Leßmann, Ortrud; Rauschmayer, Felix

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Re-conceptualising sustainable development on the basis of the capability approach: A model and its difficulties

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auf Grundlage des Capability-Ansatzes

Fair sustainable development
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Re-conceptualising Sustainable Development on the basis of the Capability Approach: a model and its difficulties

Ortrud Leßmann, Felix Rauschmayer

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Gerechte Nachhaltige Entwicklung auf Grundlage des Capability-Ansatzes (Fair sustainable development based on the capability approach):

GeNECA

'Sustainable development is a development that meets the needs of the present without compromising the ability of future generations to meet their own needs.' (WCED 1987)

Aims and objectives of the research project GeNECA

Sustainability policy has to consider the interdependencies of human life and nature; it has to meet the high moral standards of intra- and intergenerational justice set by the Brundtland Commission in 1987; and, finally, it has to motivate people to behave accordingly. This is quite a challenging task that often is responded to in a too simplistic way. Current sustainability science and civic engagement often focus on the environmental dimensions and herewith on intergenerational justice.

The Capability Approach is a leading paradigm in development economics that has informed development policy during the last 20 years. With its focus on human development it has highlighted the interaction between social and economic development. The issue of intragenerational justice constitutes an ongoing motive within the Capability Approach, but intergenerational justice and environmental concerns have often been left out of its scope.

The project GeNECA aims at conceptualizing sustainable development on the basis of the Capability Approach so as to combine the issues of inter- and intragenerational justice drawing on an integrated understanding of social, economic and environmental development. Resuming the spirit of the Brundtland commission, GeNECA puts the needs and capabilities of people all over the world, now and in future into its focus.

On the basis of conceptual reflections, current sustainability indicators will be complemented by capability-based indicators. The concept will further be used in case studies on various areas of governance to prove its usefulness in decision processes. A feedback mechanism will be installed to amend the conception to the demands of applicability.

GeNECA is a 3 years research project (04/2010-03/2013) funded by the German ministry for science and research as part of the funding programme "Economics for Sustainability". (FKZ 01UN1015A, www.wi-n.org)

Coordination

Dr. Felix Rauschmayer UFZ, Dpt. of Environmental Politics, Permoserstr. 15, 04318 Leipzig, Germany, ph. 0049 (0)341 235 1656, e-mail: felix.rauschmayer@ufz.de

Consortium

- Helmholtz Zentrum für Umweltforschung, Leipzig (UFZ)
- Deutsches Institut für Wirtschaftsforschung Berlin (DIW)
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http://www.geneca.ufz.de

Re-conceptualising Sustainable Development on the basis of the Capability Approach: a model and its difficulties

Ortrud Leßmann, Helmut-Schmidt-University Hamburg, o.lessmann@hsu-hh.de

Felix Rauschmayer, Center for Environmental Research – UFZ Leipzig, felix.rauschmayer@ufz.de

Abstract

This paper sketches a re-conceptualisation of sustainable development (SD) on the basis of the capability approach (CA). The notion sustainable development was developed as a compromise in a political process and has been re-interpreted (some say: diluted) again and again in the last 20 years. When modelling the notion through the lenses of the capability approach, difficulties occur that are at the core of SD and of CA or that are due to their combination. Our paper shows why it is not that easy to replace 'needs' in the Brundtland definition of SD with 'capabilities'. In our model, the differences between systemic and individual levels become clear and herewith the necessity to include both when dealing with issues of SD. The most salient difficulties relate to the multidimensionality and dynamics on both levels. Confronted to these difficulties, demanding individuals to consciously choose sustainable actions seems to be heroic. We propose two ways to alleviate the cognitive and moral burden on individuals by concentrating on the natural environment and by introducing collective institutions. Both alleviations are far from evident, though; this concerns their justification as well as their operationalization.

Keywords: Capability Approach, sustainable development, systemic level, collective institutions, dynamics

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"*Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts: the concept of 'needs', in particular the essential needs of the world's poor, to which overriding priority should be given; and the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs*" (WCED 1987)

1) Introduction

The World Commission on Environment and Development (WCED) elaborated the above cited definition of sustainable development, i.e. a development aiming at human well-being that can be sustained over generations, as a political compromise between environmentalists and developmentalists. This formula was clear and unclear enough at the same time to gain widespread political support (e.g. Hopwood 2005) and has since 1987 been adopted by nation states, supranational organizations, business and NGOs alike. In its divergent adoption processes, the term has experienced rather different interpretations – some focus more on the three dimensions economy, society, ecology (e.g. UN resolution 64/236 of March 2010), others on the rate of substitution between the capital stocks of and in between these dimensions (e.g. Neumayer 2010). Some overextend the definitional vagueness and use sustainable development in the sense of a sectorial development that can be sustained over some years under certain conditions (e.g. sustainable mining: Economist 2008).

What has been lost in most scientific or political definitions is the term “needs”, although it is central in the Brundtland definition of Sustainable Development (SD). We found two possible explanations for this gap: (1) Needs have often been understood as basic material needs for food and water, shelter, etc. and SD has therefore been seen as a fair distribution of basic commodities for the present, combined with the maintenance of natural capital for securing ecosystem services in the longer run. This understanding easily leads to paternalistic decisions that have been translated into hierarchical restrictions to individual possibilities. (2) Needs as a scientific concept is mostly related to psychology, and herewith to *individual* life decisions, whereas sustainability and sustainable development are mostly understood as *societal* issues related to political decisions.

The discussion on needs in the first sense was one of the starting points for developing the capability approach (CA); needs in a psychological or more abstract definition can be linked to the definition of capabilities (cp. various chapters in Reader 2005, Rauschmayer et al. 2011, but also Costanza et al. 2007, Robeyns and van der Veen 2007, Vansteenkiste et al. 2008). In this paper, we argue that re-interpreting the Brundtland definition of SD through the lens of the CA allows to better grasp the focus on well-being than by discussing the weakness or strength of sustainability (e.g. Neumayer 2010) or by using any other rather arbitrary SD concept of 3 dimensions (environmental, social, and economic) that dominates current SD policy and science.

Restraining sustainability analyses to individualistic approaches such as the CA will, on the other hand, not yield satisfying results either. The impacts of current decisions on future human well-being (or needs) are only visible on a systemic level, i.e. when modelling drivers, states, and impacts in the interrelated socio-ecological-economic systems. Some of the open questions here concern the systems and their dynamic development, such as uncertainty including ignorance, risk, and ambiguity (Leach et al. 2010). It might be necessary to link

individualistic and structuralist approaches, e.g. by addressing the questions of moral overburden of SD or of sustainability governance (Jordan 2008, Moczadlo and Volkert 2012).

