today's reality perception. Turbulence is caused by the evolutionary pattern of political systems as well as by accelerating technological change. Volatility is rooted in the dynamics of social systems.

Our pretention is that our approach meets the immense complexity of the *problematique* slightly more adequately than others. As a consequence our combined recommendations might correspond better with the varied preferences and passions of the many different actors involved.

The global institutional landscape consists of partially supranational, multinational and national public bodies, infinite numbers of enterprises, NGOs, federations, and billions of citizens. However, the landscape is also due to continuous change and is the effectiveness and legitimacy of their actions.

We have called the current evolutionary pattern of democracy knowledge democracy because the interactions between politics, media and science have adapted a new shape with far reaching consequences (in 't Veld 2010). Representative democracy appears to be in decay, or at least to be losing its monopoly position. The competence of democracies to govern the present complex problems is widely doubted. The mediatisation of politics and science has changed the character of both, as well as the way in which they interact. As a consequence the problem solving potential of societies is attached.

Co-evolution marks the fruitful development of the relationships between science and policy making, but as we shall see the conditions for that are not always met, and even less than before, wicked problems dominate political agendas. Knowledge democracy marks the transition of representative democracy to a more mixed political system in which more direct participation in decision-making by citizens and societal groups is introduced, but also the appearance of social media besides the classical media, and the rise of transdisciplinarity besides the predominant disciplinary character of science. These cause new societal relationships between old and new institutional arrangements, which are full of tensions.

Sustainable development is often described as a great transformation in Polanyi's terminology (1944). Our insights into the nature of profound change are deepened by recognising the insights produced by the advanced transition/ transformation theory – as developed by Grin, Rotmans and Schot (2010) - which deals with the multi-level and multi-scale evolution of

technical and social systems utilising a multi-level approach along the distinction landscape-regime-niche.

What happens in the niches is not altogether separated from regime changes, but the relationships are loose and complex.

The governance of transitions cannot be simplified as a simple question of top down policy making, because the different entities under consideration are semi-autonomous, or even independent from political centres. Moreover, niche actors are hardly visible from above. Classical policies lack adequate instruments in order to further creative and innovative processes. There are many decision-making bodies around without formal ties with others. With this in mind, when thinking over the governance of transitions, ideas such as informal coordination, emergent congruence, and reciprocal monitoring move to the forefront.

Moreover we embrace the "second modernisation view point" that today's societal evolution is characterised by the emergence of tense relationships between contradictory phenomena, by the "and" instead of the "or". Earlier historical developments could maybe be analysed adequately with the help of dialectical concepts, or other typologies of developmentalism as highlighted by Napolitano (2012). We however prefer the viewpoints of Ulrich Beck and others, that the specific character of the era we live in is no longer determined by the substitution of the former institution by a new one, but by the emerging tense coexistence of both. They need each other, although there are controversies and continuous tense relationships. Rosenau's definition of *fragmegration*, identifying sustainability both as fragmentation and integration, is a typical example of that character. Another instance of this is *glocalisation*, which describes the simultaneous enlargement of scales of economies, of institutional arrangements and of thinking on one hand, and the urge for local identities and intimacy on the other. In order to properly understand the meaning of this observation we digress on globalisation. This phenomenon, made possible by technological innovations, has led to unknown potentials to influence economic and other developments elsewhere in a massive manner within a split second by transactions on capital markets and others. Castells has introduced the term timeless time in this context. No morale is at stake there. Our daily life however does not take place in timeless time but in "labour" time, so our existence is characterised by multiple time concepts nowadays. In order to maintain a liveable world the simultaneous strengthening of local, regional and national identities must accompany globalisation. The present evolutionary patterns are current curves, or tension bows: controversial phenomena that need each other co-evaluate, causing innovations which are full of tension. We will attempt to perform a thorough analysis in this report on the basis of second modernity as evolutionary logic.

Adequate combinations of these frames of reference: knowledge democracy as landscape, transitions as key processes, and second modernity as evolutionary logic, enable us to cope with turbulent multimode developments, such as sustainable development.

We are facing new complexities in the consideration of metagovernance, the governance of governance. Governance arrangements on the regime level interact on the higher landscape level. However, the level distinction may also be blurring. Indeed, metagovernance is concerned with the aggregate effects of all relevant governance arrangements; here questions are put forth with regards to overall effectiveness. We must also deal with different layers of value patterns. Constitutional issues about variety/ homogeneity, equality/liberty, and inter-generational/ intragenerational justice are at stake.

Our own position is one of "*Interessenlosigkeit*"; we aim at independence, we are not affiliated with any, and hopefully not with the Western, hegemonic power, we are not serving any government. We move between science and politics, we behave like a boundary worker. That is how we understand the IASS position that has organised and financed this effort.

We consider values as substance which provides meaning. As to the values and ethics, we are clearly coined by our cultural European background, and we must admit this. Meaning is the core concept of culture. Writing a report like this one enables the reader to accumulate meaning, thereby adding to the already available repertoire. We will formulate do's and do-not's, positive and negative recommendations, but not in the blue. We will address them, suggesting who should do what when.

3.2 BROAD AND VAGUE CONCEPTS: BLESSINGS OR CURSES IN DISGUISE?

3.2.1 Governance

We define governance as a collection of normative insights (how should…..) on the organisation of influence, steering, power, checks and balances in human societies. Thus, "good governance" is a pleonasm. Governance relates to social systems. These are reflexive in nature. They learn continuously, with the support of experience, knowledge, revelation and so on. Creating governance means shaping and influencing social systems, so governance should be reflexive in itself. Moreover, reflexivity is the engine of learning, and therefore of dynamics, thus governance should be formulated in terms of dynamics.

Governance in its simplest form concerns a certain system but for a society, to be considered as a collection of systems, as a whole a multiplicity of interacting systems is the subject matter of governance. The modes of governance will differ from system to system. The main categories are hierarchy, market and network. The majority of the existing arrange-

ments consist of mixtures of these three archetypes. Each society has a multiplicity of these arrangements. We should consider how these modes interact in a specific situation. We call this type of considerations metagovernance.

> Whether we like it or not, we are locked into each other going forward in a way we were not in the past. When we look at partnerships, there is the question of the role of civil society. I see civil society as the supplier of trust for these solutions. Even if we are in agreement in government and business about what should be done, none of us enjoys a high degree of trust. So we need cooperations with civil society to provide trust for the solutions and to gain political acceptance of some of the solutions going forward. (Björn Stigson)

Metagovernance leads to a preference for a mix of institutions, consisting of hierarchies/states, markets, and networks as well as numerous mixtures. Each of these exists on its own, but metagovernance determines how they should be related. One might think that it is possible to decide upon a certain type of governance, and then to implement the decision. This is however only possible in strict hierarchical conditions that do not exist in social realities. The distribution of power is far more dispersed. Societal arrangements emerge, grow, develop, but only partially by coordinated decisions, and even more seldom by central decisions.

The idea that the world is governed does not imply that historical developments of societies are mainly determined by planning, by law or by budgets. Their influence however is undisputable. With this said, co-evolution is a notion that also refers to metagovernance. It is not fruitful and even dangerous to accept single actor perspectives with respect to governance. We are confronted with the well-known puzzle of infinite regress once we raise the question of how to realise ideas on metagovernance. Indeed, we would first have to decide how to decide on governance, but in order to do so we would first have to decide how to decide on metagovernance, and so on. We face the same problem once we wonder how to change the constitution, and then how to change the procedure in order to change the constitution and so on. This problem is fixed, not solved by equalising both procedures.

In our world the production of goods and services is realised by enterprises. The governance of societies is partially governed by governments, or better parliamentary democracies, and other institutional arrangements. Governance is also, but not solely government. Each institutional arrangement has structural and process characteristics. In order to understand the functionality of institutional arrangements we must take both into account. So governance relates both to structure and process.

Grin et al. (2010: 328) describe the necessity that during transitions changes on each of the relevant levels landscape, regime/structure, and niches; reinforce each other. His focal term is re-structuration. Learning is conditional for each actor. Fruitful developments are possible once the actors reach a certain degree of congruency:

> "*Re-structuration not only involves a co-evolution between innovative practices and structural change, but also includes the emergence and evolution of new normative orientations*".

Restructuration is essence, or at least one of the essences. Because of complexity, it is an illusion to oversee all simultaneous interactions during transition or transformation. In order to learn, iteration is crucial: iteration is indicated as a necessary activity of policy makers (Grin et al. 2010: 317).

This important observation can be reformulated in yet another terminology. If we consider the institutional framework of a society as a solidification of value patterns, the transition consists of changes both in the value domain, in the institutions and in practices and behaviour. It is necessary to de-solidify the institutional framework, before new ones can be found. In a continuous process of change it is clear that values codetermine institutions and productive processes as well as technological innovations, but the latter leads to changes in behaviour as well as changes in value patterns of social systems and individuals.

Sustainable development is the great transition, the key transformation of the twenty-first century, according to Grin. Can we prioritise "key processes" above other processes? Is it feasible to sketch the contours of sustainable development, or is this transition penetrating in any aspect of our existence? Indeed, governance of transitions/transformations has to do a lot with interactions, congruency and co-evolution.

In order to grasp the way in which actions of a certain actor may influence other actors, we have to include configuration theory. This theory offers a very profound insight into the essential aspects of organising, and the specific approach of organisations. It helps us to develop a more satisfactory vision on multi-level governance. In order to understand governance we must understand organisations and the professional shape of the social system. Organisations originate in processes of organising (Carl Weick 1995, Weick & Sutcliffe 2001, Peverelli & Verduyn 2010).

Organising in this theory takes place via reflexive processes of argumentation and communication. They take place repeatedly and intensely, between the members of a group. These processes gradually shape a common understanding, a common sense, a common frame, a common view on reality, and moreover a common idea of meaning within the group. We

call the result of such processes a configuration. A configuration develops along two dimensions, the social and the cognitive dimension. From this truth claims emerge with regards to both substance and to social relations. Gradually, a consensus emerges inside the configuration, both on the social order inside and outside the configuration, and on the view on reality. The members of the group are included in the configuration. Inclusion shapes the identity of the configuration, but at the same time an outside wall is built which separates the configuration and the environment. Identity and external environment co-emerge. The existence of this wall prohibits successful steering from outside. The configuration grows into impenetrability. The basic idea from systems theorists - underlying classical planning theory- is that organisations in general are half-open systems that can be steered successfully from outside.

However, due to the above mentioned factors this theory becomes more and more obsolete once the configuration stabilises. Configurations gradually become closed. Stabilisation of the configuration means that the continuous argumentation and communication are fading away: fixed convictions, views on reality and social orders reign. As argumentation and communication decrease in intensity because of the internal consensus found, fixation begins. The configuration has grown up, but the danger of a stand still starts to grow. The disappearance of reflection creates stability but learning stops. Innovation becomes problematic. Inclusion and exclusion go hand in hand. How can grown-up configurations still then innovate? Not by steering from outside, but also not by impulses from the leader, the centre, because the centre is the centre due to social fixation – firm beliefs, vision, leadership and so on. The centre to a certain degree is even the least plausible source of innovation.

[On climate Change] As it is a worldwide problem, you need a kind of structure within which the pledges/commitments are structured and added up – whether we are in line with the science, whether we are living up to what needs to be done (…). Peer pressure works, in most societies because NGOs have real political force. I'm not sure whether peer pressure works all the time in China. (…) You need a democratic setting in order to have peer pressure working out. We know lots of countries (…) that are far from having a political environment in which peer pressure can flourish. (Jos Delbeke)

People however live in different configurations: the peer group, the firm, the church, and so on. They are multiply included in several configurations. Multiple inclusion enables the multiply included actor to introduce ideas already existing in configuration A also in configuration B. He will be more credible in this role as he is more or less a marginal actor in both configurations. The configuration theory teaches us to abstain from naïve classical planning,

steering or instructing because the overwhelming majority of configurations live in the phase of fixation. More advanced intervention approaches, leaning on the awareness of multiple inclusion as a device for change, are necessary. Therefore we will later develop the concept of intraventions.

Legitimacy and effectiveness are the final static indicators for each governance arrangement. The aforementioned theory on organising has far reaching consequences for considerations on governance arrangements. Configurations are more or less autonomous agents. We have to detect the relevant configurations in order to shape legitimacy and effectiveness. Without the latter no stability is possible. One should realise however that in a culturally diversified landscape there will be a variety of values and goals around governance so legitimacy and effectiveness are actor specific. In addition, it is then possible that a certain arrangement fits all. A related concept is trust. We consider trust as a very dynamic characteristic of governance. Trust is a relational notion. The dynamics of the relationship determine the dynamics of trust. All kinds of assumptions about the relation between governance and trust are in the air: many argue for instance that the presence of a supervisory body will have a favourable influence on the governance arrangement as a whole, in terms of increasing trust. In some cases however, the contrary could be observed. Trust and legitimacy are interwoven in a complex manner. A certain degree of trust might be considered as a necessary condition for legitimacy. Actors become more or less trustworthy through their behaviour as it is perceived by others.

Allegiance, or *Verbindlichkeit*, and solidarity are relational values as well, because they concern the characteristics of relationships. They are part of the social dimension of configurations as discussed above. Such notions play a role in the establishment of legitimacy. They also determine behaviour. This is an important matter because they indicate that the motivation of behaviour is broader than based upon incentives, stimuli, sanctions and so on. Although we tend to assume that contracts with sanctions are superior qua effectiveness to voluntary agreements, we may observe in real world situations that allegiance or solidarity are far stronger motives than a sanction. With this in mind we might consider, for instance, that the option of voluntary international agreements under certain conditions could lead to a more binding force than treaties with sanctions. In general we should keep in mind that the design of governance should always take into account the relevant relational values in the specific situation. As we will indicate below, according to second modernity, institutional redundancy is a natural and necessary characteristic of governance. With this said, we will not reason in "either, or" terms but will try to design governance with sensuous and tense relations between seemingly redundant institutions. We will then also consider how to deal

with a precious and worthwhile aspect of satisfying governance, the presence of checks and balances.

> In many instances collaboration between actors is becoming more important because the issues are too complex for one to deal with it. That is especially true for transnational problems such as climate change. Government no longer has the power, NGOs have a blocking power and business is tied by what regulation allows it to do. I think there is a good rationale for increased collaboration. It's important that we think through what it [Public private partnerships] means. Any discussion that leaves out either industry or civil society is bound to fail. That's not to say you don't need regulation – the simplest and most effective way to dealing with externalities is regulation. But you will not be able to implement that regulation if you do not build in the needs of business and civil society. Getting the buy-in from these 3 sectors is becoming more and more important. (Sören Buttkereit)

History is crucial for the student of governance. In order to design governance arrangements it is not possible to rely on causal argumentation only because the complexity is too overwhelming. The recognition of patterns might be a result of historical studies so that we can learn by analogies. However we must of course also take contingency into account. As mentioned above governance relates both to institutions, consisting of structures and processes. One sided viewpoints deliver either structuralist or process fetishism. We are in between.

3.2.2 Sustainable development

Sustainable development is all over the place. The concept is broad and vague. The vagueness of the concept has a Janus face. It has been called a unifying concept because its vagueness breeds a consensus that might be utilised later on. Vagueness is an asset if it triggers action. On the other hand, if sustainable development is everything, maybe it is nothing...

Although the concept may be vague it has overwhelming appeal on political agendas, programs and dialogues. Sustainable development is so broad that it is nearly synonymous with the recommendable future, with the good life, and with bona vita.

The precautionary principle is the nucleus of a powerful moral imperative. The multidimensional nature of the concept, covering ecological, economic and social aspects of change relates to our needs for integration. Sustainable development bears a persuasive character.

