Methods, Environmental Targets, and Governance Problems

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Abstract

Our analysis shows that the climate and biodiversity targets under international law are much more ambitious (and legally binding) than most people assume. These targets alongside human rights obligations require a zero-emissions world before 2035. Methodologically, we apply a qualitative analysis of governance instruments (such as economic environmental instruments or command-and-control law). Prior to all this, there is a disambiguation of some epistemological questions. This seems necessary because especially (also) the sustainability discourse works oddly with the separations between "to be" and "ought to be", and objective and subjective, both of which are not congruent but transverse. Furthermore, social change depends on an interplay of various actors and the most important motives of all actors are not factual knowledge and values, but self-interest, path dependencies, collective good structures, conceptions of normality and emotions. This observation lead to the insight on certain central governance problems (rebound effects, shifting effects, enforcement problems, problems of depicting, and lack of ambition) that must be avoided to meet environmental targets. The problem of depicting plays a central role for forest governance (same for peatlands) since greenhouse gases and biodiversity of forest are very heterogeneous and therefore pose a great challenge for governance.

First of all, the methodology of the present volume requires some clarification. Based on a literature review, an overview regarding the history of forests and forest-related ideas in Central Europe and their implications on society, economics and law, is given. In a next step, the volume critically reviews the literature on the natural scientific debate on forest ecosystems and their potential contribution to climate

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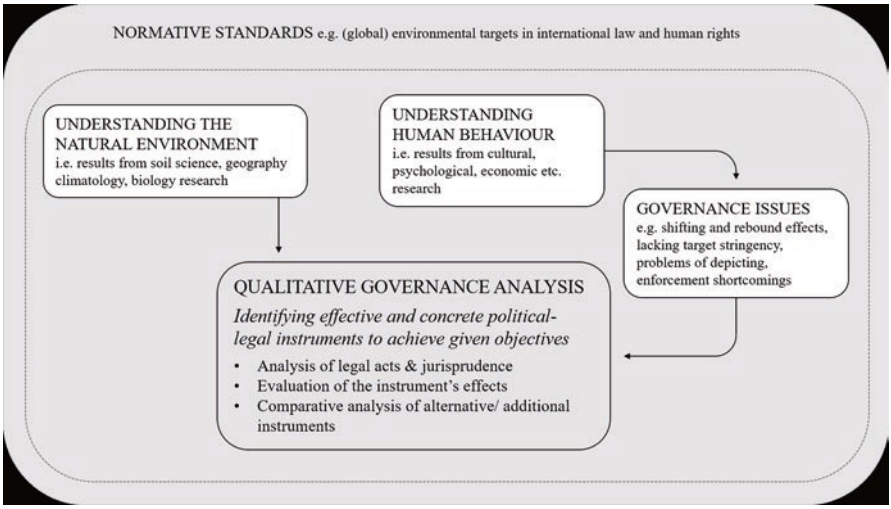

Fig. 2.1 Elements of a qualitative governance analysis. (Stubenrauch et al. 2021)

protection depending on the type of forests, their different phases of growth and varying climatic conditions including the maximum sink capacity to be achieved by reforestation, afforestation or the preservation of old or primary forest ecosystems. Building on this, a multi-methodological qualitative governance analysis (or steering analysis) will be applied to assess the effectivity of existing policy instruments and potential future policy instruments regarding forests and land use (Ekardt 2019; Ekardt et al. 2020). The effectiveness of existing and potential policy instruments is measured against (a) normative standards given by political targets, (b) the ability to avoid typically recurring governance problems, and (c) incorporates knowledge from different scientific backgrounds like natural science and human behaviour (see Fig. 2.1).

As the methodology of a qualitative governance analysis is, however, very often misunderstood (or even unknown) as we have learned during the last two decades in the context of various publications, conferences and further contacts, we will provide some more detailed insights regarding the single components of the methodology in the following.