Sustainability policy has to consider the interdependencies of human life and nature; it has to meet the high moral standards of intra- and intergenerational justice emphasized by the Brundtland Commission; and, finally, it has to motivate people to behave accordingly. This is quite a challenging task that often is responded to in a too simplistic way. Current sustainability science and civic engagement often focus on the environmental dimensions and herewith on one very important part of intergenerational justice.

With its focus on human development and thereby on an important part of intragenerational justice, the Capability Approach has highlighted the interaction between social and economic development. It is a leading paradigm in development economics that has informed development policy during the last 20 years. The issue of intragenerational justice constitutes an ongoing motive within the Capability Approach, but intergenerational justice and environmental concerns have often been left out of its scope, as well as questions of governance and of how to develop the CA into a dynamic model.

By re-conceptualizing sustainable development on the basis of the CA it is our aim to combine intra- and intergenerational justice as well as concerns of human development and the environment. We will do so by analysing what problems arise when using the CA for dealing with relations to future generations. In the next sections, we will first draft a simplifying 4-step model of SD in the CA and then discuss the difficulties linked to dynamics and multidimensionality that arise when looking closer at the model implementation. Thirdly, we explain the resulting individual cognitive and moral overburden when confronted with the norm of SD and, based on the 4-step model, indicate two ways how to alleviate the burden: by focussing on natural systems and by creating collective capabilities. Finally, we resume the insights due to this re-conceptualisation.

2) The 4-step model of sustainable development in the CA

a) Development of the model

The first and simplest version of adapting the Brundtland definition of SD (WCED 1987) with the capabilities approach is to replace the concept of "needs" by the concept of "capabilities"[1]. A new definition of SD would then read: 'sustainable development is development that promotes the capabilities of present people without compromising capabilities of future generations.' (Sen 2000: 5, cp. Anand and Sen 1994, 2000, Robeyns and van der Veen 2007). But what does this mean?

Capabilities are the doings and beings a person can achieve. The Capability Approach defines human well-being in terms of the doings and beings a person achieves – her functionings – and her capabilities. The freedom to choose from a set of functioning bundles or different life-situations is essential for the CA. In this sense, sustainable well-being based on the CA is about sustaining freedoms, i.e. sustaining the opportunity to choose a life one values and has reason to value – for current and future generations. Sen explains what a

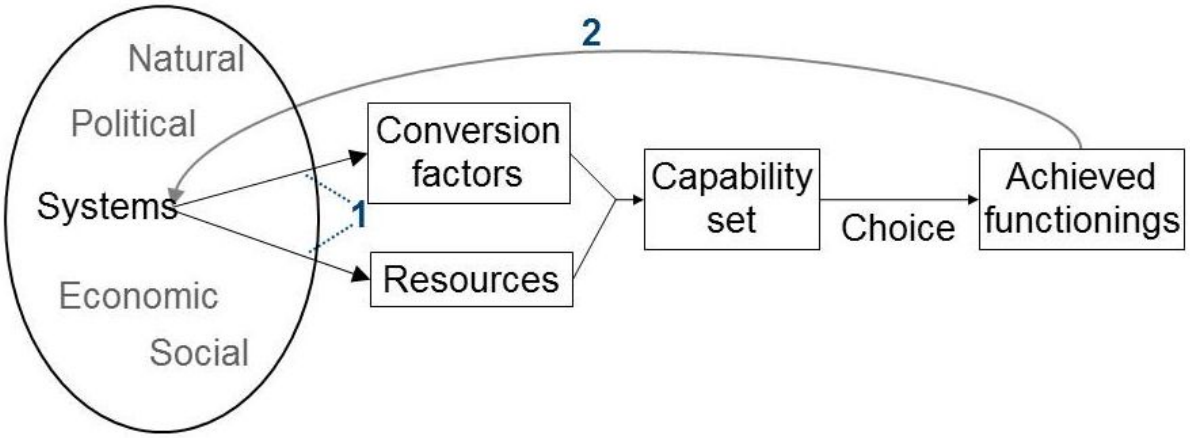
[1] Historically, this replacement makes sense, as the capability approach was developed with the aim to overcome difficulties with the basic needs-approach (Sen 1983).

person values and has reason to value by two different human motives: Well-being goals focus on achieving one's own individual well-being and are mainly informed by self-interest while agency goals may pertain to "whatever the person, as a responsible agent, decides he or she should achieve" (Sen 1985b: 203). Concerns for justice, such as those underlying SD, cannot be understood by "seeing a person as just a vehicle of well-being, ignoring the importance of the person's own judgments and priorities, with which the agency concerns are linked"(Sen 2009: 288). Rather it is crucial to take note of agency goals such as altruistic or stewardship values (Hernandez 2012).

Given the values, what a person can do and be – her capability-set – depends on the one hand on her resources and on the other hand on conversion factors which impact her ability to use resources for achieving doings and beings. Resources are mainly thought of as material resources: commodities and services available. This includes also environmental resources like wood and water (cp. Polishchuk and Rauschmayer 2011).

Conversion factors can be classified in three groups: personal, social and environmental conversion factors. Personal conversion factors refer to health, sex, age, skills, talents, etc. of the person. These are in part innate and in part the result of training and education. Social conversion factors relate to the opportunities and constraints given by the social environment of the person. They are related to the individual, too, since they refer to the place where the individual lives. Some ecosystem services like the cleansing of the air by woods can be classified as an environmental conversion factor as well (cp. Polishchuk and Rauschmayer 2011). All three types of conversion factors are interrelated. For example, if women aren't allowed to go by bike, this is a social constraint women have to consider even when they are able to ride a bike (skill) and have a bike at their disposal (resource). To take a different example, only if public transport services exist, people have the opportunity to go by bus. The traffic infrastructure exemplifies that environmental and social conversion factors interact: what kind of transport facilities are used is as much shaped by natural conditions as by political decisions. Social conversion factors cover social norms and habits as well as social institutions and can be influenced by the government. Environmental conversion factors refer to climate, geographical characteristics and so on. Resources and conversion factors link individual capabilities to the systemic level in that they describe which economic and environmental commodities and services are available for the individual and which economic, social and environmental conditions the individual requires to convert resources into functionings. An individual's capability set comprises all ways of life or combinations of functionings feasible for the person given her embeddedness in the natural and manmade system. Figure 1 makes this link explicit by combining the standard CA-model (e.g. Robeyns 2005) with the idea of interacting natural and manmade systems, such as the four mentioned.

Figure 1: Linking individual capabilities to the systemic level



Since our main aim is to capture the impacts of specific ways of life of the present generation on the capability sets of future generations, we have to change the perspective. Figure 1 concentrates on the question how individual capabilities come about and what role the natural and manmade systems play in bringing them about by influencing resources and conversion factors (arrows 1)[2]. For judging the sustainability of lifestyles, though, it is important to know which impacts an individual's choice of functionings has on the natural and manmade systems. This establishes a link between an individual's way of life (her chosen combination of functionings) and the systemic level (arrow 2). Arrow 2 captures direct effects like the consumption of non-renewable resources as well as indirect effects such as the political reverberations of individual decisions. However, this first link between an individual (or micro-) and a systemic (or macro-) level still concerns the current generation.