The vagueness may be a blessing in disguise: It is a unifying persuasive concept. Key notions are:

- The precautionary principle, which finds itself enriched by a long term view and by the notion of irreversibility.
- The multidimensional character which emphasises the need for integration and dialogue-style processes.
- The life-support (ecologic) code which focuses on resources and the path-specific impacts of technological and social options.
- The vagueness which allows for involvement and the breaking down of the overall concept to what is needed in specific areas.

It has been generally accepted nowadays that humankind is able to bring about irreversible change which partially diminishes the options of future generations. The normative insight derived from this principle is formulated as the precautionary principle. This principle leads to the norm that we should abstain from action that reduces the valuable future options for choice. This norm refers to intergenerational justice.

Of course this principle is not altogether linear in its structure. It is loaded with implicit normative considerations: is it for instance allowed to destroy something ugly? (the destruction prohibits the possibility of observing the ugly in the future). Moreover, the concept of sustainability now concerns the three major dimensions of human societies, the economic, social and ecological dimension, collected as the three P's, namely people, planet and profit.

The reconciliatory character of the concept raises specific questions as to the judgement on changes which lead to improvement in two dimensions but to deterioration in the third. Until now we have lacked a satisfactory multidimensional measuring rod in with which to judge these types of changes. This quest is similar to the earlier search in welfare economics on decision criteria on policy measures not leading to Pareto-optimal changes (i.e. changes where no one is worse off afterwards), but to other types of change. All kinds of compensation principles and tests are developed: for instance, a policy measure is recommendable if it leads to a change of income so big that all the losers can and will be compensated. Later on even hypothetical compensation is introduced: if the losers could be compensated, the measure is worthwhile, even if the compensation does not take place in reality. To say the least, hardly any politician in the world is convinced by these types of compensation tests. This has led Boulding (1972) to the expression: the wreck of welfare economics. The problem of the absence of a measuring rod over the dimensions does not prevent politicians from taking everyday decisions on issues where there is no Pareto-optimality between the dimensions. The same may be a valid observation for sustainability policies: although scien-

tists in many cases cannot measure whether a certain policy measure will increase sustainability, political rationality will deal with inter-dimensional trade-offs.

Many different dialogues about sustainable development take place simultaneously: cities, states, enterprises and families discuss sustainable development each in their own environment. They use common words, but in various rationalities. Sustainable development is a "container notion", which enables these various topics to be addressed simultaneously and yet it often does not do justice to the different rationalities. The use of the singular form fits with holistic viewpoints. The supporters of these viewpoints speak about *the* climate, *the* earth, *the* emissions, and *the* planetary boundaries. All of these are at stake, and global disasters threaten. Such constructs enable us to subsequently deal with a *global* challenge which should be met in a well-coordinated manner.

With this in mind, the normative construction of the *problematique* leads to a specific line of argumentation on governance. The supporters of this view may be found in international organisations which make continuous efforts to produce agreement on international binding agreements, in order to prevent disasters. Basic metaphors such as the exhaustion of the earth then are very useful. This per se may or may not be a problem. However, one should be aware of this "unifying character" and its implications. People do not experience *the* climate but a climate in the neighbourhood. They pursue a good life according to their own values and in many cases try to find a satisfactory relationship with the surrounding nature. Their visible world is not abstract or systemic but specific and concrete. Entrepreneurs make attempts to design and apply more sustainable technologies. These are also specific.

Indeed, major discrepancies may exist between views on the systemic world on one hand and the daily life world on the other. In governance concepts both are legitimate, and both should be taken care of, but they may not always go together well.

Development of sustainability appears to be a better point of reference than sustainability itself. It deals with the necessary dynamics, but the notion of development also touches the character of action perspectives better: a point of departure is always there in reality, today's world. Change is incremental. First derivatives (deltas) are adequate policy aims, because policies are formulated in terms of programmes and measures. The development notion moreover does not force us to bother with an end state of affairs, a final heaven on earth, or the like.

Ulrich Beck points out correctly, that sustainable development "harbours a potentially litigious contradiction: sustention and development, which is to say, development and non-development". This is a typical example of second modernisation.

Sustainism

Some attempts have been made to clarify the concept of sustainability in cultural terms. Schwarz & Elffers (2011) introduce the term Sustainism:

> "*The world has entered the Sustainism age…What is coming into being is nothing less than a change in cultural perspective, a new mindset, a worldwide remaking. Moving beyond ideas of modernism and postmodernism, this shared outlook promises a networked, globalized, sustainable future*".

As their publication mainly consists of pictures and symbols, it is hard to discuss it here, but it reflects some of the basic cultural roots of sustainability. It indicates the notion that cultural dimensions might determine the fate of striving for sustainability, either in the direction of unification or in the direction of differentiation or even implosion. Basic attitudes towards the world, defining the position of humankind in historical evolution, probably codetermine the intensity of the support for sustainability measures.

Negative or positive norms?

We are usually more aware of what sustainable development is rather than what it is not. We feel more comfortable with judgements on the removal of unsustainable processes or improvements of not very sustainable technologies, than with notions of optimal sustainability. Given the overwhelming uncertainty about future worlds, future technologies and future preferences, this feeling is understandable. As sustainable change will be gradual and incremental, the disadvantages of this lack of knowledge are small as long as we choose the right direction of change. It appears that this approach is related to those views on social integration that concentrate on *unvalues* as the core notions of social integration. The supporters of these views follow the argumentation that unvalues will lead to norms of the category: you shall not… A collection of such norms leaves more individual freedom of action than a similar collection of norms which prescribe behaviour of a certain kind. Moreover, we should understand that a regulatory framework which expresses norms forthcoming from unvalues is more maintainable than any other one.

3.2.3 Greening and growth

In the international dialogue after the 2008 crisis a number of notions have come to the fore, such as the green economy, greening the economy, the green race, green based developments and green growth. Of course, these verbal inventions have harvested a lot of initial mistrust because of their supposed fashionable character. UNEP (2011) has fully recognised the opportunistic element. It has spoken about: "growing recognition that achieving

sustainability rests almost entirely on getting the economy right". UNEP has also introduced a definition: a green economy is one that results in improved human wellbeing and social equity, while significantly reducing environmental risks and ecological scarcities.

When the UN decided to call a Conference on Sustainable Development (UNCSD), to be held in 2012 in Rio de Janeiro, it chose as one of its major themes "a green economy in the context of sustainable development and poverty eradication". The latter can be analysed in depth, and in particular concepts such as the Report by a Panel of Experts to the Second Preparatory Committee Meeting for UNCSD, called: The Transition to a Green Economy: Benefits, Challenges and Risks from a Sustainable Development Perspective (UN-DESA 2011). From this, one might find it hard to distinguish between green economy and sustainable development at all. Well known issues like the desirable discount rate, intellectual property rights versus the public good character of knowledge, the financing of investment in developing countries are dealt with once again. Strong emphasis is place on the specific belief that synergies are more important than trade-offs in green developments. However, once again, this is nothing new. With this in mind we argue that the Green Economy is an attempt to reframe the dialogue around sustainable development without conceptual added value as far as content is considered.

However, another type of added value might be produced: gaining momentum for change through a new fashionable term – a point not to neglect and not to over-estimate.

> I would add to green growth not only poverty alleviation but also the issue of inequality. Those countries with less inequality have longer life expectancy, better health, more innovation, a better quality of life. In Latin America we have the champion of inequality. When people are confronted with a survival dilemma, first comes survival and only then comes sustainability. We have to avoid placing them in this dilemma. (Úrsula Oswald Spring)

Because of the unequal speed of different developments, benefits and costs are scattered over time. As a consequence the magnitude of the discount rate is a major parameter. In the Stern Report (2006) the interpretation of the discount rate question as an issue, which implies a certain view on intergenerational justice, has led to the statement that the long range discount rate should be approximately equal to the rate of technological change, 1.4%. Decisions on investments depend heavily on the size of the discount rate. The view on Green Investments is the following: they will have dual positive effect on aggregate demand and supply: in the long term they will lead to faster economic growth and reduction of downside risks of adverse events. Moreover, in the long run there will be more employ-

ment, in particular in agriculture. The economists in the aforementioned study argue that the role of the state is crucial, in particular in developing countries, because economic growth is structural change. An investment-led strategy is necessary, and here the state role is crucial. With this in mind, a green economy is not an anti-growth concept at all. On the contrary, it appears to be a background conviction that growth is necessary to further sustainable development.

However, there is a long way to go if the Green Economy is to work for sustainable development. The quality of growth appears to be crucial. In his analysis of the growth debate, Perez-Carmona (2012) looks at two major contributions to the debate:

- The Mill-Daly proposal for a steady state.
- The Illich-Latouche plea for de-growth.

As he clearly shows clearly, little attention has been paid to the degree of realism in these contributions. In the background there are a number of fundamental considerations present which can be split up into a moral category and an effectiveness and efficiency category. The major moral considerations are the following:

- Moderation and sufficiency are good, lust, greed and waste are bad.
- To exhaust the earth is sinful.
- To use up the non-renewable resources is in conflict with the precautionary principle.
- Moderation is recommendable for the rich, but not for the poor.
- The major effectiveness and efficiency considerations appear to be the following:
- Infinite growth endangers humanity because it will lead to economic disasters.
- Exponential growth is impossible due to constraints, thus it is best to start moderating now.
- Non-renewable resources should not be exhausted before alternative technologies and resources become available.
- Economic growth is necessary in order to stimulate technological progress.
- Technological progress will enhance efficiency of use of non-renewable resources.

The predominance of the neo-classical economic approach has prohibited sufficient attention for the qualitative aspects of growth, in particular the negative ones. Environmental economics compensate only partially. In the pursuit of sustainable development therefore this approach should be supplemented with more behaviour oriented sciences and branches of economics such as nudging, evolutionary economics and ecological economics.

> I see it [leadership] also in academia where people are starting to say our normal way of measuring growth, the GDP that has been sort of the guiding principle for decades, that has sort of come to an end. It's not enough anymore. We have come to the end of GDP in order to measure what is really growth. I mean if you are hitting some natural boundaries, if you are depleting resources, if you are destroying biodiversity, if you are contributing to climate change – then don't call it growth. I mean there are some trade-offs here. Or you must have a more holistic view of what is real growth in the world of the 21st century – and that might not be measured only through the economic models of the 20th and sometimes even the 19th century. So I think there academia also has something to offer and I think that the society of economics and economists (…) - there they start to embrace this kind of thinking much more than just 5 years ago. (Connie Hedegaard)

The normative character of sustainability with its embrace of the precautionary principle immediately leads to the necessity of not exhausting the non-renewable resources before superior technologies – superior in the sense that they make the use of non-renewable redundant resources – are available. The necessity of a trade off with the necessary technological progress which will bring forward these technologies is clear, once one accepts the statement that growth is a necessary but not sufficient condition for technological progress.

The governance of this trade-off is probably extremely complicated. Both of the aforementioned contributions to the growth debate point in the direction of localism, downgrading global institutions and so on. Although one might feel sympathetic with such ideas, they do not seem to be very realistic.

One general conclusion is that the pursuit of sustainable development does not more or less automatically lead to a plea for non-growth. There remain many arguments on the table that support the statement that a certain type of growth is only necessary to produce the desirable innovations that further the pursuit of sustainable development. The quest has just begun to identify such kind of growth.

> *The expansion of the air traffic demands enormous amounts of energy. Air traffic depends on non-renewable resources. The proposal to install a voucher system for flying in advanced areas of the world –each voucher allows the holder to fly x miles- could fulfil some positive objectives, but is also apt to illustrate the difficulties in implementation very well. Distributive justice could be served. It also seems to be a reasonable measure to moderate the quantitative growth at first hand. However, the complications in implementation are considerable. Should one allow trade in vouchers? Should people be al-*

lowed to buy additional vouchers from the state, because they need them for their eco-nomic survival? Should one differentiate between flying in an empty plane and flying in a full plane?

3.2.4 Global developments: Scales and planetary boundaries

Problem scales and solution scales

Sustainable development relates to multi-level interactions but also to different scales. As Beck and many others have pointed out, in modernity we have internalised a mental map of the world which is based upon the predominance of nation-states as ordering mechanisms. Fragmentation and glocalisation as expressions of second modernity have caused a more relativist view with a multiplicity of differentiated scales. Internalised scales are mental shadows. In 1.2.2 we argue that the frame of the problem – that is THE climate- leads to a specific view on the need for coordination of decision making. The scale of the problem is also related to the scale of the decision-making bodies or arrangements. Because of our accepted approach we generally try to handle a variety of scales. To give a case in point: Biermann (2011) introduces his plea for a United Nations Environment Organisation as fol-lows:

> *"Over the last two hundred years, humankind has evolved into a planetary force that in-fluences global biogeochemical systems. No longer is the human species a spectator that merely needs to adapt to the natural environment. Humanity itself has become a power-ful agent of earth system evolution... In the twenty-first century policy-makers are faced with one of the largest political problems humankind has had to deal with: protecting the entire system earth, including most of its subsystems, and building stable institutions that guarantee a safe transition and a co-evolution of natural and social systems at planetary scale".*

After this paragraph nobody will be surprised that according to Biermann, a strong suprana-tional global organisation is necessary in order to master global governance. The whole argument is very persuasive.

It is amazing that so few analyses attempt to describe the sufficient and necessary condi-tions under which the superiority of such a proposal cannot be denied. Regardless, we would have to assume that the erection of such an organisation would have no negative external effects on any other desirable course of action. Moreover we should be relatively confident that the effectiveness of such an organisation could be insured.

As we shall illustrate later, we need a lot of variety in approaches to governance because of the multi-scale and multi-sector character as well as existing cultural diversity. This in itself is an argument against too much centralisation with its inevitable standardising methods. Moreover, the probable uniformity of the policy instruments repertoire handled by a single decision maker will be a continuous nuisance to a large proportion of the parties involved. Governments and other decentral decision-makers will concentrate on the optimisation of their results in the global decision-making process and tend to give less priority to other efforts. With this, there may be a real trade off. It is not a weird assumption that attention by governing bodies itself is scarce, thus attention for binding international agreements then drives out attention for other arrangements. That is defendable once it is reasonable to assume that the effectiveness of the latter would be superior to other decision making. The effectiveness of binding international agreements however is widely debated. There is ample room for serious doubts. Accepting second modernity fully, one must argue that the effectiveness of global institutions is furthered by the simultaneous existence of local and regional ones. This demands a well thought out division of scarce attention. If agreements between neighbours are generally more effective, then streamlining through a global organisation only would even be harmful.

> I would hope that the UNFCCC is going to be much more in touch with bodies like UNEP, because we now have for every other substance another international body, which is getting surreal. We have one for mercury, we have one for chemicals, whatever, so we have to move away from that. I think that UNEP could be a hosting institution. So, is it going to be called UNEP or UNEO, or whatever, I don't know. But we have to bring in a bit of order like we are doing at the national level. We also have environmental ministries, where you have all the elements tackled together. Otherwise we are going to have a *divide et impera*, where we have all the friends of the chair having a little job here and there, but not treating the cement that we need for a sustainable development…We have to have coherence or reasonable trade-offs between the different elements. (Jos Delbeke)

Planetary boundaries

Recently a powerful new concept regarding global developments has been published: the idea about planetary boundaries. Falk Schmidt (2012) deals with it extensively. The boundaries are formulated by Rockström et al. (2009) as related biosphere threats. Nine have been identified, part of which have been quantified. Among them are: biodiversity loss, climate change, ocean acidification. Trespassing boundaries would cause disasters. As Schmidt states:

"The concept presents under the rubric 'safe operating space' further arguments for an idea widely recognized and intensively discussed within global environmental governance for a while. Since the 'safe operating space' consists of a combination of all boundaries or sub-systems, and some may still be identified in the future, it emphasizes both the systemic and interrelated nature of the challenges at hand".