2.1 Environmental Targets – Basis for Behavioural and Governance Findings

In the present contribution, Art. 2 para. 1 PA and the CBD that aims at halting global biodiversity loss serve as targets in the governance analysis. As mentioned in Chap. 1, according to Art. 2 para. 1 of the Paris Agreement global warming should be limited to well below 2 °C compared to pre-industrial levels and efforts should be pursued to stay within a 1.5 °C-temperature limit. As mentioned earlier, we have

shown elsewhere (Ekardt et al. 2018b; Wieding et al. 2020; Ekardt 2019). that this contains a legally binding obligation to trying to stay within the 1.5 °C limit (the binding character and the focus on 1.5, not 2 degrees is also adopted by the German Federal Constitutional Court, Order of 24/03/2021, 1 BvR 2656/18 et al.). To meet this limit with a probability of clearly more than 66% (since 50–67% is not enough from the legal point of view; see Ekardt et al. 2018b; Wieding et al. 2020; Ekardt 2019) and given equal per-capita emission rights on a world-wide scale, globally net-zero emissions across all sectors are required within a probable maximum of less than two decades, probably clearly before 2035 (shown by Ekardt et al. 2018b – also on basic year and natural scientific uncertainties e.g. regarding tipping points and climate sensitivity – discussing limitations of the minimum consensus represented by IPCC 2019; Mengis and Matthews 2020; Rogelj et al. 2019; now in parts also accepted by the German Federal Constitutional Court, Order of 24/03/2021, 1 BvR 2656/18 et al.).

Art. 4 para. 1 PA requires parties to achieve a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century and in this sense to prepare, communicate and maintain successive nationally determined contributions that it intends to achieve (Art. 4 para. 2 PA). The question whether it is sufficient to achieve climate neutrality only in the second half of this century to meet the legally binding temperature target of Art. 2 para. 1 PA, declared as a long-term temperature goal in Art. 4 para. 1 PA was answered in an earlier contribution (Ekardt et al. 2018b) in favour of Art. 2 para. 1 PA. The authors conclude that compliance with the 1.5 °C limit needs to be reached at lot earlier that with a high probability and without an overshoot of temperature or the employment of large-scale and high-risk geoengineering options to be able to respect human rights with a high probability (Ekardt et al. 2018b; Randers and Goluke 2020; Wieding et al. 2020).

The Convention on Biological Diversity, signed at the 1992 Earth Summit in Rio de Janeiro and entered into force in 1993, is also legally binding. For the first time, it placed all species, genes and ecosystems worldwide under protection and linked this protection to the sustainable use of biological and genetic resources (Art. 1 CBD). According to Art. 6 CBD, the protection of biodiversity takes the form of national biodiversity strategies and action plans. The CBD in itself is not very precise with regard to targets. The tenth Conference of the Parties (2010) therefore formulated a strategic plan with 20 core targets for biodiversity, the so-called Aichi Targets They show many direct and indirect relations to the protection of forests and their sustainable management. Underlying drivers of biodiversity loss should be addressed (strategic goal A), direct pressures on biodiversity reduced (strategic goal B), the status of biodiversity improved, e.g., by safeguarding ecosystems (strategic goal C), benefits to all from biodiversity and ecosystem services enhanced (strategic goal D), and the implementation should be improved (strategic goal E). The targets 5, 7, 11, 14 and 15 are directly related and the targets 2, 3, 4, 9, 12 and 18 are indirectly related to this:

- Target 5 aims to at least halve the loss of natural habitats including forests by 2020. Halting deforestation by 2020 could not be met in the EU (EU Parliament 2020a, b).
- Target 7 aims to establish, among others, sustainable forest management in order to conserve biological diversity. Forest in this case includes "all types of forests from plantations to primary forests" (UNEP 2013). This is underlined by the definition of sustainable management as preventing the decline of biodiversity in a given ecosystem, i.e. a forest. The target also calls for sustainable agricultural management which indirectly affects forests (Hosonuma et al. 2012; Gerber et al. 2013; Alexander et al. 2015). Again, there is still a considerable need for action after 2020.
- According to Target 11, by 2020 17% of "areas of particular importance for biodiversity and ecosystem services" (UNEP 2013) are to be protected in connected and equitably managed protected zones. This particularly regards tropical forests and could not be met as well.
- Target 14 calls for the preservation and restoration of ecosystems relevant for livelihood, including the spiritual integrity of indigenous peoples and local communities. This Target would warrant far-reaching activities, especially because it includes not only halting ongoing destruction, but also restoration. The aspect of resilience stands especially at the forefront of safeguarding old forests and traditionally used forests, prohibiting economic exploitation. However, it is not specific enough to overrule economic activities such as mining or agricultural activities.
- Target 15 is dedicated to combating climate change harmful to biological diversity: enhancement of sinks, strengthening resilience by restoring at least 15% of degraded land. This draws a link to the climate mitigation activities on forests.