In order to forecast the freedom of future generations to lead a life they value, we further need to prognosticate how the systems will change in the course of time. This allows us to integrate insights from system science and to draw a connection to other approaches to SD. Special emphasis needs to be given to how individuals' choices of functioning bundles affect future paths of the systems. To keep things simple we pick one point in distant future time (say: 100 years), rather than looking at the continuum of alterations of capability sets of individuals at various moments in time. This amounts to estimating the impact of choosing functionings now on the systemic context of the future generation, but we still need to infer how this affects their capabilities.

The second link between the systemic and the individual level then is at the selected time in the future and goes from the systemic to the individual level. We assume that the general model of how individual capabilities come about stays the same: resources and conversion factors are provided by the natural and manmade systems. A person's freedom to choose a life she values and has reason to value depends on the resources available to her as well as on the conversion factors she can use to convert resources into functionings. Due to the uncertainty

[2] Of course, resources and conversion factors are not objective manifestations of the systems, but are ascribed by individuals. Furthermore, the social system impacts on the individual values, i.e. on the reasons for including an option into one's own capability set and for selecting functionings out of the capability set. To simplify the figures and our argument, we omit this influence.

with regard to future social, technological, natural, economic, and cultural systems as well as the relevant values and thoughts of the future generation, we will project the impact of the natural and manmade systems on capability sets from the current on the future generation.

Hence, in order to estimate the freedom of a future generation to lead a life they value, two links have to be established:

a) Linking the individual to the systemic level (arrow a in Figure 2). This means that we have to understand which resources and conversion factors are needed to achieve alternative functioning bundles, what is changed now by selecting one functioning bundle (way of life) rather than another and how these changes affect the ecological, social (including political), and economic systems.

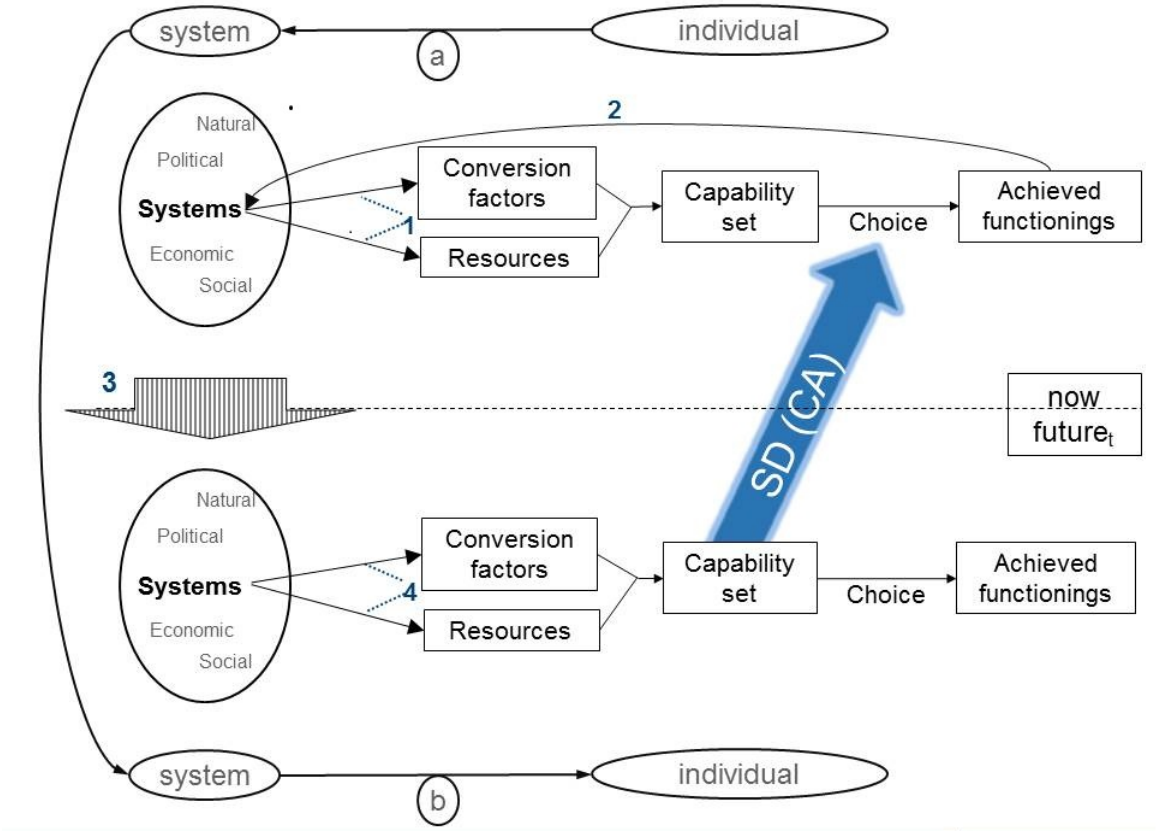
b) Linking the systemic level back to the individual level (arrow b in Figure 2). First, we have to forecast pathways on the systemic level, i.e. we have to understand, how the changes identified in the first link influence the functioning of the systems over time. Then, we have to understand how the altered systems affect the capability-sets of future generations via availability of resources or changed conversion factors and wider context[3].

Obviously, this is a vast programme. We propose Figure 2 as a simplified graphical representation of the programme, before looking in more detail at the four steps that would need to be accomplished in order to better understand the impacts of current on future generations.

Ultimately, we are interested in integrating the size and shape of capability-sets of future people in current choices of achieved functionings. We know that future capabilities depend on the then existing systems and that those depend on the currently existing systems. We aim therefore at understanding the impacts of the arrow 2, i.e. the impacts of the selected achieved functionings on the natural and manmade systems and via the systems on the capability set_t, i.e. the capability set of a future generation in time t. Understanding the impact of our current lifestyles on the capabilities of future generations would give us the factual basis for discussing whether our lifestyles are sustainable or what has to change in order to live sustainable lifestyles.

[3] Scholtes (2010) calls this dependency of future generations on our current decisions our environmental domination.

Figure 2: The 4-step model of SD based on the CA[4]



Substantiating the wide arrow from future capability-sets to current choices implies knowledge (not necessarily in a chronological order) with regard to the four following steps:

1. how current individually available resources and conversion factors contribute to current individual capability sets (arrows 1),
2. how achieved functionings affect the ecological, economic and social systems (arrow 2),
3. how the systems will change over time (large, shaded arrow 3), and, finally,
4. how these changes impact on the capability set of future generations via the resources and conversion factors (arrows 4). [5]

b) Knowledge requirements for its application

In the perspective of *sustainability policy*, the 4-step model draws attention to the following possibilities for individual or collective action: Individual steps to increase the sustainability of decisions refer to the choice of different functionings with different, less negative impacts on the systems' resilience, stability, robustness and/or durability (arrow 2, cp. Leach et al. 2010: 58pp. for the different systemic goals). This entails using different resources and

[4] This figure has been co-developed by Torsten Masson to whom we are grateful.