The general line of argumentation pursued by his chapter is as follows: "It seems to be intuitively convincing if one tries to identify 'boundaries' of coupled socio-ecological systems, since they are increasingly threatened by human activities such as multiple usage, (over-) exploitation or pollution of the earth's resources. Being aware of such boundaries may indeed be necessary for effective sustainability governance, based on the assumption that (abrupt) changes may occur once a 'threshold' or 'tipping point' of a system is passed which will shift the system to a less-desired state less conducive for human development and leading to a situation which is hard if not 'impossible' to reverse.

"Assuming, for the sake of the argument, that such thresholds leading toward (abrupt) changes exist, and we may or may not be able to identify them properly, the question of practical concern is how to detect trajectories leading toward such tipping points and subsequently how to avoid being pushed 'beyond the limits'. In fact, identifying such boundaries as 'warning signs' for not being pushed beyond such boundaries seems to be the core function of this concept, which may indeed add something crucial to our understanding of the challenges of global environmental change as well as something crucial to our 'governance tool box' for governing such challenges. How to deal with the governance implications of this concept?"

With these thoughts in mind, Schmidt formulates three critical remarks:

- The planetary boundaries concentrate on the earth system itself, not on human actions such as drivers for economic development, joy, and so on. Indeed, the boundary for the water system would be defined quite differently, once the human access to water becomes the key dimension of concern instead of the water system itself;
- The creators of the concept argue that, contrary to other matters such as economic and social affairs, the planetary boundaries should be non-negotiable. Schmidt argues quite rightly that this is a statement with potential political implications beyond what is intended here. Such non-negotiability as a demand is not supported by science itself;
- From other experiences it is well known that setting boundaries is the main cause of a development by which they will be reached.

The major difficulties that the concept causes in attempts to give them a fair place in considerations on the governance of sustainable development are the following:

- The boundaries are solely formulated in one of the three dimensions of sustainability.
- The aggregated level of the boundaries, seen as truth claims, seems to necessitate central decision-making.
- It remains unclear how to disaggregate the boundaries in order to create a frame of reference for decision makers other than global central decision-makers.

Regarding the first cause, maybe it is worthwhile to identify planetary boundaries in the other dimensions too, in order to restore equilibrium again. In economics for instance, the concept of a "positional good" (Hirsch 1976) resembles the boundary concept. The core idea here is that the utility of certain goods and services decreases once the increase of economic welfare enables mass consumption. This decrease may be gradual, but the loss or even erosion of sociability which Hirsch forecasts as a fatal consequence of the expansion of the relative share of positional goods in total consumption, might bear a tipping point character.

Dealing with cultural diversity we have already analysed that a minimum of social cohesion within a society is needed in order to produce the worthwhile public goods. This cohesion may be protected by the existence of a democratic nation-state, but the minimum condition is valid in other regimes too. Indeed, loss of social cohesion as it is described in the literature on social capital (Putnam 2002 a.o.), also leads to the awareness that we trespass a critical boundary if we lose too much cohesion, for instance either due to intense individualisation or through the predominance of greed in economic affairs.

The plea for sustainable development itself has to a certain degree a boundary character. The thorny path to more sustainability is surrounded by threats. This argument supports Schmidt's view that it is not plausible to call only the ecological and biosphere boundaries non –negotiable.

Concerning the second and third causes, it may be clear that on each level of decision making contributions are possible in order not to trespass a boundary but, unless the global models are disaggregated, it never will be clear whether a contribution is sufficient. With this said, the major advantage of the boundary concepts, a clear general warning to act carefully, is blurred in the direction of an individual actor. The interaction between the systems under consideration in the boundary concept is yet another threatening and complicating component which suggests the necessity of consistent decisions on a world wide scale.

Once more the strength of a series of assumptions, concepts, models, and constraints is demonstrated in the planetary boundary concept, as in other related statements. Reasoning

in terms of aggregated, modelled, interactive, seemingly causal chains of argumentation leads to strong convictions and suggestions in favour of globally consistent coordinating decision making mechanisms. The impossibility of disaggregation of the models once more suggests that only global coordination may lead to acceptable results. It is hard to understand that the basis for all of this is mainly rhetorical. Of course the effects of local actions are also global: they add up to global effects on water, air, forests (causal theory). It is also of no surprise that arguments are based upon theories: aggregate emissions for instance cause damage in the stratosphere, and this damage causes climate change. However, for local actors, the local consequences of actions are also relevant. They will include information on global and local consequences in the considerations that actions are based upon. They might act in such a way that the aggregate effect on a global level is optimal, without any centralised decision making.

In terms of second modernity, we should accept that both patterns of thinking about governance are present: on one hand creating systems worlds by using modelling as a scientific method, as habitus and *"Zwang",* while simultaneously on the other hand using local knowledge, culture, consciousness and observations, demands local governance.

It appears useful to identify some statements as essentially belief systems; for instance: Global problems should be governed on a global level by global arrangements and global actors. This simplistic statement neglects the potential quality of decentral arrangements such as markets and networks to produce satisfactory aggregate results.

Reflecting on governance implies thinking about alternative methods of creating order: we associate the market with invisible hands. A powerful nineteenth century theory states: Without centralised decisions the allocation of resources is optimised on the macro-level, if interconnected markets function in a perfect manner. Argumentations regarding the necessity of also producing public goods lead to the wish for a centralised powerful structure, such as the nation-state. Networks have been added in theory as a third major institution during the last century.

Now we fully experience the turbulence and volatility which has been caused by the acceleration of reflexivity. The notion of acceleration is to be dealt with in any future governance arrangements.

3.3 KNOWLEDGE DEMOCRACY AS FRAME OF REFERENCE

We have seen in the last paragraph that "vague concepts" bear an ambivalent character. These concepts have evolved in a specific socio-political context, which has itself evolved. This evolution is the subject of this paragraph.

In the course of the last two centuries, a group of related types of representative constitutional democracy have become the predominant format of the nation-state. It has enjoyed unheard popularity, and still does, all over the globe. All Western and most Southern political leaders preach democracy as an all-healing recipe. Representation has gradually become the predominant mechanism by which the population at large, through elections, provides a body with a general authorisation to take decisions in all public domains for a certain period of time.

State, sovereignty, society and territory have become intensely related with democracy in Europe and the USA: the formation of the nation-state was territory-oriented by nature, its violence monopoly became legitimated by representative democracy, and the population to be represented was the stable population of that same territory, gradually evolving into a society with a degree of cohesion that justified sovereignty. Of course the dynamics of this development is far more complicated than indicated here so far.

The curse of success

The cognitive and emotional investments into the present democratic institutions have been large. As a consequence, the stability of these institutions is embraced. However, exogenous as well as endogenous developments threaten the continuation of success or "monopoly" of representative parliamentary democracy.

The recent decline of representative parliamentary democracy has been called upon by many authors. Three intertwining simultaneous developments have taken place on the macro-, meso- and micro-level of societies, with important effects.

On the micro-level, the citizen has evolved from an ideology supporter to a fragmented individual. Living in different configurations the citizen has different values in various domains. The earlier individual position of an ideologically-based consistent value pattern has disappeared. Today's citizen is not without values but the glue of a focal ideological principle is no longer at stock. Fragmentation of values has led to individualisation, to uniqueness but thereby also to the impossibility of being represented in a general and trustworthy manner by a single actor such as a member of parliament. None of the values cherished by an individual may be unique, but the combination probably is. The preference on behalf of individuals for partial representation by an NGO per value-domain therefore is no mistake, but a logical evolution.

On the meso-level, the development of political parties to marketers in the political realm destroys their capacity for designing consistent broad political strategies. Just like willow

trees, they move with the winds of the supposed voters' preferences, sensitised by their daily interaction with the media.

On the macro-level, media-politics dominate. As a consequence the epicentre of politics is shifting from parliament to the media.

Personalities instead of programmes become the most important discriminating factor and therefore the voters choose personalities. In an attempt to maximise the number of voters, political parties are keen to use the media, as it is merely possible to actually "sell" personalities through mass media. This of course significantly increases the structural dependence of politicians on the mass media. Media and politics is a relationship based on mutual interest, as on the one hand politicians need the media in order to reach the voters, and on the other hand the media equally need politicians in order to produce news, one of their main products. Indeed, this dependence is structural and reciprocal. The central position of the media – networks in themselves – with their natural focus on the production of news, causes the political debate to become superficial and short-term oriented. The classical function of democracy to protect the people against tyranny and random or arbitrary action by rulers is endangered by the stress on personalities instead of programmes. More fundamentally media-politics destroys the original meaning of representation. As Castells (2009) points out:

> "It is not improbable that people will utilise their vote at general elections to show disgust or disapproval, more than revealing their preference for the favourite representative".

In his judgement, representation no longer produces a sustainable mandate for the representative. It merely registers an instantaneous picture of disgust at the moment of elections, timeless, possibly without any meaning for future trust, and certainly not for a longer time span. Volatility therefore will probably increase.

The arguments in some attempts to gain insight into the consequences of the decline of democracy, point at the under-institutionalised global developments. These developments are characterised by the increasing predominance of global economic conglomerates and are accompanied by the rise of a new global elite. Other comments indicate that new communication technologies create virtual worlds and weaken the relevance of a physical stable territory. The notion of state, of territory, of society, of sovereignty and therefore of democracy appear to be endangered. ICT and mass media are identified by the above-mentioned analysts as threats for the political realm with a specific negative influence on political representation as media-politics develops. All these trends appear to cause the gradual disap-

pearance of checks and balances, including adequate protection against arbitrary or random political action.

In many different parts of the world evolution into the direction of more participatory democracy is visible. The people are, on average, far better educated than ever before, and the advanced technologies enable effective and efficient mass communication between decision centres and the population. In addition, citizens who are aware of the weaknesses of representative democracy demand more direct influence in decision-making. This evolution causes many tensions, not in the last instance because the traditional power brokers feel threatened.

Wide access to information for everyone

Meanwhile, the worldwide web as well as the evolution of social media also provides for a drastic change in the rules of the game. Acts of harassment on weblogs become political facts; virtual allegations become unchecked myths and pressure groups design increasingly easier ways to find endorsement on the internet. Obama's campaign is trend-setting for the latter.

Internet, better education and other societal changes have made knowledge accessible to many more people than in the past. This leads to an abundance of knowledge which must be interpreted. It also leads to different types of knowledge: not only scientific knowledge but also citizens' knowledge. This is a huge challenge for policy-makers, for scientists and for the media. Politics is not just about how knowledge can be selected for political decisions, but also about how democratic decision-making processes should change in order to incorporate the different types of knowledge adequately.

> Normally, in a national democracy, be it in the UK, Germany, or Den-mark, the media can create that bridge [between politics and citizens]. But for instance in Europe, there is a lack of a real European public and public sphere, and even more so at the international level. Here we have a big challenge with our normal ideas about how some of the ideal democratic functions should be. It is very hard to achieve the involvement of citizens without having the bridge through the information via choices and through the media. (Connie Hedegaard)

A majority of the population now utilises social media. Castells in his Communication Power (2009) speaks about "Mass self-communication". Moreover, citizens themselves have become media: any citizen may produce a YouTube movie picture which can become world-famous in as little as two days: icons in political turmoil with great political momentum may

be created by amateurs, as the recent events, first in Iran and later on in other Arab coun-
tries have shown us. The classical media suffer from the new ones: not only in a commercial
sense, but also because of the influence of the new media. We call the new media the bot-
tom-up media in order to distinguish them from the classical media, the top-down media.
Many of the new media are not familiar with an editing function: hardly anyone accepts the
obligation to select rubbish from the trustworthy materials. This results in very high costs for
the recipient of the information in order to make the aforementioned selection. The devel-
opments in and with the media are confusing. Our capacity to observe appears deficient.
Information and knowledge of very different origins are available within a second but it is
hard to judge whether or not they are of good quality. The 'wicked' character of many prob-
lems on the political agenda sheds a fascinating light on the complexities caused by the
interaction of top-down and bottom-up media.

Inclusion and exclusion get new dimensions

As mentioned above, we distinguish "top-down media" and "bottom-up media". Both con-
tribute to the agenda-setting of politics. The top-down media operate in structural interde-
pendency with politics. The expression "media-politics" is devoted to this interdependency.
The bottom-up media are to a considerable degree independent from both the top-down
media and politics. Participation in decision preparation and decision making may be invited
by public authorities, but uninvited participation takes place too, in particular with the sup-
port of bottom-up media.

The rise of social media also changes the relationships between the politicians and the clas-
sical media. The politicians may reach the voters through social media, like Twitter and
Facebook directly, without the intermediary role of top-down media. This might have far-
reaching consequences for political life, for instance because politicians can create armies of
digital followers which can be mobilised to take real life action at a moment's notice.

> Given the bias of some media outlets, social media can improve the access to information
> to the common citizen. (Juan José Daboub)

Hardly any empirical research is available here yet

During the last decade, an influential debate has been conducted on the "knowledge-based
economy". This concept has even become the main policy objective of the European Union,
the Lisbon Strategy. However, there are signs that the strength of the argument for the
knowledge-based economy is weakening rapidly. The current worldwide economic crisis

leads to new, very challenging questions. It even has the potential to challenge the current economic world order as such. It is likely that new concepts will be needed to reflect upon.

These questions refer mainly to the institutional frameworks of today's societies. It is therefore time for a transition to a new concept which concentrates on institutional and functional innovation. As the industrial economy has been combined with mass democracy through universal suffrage and later by the rise of mass media, one might suggest that the logical successor of knowledge economy is a new type of governance, which is called "knowledge democracy".

Which challenges and threats will we be faced? How will the respectable parliamentary and new direct forms of democracy mix, and which roles will knowledge play in the transition towards a knowledge democracy? The crucial combination of a network society and media-politics provides new problems and tensions. Earlier we have concentrated on the roles of knowledge and information in today's democracies. We have further developed the concept of knowledge democracy in order to analyse whether we might be able to deal with these problems and tensions. Now we wish to discover what new tensions are arising once we practice knowledge democracy.

> At the same as the world gets more and more complex, we also have access to information to a degree that we have never had before so it is possible for the conscious citizen to actually go and seek information; to try and to form an opinion on the basis of that, to work for it. So in that sense we have not gotten less transparency, less chances of getting involved. But of course there is a paradox because we see more and more globalisation, also of political decision-making, and in that sense decisions seem to be getting more distant from you as an individual. (…) I think that the big challenge is the gap between those being very much involved in this and the ordinary citizen, and that is particularly a problem in democratic societies. (Connie Hedegaard)

Today policy-making in many instances is evidence- or knowledge- based, providing both legitimacy and effectiveness, according to the supporters. Effectiveness seems to be assured as the knowledge concerns true statements on the relationships between political interventions and their societal effects. Legitimacy is furthered when the policies are based upon the "objective" truth. As Funtowicz & Ravetz (1991, 1992, 1993) have explained over and over again, this image of knowledge is not adequate according to the modern science model. We will elaborate upon this later, while dealing with transdisciplinarity.

Sustainability often deals with so-called "wicked problems". In the typology of Figure 5, values and knowledge as well as how they are contested form the criteria for distinguishing between problems.

Knowledge / Values	Consensus	Disagreement
Consensus	Technical	Political
Disagreement	Scientific	**WICKED**

Figure 5. Typology of problems.