The overarching EU target for 2020 as a normative basis of the 2011 biodiversity strategy was to halt the loss of biodiversity and degradation of ecosystem services in the EU and restore them as far as possible, while increasing the EU's contribution to preventing biodiversity loss globally. However, it has repeatedly become clear that this target is being missed by a wide margin (European Commission 2015, 4; European Parliament 2018; UNEP 2019). As a follow-up, the Kunming Declaration[1] was announced on 13.10.2021 aiming to establish a post-2020 global biodiversity framework regarding biodiversity loss (CBD 2021). According to the declaration, inter alia biodiversity protection should be considered across all legal decision-making processes, harmful subsidies should be phased out and redirected and the rights of indigenous people should (finally) be protected in the future. Apart from that, the call to protect and conserve 30% of terrestrial and marine areas "through well-connected systems of protected areas and other effective area-based conservation measures by 2030" (Kunming Declaration 2021, p. 3) is noted.

[1] Kunming Declaration of 13/10/2021. Declaration from the High-Level Segment of the UN Biodiversity Conference 2020 (Part 1) under the theme: "Ecological Civilization: Building a Shared Future for All Life on Earth", CBD/COP/15/5/Add.1.

However, thus far the rather "vague commitments that lack accountability are hardly a step forward from the 2010 Aichi targets" (Greenpeace International 2021). However, in the end, the outcomes of the negotiation processes following the vison of "Living in Harmony with Nature" in 2050 in spring 2022 will be decisive as to how far the so far colossally missed biodiversity targets from the CBD can be achieved in the future.

It generally must be taken into account, that biodiversity is difficult to measure and therefore difficult to translate into an operationalisable ecological target (cf. Baumgärtner 2003; Forum Biodiversität Schweiz 2013; Trepl 2013). Ultimately, limiting global warming is easier to operationalise (via a GHG emission cap) than protecting biodiversity or restoring ecosystems. Nevertheless, it makes sense to consider the CBD as a complement to the Paris Agreement, because climate change is closely intertwined with other sustainability issues like biodiversity loss but also disrupted nitrogen (N) and phosphorus (P) cycles, and water and soil pollution (Stubenrauch 2019; Garske 2020; Ekardt 2019).

Admittedly, even if climate protection and biodiversity conservation predominantly point in the same direction, conflicts of objectives can also arise between them. This can be the case, for example, if monocultural forests are afforested for reasons of climate protection, large areas of energy crops are cultivated, or cultivated areas are expanded due to lower yields as a result of the abandonment of (fossil-based) mineral fertilisers, which runs counter to the protection of biodiversity and the creation of species-rich ecosystems (Hennig 2017). Therefore, the combination of the targets speaks in favour of more natural forests, although it is difficult to exactly quantify the required amounts, as already mentioned in the introduction, which will (as a substitute) take us to the question potentials later.

The climate protection target and the biodiversity target can also be derived from human rights (in international law, EU law and national constitutional law). Liberal democracies are essentially about balancing different spheres of freedom and its preconditions. Parliaments have considerable leeway in this respect, which is only limited by balancing rules following from freedom itself. One essential balancing rule, however, is that the political majority cannot dispose of the physical foundations of future balancing. This is exactly what could happen without an ambitious protection of climate and biodiversity (see in detail Ekardt 2019). In a landmark ruling, the German Federal Constitutional Court has now also explicitly recognised that spheres of freedom of different people – also intertemporally and globally – must be brought into an appropriate balance (Federal Constitutional Court, Order of 24/03/2021, 1 BvR 2656/18 et al.; Ekardt 2021b; Ekardt et al. 2021).