[5] In principle, if we are also interested in the agency freedom of future generations, we should also be interested in the impacts of their achieved functionings on their embedding systems as a precondition to responsible behaviour. This could be represented by an arrow going from future achievements to future systems in Figure 2. But this would extend the scope of this paper too much.

conversion factors (or using them differently) and has thus also an indirect effect on the systems (arrows 1). Collective actors might be able to change the current availability of resources or shape of conversion factors (arrows 1) or the investment in or management of socio-ecological systems (arrow 3). The ultimate aim of such activities in the intergenerational perspective is a sufficient availability of resources and conversion factors for future generations so that they can attain an appropriate capability-set (arrows 4).

There are some branches of research one can draw on in the course of research:

Ad 1) With regard to the systems' input into capability production, one can draw on different arrays of literature which have not yet been linked to each other, though. Research in the capability approach has focused on capability sets mostly in connection with social injustice, in studies on education, poverty, or gender studies. The use of environmental resources or conversion factors has hardly been investigated within the CA, whereas it has been well investigated in the environmental policy literature for a long while. However, the CA might help to shed light on the interaction between environmental and other systems. The literature on environmental policy has focused on efficiency increase so far, and many hopes have been set on efficiency revolutions (e.g. Lovins et al. 1998, critical to this is e.g. Jackson 2009). Empirical evidence has not given much support so far that efficiency gains result in less resource use and are not overcompensated by more resource consumption. Here, the dynamics and a multidimensional understanding of human well-being come into play, and many models have not been designed to deal with it (see section 3b).

Ad 2) Sustainability research is doing a lot to gain knowledge on the environmental part of arrow 2 by measuring e.g. the ecological footprint, CO_2-footprint, material flow analyses, etc. Traditional sociological and economic indicators give a picture on the social and economic parts of arrow 2. Theoretical and empirical literature, mainly in sociology, addresses the interactions of systemic and individual levels, relevant to arrows 1 and 2.

Ad 3) System sciences are a necessary part to gain knowledge on arrow 3. A whole range of disciplinary models deals with separate subsystems, e.g. models on social change, on ecosystem change etc. Some models, though, try to integrate the different subsystems such as the calculations on climate done by the IPCC. But the limitations of such models are obvious (see Leach et al. 2010 and the next section for the various difficulties of a dynamic understanding of sustainabilities). These difficulties are even more salient when they do not only aim at a limited set of variables (such as changes of temperature, sea level, flooding risk, drought risk, hurricane risk, etc.), but at a more complete understanding of the changes in the system. Also research on the resilience of socio-ecological systems (Walker et al. 2006) has not shown clear ways of how to gain such knowledge. It is due to the complex interrelations between the systems and the delivery of resources and constitution of conversion factors (as depicted in the arrows 1 or 4 respectively), that an understanding of SD based on the CA needs such more complete knowledge.[6]

Ad 4) The only way we see how to gain knowledge on the arrows 4 is by (i) better understanding the contemporaneous arrows 1, as well as their dependency on the systems, and by (ii) projecting this knowledge into the future. An example on the impact of climate on

[6] As stated above, we only deal with two moments in time t1 and t2, and not with the continuity of changes occurring and influencing the respective present capability sets, which would complicate the model even more.

capability sets might illustrate this: (i) better understanding the impacts of current climate conditions on current capabilities, e.g. via the dependence of ecosystems and their services on specific climate conditions or via human vulnerability to extreme weather events; and (ii) by projecting these human dependencies which are contingent on the development of biological, technological, social, institutional, economic, etc. systems, and herewith of future resources and conversion factors available.

Before discussing the difficulties when aiming at applying the model, let us note which difficulties we leave out:

1) We will not deal with the issue of how the capability sets of present individuals can be enhanced, but restrict ourselves to analysing how they are constituted by available resources and conversion factors.[7]
2) We will not deal with conceptual nor practical problems of intragenerational justice (i.e. the questions of interpersonal comparability of capability sets and of the *just* allocation of resources to individuals or groups of individuals or to processes changing the conversion factors relevant for them), neither for present nor for future generations.[8]
3) We assume that people are obligated to future generations, but do not discuss why and to which degree (see on this: Gutwald et al. 2011).

3) Difficulties when aiming for model application

Operationalizing this complex model raises a number of difficulties. Some of these are linked to the concept of sustainable development, others are rather linked to the CA, and some arise due to their combination. We propose to cut across the 4 steps and to group the difficulties to the issues of multidimensionality and dynamics, both on individual and system levels. We are aware that we necessarily leave out a number of issues, such as the source of normativity of SD, the reason for and handling of uncertainty and other forms of incomplete knowledge, the irreversibility of specific developments, to mention but a few.

a) Multidimensionality

A basic feature of the model is its multidimensionality on the individual and systemic level. At the individual level, the CA measures well-being in terms of the functionings people can achieve. As any valuable doing and being is such a dimension, well-being necessarily is multidimensional. Maximising multidimensional achievements such as functioning bundles of only one person is far from trivial, as we encounter many incomparable combinations (if we don't go for weightings of the many dimensions with complete substitution – which ultimately would bring down the multidimensionality to monodimensionality again). Evaluating and comparing capability sets demands even more, namely to compare functioning

[7] There are studies analyzing how capability sets can be enhanced by changing resource availability or conversion factors. For a theoretical overview see Alkire 2008, for an overview on empirical studies, see e.g. Leßmann 2011a.

[8] Concrete proposals for SD policy based on the CA would nevertheless have to assume some sort of comparability and some specification of justice. Alkire (2008) and Qizilbash (2008) discuss questions related to policy applications of the CA and there are longstanding discussions on completeness and listing capabilities (cf. Leßmann 2007, Robeyns 2005 and Alkire 2008).

bundles and then assess the freedom of choice entailed by capability sets consisting of bundles of functionings. How to evaluate and possibly maximise freedom is still an open issue (e.g. Pattaniak and Xu 2007, Foster 2010).