The notion of "wicked problems", characterised by the absence of consensus both on the relevant values and the necessary knowledge and information, is crucial for understanding the governance of the ambiguous and contested concept of sustainable development: if there is no consensus on values and no consensus on knowledge, then the result is one of conflict. The political agenda is filled with these "wicked problems". Uncertainty and complexity prevail.

> We have these discussions about the scientific results on climate [change]. It still cannot be refuted as a dream, something that was dreamt up by someone. No, the basic facts still stand. One footnote could have been wrong, should have been paid attention to, the basic fabric is there. Then you have to argue your case, you have to go out into the media and say that this was proven and that was proven. You know, it is a daily fight, you have to maintain, never is anything a given. You have to maintain the debate, and all the time engage and incorporate new facts, but that's life in a democracy. You have to get the good arguments, the winning arguments. That's the secret of things, I find. And here and there you can compromise, if your basic facts stand up. Compromise is forging majorities, that is what we need to have in a democracy. It is sometimes painful; it sometimes takes too much time. (Jos Delbeke)

Wicked problems are a product of the increasing complexity and uncertainty of the physical world as well as of our cognitive capabilities and values to cope with this. Concretely, as we

(should) move further into the direction of implementation and hence away from pure norm-setting, dissent over the "how to" increases exponentially. As a consequence, more often than not no action is taken. Governance based on hierarchical mechanisms tends to fail when applied to wicked problems. Hence, in support of the question raised above, the values and culture dimensions seem to be necessary components in understanding sustainable development. Theories such as those reflecting on configurations and other knowledge-related aspects/phenomenon are needed to move forward.

Knowledge democracy could become an emerging concept with political, ideological and persuasive meaning. The analogy with the concept of knowledge economy is clear: the latter brought political attention for the economic meaning of research and development, a focus on the quality of education and political support for larger public budgets for the domains under consideration. The human capital theory – although deficient from a scientific point of view – has become the predominant policy paradigm in educational policies.

The concept of knowledge economy has developed as a rather vague persuasive notion concerning the relationships between advanced research and education on one hand and economic prosperity on the other. The "container" character of the concept has not prohibited favourable effects. It has been proven to cause a more conscious approach to the relationships between knowledge production and dissemination on one hand and economic innovation on the other.

The concept of knowledge democracy is meant to enable a new focus on the relationships between knowledge production and dissemination, the functioning of the media and our democratic institutions. Moreover, the emerging concept of knowledge democracy obliges us to realise that the institutional frameworks of today's societies may appear to be deficient insofar as the above mentioned undercurrents, trends and other developments demand change. From the perspective of new relationships between politics, media and science, classical problems also demand new solutions: the concept of knowledge democracy concerns a *problematique* that relates to the intensification of knowledge in politics. Earlier we have developed a heuristic scheme in order to think properly about the bottlenecks which threaten optimal trajectories between the realm of politics, policy-making and useful research (Figure 6):
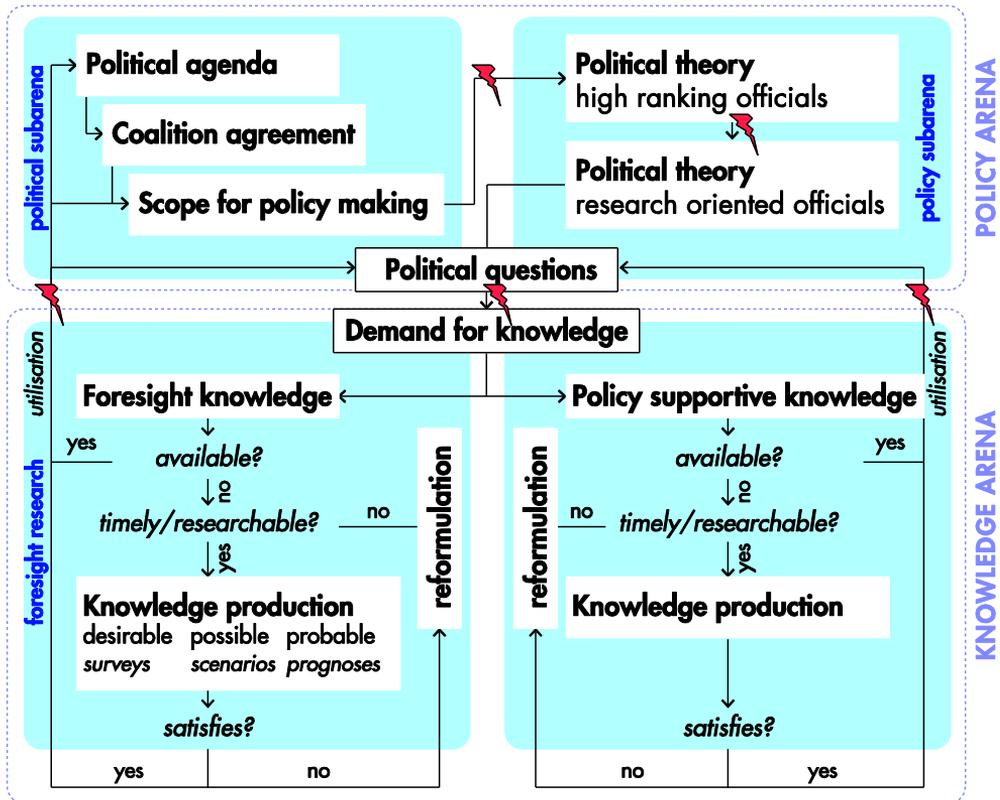
Figure 6. Bottlenecks between the realm of politics, policy-making and useful research (after In 't Veld 2009).

The thunderbolts show possible bottlenecks in the processes of articulation of the demand for knowledge, as well as the utilisation of knowledge, for instance:

- The actual political agenda may not correspond with the existing policy theories that are either laid down in existing policies, legal systems budgeting rules and so on, or/and are embraced by the top civil servants.
- The translation of policy questions in knowledge demand may prove to be extremely difficult, for instance because the policy objectives bear a symbolic character, or because the policy questions are wicked in nature, lacking underlying consensus on values.
- Inconvenient truth, newly produced knowledge which attacks the existing policy theories, will probably not be applied in policy-making.
- Research will produce knowledge in the future but the need is urgent, and the political agenda is slightly volatile so there is a general problem of timeliness. In order to recognise these time lags just on one hand and the legitimate demand for useful new

knowledge on the other, we should attempt to design the policy agenda in the near future instead of only the present one, but this is a dangerous activity.

The aforementioned bottlenecks can be reformulated as problems which demand a solution or at least improvements. In other words, these are starting points for a knowledge-related reform agenda of governance systems as multiple levels.

The media are far from neutral or passive. The illusion that they are a neutral mirror of reality belongs to a forgotten past. We have already shed light on the relationships between politics and media. Media create realities, produce knowledge, and moreover report on citizens' knowledge. They are the reporters on scientific findings but also competitors of scientists. The same holds for the relationships between media and citizens. This increasing complexity demands efforts in order to gain insight. Other important questions are for instance:

- How do the media deal with scientific knowledge, and in particular how do they select the new knowledge to be reported on from the vast supply of new knowledge?
- How can scientific knowledge and citizens' science both be utilised in processes within politics?
- How can conflicts between both types of knowledge be solved?
- How do supervisors and regulators deal with citizens' science?

A number of questions concerning the functioning of the democratic institutions themselves as far as application of knowledge is concerned are very relevant:

- How do parliaments deal with different types of knowledge?
- How do parliaments not only use but also produce knowledge?
- Is parliamentary research to be trusted since parliamentary research committees never lose their power orientation?
- How do parliaments deal with their dependence on information from ministries?
- Which challenges and threats will we be facing? How will parliamentary and new direct forms of democracy mix, and which roles will knowledge play in the transition towards a durable and sustainable knowledge democracy?

Transdisciplinarity

Much valuable scientific work has been conducted with regards to the relationships between science and politics, specifically in order to partially answer the last question. Jasanoff (2004) and others have argued that it would be wise to design an independent boundary function in order to foster the quality of the translation. The classical theory on boundary

work in order to master the existing gaps between science and politics is nowadays widely accepted among experts. The underlying insight is that scientific knowledge by its very structure never directly relates to action, because it is fragmented, partial, conditional and immunised. This observation is valid for both mono- and multi- disciplinary knowledge. With this, translation activities are always necessary in order to utilise scientific knowledge for policy purposes. Pohl (2007), Scholz (2011), Nowotny (2002), Regeer & Bunders (2009) as well as many others have explored this vast domain and have developed the concept of transdisciplinarity in a number of variations.

The literature on transdisciplinary research is dominated by process-directed normative studies. It appears clear that the core concept of transdisciplinarity is to be defined as the trajectory in a multi-actor environment from both sources: from a political agenda on the one hand and existing expertise on the other, to a robust, plausible perspective for action. The terminology of the main authors is still more hesitant and still bears the word "research" in the title. It appears fair however, to acknowledge that the core activity of transdisciplinarity is design, more than research. Researchers of course may contribute to design.

If we consider the different categories of knowledge more closely, we observe that the shape and structure of the categories differ widely: disciplinary scientific knowledge is formulated in "laws", and other generalities, while citizens' knowledge is mostly experience-based and specific. In some cases, groups or crowds might possess insights which are not to be represented by a single individual.

From the perspective of knowledge democracy, we can distinguish two important dimensions with regards to research approaches: the degree of knowledge input of lay groups which is included in a specific transdisciplinary project and the degree to which non-dominant actors are explicitly involved in the decision-making of the development process of policies or research agendas. This results in two different styles of transdisciplinary approaches, as discussed in several chapters of Knowledge Democracy (2010). From the perspective of knowledge democracy, it becomes a matter of terminology whether we describe knowledge input by lay groups as either transdisciplinarity or participatory democracy.

What then is the character of the cooperation between scientists, policy-makers and others? Each of the participants is outside his comfort zone. The scientists fear being lured into the trap of having to admit that disciplinary knowledge has only a restricted validity, and cannot be applied directly to solutions of societal problems. In contrast, the policy makers must admit that they have to confront the world of knowing with the world of willing. This uneasy meeting could however produce robust, plausible action perspectives once the process architecture is adequate. The remarkable success of the Ethics Commission in Germany in

2011 which succeeded in designing a consensual action perspective as to nuclear energy within two months is a fine example of a superior process architecture.
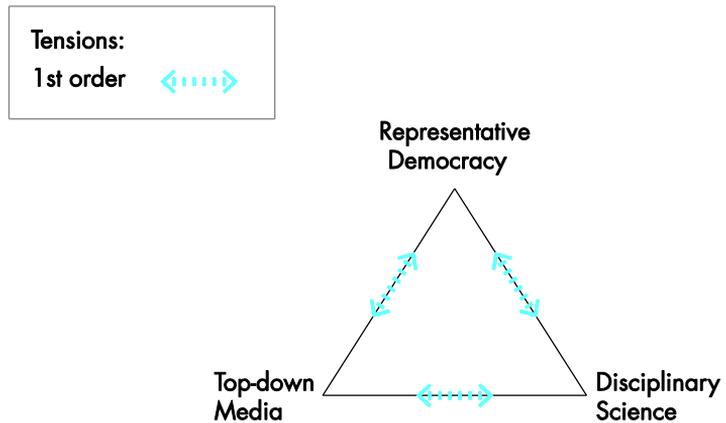
Figure 7. The emergence of the knowledge democracy concept.

This scheme (Figure 7) illustrates the emergence of knowledge democracy. The original institutional framework is fit for the application of the fruits of disciplinary science, in order to solve rather straightforward policy problems within the framework of representative democracy. Society was ordered clearly in terms of ideological patterns and classical top-down media fulfilled their roles. The first-order relationships show this picture. Each of the corners in the triangle is prone to profound change, indicated in the second-order relationships (Figure 8):

1. The bottom-up media do not only supplement the classical media, but also compete with them.
2. Participatory democracy is complementary to representative democracy but is also considered as a threat to the latter.
3. Transdisciplinary design or research is not only a bridge between classical science and the real world but also produces deviant knowledge and insights.
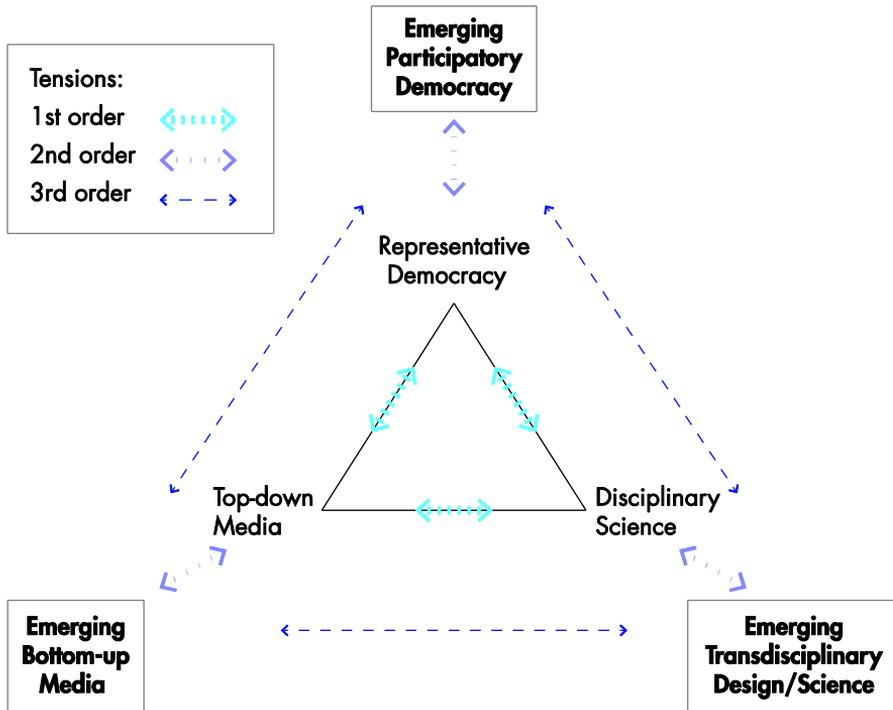
Figure 8. Knowledge democracy: Three orders of tensions (after In 't Veld 2010: 11).

As a consequence we are confronted with tensions, threats and opportunities that are indicated in the third-order relationships. The tensions are those we find in second modernity. Society is enriched by the extensions of the corners of the triangles but it has to cope with the tensions. There is a shortage of empirical research in this area.

As we may observe, the outer points of the extended triangle (Figure 9.) also strengthen and stimulate each other. Transdisciplinarity nears participatory democracy, and social media play crucial roles in large scale communication processes. With this, the tensions relate mainly to the inside-outside relations in the triangle while the stimuli relate to the outer points of the corners.