On the other hand, a natural forest condition (occasionally cited) would be unsuitable as a guiding star from the outset. In view of the processuality of ecosystemic events, this can be understood to mean completely different states and points in time in natural history since the last ice age. Given this, the implication of terms such as "natural" or "close to nature" is untenable that it can be decided scientifically which treatment of the forest is to be aimed for. Rather, this is an ethical, legal and political question.

2.2 Terminology and Epistemology: Misunderstandings About What Is and What Ought to Be, Objective and Subjective, Values and Normative Aspects of Sustainability Research

Generally, the pursuit of sustainability – meaning of a permanent and globally feasible lifestyle and economy (Ekardt 2019) – and its relative failure in terms of the size of the challenges, e.g., regarding climate change, biodiversity loss, soil degradation or disrupted nitrogen cycles, raises the question how human activities and human inactivity can be explained and how effective counter-instruments in terms of governance could look like. Governance in this volume refers to the question of effective measures and specific policy instruments to reach the respectively given targets. Therefore, governance is not used – as is sometimes done – to describe specific self-regulative processes, and also not as good governance in the sense of a normative system of liberal-democratic principles. Prior to the behaviour and governance analysis, all of this raises issues of epistemology, which are of significant meaning for both other questions. Both in the epistemological basics and in the methodology of behavioural research, this will result in a criticism of empiricism in the following, which dominates since the age of renaissance. It declares not norms, but only facts, meaning countable and reproducible facts, as objectively tangible objects of knowledge (on this Ekardt 2019, 2021a).

Criticising empirical paradigms might cause misunderstandings and create false friends. It is therefore important to be clear about what is not meant by the criticism in the following. At the same time, this allows to take a clarifying stand on some basic ambiguities, which occur in various sciences and also in the sustainability debate. It is often assumed that there is a postmodern, at least however some sort of subjectivist epistemological position behind a critical point of view on empirical perspectives, which considers facts and norms as not objectively discernible (classical Rorty 1989; Foucault 1965). Furthermore, it is often suspected, that criticism aims at claiming that research in human science is thus inevitably normative in all aspects including governance and behavioural research – and that sustainability research in particular is inevitably normative as is develops political proposals (exemplary on this Lang et al. 2014, 129 et seq.). Both of those assumptions will be contradicted in the following, helping meanwhile to clarify the state of findings on behaviour and governance.

The present volume will not defy the possibility of objective – meaning generally valid and not dependent on subjective (shared by individual persons or groups) preferences – perceptions, respectively of truth when asked for convincing methods of behavioural and governance research. Neither for facts and incidentally nor for norms (whereas the latter will only be shortly mentioned) are inevitably normative or subjective. Truth refers by definition that a statement is in accordance to a situation in the real world. Rightness or correctness, on the other hand, refers to the applicability of normative statements. Furthermore, justice refers to the correctness of social order without having an item of reference in the outer world, as is the case with truth (Habermas 2009; Stamp 1998, 30 et seq.; Ekardt 2019). Whether there is

truth in the sense of objective facts at least principally, has nothing to do with the common (Berger and Luckmann 1966; Otto 2015, 35 et seq.) and for all of us familiar correct cognition that fact and norm perceptions are indeed frequently disturbed by our subjective perspectives including influences through personal wishes, power relations etc. and are tainted. Humans therefore tend to a subjectively distorted, instead of an objective perspective. This is undoubtedly true, proves however by no means that objectivity – e.g., through careful assessment and discourse with others – is per se impossible (on this separation also Berger and Luckmann 1966; unclear Scholz 2011; Habermas 1968, 262 et seq.). To give an example: It may be that there are natural scientists, which comment either pro or contra the existence of human-induced climate change, because they expect financial advantages from it, such as research contracts. Such a subjective bias does not prove however, that objective and impartial findings on climate change are possible. More formally, it can be said that truth sceptics confuse the genesis of a statement with the validity of a statement. It is for instance possible that the author – as son of a globetrotting physicist – only assumes that the earth is a sphere, because his father taught him while threatening beatings (genesis). Notwithstanding the above, the statement would remain true (validity) – regardless of the power relations, which caused the author to come to this conviction about the statement. The difference between genesis and validity does not merely apply to statements of facts, but also to normative statements: There is a difference between researching moral-sociologically the factual cause for the creation of a value (e.g., why human rights emerged in fact) – and asking ethically/ legally whether human rights (or race fanaticism) are valid, meaning whether they are normatively justified or much rather intolerable.