Multidimensionality necessitates the researcher to select dimensions. Doing this for evaluating well-being now and in future is not an easy task. There is an ongoing discussion within the CA about the use of lists of dimensions. Nussbaum (2011: 33–34) has proposed a list of ten central functional capabilities which is often used as a basis for empirical research (e.g. Anand/Santos/Smith 2009). Sen (2005: 160) is opposed to fixing a list because he fears that this will impede public discussion. However, Alkire (2006) argues for using a list as a tool in participatory exercises for identifying evaluative dimensions. She has provided an account of different lists (Alkire 2002) and favours the one of Finnis stating "basic reasons for action". Her account also covers Max-Neef's (1991) list of human needs that is also referred to by SD research and could thus constitute a bridge between SD research and the CA (e.g. Costanza et al. 2007, Guillen-Royo 2010). Similar to Alkire, Max-Neef's Human Scale Development Approach uses the list that was derived by using methods of humanistic psychology for enhancing public discussions. The usefulness of lists in this role is mentioned by all the aforementioned authors.

Though the participatory approach to identify relevant evaluative dimensions has a lot of appeal, it is simply impossible in case of future generations. When talking about intergenerational justice, we deal with people in different periods of time, and without assumptions about the interpersonal and intertemporal comparability of their conversion functions, functioning bundles and capability sets, another irresolvable conceptual problem arises. Further, assuming the importance of specific resources and conversion factors for future people necessitates assumptions on an intergenerational conception of humans that includes not only formal issues (such as the principal multidimensionality of their well-being), but also substantial issues. Here, lists of dimensions such as the one by Nussbaum offer some ground. Her 10 central functional capabilities cited above give a certain image of humans, even though she calls this list provisory and reversible, and does not mean it as an anthropological truth. To our knowledge and for issues of intergenerational justice, the advantages or disadvantages of her list compared to others such as those mentioned above have not yet been discussed.

Whatever list is used as a basis, operationalization requires finding suitable data and forming indicators for each dimension. The available data has mostly been collected as part of quality of life studies, thus using yet another conception as its base (Leßmann 2011a). Further, some understanding of the interaction between resources and conversion factors and how they together bring about functionings is necessary in order to assign indicators for each of these categories. Often the classification of an aspect as a resource or a conversion factor (either of both arrows 1 in Figure 1) is far from clear. Even functionings can be resources or conversion factors for other capabilities and herewith influence each other, being an end in itself but at the same time the means to achieve other functionings. For example, being educated is a functioning that can be said to be an end in itself because it is constitutive of human flourishing, but it is at the same time an important means for achieving other ends like being healthy and taking part in the life of the community.

The classification of the environment or the natural system as resources or conversion factors is especially underdeveloped in the CA (exceptions are Casini and Bernetti 1996 and

Robeyns and van der Veen 2007). However, in order to link the systemic level with the "production" of capabilities (arrows 1) we have to explicitly categorize environmental goods and services with regard to their role in producing capabilities. Sometimes the category seems to be obvious, e.g. Sen (1985a: 26, 1999: 70) repeatedly refers to the influence of climate on converting goods into functionings thus taking it as a conversion factor. Other environmental goods like wood can be seen as resources which form a basis for obtaining functionings (UNEP/iisd 2004). Enriching the CA by the ecosystem services approach may be a good way to explicate the relation between the environment and the production of capabilities (Polishchuk and Rauschmayer 2011).

As on the individual level, it is also difficult on the systemic level to consistently draw distinctions between the various systems or to determine the interplay between dimensions. The famous separation of the three pillars economy, ecology, and society of SD is at least as old as the Brundtland report and it still is in use (e.g. UN resolution 64/236 of March 2010). At the same time, the restriction to three dimensions raises several questions such as why not four or five dimensions (including cultural and institutional/political, cp. Meadowcroft et al. 2005)? What are the relations between the pillars: are they interlinked dimensions without a clear hierarchy (von Hauff 2009) or with a hierarchy accentuating the basic importance of the natural system for all life on earth (Passet 1979, Daly 1987, Gowdy and O'Hara 1995)? Some also argue for a normative embedding of any systemic perspective (e.g. Ott 2009). Of course, when going into the detail, it often is unclear which element belongs to which subsystem: a job in an oil-drilling company is part of the economic, social, and ecological (and political, technological, …) system. Due to this difficulty and to the interdependencies of the systems, some scholars have turned towards integrated perspectives: Scholars of the Resilience Alliance, e.g. Folke et al. 2007, talk of socio-ecological systems, Leach et al. (2010) of socio-ecological-technology systems in general and in particular of systems such as water-agro-ecological systems. There is a wide variety of different combinations of systems, which also represent different interpretations on what is important for the specific issue under examination. Technological innovation, but also other increase in knowledge necessarily changes these interpretations.

Finally, linking the individual with the systemic level and back poses additional questions on the interaction between individuals, about collective efforts to affect the systems and how to discriminate the effects of the systems on various groups and individuals. The target (i.e. the arrows 4 of Figure 2 in our model is to find an appropriate level of future resources and conversion factors that ensure appropriate capability sets to future individuals for enabling them to live a life they value and have reason to value. For identifying the appropriate levels of resources and conversion factors it is necessary to look at the effects of individual achieved functionings on the systems (arrow 2) combined with prognostics how the accumulation of these effects impacts future systems (arrow 3). Those necessarily are interlinked systems with unclear boundaries and uncertain trajectories.

b) Dynamics

A second difficulty of the model is the missing dynamics of the CA model and the difficult handling of dynamics at a systemic level. This problem is exacerbated by the long time frame of SD issues.

The CA is a static model that has not yet been convincingly designed dynamically (see Pick and Sirkin 2010, Comim 2003, Leßmann 2009, Bartelheimer et al. 2011 for some sketches).

In part this lack is due to the CA's original focus on evaluation of existing states of affairs. Apart from this evaluative use of the CA Alkire (2008) distinguishes a prospective use of the approach that aims at identifying "which concrete actions are likely to generate a greater stream of expanded capabilities, the better state of affairs" (Alkire 2008: 32). Putting an emphasis on "causality, probability, and assumptions" such as we do is the characteristic feature of such a prospective analysis. As Alkire (2008: 41, referring to other CA researchers) notes: "one component of prospective analyses which will be relevant across many contexts and sectors will be the component of groups and social structures". This is also true in our case (see below 4b). In fact, the issue of temporal interaction is usually connected with social interaction (Leßmann, 2011b). In our case, a central question of dynamics is what happens when a person has chosen a functioning bundle (arrow 2 of Figure 2). We can distinguish between its direct effects on the systems, e.g. by the pollution caused by driving a car (arrow 2), and its indirect effects as driving a car to achieve mobility implies the use of different resources and conversion factors than e.g. going by bike or public transport (arrows 1 on the same as well as on other individuals) which again yield direct and indirect effects and so forth.).

While the impact of the actions of a single person seems marginal, the aggregate impact of the actions of all people also shapes the individual opportunities as the example of public transport shows: It is only an option if it is available. Hence, when most people prefer to go by car, public transport will probably not be an option even for those who would prefer using it. Thus, dynamic modelling is necessary for capturing the feed-back loops between the arrows 1 and 2 in Figure 2, and for modelling the societal co-dependency of conversion factors.