This has far reaching consequences for the governance of sustainable development in knowledge democracies. The earlier formulated recipe of *intraventions* is brought into practice both in transdisciplinarity and in participatory democracy.
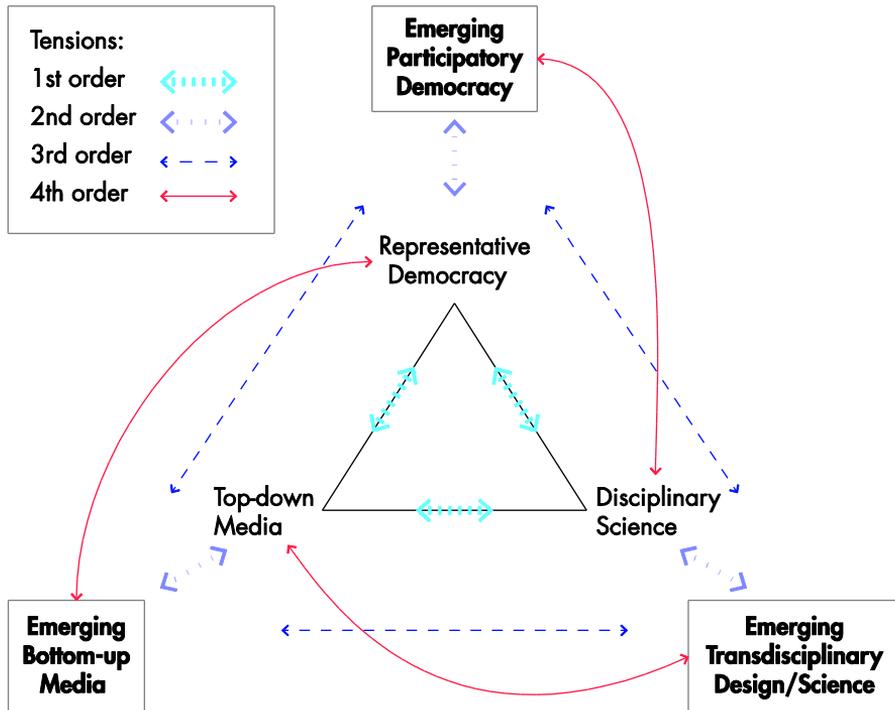
Figure 9. Old and new forms co-exist and influence each other.

3.4 CORE CHARACTERISTICS: TECHNO-SOCIAL SYSTEMS; CAUSALITY IN NATURAL SYSTEMS AND REFLEXIVITY IN SOCIAL SYSTEMS ON THE THRONE.

We have organised our worlds in order to master technologies, to produce goods and services according to human preferences, to enable people to pursue happiness, as well as to avoid and to fight disagreeable actions and events. The patterns of organisation are immensely varied, and are interconnected. People have organised themselves in stable social systems like tribes, villages, cities, regions and states, but can also be observed as flows of fugitives, masses, publics, crowds and other temporary shapes.

Moreover, people live in a technological manner, that is, they are surrounded by applications of technologies in nearly every aspect of their activities, and increasingly are themselves parts of technological systems. In addition, people are (parts of) ecological-biological systems, or at least are surrounded by such systems.

All systems are due to change over time, but they evolve in very different ways. Some seem to change according to an S-curve, while others show tipping points. We may be able to analyse the change of ecological-biological systems with the support of natural sciences which lean heavily on regularities, often formulated as causalities. These regularities shape bodies of knowledge. This type of knowledge is accumulative in nature: our knowledge

about stars nowadays is better than it was a century ago. It can be utilised to forecast, to steer, and to develop.

Social systems however, function according to the way in which the human competence to learn, and to adapt, referred to here as reflexivity, operates. This competence enables humans to learn from any source, experience, practice, experience, information, knowledge, theory, and so on. In addition, they can re-orientate behaviour subsequently. The inner logic of this learning process is unknown to any outside observer. As a consequence the future behaviour of a social system in general cannot be forecast properly. It is doubtful whether knowledge about social systems can be characterised as accumulative: social systems will learn from any knowledge known to them. As a consequence the knowledge may lose its validity. Knowledge on social systems is volatile in principle.

Systems can often be influenced from outside. We call a purposeful attempt to influence a system from outside an intervention (or steering action). We call an attempt to influence a system from inside an intravention. The volatility of knowledge concerning social systems provides a major hindrance in attempts to formulate adequate outside policies for interventions pointing at change, because the knowledge base is not trustworthy as far as the functions and characteristics of social systems are concerned. Reflexivity, or in Giddens' terminology reflexive monitoring, leads to intraventions.

Our surrounding phenomena mostly bear a mixed character: partially technological and/or ecological- biological, and partially social. Representative and participatory democracy, top-down and bottom-up media, as well as disciplinary and transdisciplinary science, are all pairs of interventions and intraventions. One might feel tempted to choose optimal critical paths but second modernity feeds the recommendation that all need to be utilised.

3.5 INTERACTION BETWEEN NATURAL AND SOCIAL SYSTEMS: ONE OF THE GOVERNANCE DILEMMAS

Governance implies among others, government, and government implies the existence of the state. The powerful concept of the national state is, according to many, developed in order to cope with the well-known tragedy of the commons. The violence monopoly position is necessary for the elimination of free rider behaviour, and thus for the production of solidarity. The violence monopoly however necessitates centrality of decision making. The state concept was and is considered by critics as prosthesis for altruism, as a second best solution, because moral improvement resulting in altruism would be a superior solution for the prisoner dilemma super game. This criticism has been judged as utopian in nature.

The theory on the optimisation of government action has been dominated by the democracy concept on one hand and the idea of scientific planning on the other. The state would be able, with support from science, to forecast in such a manner that optimal policies could be designed. Steering society could be based upon such policies. The present insight into the character of social systems clarifies the general inability of anyone to forecast the future behaviour of such systems. Therefore the idea of steering society from centre by interventions into social systems appears to be a dangerous illusion. Intraventions should be our hope.

Government is a social system itself. Effective governance of social systems consists mainly of intraventions, and government is always partially "outside". As we shall argue, interventions are subject in general to diminishing effectiveness over time, because of unexpected and undesirable effects which are rooted in reflexivity. This tragedy is the fate of social engineering.

Technological and natural systems may be governed by interventions, because a satisfactory causal theory may be available and reflexivity does not play a role. As a consequence trustworthy forecasts are feasible, so planning may be adequate. The systems we observe are of a mixed character. They consist of both technological and/or natural systems but also of social systems. With this in mind, causality and reflexivity go hand in hand.

3.6 VALUES UNDERLYING THE "AND" STRUCTURE

Values are psychic concepts. They are rooted in cognition and emotion. They concern the beautiful, the good, the true, and the trustworthy. Values urge for reflection, interventions and intraventions. Socialised values lead to norms that regulate human behaviour. People live values. Values that are lived, albeit in the shape of explicit norms, constitute culture. The specific culture of a certain social system is its identity. Cultures and identities may change over time. This change however takes place in a reflexive manner. Developments in accordance with values make sense.

Well understood self-interest might lead to collective action which produces collective goods. Egocentricity and free rider behaviour however demand violence monopoly over a group in order to ensure sufficient collective goods production. Therefore many argue that states have been invented to overcome the tragedy of the commons and other sub-optimal consequences of human egocentricity and resulting free rider behaviour. Therefore agencies with a violence monopoly have been created to enforce the norms which result from the most widely shared values. We call the general activities of states policies. Policies are interventions with a general character. As we have argued above, interventions pointing at social

systems are generally ineffective. Designing policies which result in intraventions might work. The life cycle of policies is determined by the interaction of different categories of learning processes.

One category consists of behavioural reactions of a tactical nature on the part of the social systems involved, meant to escape the disagreeable aspects and effects of the policies. This type of learning causes losses of effectiveness of the policies because the systems concerned gradually succeed more and more. A second, contradictory learning process may concern the gradual internalisation of the values and/or norms that the policies are based upon. This type of learning leads to increasing effectiveness of the policies. The different categories of learning processes may differ in intensity and in speed. The net surplus is decisive. A crisis emerges once the perception of ineffectiveness of a specific policy is overwhelming.

One might ask why the gradual loss of effectiveness of a policy is not met on time by adequate incremental adaptation, and internalisation of that policy. Policy makers in reality react to diminishing effectiveness nearly always by policy accumulation: still more detailed norms and more control are introduced. Of course a new impetus to decreasing effectiveness is thus provided. Is nothing better possible? The general answer is that the political momentum for sophisticated adaptation is often not there until a crisis emerges, or at least the perception of a crisis. Policies are solidified in regulation, financial schemes, and so on. Decision-making in democratic environments takes time, so policy makers try to adapt in a manner that does not demand formalised new decisions at the highest level. The formulation of more detailed norms and the intensification of control is often in the hands of the executive branch of government which may shift its view, and/or approach more quickly than legislators. With this, decreasing effectiveness in most cases leads to accumulation of policies.

The idea that interventions by democratic governments are benign to societies at large has been criticised by many analysts. Unforeseen undesirable side effects of policies leading to crises appear to dominate in the long run. The most radical observation is that the national state itself, through its production of unforeseen undesirable effects of policies, is in the process of destroying society itself. An example might be that the negative effects of formalised public social security systems (the general perception that the people profiting from social security are partially free riders) destroy societal caritas as value. Generally speaking, such a hypothesis is that the state, or put more provocatively the functioning of democracy, destroys social capital.

Second modernity, substantial and relational values

The concept of "second modernity" is related to this. We interpret this concept as the pre-dominance of the simultaneous co-evolution of contradictory processes. This co-evolution is full of tensions. Earlier dialectics may have dominated our thinking on profound change, as developed by Hegel, Feuerbach & Marx. The strength of the thesis-antithesis-synthesis order as an explanation of historical dynamics would still be larger once one accepts the functioning of reflexivity. It is misleading to say that Marxism was wrong in forecasting the proletarian revolution because it did not happen. Reflexivity teaches us that the avoidance of extreme exploitation of the workers was a result of reflexive thinking which was made possible by Marx's insights. As a consequence, the forecast was not realised. Indeed, theories on social systems are not useless, but their validity is volatile, and it remains uncertain beforehand how long it will last.

We distinguish substantial values and relational values. Substantial values concern beauty and ugliness, the good and the bad, and so on. In many but not all cultures, substantial values are formulated as dichotomies. Something is either good or bad. If it is bad, it is not good. This helps us to distinguish, and to select. In other cultures it is assumed that anything on earth is both good and bad, at least to a certain degree.

Relational values concern someone's attitude towards others. Five categories of relational values which show different relation types, are (In 't Veld 2010b):

- Hegemony: My values are the best that are available; if they were not, I would have other values. Thus, the values of others are inferior. Therefore it is an act of friendship, or even love to ensure that the other adopts my values. We call this the universality claim.
- Separatism∕Autonomy: I accept that the world is split up. I do not want to interfere with the values of people if I do not have to be confronted with the implications of other people's values.
- Autonomy/Pluralism: Other people's values may be valuable, and I am co-responsible for protecting them.
- Tolerance: I find my values superior to other people's values, but I abstain from interventions because of sympathy.
- Indifference: I find my values superior to other people's values, but I abstain from interventions because I am not interested.

It is important to notice that these categories of relational values show some overlap. Hegemony of course was once the predominant historical tradition of both Christianity and

Islam. Other religions have shown less hegemonic tendencies. More profound analysis shows that not the content, but the pattern or structure of substantial values is related to the predominance of a certain category of relational values: if dichotomies characterise the substantial values, the probability of hegemonic relational values is bigger than in other cases. We should keep this in mind when designing governance arrangements.

Governance style	Relation to other people's Values
Hierarchical governance (dependency, authority)	Hegemony or separatism
Network governance (interdependency, empathy)	Pluralism or tolerance
Market governance (independency, autonomy)	Indifference

Table 1. Governance styles and relational values (Meuleman 2010).

To draw up a broad typology, hegemony and separatism are related to the top-down and authoritarian thinking of hierarchical governance, pluralism and tolerance to the empathy, trust and respect of network governance, as well as indifference to the individualism and autonomy of market governance (Table 1).

Sustainable development is a value-loaded notion. Governance has to deal with the complex relationships in a culturally varied context. We are tempted to assume that the structure or pattern of values on one hand and the way in which historical evolution takes place on the other should correspond in the long run.

Of course we should distinguish between empirical evidence and wishful thinking here. However, once reality evolves in terms of complementarities, leading to tense relationships between seemingly opposite institutions, it might also be more adequate to develop normative insights along the lines of complementarities. With this, we embrace the idea of values which are not formulated in "or" terms but in "and" terms.

4. Diversity breeds diversity (Diversity controls diversity)

> Each country has to develop its own capacity based on principles that have historically shown to work. Principles based on economic freedom and true democracy. Some of the existing institutions respond to the agendas of particular sectors within their constituencies and that is not positive. (Juan José Daboub)

Classical steering and control are directed at standardisation according to the will of the most powerful party which plans, steers, commands, and/or controls. Standardisation is equal to loss of variety. This may cause efficiency gains and the like. Innovation in turn increases variety. Indeed, evolutionary processes show subsequent increases and decreases of variety in economic and social life.

How do biodiversity and cultural diversity relate? Biodiversity is a specific description of biochemical systems which is loaded with human value judgements. In many human value patterns it is a duty of stewardship to preserve the existing biodiversity. Human action which would diminish biodiversity then is never allowed. Because loss of biodiversity would be irreversible, it is also in conflict with the precautionary principle. However, the reasons to preserve biodiversity are still more basic: nature, biodiversity is inherently good. It provides resilience in ecosystems. Biodiversity is modified in Darwinian evolution.

> Supporting people to protect environmental services will help overcome poverty and improve sustainability. It means that the people then have their own resources – and this must be quantified and involved and recognised so as to not create dependency. (Úrsula Oswald Spring)

Coupling sustainability with cultural diversity is far from new. UNESCO's Universal Declaration on Cultural Diversity (2001) has stated in article 1 that cultural diversity is as necessary for humankind as biodiversity is for nature. As we shall see however, the differences are also striking.

How should we deal with cultural diversity in relation to the precautionary principle? Culture is the production of meaning, and meaning relates to values. Without values there is no meaning, and no culture. Humankind has brought forward many varied cultures. In a certain normative orientation we experience cultural variety as richness. However, our basic attitude

to cultural diversity is more critical than our attitude towards biodiversity. Nature does not produce horrible species, but we experience components of human culture which are sometimes just as monstrous. Take the viewpoint of the Nazi's on the superiority of the Caucasian race. It is highly doubtful that this was part of Nazi culture. Indeed, our values relate to the values of others, as the digression on values in the previous chapter has demonstrated. The precautionary principle could even demand that we destroy those cultures which through their hegemonic objectives would put the next generations into slavery.

A society needs a certain cohesion which is produced as a moral order, based on consensus on some fundamental values and norms. With this in mind, culture within a society also shares some common substantial and relational values. A society consists of configurations. A configuration possesses a specific culture but as observed earlier, this leads to outside walls and thus tensions arise. In particular, the tensions between emerging identities on one side, accompanied necessarily by outer walls, and the need for cohesion and collective action on the other will never disappear. Shaping governance thus is walking a high wire.

We may conclude that biodiversity and cultural diversity are both components of sustainability. We may mourn the loss of a language somewhere on this globe as we would the loss of a species. However, our general attitude towards cultural diversity is far more critical than towards biodiversity. We do not believe that each culture is intrinsically good. On the contrary, some cultures are horrifying to many. As sustainability also implies the economic and social dimension, we realise that "diversity always is a bedfellow of inequality" (Van Londen en De Ruijter 2011: 14). Inequality might be a threat to sustainable development and so our attitude towards cultural diversity is ambiguous.

According to second modernity it is probable that from the tense relations between emerging opposites variety increases. Striving for sustainable development urges us to take these tensions fully into account when dealing with governance. Van Londen & De Ruijter (2011: 17) develop the notion Sustainable Diversity, which they define as: "the ability to structure and manage diversity in such a way that this diversity results in or promotes (ecological and social) sustainability, resulting in the paradoxical notion that equality in rights and opportunities has to be realised under conditions of all kinds of diversity".