As trivially correct the typically subjective timbre of the actual genesis of statement might therefore be (this assessment can also be called sociological constructivism), as problematic is to derive from it the impossibility of objective perceptions (this would be philosophical constructivism, found in, e.g., Watzlawick 2004; ultimately also in Rorty 1989; Foucault 1965). As seen, one has initially nothing to do with the other. Besides this, defying the possibility of objectivity cancel each other out logically, and can therefore not be formulated as valid statement. Because the statement "there is no true or untrue, but only subjective perspectives" is obviously one which is not understood as purely subjective opinion, otherwise it will make itself irrelevant. In other words: The assessment of often very subjective perspectives logically requires that there are objective perspectives at all – otherwise it would be impossible to determine the subjective content of a subjective perspective. Equally, the talk of defying former knowledge and substituting it with new ones logically requires that there is objective knowledge.

These logical connections are neglected when particularly postmodernists, feminists or critics of capitalism express pointed Marxist thoughts for a long time that facts and norms are anyhow never objective, because everything is directed by a specific interest, be it power, capitalism, gender, ethnicity. Every criticism of this sort, that allegedly objective notions are per se tainted by intended power relation, can only be formulated, if objective notions – regarding the existence of those power relations – is nonetheless possible (accurate Habermas 1985 against Foucault 1965;

furthermore Ekardt 2019). Ergo, it is not possible to defy the proclamation without contradiction that facts are *not* dependent on the observer – but that our impressions are very well reflections of the real world (von der Pfordten 2010, 54–55; Stamp 1998, 57 et seq.; Klatt 2008; Habermas 1999; Ekardt 2019).

Apart from that, no one can live without necessarily assuming that the outer world and whatever people say about it can be coherent. How else can we explain that coordination among ourselves and our interaction with the world works quite well, if the world were "only subjective"? And, who would want to declare it dependent on a matter of opinion, or of certain power relations that somebody is dead after jumping off the 90th floor of a building? Also, that fact statements are necessarily attached to a language does not take away the possibility of them being objective. Of course, language might contribute to unclarities and even irritation; however, the problem can be mostly solved by sufficiently precise formulation.[2] This remains true, even if the language community – or each individual – is free to allocate a meaning to a word, if they wish. Still, language is a medium, which is responsive to precision if wanted. This is not changed by the circumstance that not all facts can be reproduced in experiments or even quantifiable. Such an ideal of facts has spread vastly within the last 300 years based on the philosophical empiricism, it is however in no way imperative (Lippert 2011; Ekardt 2021a). For example, taking the field of human motives – which is what this paper is predominantly about – there are many things which are not quantifiable or reproducible at will, as will be seen in the course of this paper.

It is undisputed that there are questions about facts that no one knows the answer to – and there are even questions, to which probably no human will ever know the answer. This might be the case for details of climate change for instance. That a question does not currently have a definite answer (that there are evidence issues), will not void the general possibility to objective knowledge. Generally, the fact – e.g., a changing climate or that someone murdered Ms. Miller in broad daylight – remains objective, even if no one knows it exactly (by the way, at least the murderer will know who did it). In other words: Should the Maldives drown one day

[2] It is also not possible to escape the said that as Rorty 1989 truth is understood as that 'which has proved successful'. Because, in order to determine when this is the case, an objective criterion would be necessary (if saying then 'no, for everyone is simply all plausible/ true which is evident from their personal life-story', this would again raise the question how this objective general statement ('for everyone …') comes about, if at the time, the content of the sentence states there are subjective discernments only; in this case, it is not about which factors influence me subjectively in my knowledge finding process, but about which is the objectively accurate finding). The coherence theory of truth represents a middle way between those pragmatic-sceptic prove-based theory and the correspondence theory of truth advocated in this paper. Coherence theory aims to grasp truth in a process of admitting and understanding, which will lead back from subject to object. Against such a procedure can be raised that it is prone to a hermeneutic circle; see also Esser 1972, 137–138. Also, the consensus theory, proposed by the older discourse theory as way out from the dissent between correspondence and coherence theory suffers frictions. It says that truth should be determined by reasoned (not only factual) consensus of the concerned people. Because what about the numerous historic cases in which all stakeholders or at least the vast majorities erred severely? The consensus theory was put therefore put aside by Habermas 1999, 239 and 286 et seq.