Further, there might be good reasons for assuming that the individual assessment of behavioural consequences over time really is difficult. Leach et al. (2010: 3pp) see four major hurdles for more effective approaches to SD two of which concern the dynamics as well as the incomplete knowledge with regard to the development of systems (arrow 3 of Figure 2): First, if one acknowledges the dynamics within systems, as opposed to assuming their statics and return to equilibrium states, then generalized models make much less sense than located and context-specific approaches. The latter require a different format of knowledge production and integration than the one which is usual part of ignorance-reducing science. Second, handling situations with all kinds of incomplete knowledge by models of risk (which are relatively easy to handle) is inappropriate in SD issues, regularly involving uncertainty without probability, ambiguity with regard to the outcomes or the evaluations thereof, and ignorance. Local tendencies of climate change, for example, can not be given a specific probability. Their general tendency which requires adaptation is rather certain, but cannot be localised, the effects and their evaluations are ambiguous, and science still deals with a not negligible part of ignorance on causes and effects of climate change. All these forms of uncertainty can not be translated into risk – therefore risk-based management models can help to restrict or adapt to climate change only in a very limited number of cases.

Additionally, social dynamics also play a role in understanding how future people conceive of their well-being, i.e. in which contexts, and on what resources and conversion factors they rely in order to achieve a capability-set, deemed worthy of human life.

4) Discussion: Sustaining capabilities: how and who?

Apart from operationalising the model for analysis of SD one can use it to better understand the conditions of implementing SD. Ultimately, not only the target (inclusion of capability-sets of future individuals in individual choices) is individualistic, but the decisions are taken on an individual level as well. However, the impacts of individual decisions are mediated on a systemic level and only the aggregated impact of individual decisions counts for SD. Hence, the individual has a marginal impact on SD but is charged with the full (moral) responsibility for SD. But why should individuals act in line with SD? To put it more concisely: why should people care about future generations? Or, to relate to Figure 2, why should they, when choosing which functionings to achieve, consider the impact of arrow 2 on the capability set of future people via arrows 3 and 4?

In moral philosophy, the wish to care for future people can be explained by an ongoing extension of the moral realm: from egocentrism via tribe-centrism, ethno-centrism, and contemporary anthropocentrism to a universal anthropocentrism encompassing also future people. This extension brings with it conceptual challenges (cp. Gutwald et al. 2011), but also motivational challenges. First, one can be sceptical as to whether such universal anthropocentrism is in general a shared moral principle. Second, even if this is the case, embracing a principle does not automatically entail acting on it. Third, rational decision-making in the light of SD, requires assessing the consequences of one's decisions on the capabilities of future people. Grunwald (2010) has argued that individuals are overburdened by this task.

To illustrate the last point: It is rather easy to notice that by taking an airplane to a conference to give a talk on SD, I need resources (such as oil) and conversion factors (aircraft industries etc.), and that my flight will have impacts on natural (CO_2, noise) as well as on manmade systems (such as directly strengthening the airborne traffic systems). It is much harder to notice the impacts of this in detail (e.g. did the oil come from Nigeria, and have the indigenous people's rights and environmental regulations been protected in its production? Under which working conditions has the plane been built?). In order to make a final individual decision as to whether flying to the conference is sustainable (in the meaning of SD as used in this paper), one would additionally have to be able to forecast the changes in the systems (arrow 3) and the impact of these changes on individual capabilities (arrows 4). Thus, going into detail blurs the distinctions between resources and conversion factors needed for functionings (arrows 1 of Figure 2) and the impacts of these functionings on natural and manmade systems (arrow 2). In consequence, in our globalised economies it is often factually impossible to make judgements on the normative quality of one's decisions, i.e. their impact on the capabilities of uncertain future people through an uncertain systemic development. Grunwald (2010) argues that placing this cognitive and moral burden on the shoulders of individuals is demanding too much and can even result in counterproductive effects. Therefore he suggests that implementing SD mainly is a political task to be undertaken by collective entities.[9]

[9] The argument from institutional economics that due to free-riding etc. it is more efficient to reach and implement collectively binding agreements adds to this.

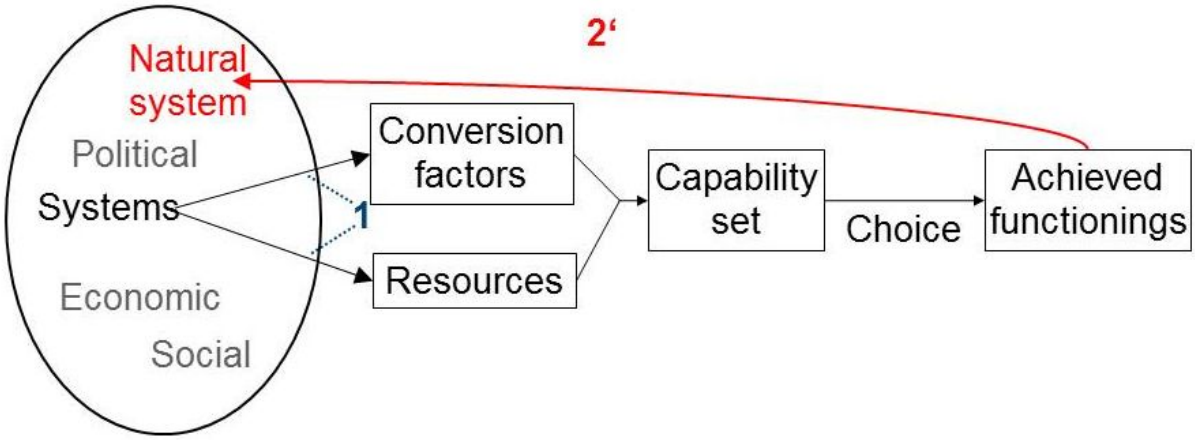
However, as Leach et al. (2010: 3pp) point out, the interaction between individuals in decision-making can hinder the implementation as well. They see two other hurdles for effective approaches to SD: first, SD relates to issues that are framed and understood differently by different people. Regularly, there is no way to discard one or the other view and, to convert the hurdle into an opportunity, "paying serious attention to multiple, diverse framings and narratives […] brings vital opportunities to advance debates about sustainability" (ibid.: 4). The difficulties of understanding the multidimensional nature of SD and handling the multiple framings in a societal dialogue entail the second hurdle, i.e. the tendency to abandon normativity and stop at "the maintenance of (unspecified) features of systems over time" (ibid.: 5). It is with regard to this last tendency that we see an advantage of the CA compared to standard economic approaches that consider any motivation ultimately as self-regarding. The CA, through its focus on agency, explicitly gives space to normative considerations with regard to the well-being of others. At the same time, this focus on agency still lacks concretisation: E.g., what are the links between well-being and agency achievements? (see on this Leßmann 2011c). In which way are agency goals motivating choices compared to well-being goals?