Meuleman (2012) follows a related argumentation:

> *"Building sustainability governance on cultural diversity and investing in compatibility of values and practices rather than on assimilation, will lead to an increased variety of solutions to similar problems, instead of current practice in which centrally proposed solutions are accepted in some cultures and rejected in others."*

Each discussion on cultural diversity leads to the question if there are also universal values, and if yes, how they relate to the premise of diversity. The paradoxical situation that we apparently want both, is expressed in the European Union's and Hindu motto 'Unity in diversity' and in the *'E pluribus unum'* of the USA. The message may be that there are merits in this being a never-ending discussion. The question how to make the trade-off between unity and diversity in sustainability governance is relevant because, as we have seen, there is a dominant coalition pushing the 'unity' side of the equation".

If we accept that it is impossible to determine which governance approach is in general the most successful, it makes no sense to design standardised approaches. What can be standardised, however, are mechanisms that increase the chance of successful governance emerging in a certain situation. Such a mechanism is "governance beyond governance", or *metagovernance*:

> *"In order to make sustainability governance culturally sensitive, permanent and systematic attention is required to translate or adapt possible solutions into such ones that work well in a given cultural setting. This is culturally sensitive sustainability metagovernance"* (Meuleman 2012).

We have not found a general recipe, a panacea for sustainability governance in a cultural context, but it seems that metagovernance as a mechanism, a tool beyond standardised governance, can be useful. We have also found that several principles can help to decide (top-down or bottom-up) what should be done. Culturally sensitive sustainability metagovernance might profit from the application of the following principles: Problem-orientedness, temporality, locality, culturality, policentricity, historicity, reflexivity, resilience, inclusiveness and transparency.

Governance is a relational concept. Hierarchy needs dependent subjects, network governance requires interdependency between partners, and market governance necessitates independent relationships. Hence, it is fair to assume that different governance styles also reveal how people consider other people's values. If the complexity of a sustainability challenge leads to choosing network governance, pluralism or at least tolerance are relational values to be expected. However, if for a specific problem hierarchical governance is chosen as the main style, its congruency with hegemony and separatism should be taken into account: it can destroy trust and innovation power. If a market-based approach is chosen, the indifference towards values and traditions related to market governance can become a bottle neck for implementation. Complex metagovernance combines the different archetypes, thus different patterns of relational values are also assembled. In system theory it is

held that diversity promotes resilience, while uniformity breeds fragility. This may also be the case regarding cultural diversity. Thompson et al. (1990) argue that:

> "*A nation in which ways of life are nicely balanced (or, at least, 'never entirely excluded') is less prone to being surprised and will have a wider repertoire to draw from in responding to novel situations. It will still blunder, of course, but it will blunder less than its more monolithic competitors*".

Therefore, pluralism is essential. However, there are extreme examples of fragility in highly centralised governance (Pakistan) as well as fragility due to over decentralised governance (Belgium). Diversity alone leads to chaos, whilst what is probably needed is institutional redundancy, similar to redundancy in ecosystems. Diversity itself is not sufficient: a critical mass of diverse approaches and density of people involved is needed in order to maintain and use diversity (e.g. diversity in transport, culture, and food in big cities, vs. uniformity in rural areas).

Reflexivity is the strongest engine of social dynamics. It also relates to governance. The interaction of the general laws of diminishing effectiveness and of subsequent policy accumulation as indicated above lead to crises which enable a phoenix to arise from the ashes, and to invent new governance arrangements.

We are aware of the inevitability that government as a major component of governance will consciously destroy variety according to predominant substantial values, but also profoundly influence social relations and relational values. How the latter is evaluated is due to reflexivity. We may better observe, with the support of the foregoing schemes, how these evolutions emerge. We will realise in shaping governance that tensions are not going to disappear but tend to intensify as governance solidifies. We understand that the precautionary principle sometimes demands the destruction of cultural variety. We know that biodiversity and cultural diversity have similarities but also major differences.

Governance of sustainable development is extremely complex because it has to deal with all of the tensions described above and their dynamics, while at the same time it is subject to reflexivity itself. It might be attractive to evade this complexity by defining a list of clear indicators as formulated in the United Nations Human Development Report Governance for Sustainable Human Development (2007: 25): Intra- and intergenerational equity, participation, rule of law, transparency, responsiveness, effectiveness and efficiency, consensus-orientation, accountability, and strategic vision.

However, once we become aware of the fact that each of the indicators is value-loaded, we must conclude that the image of clarity and simplicity as suggested by this list is a rather dangerous illusion in a culturally diversified context.

Humanity has codified its consensus in the UDHR and some other texts. Later unifying efforts have been made on this path, like the Earth Charter. Continuous debate on the possibilities of consensus or at least consent is useful. Within this debate the demand for "social contracts" or even a "global social contract" earns attention. The recommendation for this governance arrangement suggests that we could reach agreements on a worldwide scale as to entitlements and policies. It may be useful to codify the consensus reached, but it certainly would be a tragic mistake to imagine that it would be feasible to modify major developments by formulating legal texts only. The "compatibility" criterion as formulated by Van Londen, & Ruijter (2011) and linked to governance by Meuleman (2012) specifically points out how to accommodate cultural variety in metagovernance.

5. Roadmaps, labyrinths or recommendations?

5.1 INTRODUCTION

At the start of the preparation of this report we imagined that it would be possible to describe adequate roads and road maps leading to sustainable development. We would like to design roadmaps for smart transformations and transitions that would guide the interactions between landscape, regime and niches. Maps in order to build smart institutions. Maps for effective change processes. However, having internalised the concepts of knowledge democracy and second modernity we now feel that the idea of roads is too simplistic to serve as an adequate design. Roads are linear. Roads lead to a certain destination. In a complex and uncertain world it is even dangerous to determine a final destination. Notions like resilience provide guidance to actions but without a fixed point in the future. Wicked problems demand management but cannot be solved in a manner that satisfies everyone. The awareness that each social system is reflexive in nature forces each actor to develop behaviour which copes sufficiently with the uncertainty that is caused by the reflexivity of the others. To master the art of navigating is the best we could expect.

Leaving the roadmaps behind us we wonder whether the labyrinth would be a fitting metaphor for our proposals. Understanding reflexivity and second modernity and accepting the concept of intraventions as an adequate approach initially suggests a fit. However, a labyrinth is too concentrated on the exit. Our world has no exits. With this in mind we have formulated recommendations for wise behaviour, which are positioned after the summary with which this report began, on ten sustainability governance themes:

- Networks involving private and public actors: "co-decentral" arrangements.
- Conditions for better long-term decisions.
- A new diplomacy for international agreements.
- Conditions for a more transdisciplinary science system.
- Checks and balances in science communication.
- Upgrading the relevance of city initiatives.
- Nation states in a new role of process architect.
- Crowds sourcing and volatile publics.
- Creating space for new institutions.
- Measuring progress through dialogue.

5.2 THE GOVERNANCE OF LONG TERM DECISIONS

This section summarises and adds to recent thinking about a theme which is very relevant for sustainability governance, namely policy-making about the long-term and affecting the long-term. Particular focus is placed on the context of sustainable development, taking a broad "governance" perspective (Meuleman and In 't Veld 2010). It provides a framework for looking at different types of future-oriented decisions and the long-term effects of policy decisions (which may be oriented at short-term objectives), and discusses the role of knowledge in each of these cases. It argues that future-oriented knowledge production is scientifically valid and employs specific procedures, but is primarily concerned with handling uncertainty.

The problems of long-term decision-making

We tend to neglect long-term futures, or to think about it in terms of long term visions and targets (e.g. 2050) which have the "virtue" not to harm today's action. Human action is often characterised by the ostrich's point of view. Still, politicians develop visions, describing desirable futures. A vision may mobilise voters to support the designer of the vision. However, while developing political visions about the future can be attractive for politicians; concrete political decision-making about the long term is often not popular. The results of such decisions are usually harvested by future politicians, but the costs (capacity, money) and other sacrifices have to be made in the present. This is only one of many reasons why long-term decisions tend to be postponed or not taken, even if considerable evidence exists that taking measures now prevents enormous costs in the future. At the political level, the realisation of long-term concepts like sustainable development requires an adequate political and societal agenda ("what to do?") and a well-functioning governance system ("how to act?").

Reports like the EEA's "Late lessons from Early Warnings: the precautionary principle 1896-2000" present powerful examples of the dramatic impact of postponed decisions and non-action in the case of environmental policy-making.

> PCB (polychlorinated biphenyl) was the first obvious example of a substance that was not intentionally spread into the environment, but nevertheless became widespread and bio-accumulated to high concentrations. PCBs were used for a range of different purposes in electric equipment, heat exchangers, PVC plastics, paints, adhesives, lubricants, carbonless copy paper, and so on. This example shows that non-action by regulators had costly and unforeseen consequences for human health and the environment. Early warnings, and even "loud and late" warnings of the emerging problems, were ignored.

By the late 1930s, evidence already existed, albeit at a low level of proof, that PCBs could poison people. This information was not widely circulated among policy-makers or other stakeholders until 30 years later when there was a higher level of proof that PCBs could cause serious harm to human health and could accumulate in the food chain of seals in the Baltic Sea. It was not until the 1970s, however, that the first regulatory actions were taken by Sweden to ban these chemicals. The EU directive to eliminate PCBs was not implemented until 1996, with a total phase-out planned by 2010. (Gee 2008)

The consequences of inappropriate action, late action or non-action are sometimes huge and in any case concern a broad spectrum: human casualties and suffering, serious damage to people's health and animal welfare, hazard of species' extinction, environmental damage and economic costs. Other examples, for example of social and economic policy-making, have in common that "early warnings" are not listened to, because postponement or the decision to do nothing is considered as more politically opportune. Problems which are too big, too inconvenient, and for which no solution is emerging, tend to not even reach the policy agenda.

The 2006 EU Sustainable Development Strategy has encouraged Member States to develop long-term oriented sustainability strategies. Increasing political and societal pressure and recent policy failures like the widely-discussed sustainability impacts of too hastily set targets for biofuels have increased the need for practical governance approaches for long-term decision-making. The problem is that such approaches are not, or only to a certain extent, available.

The remits of government institutions like ministries are usually determined by societal challenges of the past. They often lack the organisational capacity to deal adequately with new and future problems. For example, there are no (national) policy-making bodies with the primary task of dealing with climate change, poverty or demographic changes. Another failure is the fact that available data on for example environmental pollution is often not aggregated or otherwise coupled.

[About the EU]… we have had six EU Environmental Action Programmes, and the sixth Programme comes to an end in 2012. Do we need a seventh programme or is there no more necessity for an environmental action programme anymore? My aim is to have a seventh Environmental Action Programme for the EU, even stronger than the sixth programme, so we can obtain the mainstreaming of sustainable development in all other sectors. (Jo Leinen)

Governance instruments reflect the "policy theories" of the moment at which they are established. For example, environmental policy instruments made in the 1970s and 1980s are mainly legislative instruments, but since the 1990s the general belief of European politicians seems to be that the utilisation of market mechanisms and the application of network concepts are better approaches. Apart from the fact that considering one or two of the three ideal-typical governance styles as a panacea neglects the complexity of societal problems, such approaches also deny policy-makers the use of a rich "toolbox".

Furthermore, long-term policy-making requires ex ante assessment methods. The currently available methods, such as cost-benefit analysis, are often disputed: many of them contain concealed normative assumptions. Politicians often do not take the time to make those assumptions explicit and pass judgement on them in a timely fashion.

Although the growing attention for the quality of the processes of governance allows for more future-oriented thinking, this may make it increasingly difficult to develop and implement unpopular and firm decisions. The longer the impact of a decision, the more uncertainty is involved. This is an often-used argument for postponing decisions. Therefore, the "governance of non- decision-making" is also important. In addition, the sheer complexity of the many "wicked" problems on the sustainability agenda, and disputes about the roles of knowledge (what is "evidence-based" policy?) add to the governance challenge.

Finally, problems also arise regarding the actors involved in policy-making. Not only can future generations not be asked about their preferences, there are also quite different opinions on who should be involved, when and why. There is a tendency to increase stakeholder participation as well as involving "the public". This has brought about the paradox that more support implies less daring policies.

In general, the agenda-setting of long-term problems is difficult. Long-term decisions conflict with the usual 4-5 years political life cycle of a government: the potential successes are not harvested during this period. Therefore, the interests of those who determine the political agenda may be short-term rather than long-term oriented. Unsolved problems and seemingly unreachable results tend not to achieve the status of political priorities. In some cases however the civil society itself becomes long-term oriented. Values which reflect a variant of the precautionary principle may gain wide support. Politicians then have no choice but to follow that point of view and to adapt the long-term problem as an immediate priority. In this manner it can be understood how the issue of climate change has finally become a global political top priority in 2007-2009.

The accumulated complexity of our societies and of the problems governments and other actors are dealing with, has made the challenge of successful long-term decision-making

more important than before. The emergence of large scale problems like climate change, energy supply and the global distribution of chemicals in the environment may have raised the political attention towards long-term issues.

An analytical framework for long-term decision-making

Different actors typically have different time horizons. Politicians divide their time horizon into short-term (1-5 years), following the political cycle and democratic legitimacy of the current government; medium-term (5-10 years, or the next government); and long-term (more than 10 years, or a generation or more). The time horizons of politicians are partially dependent on the time horizons of citizens. Other actors have different time perspectives. Long-term business innovations usually imply 5 to 10 year time horizons, environmental and SD policies often have a 20 year or more time span. Researchers on climate change or geo-physicists can have time horizons ranging from 100 years to millions of years.

Long-term decisions are not characterised by the long-lasting character of the effects. Every real-world intervention leads to an infinite series of effects, because of infinite causality. In a certain case the aims and values of decision-makers determine what the relevant direct and indirect effects of an intervention are. Tensions between objectives and reality, and between values and the status quo, are often described as problems and so become drivers for deci-sion-making. Decisions may be based on lessons from the past, but concern only the pre-sent and the future.

Long-term decisions relate to objectives concerning the future that must be reached by taking decisions today. Some of these decisions explicitly aim to achieve results at a certain point in the future, while others have objectives with an indefinite time horizon. The objec-tive may be to have the Olympic Games in the Netherlands in 2028 or to have the Olympic Games in the Netherlands sometime in the future, for example. From a politician's view-point, a fixed point in the future has the advantage that it may mobilise people to act, but the weakness of deadlines lies in their vulnerability: the distinction between success and failure then is sharp, which brings about a political risk.

Typology of long-term decisions

Two types of long-term decisions must be distinguished:

- Cases with a relatively long period between the policy intervention and the intended effects: a long lead time. This type demands firm leadership in order to collect sufficient momentum for the focal decision. Already from a simple economic viewpoint it is clear that the benefits will have to be discounted again and again, while the costs of the inter-

vention have to be made from now on. Climate change mitigation is an example of this category. An excessive discount rate in these cases may lead to such a high cost-benefit ratio that the decision tends to be postponed or even turns into a non-decision. A typical complication which this category of problems has to face is the interference between long-term and short-term objectives during policy implementation.

- Cases that demand a long-lasting series of interventions which as a whole is necessary to cause a favourable effect, following the drop-in-the-bucket metaphor. This type asks for perseverance, consistency, continuity and reflexivity. The lead time of each intervention may be short (for example the introduction of some legislation), but the lead time of the total series of actions is long. The "drop in the bucket" metaphor is adequate here: it may take a long time before effects of measures become visible. Perseverance and consistency are important conditions in such cases. A classic example is the centuries-old Water Boards in the Netherlands, who were only able to do their drop in the bucket work because they had institutional characteristics that ensured independency from short-term (party-)political objectives.