from climate-induced rising sea-levels, it was still a fact, even if millions of Germans would subjectively construe a scenario, in which the drowning had not happened. Also, it is not a matter of opinion (of an individual or a social group), whether climate change is the cause of the occurrence – or whether the drowning is due to excessive guitar playing of the islanders. Of course, with all that, not all kinds of facts are equally easy to put objectively. Causes and inner facts such as emotional states are, e.g., at times hard to *prove*, as well as the man who killed Grandpa Paul last night might be hard to find. Sometimes, we do not get a definite answer, at least not today. However, the cause does *exist*, meaning the causal connection of many exterior occurrences, even if we cannot always prove the cause (like some outer facts also). And just as little is it simply a matter of opinion, whether the emission of climate gases can for instance be more effectively reduced by phasing-out fossil fuels or by grand speeches.

A subjective estimate of facts is no valuation, even where (see above) no objectivity can be reached, even if the terms subjective and valuing are confused even at the core of scientific research. A scientist may subjectively estimate that climate change of this and that speed will cause exactly XY – this does not mean however that she normatively welcomes it or not.[3] Behavioural and governance research are not rendered normative by uncertainties in fact finding, but at most subjective (because of that, the traditional controversy about explaining versus understanding – more on that in von Kutschera 1981– is not about whether behavioural research is normative, but whether behavioural research is subjective, meaning whether there are methods to determine behaviour objectively).

Besides the separation of subjective and objective perspectives with regard to norms and facts, there is ergo the separation of facts from exactly norms/valuation/objectives/purposes (the terms are used cum grano salis interchangeably; in my opinion unclear in this regard Scarano 2012; von der Pfordten 1993, 48 et seq.). From climate change (fact) for example does not follow its imperativeness or its prohibition (norm): e.g., that climate protection is absolutely necessary. It is much rather needed to have a criterion for evaluation, meaning a norm, which says "No one shall kill a person" or "human basics of life and therefore a stabile global climate shall be preserved". And the criterion for evaluation cannot be observed from outside; it can only be reasoned (how is shown in the following chapters). Certainly, facts provide the area of application respectively grounds for subsuming under a norm. Those, e.g., who consider climate protection normatively as important, even when taking other objectives into account, has to also assess, whether climate change is at all a problem. Despite this, facts and norms remain two things in this case. Sustainability research is normative, if it is used to justify objectives itself ethically or judicially; ethics and law are undoubtedly normative fields. It is on the other hand not normative to determine the effectiveness instruments to achieve

[3] The separation between objective fact statements and subjective evaluation of uncertain facts is in its intention coherent with the separation risk assessment/risk evaluation/risk management. The latter is found in Risk Commission 2003. The current mix up is, however, found in Eidenmüller 1999, 53 et seq.; falling short in differentiating levels also Jaeckel 2010, 243 et seq.

objectives, which are not self-assessed. Because this is a matter of facts (not seen in Suchanek 2000).

Statements like those that a research field like sustainability research has to do with values should be therefore avoided due to their unclarities (Caniglia et al. 2017; Lang et al. 2014, 129 et seq.; Suchanek 2000; see also Hulme 2009). Because such a statement is not clear whether it means that values, which are in fact deemed right by people, influence human behaviour – or rather that sustainability research treats and answers normative questions as objectively resolvable questions. Both is true, but they are two different things. For example, it is possible to factually explain the occurrences of totalitarian wrongdoings (genesis), without justifying it, meaning approving of it (validity). By the way, the common aphorism "facts are objective, norms are subjective" (i.e. Häberle 1974, 14–15; Rühl 1998, 224 et seq.) is short-sighted,[4] not only because it equates subjective and valuing, although, as seen, fact statements can be subjective at times. The aphorism also neglects that norms may indeed have objective justifications; to examine this closer would however side-track the issue of this volume, even though it complies with a broadly shared opinion in ethics and law (see in place of many Alexy 1995; Habermas 1983; Rawls 1971; Ekardt 2019; Klatt 2008). Claiming validity of normative statements may not be mistaken for simply collecting moral-sociologically values which are subjectively shared by individuals or groups – or if in sociology of knowledge, tracing the genesis of discourses. Sociology of moral and knowledge allow for the question how e.g., non-sustainable lifestyle and economy evolved – normatively, the question would be, whether this lifestyle and forms of economy are justified and can therefore be labelled as fair.