In the following we will discuss two complementary ways of alleviating the moral overburden of individuals without falling into the pitfall of abandoning normativity. As we will show, none of these ways is easy to go, though.

a) Concentrate on the natural environment

One method to simplify decision-making for SD is to concentrate on the ecological aspect and to look at the care for "nature" as a vehicle in support of SD in the broader sense (thus focusing on the impact of arrow 2 on the natural system, cp. arrow 2' in figure 3). This is currently done by a vast majority of tools of SD analysis such as the CO_2- or ecological footprints. The main argument for this strategy is that one can make reasonable assumptions on some resources and conversion factors required for any human life due to human biological dependency. While some of these resources and conversion factors might be replaceable by technical arrangements, ecosystems can generally be considered as more efficient providers of such services, be it directly to individuals or indirectly through social and economic systems (cp. ten Brink 2011). Furthermore, identifying services and elements of manmade systems which are necessary for the accomplishment of basic human capabilities, and forecasting the trajectories of manmade systems is much more difficult than for natural systems.

Figure 3: 1st alleviation: concentrate on the impacts on natural system



However, this popular alleviation cannot yet be well modelled in a CA-based concept of SD. As mentioned in 3a), the CA is currently not well equipped for modelling the interdependency between individual capabilities and the environment. But nature-related aspects are included within the lists used in the CA, as the “beauty of the environment” in Alkire’s favourite list or as the relationship to “other species” in Nussbaum’s (2000: 80, 2011: 34) list of central functional capabilities. Kamsler (2006) shows how Alkire’s proposal distracts our attention from conflicts between anthropocentric and environmental concerns whereas Nussbaum’s proposal may help to identify these conflicts. Yet, both proposals only highlight some specific reasons why nature is relevant to people (i.e. aesthetic and relational), omitting many other (cp. Krebs 1999 for a map of nature ethics).

Sen (2004) provides a different argument “Why we should preserve the spotted owl”, namely the power imbalance between humans and other species, appealing to the responsibility of the human race to maintain opportunities. Thus, instead of taking ”caring for nature” as an evaluative dimension, Sen accentuates responsibility towards one’s environment as a motivating agency goal rather than building a relationship to “other species” or “the nature”. Sen herewith claims the existence of other-regarding goals which can serve as a motivation behind SD.

Concentrating on the impacts on natural systems has severe drawbacks, of course, as the reverse of the alleviation. Some might argue that socio-economic conditions are far more important for capability sets than natural conditions and therefore focus on the former or the interaction of both (e.g. UNEP/iisd 2004, Ballet et al. 2005). Leaving this unresolvable dispute besides, concentrating on one system instead of on the whole web of systems means to ignore the interdependencies existing between the systems, in and over time. For instance, there is a large inequality between rich and poor with respect to the impacts from changes in ecosystems and their services. At the same time, as noted by Martinez-Allier (2002) and others (e.g. Laurent 2011), the burden of protecting biodiversity usually falls on the shoulders of the underprivileged – on a global as well as on a local level.

Concentrating on the environment thus entails questions about the interdependency between the individual and the collective level. We will now turn to this in more detail.

b) Turn SD to an issue of collective institutions

Many environmentalists have requested to introduce institutions for SD in form of, e.g., greening the UN, prohibiting specific functionings etc., up to eco-dictatorships.[10] The idea behind this is that introducing such collective institutions would solve the prisoner's and other dilemmas that hinder even good-willing individuals to change their behaviour.

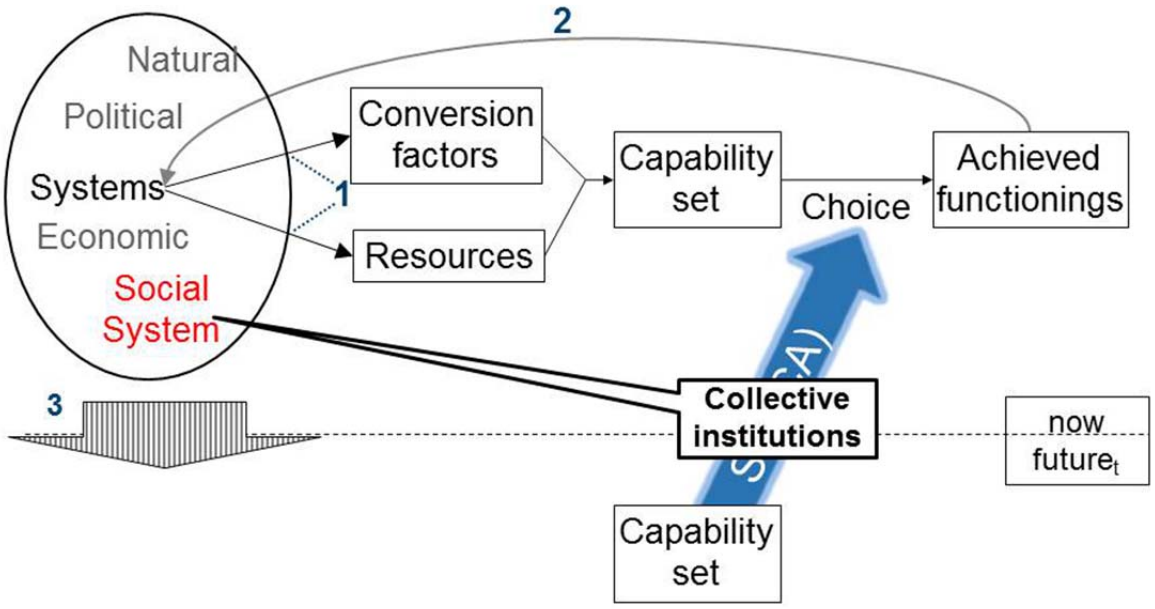
Introducing collective institutions for SD therefore is a second potential way of facilitating individual decision-making for SD: by distinguishing between normative tasks that can be fulfilled in principle by individuals and those which demand a collective effort. This distinction restricts the moral burden on the individual to undertaking the former tasks and contributing to building collective norms that enhance the transition to SD (see figure 4). Instead of judging sustainability entirely through the impacts of chosen functionings (arrow 2) on future individual capabilities (arrows 4) this line of reasoning suggests introducing a sustainability criterion that refers to the collective level. The aim is to judge whether the impacts collectively influence the systemic structures in such a way that there are high chances that future capabilities may still be enhanced (figure 4).