Besides long-term decision-making *pur sang*, on which we focus in this chapter, other types of decisions may also have long-term effects:

- Short-term decisions: some decisions are not aimed at the long-term future, but nevertheless may have important long-term consequences. Such decisions should be taken into account when discussing the governance of long-term decision-making.
- Postponed decisions: this category implies that the result of reasoning on a long-term policy objective is to not take a decision now. Of course, in this case consequences of such a decision may also have a great influence on the future.
- Non-action: the last category concerns decisions not to deal with a problem politically. The reason may be that the issue is politically too risky, or that there are no solutions to the problem. Several of the retrospective cases presented in this study illustrate that no matter on which grounds non-action is decided, the future impact of such a decision can be substantial. Non-action may be politically difficult, when the pressure to act is high.

Long-time decisions may have irreversible or almost irreversible impacts, which are not considered when the actual decision is taken. An example which is often mentioned is the privatisation of US public transport systems in the 1930s, which has led to the closing down and destroying of the public transport infrastructure, in favour of automobile infrastructure (Newman & Kenworthy 1999: 30).

Resilience and long-term decisions

With regard to uncertainty, the question arises of how much policy-makers should invest in policies to be implemented within an unknown future. Does the wisdom of the decision lie in increasing resilience? Resilience is the capacity of a system to absorb disturbance and reorganise, while undergoing change so as to still retain essentially the same function, structure, identity, and feedbacks (Walker et al. 2004). The concept of resilience addresses both the governance system under consideration and the policy content. How to develop and sufficiently maintain resilient long-term policies is still an important knowledge question. Resilience requires "mindfulness" (Weick & Sutcliffe 2001): a critical and reflexive attitude/awareness, both inside and outside organisations, in order to detect and select (weak) signals that may have a large impact.

Resilience and adaptation are related concepts: resilience and adaptability relate to the dynamics of a particular system, or a closely related set of systems. Adaptability can be seen as the capacity of actors in a system to influence resilience (Walker et al. 2004). The other way around: increasing the resilience increases the possibility to adapt to new circumstances.

Anticipation and mitigation are also a related set of concepts. Anticipation leads to taking measures now as a pro-active reaction to expected future events, and mitigation implies taking measures now in order to decrease or minimise effects now or later.

Policy-making is per definition normative and there are no scientific algorithms for long-term decision-making. One could say that principles are the politician's algorithms. A broad principle for long-term decision-making refers to Kant's wise categorical imperative and to the precautionary principle:

> "We have no right to make decisions which would, according to our present knowledge and values, impose on future generations such costs and risks as we would not be willing to assume by ourselves" (Meuleman & In 't Veld 2009: 10).

The above also implies that decisions are "wise" from a certain viewpoint. In certain circumstances extensive forms of public participation are necessary, in order to use the "wisdom of crowds", while in others expert knowledge may suffice (Surowiecki 2004); this is the dilemma of collective versus individual wisdom.

When an issue with possibly long-term impacts finally arrives on the political agenda, like with all political issues, there will be a political lifecycle which facilitates that they will disappear again from the political limelight – and it may be long before all measures have been implemented. This risk seems highest for decisions with a long lead time. The question is

how such issues can be kept on the political agenda. Awareness of policy windows and the use of concepts like trajectory management and transition management may be required. It is therefore important to recognise that long-term impacts of decisions may become under-estimated, because the problems which lead to the decisions have reached the end of their policy life cycle. Long-term decision-making requires policy mechanisms that prolong the policy lifecycle of policy issues.

Long-term decision-making requires the availability of sophisticated decision support meth-ods. When ethical and political assumptions are used in ex-ante assessment methods, it is important that such assumptions are chosen in the political domain, not in the scientific or technical arena. The main objective of such methods, namely to create a debate in which the "right" (which may mean "inconvenient") questions are asked, may be reached with anything between detailed scenarios and relatively simple questionnaires based on a general horizon scan. The assumptions behind support methods should be transparent for the actors using these methods, and for actors confronted with these methods. Assumptions may limit the use of instruments. For example, cost-benefit analysis is not applicable for very large-scale problems like global climate change, because decisions on such a scale would influ-ence a basic parameter: the future state of the economy and national income. The logic of assumptions generates certain results. Subjective (political, ethical) assumptions used in decision support models belong to the political arena instead of the technical arena in which they are often chosen. Therefore, the production of knowledge to support sustainability is not a neutral process, but value–laden and influenced by actors in "knowledge arenas". A strict separation between science ("the world of measuring") and the policy arena ("the world of weighing") is not possible.

When the decision is made to start a policy-making process with a certain set of goals, policy-makers will start with collecting facts, figures and information from various sources. Together, these will form the preliminary knowledge base. How best to do this depends on the type of policy issue: if it is very urgent, or, on the other side of the spectrum, a rather routine issue, then in general there will not be many actors involved in collecting and inter-preting the findings. However, for complex and "unstructured" issues, in which many actors have different interests and information, a process of Joint Fact Finding (JFF) is advisable. One reason is that only all actors together can oversee the complexity of the issue. Another reason is that JFF is an approach which helps to resolve disputes over the valuation of the collected knowledge. If this is not done in an early phase of policy-making, it will return as a boomerang in a later phase.

In a transition process, science and daily practice must be integrated, in order to generate "socially solid knowledge". In this kind of situation the most important goal might be to develop a collective problem definition; thus the process of achieving transdisciplinary knowledge might be just as important as the actual content. It can be argued that transdisciplinary knowledge-gathering might be one of the methods with which to deal with long-term governance issues, since it is a means to create shared knowledge (formal and informal), a shared problem definition, and a way to involve different actors at an early stage.

> We need policies – global, national, regional, and local – where we can work together and where we can have a decentralised world. I know that people are frightened because it could become anarchy – but I think we can do it. We need to place the positive into these things. We need to start in schools with learning how to negotiate – learning how we can get to an agreement together. (Úrsula Oswald Spring)

Future-oriented research for long-term decisions

There are different types of future-oriented research we all know, such as forecasting, extrapolating, building scenarios, simulation exercises, and so on. In these types of studies researchers and policy-makers may operate on their own, separated from each other. However, many problems that demand long-term decisions have a so-called wicked nature. Extreme uncertainty and complexity as well as value disputes underlie wicked problems. "Normal" science or even future-oriented research does not deliver sufficient tools for wise decisions. A more complex methodology is necessary.

An alternative is the combination of future orientation, design and research. This is more than gathering information. It contains a creative element. This creativity can originate within a person's brain and/or from a chance encounter.

Scientific research is a specific form of research, aimed at the creation or accumulation of scientific knowledge. This knowledge is formalised in a particular way methodologically, for example it is subject to peer review. It is often put into a rule-based form, such as: "A implies B" in a particular set of circumstances, whenever these circumstances occur. Such an assertion is known as a hypothesis. "The more a parent treats a child with respect, the less likely the child is to turn to drugs", is a statement which could originate from empirical research and which probably holds true for white families in European cities from 1990 to the present time. But not for rural areas in Colombia. And why should this statement hold true for the future? Scientific knowledge is therefore by definition both fragmented and conditional. Its scientific value is dependent on the correct application of the agreed methodology. Scientific knowledge lays claim to validity and is a pro-

tection against criticism. What we are talking about here is what is called "normal research".

It is difficult to integrate different areas of scientific knowledge because scientific knowledge is by its very nature fragmented. In addition, its conditional character means that in order to apply the knowledge in real-world situations, it is necessary to verify whether the conditions set have been complied with. In terms of the future, this question can never be definitively answered. This means that every application of social scientific knowledge for the purpose of policy bears an element of risk.

Applying scientific knowledge in policy does not always follow the accepted route of meeting the methodological requirements which apply when the knowledge in question is developed. The application of scientific knowledge in a political and governmental context is an exercise in uncertainty, partly based on suppositions and also requires competences other than scientific ones, such as social intelligence and well-developed social intuition. It appears necessary to link scientific knowledge to other types of insights without detracting from its relevance and usefulness. Combining knowledge from different scientific disciplines and mixing it with other insights is an opportunity to try to maintain the relevance and usefulness of such knowledge in the relevant application. Multi-, inter- and transdisciplinary developments in research are in full swing. Anyone who realises this cannot fail to be impressed by the speculative nature of many elements of the methods used. The precision of a great deal of scientific knowledge rapidly gets lost in these methods. Robust concepts are often unrefined.

Precise knowledge about natural orders which is gained from normal research is often important for knowledge about the future. This is knowledge which is gained from normal scientific research. It is also possible to make one particular aspect or element of the future the specific object of scientific research, for example the climate in 2100, or the level of the national income in 2010. The issue is then the application of an existing theory which has already been recognised as valid, to future situations.

The nature of our image of the future as related to our own lives is holistic rather than fragmented. We regard our world and the developments therein as a whole and not per element. This does not mean that we can be aware of all the interconnections, but it does mean that anything that affects us is now relevant for the future.

Furthermore, elements of what is as yet unknown will also be important. We must recognise that there will be many uncertainties along the way. This awareness creates a thirst for more certainty and probably also more knowledge about this future. Just beyond the bor-

ders of what is strictly scientifically possible, and with a renewed striving for integrated images and policy. Striving for certainty about the future is by nature double-edged and relative. On the one hand, it is possible to become aware of threats which we could eliminate by taking sensible actions, and on the other hand there is the possibility to invent windows of opportunity of which we could make use. This knowledge about the future is related to the perspective for (political) action which we adopt. We understand that this knowledge is formulated in uncertainty, but at the same time we know that we have the opportunity to exercise some influence. The link between the type of knowledge and future actions which are tailored to it also has far-reaching consequences for the nature of the relationship between future researchers and other parties involved.

This short discussion on future research leads to two recommendations. The first is more general. The methodology of gathering and interpreting knowledge about the future must reflect the complexity and uncertainty of the future. Generally speaking, it is recommended that scientific and practical knowledge are combined (transdisciplinary research). Such research designs require a certain degree of participation of actors outside the realms of science and politics, and ensure that a rich set of visions, signals and expectations about possible futures develops.

The knowledge basis for long-term decisions requires a comprehensive approach. Knowledge production for long-term decision-making should be a combination of future orientation, design and research (F-ODR). This demands different process requirements than the requirements for "normal research" and "future-oriented research". Participation of actors is one of the key requirements. Our general view is adequate here once more: in a reflexive world the key drivers of transitions and transformations are intraventions, mainly shaped in combinations of participatory democracy and transdisciplinarity.

Annex 1. TransGov workshops and interviews

The findings in this report and the accompanying scholarly book were very much inspired by discussions and interviews with scholars and practitioners during several occasions, including the following, who cannot be thanked enough.

WORKSHOPS

During the one-year TransGov project, two international workshops were organised at IASS in Potsdam. The first concentrated on scoping, the second high-lighted the cultural dimension of sustainability governance.

Scoping and Development Workshop (12-13 July 2010)

Participants included, besides the TransGov project team and support from IFOK (Dr. Hannah Büttner and Julie Ren):

- Prof. Dr. Frans Berkhout, Professor of Innovation and Sustainability, and Director of the Institute for Environmental Studies (IVM) at the Free University in Amsterdam.
- Ambassador Daniel Chuburu, Argentine Ambassador to Kenya, Permanent Representative to the UNEP and UN-Habitat, Chair of the Committee of Permanent Representatives to the UNEP.
- Stephan Contius, Head of Division for United Nations and Cooperation with emerging and Developing Countries, German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety.
- Dr. Susanne Dröge, Head of Global Issues Division, German Institute for International and Security Affairs (Stiftung Wissenschaft und Politik, SWP).
- Prof. Dr. Harald Heinrichs, Professor of Sustainability Politics at the Institute for Environmental Communication, University of Lüneburg.
- Dr. Klaus Jacob, Research Director of the Environmental Policy Research Centre (FFU), Freie Universität Berlin.
- Dr. Asad Majeed Khan, Minister, Permanent Mission of Pakistan to the United Nations, New York.
- Dr. Albert Jan Kruiter, Researcher, focus on the boundaries between democracy and public administration; Budapest.
- Dr. Hans-Peter Meister, Founder and CEO, IFOK GmbH.

- Prof. Dr. Dirk Messner, Director, German Institute for Development Politics (DIE).
- Dr. Bernd Uwe Schneider, Scientific Executive Board, German Research Centre for Geo-sciences (Deutsches GeoForschungs-zentrum, GFZ).
- Sibyl D. Steuwer, Project manager, German Council for Sustainable Development (Rat für Nachhaltige Entwicklung, RNE).
- Dr. Rie Watanabe, Project head, Wuppertal Institute for Climate, Environment and Energy.
- Dr. Helmut Weidner, Senior Researcher, Social Science Research Center Berlin (Wissen-schaftszentrum Berlin für Sozialforschung WZB).
- Prof. Dr. Harald Welzer, Director, Center for Interdisciplinary Memory Research, Institute for Advanced Studies in the Humanities (Kultuwissenschaftliches Institut, KWI) in Essen.

Workshop Cultural Dimension of Sustainability Governance (30th November – 1st December 2010)

Participants included, besides the TransGov project team and organisational support from IFOK (Henning Banthien and Julie Ren):

- Dr. Ilan Chabay, Erna & Victor Hasselblad Professor of Public Learning and Understand-ing of Science (PLUS) and Director, Göteborg Center for PLUS at Chalmers University of Technology.
- Prof. Dr. Matthias Fritsch, Associate Professor of Philosophy, Concordia University.
- Dr. Edgar Göll, Scientific Researcher, Institute for Future Studies and Technology As-sessment.
- Dr. Takashi Kurata, Assistant Professor of Philosophy, Research Institute for Humanity and Nature, Japan.
- Dr. Daniel Niles, Assistant Professor of Geography, Research Institute for Humanity and Nature, Japan.
- Dr. Keith Nurse, Director, Shridath Ramphal Centre for International Trade Law, Policy and Services, University of the West Indies, Barbados.
- Prof. Dr Úrsula Oswald Spring , Professor and researcher Regional Centre of Multidisci-plinary Research, National University Mexico.
- Prof. Dr. Pramod Parajuli, Graduate Faculty, Chair and Director of Sustainability Educa-tion, Prescott College.
- Dr. Miguel Pinedo-Vasquez, Adjunct Assistant Professor of International and Public Af-fairs, Columbia University.
- Prof. Dr. Kobus du Pisani, Professor of History, School of Social and Government Studies, North West University (Potchefstroom Campus) South Africa.

- Prof. Dr. Constantin von Barlöwen, Member of the Advisory Committee for the Harvard Academy for International Studies of Harvard University.
- Prof. Dr. Zhou Yongming, Professor of Anthropology, University of Wisconsin-Madison.
- Sonia Zouari, Author and Actress; managing director of Vanguard Productions, Berlin and Paris.

TransGov Side-event at UNCSD Rio 2012 PrepCom, New York (8 March 2011)

A side event on "Cultural Diversity and Sustainable Development – From Hindrance to part of the Solution" was organised on 8th March 2011 at the United Nations Headquarters, New York, during the 2nd Preparatory Meeting for UNCSD 2012 ('Rio+20'). The panel members included, besides Dr. Louis Meuleman and Dr. Stefan Jungcurt of the TransGov project:

- Dr. Asad M. Khan, Vice-Chair of the UNCSD 2012 Bureau, and Director-General, United Nations Division, Ministry of External Affairs of Pakistan, Islamabad.
- Prof. Dr. Adil Najam, Professor, Director of the Frederick S. Pardee Center for the Study of the Longer-Range Future, University of Boston.
- Dr. Ingeborg Niestroy, Secretary-General of the network of European Environmental and Sustainable Development Advisory Councils (EEAC), Brussels.
- Dr. Keith Nurse, Director, Shridath Ramphal Centre for International Trade Law, Policy and Services, University of the West Indies, Barbados.
- Nadine Gouzée, Head of Task Force on Sustainable development of the Federal Planning Bureau and Belgian Delegation for CSD and UNCSD issues, Brussels.