Based on the before stated, a behavioural and sustainability research, which sees itself (in light of postmodernism, ethnology, feminism or other auspices) as criticism of the possibility of objectivity as alleged instrument and expression of power, would not be useful. Because, as seen, criticism with the aspiration of general validity can only be formulated if it makes use of objectivity itself (it is, as seen, as important to detect hidden – typical human – subjectivism but finding those is again only feasible against the scale of objectivity, because otherwise, it would not be possible to determine something as subjective). The wish for a criticism of power relations is furthermore problematic, because it equalises and latently mixes normative scales (which again require the possibility of objectivity) with the descriptive subject. All this may not be escaped by talking of partial truths, truths of situated positions and the like – it is only possible to perceive and determine something if objective perceptibility is somehow assumed possible.

[4] It is also correct that knowledge of facts requires a framework of theoretical hypotheses. However, this does not repute the distinctions made in the text: experience-based scientific theories are not norms. Much rather, they merely serve formulating hypotheses and if proved wrong, they need to be reformulated through empirical observations. Also, a hypothesis is not normative either way, but at best subjective.

2.3 Is It Necessary to Complement (Qualitative and Quantitative) Empiricist Methods of Analysis from Human Scientific (Behavioural and Governance) Research?

Even if objectivity in fact finding is assumed possible after the last chapter, it remains methodologically a large challenge to explain behaviour and, on this basis, to identify effective governance approaches – meaning to objectively determine the incentives of a behaviour (and build governance analyses on the findings later). Under the influence of especially economics, but following recent tendencies also psychology, the idea that behavioural research should per se based on natural sciences dominates. This implies: Research findings need to be reproducible and quantifiable (exemplary Mußhoff and Hirschauer 2011, 437 et seq.; Buchholz et al. 2014, 326 et seq.; critically on this Schubert 2015; Scheidler 2015, 106 et seq.; Lippert 2011; Ekardt 2021a). To achieve this, economics in particular conducts experiments using game theory. They simulate, like the name suggests, situations with real-life behaviour; for instance, the climate-related motivation of players is observed through playful arrangements in a laboratory situation. This way, climate conferences or daily consumption decisions can be simulated. Enhanced with many data from economics, social sciences and natural sciences, this also provides the basis to create complex scenarios, e.g., how to continue with climate protection activities. In contrast to this, many researchers in sociology and political science rather believe in questioning people. Either in great numbers via questionnaires, or in small numbers via extensive, and more or less free qualitative interviews (mostly equating experiments with science Caniglia et al. 2017).

The focus on countable and reproducible facts is, as touched on earlier, a result of the philosophical empiricism since the seventeenth century (extensively on this Ekardt 2021a; on criticism of observations and experiments already Ekardt 2019). In reality, it is philosophically not self-evident to accept facts alone (and not norms) as subject of rational thinking, as has been brought up earlier. More importantly, however, is another direction in the criticism of empiricism: Namely that experiments and questioning might possibly not be informative about human behaviour and about change.

If wanting to know how individuals and societies change (behavioural research) and how humans react to, e.g., certain newly designed political measures (governance research), one has to know their behaviour. Getting to know this generally has to be done in a way which does not falsify behaviour already, because the observed change their behaviour because they feel watched. Furthermore, not only the behaviour itself, but its motives and causes have to be understood, in order to determine how behaviour can be actually influenced by governance options. Human motives are however not visible in the outer reality. Likewise, the causality between motives and real behaviour is as such invisible, even though they belong to the world of facts.