Here, the work of Elinor Ostrom and her scholars on the impact of collective decisions on individual choices and vice versa might be instructive (e.g. Ostrom 2000, 2009). She enlists a number of conditions for successfully managing collective resources. A prominent condition among these is developing a common understanding.[11] What distinguishes our SD context from that of most common goods examples (also Sen's example on Malaria vaccination belongs to these, cp. Sen 1992: 66–69) is the pure agency orientation of SD concerns. People creating or entertaining a collective institution to manage a common good usually also benefit (or may benefit) from this institution in their well-being; this is different for adherents to SD policies with a purely other-regarding motivation for SD: their capability-set is enhanced due to an enhancement of their agency, not of their well-being! In reality, the effects of collective institutions on individual capability sets is not easy to grasp, as the conference-flight example mentioned above may illustrate: The introduction of a tax on kerosene and the implementation of social and ecological production standards would constitute collective institutions that benefit others living now (working conditions, oil spills, …) and in the future (less CO_2-emissions, …). The well-being of the people who usually fly would be reduced due to higher prices. At the same time, more agency freedom would have been achieved for those who care for these other people, and in some cases, even their well-being would have increased: Not flying to conferences could have become a regular option and it could have become easier to restrain from flying without shame.

[10] It is another question how these norms should be brought about: through dictatorships, majority voting, discursive and participatory processes, a council of wise people, etc.

[11] To our knowledge, the translation of her work into the language of the CA has not yet been really made.

Figure 4: 2nd alleviation: introduce collective institutions



The introduction of collective institutions for SD creates a specific problem, though: Whereas any individual has the freedom to restrain her own well-being in order to reach her agency goals, it is delicate to restrict other people's well-being due to one's own agency goals, if these people do not have any chance to benefit from those restrictions. The differentiation between self- and other-regarding motivations, or, what Soma and Vatn (2011) call 'I' and 'We'-rationalities, might constitute a way out. Soma and Vatn argue that different sets of values are at the base of these rationalities, focusing on the individual and the social or collective identities, respectively. Sen (2002a) suggests, for issues of moral concern and democratic deliberation, to go even beyond the group of people directly affected and to look at the issue at hand as a kind of impartial spectator (Smith 1976) in order to include "judgements that would be made by disinterested people from other societies" (Sen 2002a: 450). This is especially important for SD issues since they stretch to unborn people. Thus, SD implies that the 'We'-identity must include unborn people, or that they are represented by impartial spectators.[12]

The strategy of introducing collective institutions thus shifts the responsibility from the consumer- to the citizen-identity of the individual (on this distinction see Sen 1996, Soma and Vatn 2011). Soma and Vatn (2011) argue that, in a participatory process, it is possible to address issues in a cooperative and dialogical way, focusing on a vision about a common good rather than on individual interests relating to one's own standard of living or well-being. Yet it is unclear, how collective institutions come about. Perhaps the instalment of social structures can help to recognize shared other-regarding goals, to guarantee a relative temporal stability of these conditions, and to alleviate conflicts with self-regarding goals that – in extremis – cannot be solved on individual levels. For example, Deneulin (2008) argues for complementing Sen's CA by valuing structures which themselves lead to human flourishing.

[12] We cannot go into detail of such deliberations on intergenerational justice (cp. Gutwald et al. 2011 on this), but note that arguing for SD institutions still is confronted with the moral and conceptual difficulties of granting the status of moral subjects to unborn people.

It may be that organisations such as environmental NGOs or multinational organisations such as the UN as part of social structures on the one hand facilitate the identification with future generations by playing the role of a collective impartial observer and herewith contribute to the establishment of such a norm, and, on the other hand, contribute to the temporal stability of such norm.[13]

This way to alleviate the burden on individuals to choose sustainable functionings implies to go beyond the individualist features of the CA. Several CA researchers have suggested doing this by introducing the term "collective capabilities" for denoting capabilities that can only be achieved collectively. SD seems to be a prime example of such a phenomenon. Additionally, Evans (2002: 56) demands that the goal of collective capabilities has to be defined and accepted collectively. Answering Evans, Sen (2002b: 84) maintains that most examples given for collective capabilities refer to "socially dependent individual capabilities" because they are directed towards individual satisfactions. Therefore Ibrahim (2006: 404, emphasis in the original) holds that collective capabilities can be defined as having the "potential of benefiting the *collectivity* at large", in the case of SD humanity as a whole. Yet, on a conceptual level with regard to the CA, this definition neither answers the question how collective capabilities relate to individual capabilities nor the question who is to choose from collective capabilities. Further, distinguishing the concept from others such as collective action, collective agency and collective intentions seems to be difficult.

The whole issue of collectivity raises the question how to place this in a theory that has subscribed to ethical individualism, i.e. one which sees the individual as the only unit of moral concern (Robeyns 2005). Deneulin (2008) considers it necessary to "complement" the ethically individualistic approach of Sen by collective valuing structures.

In a similar vein Soma and Vatn (2011) place their considerations of developing a common understanding before the background of contrasting methodological individualist and social constructivist theories. The distinction between the 'consumer' and the 'citizen' or the 'I' and the 'We' can be found in institutional theory as well as discourse ethics. Recognizing the existence of a 'we-rationality' questions at least methodological individualism if not ethical individualism. Pragmatically, this calls for developing on a societal level heuristics for sustainable living rather than putting much emphasis on factual and moral individual analyses that cannot reach the status of sound knowledge.

5) Conclusion

We have developed a 4-step model on what it would mean to replace the concept of *needs* by the concept of *capabilities* in the Brundtland definition of sustainable development. Based on this model, we see that a CA-based implementation of SD requires knowledge with regard to the four steps:

1. how current individually available resources and conversion factors contribute to current individual capability sets (arrows 1),
2. how achieved functionings affect the ecological, economic and social systems (arrow 2),

[13] We are grateful to Peter Krause for this still unexplored remark.

3. how the systems will change over time (large, shaded arrow 3), and, finally,
4. how these changes impact on the capability set of future generations via the resources and conversion factors (arrows 4).

The most salient of the difficulties that would arise when trying to operationalize this model are linked to the issues of multidimensionality and dynamics – both on individual and systemic levels. Furthermore, placing the burden of selecting one's functionings according to this norm of CA-based SD on the shoulders of individuals only seems to demand too much.

We identified two ways of alleviating this burden: (1) concentrate on the natural environment, (2) introduce collective institutions caring for SD. These two ways to alleviate the burden may sound like all-too-familiar *muddling through* the difficulty of SD. We proposed them as there is no clear and theoretically sound way to define what a sustainable choice is and what not. For the moment, we don't have positive and theoretically coherent reasons for these alleviations. At the same time, they describe tendencies in the public and scientific discourse on SD. We hope that the background of the 4-step model described above helps to better understand the *raisons d'être* for these alleviations of the moral overburden and herewith to better capture the need for further research.

Therefore, additionally to general analyses on the 4 arrows of Figure 2, we need

- a better understanding primarily of the development of natural systems with human interferences
- a better understanding of collective capabilities, norms, intentions, institutions etc. and their link to individual capabilities, norms, intentions, institutions etc., on a conceptual level, but also in practical governance processes
- a better understanding of the role of collective-level heuristics in complex decision-making and in relation to ethical individualism.

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