TransGov Presentation at the German Center for Research and Innovation, New York (9 May 2011)

The Institute for Advanced Sustainability Studies, in collaboration with Columbia University's Earth Institute, held a discussion about their approaches to sustainable development challenges, at the German Center for Research and Innovation in New York, on the evening of May 9, 2011. Speakers were, besides Prof. Dr. Klaus Töpfer and Dr. Falk Schmidt from the TransGov team and Julie Ren (IFOK):

- Prof. Dr. Eric Schlosser, associate director and director of research of the Earth Institute, Columbia University, New York
- Oliver Schnakenberg, Deputy Consul General of the German Consulate in New York.

TransGov discussion with leading public managers in the Government of the Netherlands on 21th June 2011, The Hague

The Ministry of Economic Affairs, Agriculture and Innovation of the Netherlands hosted a discussion evening on TransGov issues with, besides Prof. Dr. Roel in 't Veld and Dr. Louis Meuleman from the TransGov team:

- Dr. Bernard ter Haar, Director-General Environment, Ministry of Infrastructure and Environment.
- Carla Moonen, Senior advisor on sustainable development of the Prime-Minister of the Netherlands.
- Prof. Dr. John Grin, professor Policy science and system innovation, University of Amsterdam.
- Prof. Dr. Gerard de Vries, Member of the Scientific Council of the Dutch Government and professor Science philosophy, University of Amsterdam.
- Rob Swartbol, dpt. Director-general International Cooperation, Ministry of Foreign Affairs.
- Dr. Louise van Schaik, Senior research fellow, Clingendael Institute for International Relations.

INTERVIEWS

Following several transdisciplinary workshops with academic experts around issues of sustainability governance, institutions, and cultural diversity, the IASS TransGov project sought out perspectives beyond academia in its interview phase. These include former ministers, executive directors of NGOs, voices from business, and the leadership of key European institutions. Many of the interviewees have held multiple positions across different sectors, and were also able to offer a broader perspective based on their unique professional careers. Interviews were conducted by IFOK GmbH in 30-50 minute appointments either by phone or in person during the period of May – June 2011. The interviewees were:

- Sören Buttkereit (09 June 2011), head of the Sustainability External Office at Siemens and a Fellow at the Global Public Policy Institute; formerly a strategy consultant at McKinsey and Company.
- Eileen Claussen (27 May 2011), member of the Council on Foreign Relations, the Natural Gas Council and the Harvard Environmental Economics Program Advisory Panel.

- Dr. Juan José Daboub (16 May 2011, per email), former Managing Director of the World Bank (2006-2010) and former Minister of Finance and Chief of Staff of the President of El Salvador (1999-2004); currently the CEO of the Global Adaptation Institute.

- Dr. Jos Delbeke (01 June 2011), Director General Climate Action, European Commission, Brussels.

- Bärbel Dieckmann (27 May 2011), former Mayor of Bonn (1994-2009) and Member of the Federal Board and Executive Committee of the Social Democratic Party of Germany (2001-2009); President of Deutsche Welthungerhilfe, e.V.

- Karl Falkenberg (17 June 2011), Director General Environment, European Commission, Brussels.

- Connie Hedegaard (28 June 2011), European Commissioner for Climate Action. She was formerly Minister for Energy and Climate (2007-2009) and Minister for the Environment (2004-2007) in Denmark and hosted the UN Conference on Climate Change in Copenhagen in 2009.

- Jo Leinen (31 May 2011), Member of European Parliament (Social Democracts) from Germany where he serves as chair of the EP Committee on the Environment, Public Health and Food Safety. He was formerly Minister of the Environment in the German Federal State of Saarland.

- Staffan Nilsson (01 June 2011), President of the European Economic and Social Committee, Brussels.

- Prof. Dr. Úrsula Oswald Spring (08 June 2011), professor and researcher at the Regional Centre of Multidisciplinary Research, National University Mexico. She was the first General Attorney (Ombudswomen) for Environment in Latin America and the first Minister of Environmental Development in Mexico in the State of Morelos.

- Prof. Dr. Jan Pronk (17 May 2011), former Minister for Development Cooperation (1973-1977; 1989-1998) and Minister of Environment (1998-2002) of the Netherlands; he has worked for UNCTAD in Geneva, and led the UN peace keeping operation (UNMIS) in Sudan. He is currently a professor at the Institute for Social Studies and President of the Society for International Development (SID).

- Björn Stigson (26 May 2011), President of the World Business Council for Sustainable Development. He is also, among others, member of the China Council for International Cooperation on Environment and Development.

The interviews covered a number of TransGov topics, and a selection of key messages is presented in text boxes in this report.

Annex 2. About IASS

THE INSTITUTE

Inspired by the 2007 Nobel Laureate Symposium "Global Sustainability – A Nobel Cause" held in Potsdam and acting on the initiative of the German Federal Government at the subsequent Climate Research Summit, the Alliance of German Scientific Organisations developed a concept for creating an international, interdisciplinary institute of excellence, the IASS Institute for Advanced Sustainability Studies Potsdam.

The IASS develops challenging and innovative approaches to highly relevant sustainability areas such as climate stability, energy security and resource efficiency. In addition it will address ecological and social-compatible economic growth issues, co-evolution of urban and rural spaces and sustainable technological developments. The institute is called to make a focal contribution to the development of a national research strategy for climate protection and play a role in the ecological, economic and socio-political dimension of a climate and earth system based on sustainability. The institute will therefore foster scientific advancement and act as a hub for strategic dialogue and shaping opinion amongst research, politics, economy and the general public.

GLOBAL CONTRACT FOR SUSTAINABILITY

The cluster "Global Contract for Sustainability" is directed by Prof. Dr. Klaus Töpfer. This cluster is involved in the study of social sciences and humanities in relation to sustainability. The social implementation of a holistic sustainability concept is paramount, as well as interdisciplinary and transdisciplinary working methods. Social challenges – on local, regional and global levels – with regard to environmental, economic and social politics are the focus of this IASS clusters research interest.

It is the intention to contribute positively to the creation of knowledge for fundamental lifestyle change (in industrial nations) and development paths (in less developed countries) towards an integrally sustainable global society. The inclusion of the cultural dimension with knowledge production is especially important to us – thus emphasizing the transdisciplinary claim of the institute.

THE TRANSGOV TEAM

The first research project of the IASS cluster "Global Contract for Sustainability", TransGov – Science for Sustainable TRANSformations: Towards Effective Governance – began in the summer of 2010. This cluster also works very closely with GeoGovernance collaborating with various partner institutes in the region. Further research projects are currently under development and will be presented on the IASS website www.iass-potsdam.de.

The composition of the TransGov team was as follows:

Dr. Günther Bachmann studied landscape planning and ecology, and received his PhD from the Technical University Berlin in 1985 with a thesis about soil functions. He was a researcher in environmental sciences at the Technical University Berlin until 1983, and then became a scientific assistant with the Federal Environmental Agency. With post doc grants he researched hazardous waste issues and the environmental transition policies. In 1992 he became a director and professor with the Federal Environmental Agency and took over responsibility for upcoming soil regulation in Germany. In 2001, Günther Bachmann started his work for the German Council for Sustainable Development, an advisory board to the Federal Government, since 2007 in the position of its General Secretary. He is networking sustainability solutions, both in the international level and through comparative instruments within the private sector. He publishes on environmental policies, energy and climate, and on sustainability issues. He is cooperating with the IASS, and was member of the IASS TransGov steering group.

Contact: guenther.bachmann@nachhaltigkeitsrat.de.

Prof. Dr. Roeland J. in 't Veld is professor at the Open University of the Netherlands and professor of Governance and Sustainability at the University of Tilburg. Moreover he chairs a number of national and international research programs, and societal organisations. Roel in 't Veld has editorial responsibility for a wide range of publications, including works on process management and the Handbook on 'Corporate Governance' as well as Knowledge Democracy.

During the last fifteen years Roel in 't Veld was Chair of the Advisory Council for Research on Spatial Planning, Nature and the Environment in the Hague and has held such positions as Director-General for Higher Education and Scientific Research at the Ministry of Education, Culture and Science, Secretary of State for Education and Science and Chairman of the

Supervisory Board of the Dutch Railway Infraprovider, as well as IBM. He fulfilled duties as a professor at seven European universities. He served as an advisor of the World Bank, OECD and the Council of Europe. He was also Dean of the Netherlands School for Public Administration, Rector of SIOO, the Interuniversity Centre for Development in the field of Organisation and Change Management. Roeland in 't Veld was member of the IASS TransGov Steering group. More on www.roelintveld.nl.

Contact: roelintveld@hotmail.com.

Dr. Stefan Jungcurt has a PhD in agricultural sciences from Humboldt University, Berlin. His PhD research focused on institutional interplay in the international regulation of the conservation and use of plant genetic resources for food and agriculture. Stefan works as research associate at the Council of Canadian Academies, a not for profit corporation that provides independent, science-based assessments that inform public policy development in Canada. Stefan is also, writer, team leader and thematic expert for the International Institute for Sustainable Development (IISD) Reporting Services. He is reporting for the Earth Negotiations Bulletin at international negotiations in the areas of biodiversity, biosafety, forests, wetlands and food and agriculture. His work as thematic expert for the biodiversity policy and practice website (www.biodiversity-l.org) focuses on developments in international biotechnology research and policy. Stefan has also worked for IISD as project officer on capacity building for negotiators in the negotiations on reducing emissions from deforestation and forest degradation in developing countries (REDD). He has worked as research assistant and project associate on numerous projects in the areas of sustainable agriculture, genetic resources for food and agriculture, and linkages between international regulation on biodiversity conservation and other issue areas such as trade and climate change. He was research fellow at the IASS TransGov project.

Contact: sjungcurt@gmail.com.

Dr. Louis Meuleman was the director of the TransGov project. He has 30 years of public sector experience, serving as a policy-maker, project manager, head of unit, process manager and project director, on national, regional and international issues, mainly in the fields of environment, sustainable development and spatial (land use) planning. He works currently as seconded national expert in DG Environment of the European Commission. Until January 2010 he was Director of the Dutch Advisory Council for Research on Spatial Planning, Nature and Environment (RMNO) in The Hague. He was until May 2011 Chair of the Nether-

lands Association for Public Management (VOM), is senior lecturer at the Strategy Centre of Nyenrode Business University, Breukelen, the Netherlands, and research fellow at the VU University, Amsterdam. He is the author of a.o. *Public Management and the Metagovernance of Hierarchies, Networks and Markets* (PhD dissertation; Springer, 2008) and *The Pegasus Principle: Reinventing a credible public sector* (Lemma, 2003). See also www.louismeuleman.nl.

Contact: louismeuleman@hotmail.com.

Dr. Jamel Napolitano graduated summa cum laude in Sociology from the University of Naples with a dissertation in Development Studies. She completed her PhD with a scholarship from the University of Bologna, undertaking research in the field of International Politics. While a PhD student, she was invited as a visiting scholar at the School of Advanced International Studies at Johns Hopkins University in Washington DC to carry out her doctoral research on the topic of world hegemony. After she received her PhD in Political Science in 2009, she had some teaching experiences at the undergraduate level both in International Relations and in History of Sociology. She has also been translating into Italian a monograph on development and globalization and a number of chapters from a book on the 2008 American presidential elections. Finally, she has been involved as a scientific consultant in the field of EU-funded projects. Jamel Napolitano was research fellow at the IASS TransGov project.

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MSc Alexander Perez-Carmona received his Diploma as agronomist at the National University of Colombia in 2000. In 2003 he participated in an investigation about the conditions for the entrance of Poland in the European Union from the perspective of agricultural, environmental and institutional economics. In 2003/2004 he was involved in a project in the Philippines helping to build an ecological network and investigating negative externalities arising from a mining mega-project in the island Palawan. In 2005 he received the master degree "Sustainable Land Use" from the Humboldt University of Berlin with emphasis in the topics: power, environmental and institutional economics. In 2007 he started his PhD. The doctoral investigation addresses different economic and institutional perspectives of the environmental conflict labelled as the not-in-my-backyard phenomenon (NIMBY) arising in Colombia by the siting of landfill facilities. His intellectual interests lie in institutions from the "old" tradition, and the sub-fields of collective action and game theory from New Institution-

al Economics; and economics/environment from the perspective of Ecological Economics. He was research fellow at the IASS TransGov project.

Contact: alexandrop@gmx.net.

Falk Schmidt M.A. is the Academic Officer in the Executive Office of IASS, Potsdam. He was one of the research fellows of the IASS TransGov project, too. Before joining IASS, he has been an Academic Officer at the Secretariat of the International Human Dimensions Programme on Global Environmental Change (IHDP) and head of its Science Management Unit from 2006 to 2010. Among other things, he acted as Officer-in-charge of the IHDP in 2009. He has a special expertise in water and governance research and he is involved in several international interdisciplinary research projects and initiatives in the realm of global (environmental) change. Furthermore, science-policy interaction has been a key feature of his work, both as a topic of social science research as well as a participant in international policy processes, for example within global water governance. He holds a M.A. in Practical Philosophy, Business and Law. He defended successfully his doctoral thesis at the Otto-Suhr-Institute of Political Science of the Free University Berlin, currently in the process to be published. In his doctoral thesis he proposes a new way of understanding current global water governance in the light of a renewed regime theory. In doing so, he addresses a significant research gap, i.e. the global level of water governance, related to one of the most important challenges nowadays: the global water crisis. However, his focus on the institutional dimensions present important insights for many issue areas and his methodological considerations aim, more generally, at clarifying the role of the social sciences within global change research. Contact: falk.schmidt@iass-potsdam.de.

Prof. Dr. Klaus Töpfer is the founding Director and current Executive Director of the Institute for Advanced Sustainability Studies (IASS) based in Potsdam. He is also the former Executive Director of the United Nations Environment Programme (UNEP) based in Nairobi and Under-Secretary-General of the United Nations (1998-2006). He graduated from Mainz, Frankfurt and Munster in 1964 with a degree in Economics. From 1965 to 1971 he was a Research Assistant at the Central Institute for Spatial Research and Planning at the University of Münster, where he graduated in 1968 with a PHD on "Regional development and location decision."

From 1971 to 1978 he was Head of Planning and Information in the State of Saarland, as well as a visiting Professor at the Academy of Administrative Sciences in Speyer. During this

period he also served as a consultant on development policy on the following countries Egypt, Malawi, Brazil and Jordan. From 1978 to 1979 he was Professor and Director of the Institute for Spatial Research and Planning at the University of Hannover. In 1985 he was appointed by the University of Mainz Economics Faculty as an Honorary Professor. He has since 2007 been a Professor of Environment and Sustainable Development at Tongji University, Shanghai. He is also a visiting Professor at the Frank-Loeb Institute, University of Landau.

Klaus Töpfer is a member of the CDU party in Germany and has been since 1972. He is the Former minister for Environment and Health, Rheinland-Pfalz (1985-1987). He was Federal Minister for the Environment, Nature Conservation and Nuclear Safety from 1987 to 1994 and Federal Minister for Regional Planning, Housing and Urban Development from 1994-1998. He was also a member of the German Bundestag during the period 1990 to 1998. He has received numerous awards and honours, including in 1986, the Federal Cross of Merit and in 2008 the German Sustainability Award for his lifetime achievement in the field of sustainability. Klaus Töpfer was chairman of the IASS TransGov steering group.

Contact: klaus.toepfer@iass-potsdam.de.

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