Understanding behaviour will therefore oftentimes be a matter of conclusions: from behaviour to the motives as well as from behaviour and motives to the causality. Using a philosophical term, this can be called interference to best explanation

(Ekardt 2019).[5] Whether the players in a game-theory experiment act based on a motive like self-interest, altruistic values, and subconscious concepts of what is normal or entirely different motives, cannot be observed by watching the behaviour. Also, the assumption that participants of an experiment choose an option which is economically beneficial to them, does not show conclusively that self-interest and conscious calculation alone were the motives. There can be further motives. Statistically speaking: The correlation of two factors does not necessarily mean that these are the only factors correlating (this is neglected in, e.g., Otto 2015, 145 et seq.; Hamann 2014, 142 et seq.).

The problems opened up with this are of general nature, and they occur with experiments and interviews – whether quantitatively with many people or qualitatively in interviews with few people – more or less to the same degree (cum grano salis Meyer 2003, 149 et seq.; Hamann 2014, 250–251; Scheidler 2015, 106 et seq.; Ekardt 2019; neglected in Lang et al. 2014, 129 et seq.). It is an obvious problem of interviews that the answers often do not entirely reflect the behaviour and the motives – e.g., because the own behaviour and its social conditions cannot always be truthfully reflected (Ekardt 2019; Kelle 2008, 63). Additionally, there are other falsifying factors like the wish to please the interviewer, to meet expectations and to stay in accordance to social conventions. Also, the manner in which questions are posed and the context of a conversation frequently preform the possible answers. If, for instance, a questioning is supposed to be about environmental protection, this will be labelled from the beginning as relevant and socially desirable. Merely because of the active framing of a question, behaviour and motives are altered considerably – people seem therefore, casually speaking, more eco than they actually are. Such problems can be minimised by techniques of questioning, but not be eliminated. Also, there are clear limitations to the question of motives which are relevant to sustainability, due to the complexity and possible (periodical or permanent) subconsciousness of certain motives (on the current psychological debate of the subconscious also Kettner and Mertens 2010, 7 et seq., 77 et seq. and 109 et seq.). Furthermore, there might be wrongful perceptions about the own behaviour and its motives which are based on emotional mechanisms such as denial (on the different frictions also Stoll-Kleemann et al. 2001; Presser and Traugott 1992; Ekardt 2019; Veroff et al. 1992; Padfield and Procter 1996; Lee 2000). Conducting surveys strictly quantitatively, creating thus real statistics, other falsifying factors come into play. One is the arbitrary selection of test persons which is often not representative. Also, some segments of the population (especially the elderly) are more easily accessible via land-line calls than others. Prior questionings influence the statements as well, for example, if the interviewees know the specific result of a prior similar questioning. Even if, despite all this, the interviewees answer largely truthfully, which is already quite improbable, there is the additional problem of the

[5] While however the criterion for the 'best' explanation is almost as difficult to formulate abstractly as the criterion for 'correspondence' in correspondence theory of truth. As much as the possibility of objective truth cannot be logically overcome (because whoever disputed the possibility of truth is not able to claim the truthfulness for the disputation per se).

difference between preference and behaviour. Interviews can directly ask for behaviour and its (maybe ostensible or alleged) motives, but they can also ask for preferences such as the opinion on environmental protection and try to draw conclusions from that for the possible behaviour towards more ambitious environmental politics. The latter fails due to the gap between preference and behaviour and frequently also between different simultaneous preferences which specifically occur with regard to the environment but are generally human (more on the way to handle cognitive dissonances Stoll-Kleemann et al. 2001; Lübbe 1998; Ekardt 2019).

However, these considerable and not generally resolvable frictions do not imperatively lead to the consequence that the method of qualitative or quantitative questioning is completely void. There are, e.g., questions with a low tendency to trigger seeking the approval of the interviewer of society. Also, especially in quantitative questionings, interviewees have the potential to address structural connections and broad ranges of opinions. In light of the described problems, however, it seems primarily interesting to look at ways to combine them with other approaches which will be further developed in the following. However, before doing so, we need to elaborate on the second common empiricist method approach:

Namely in principle, the same described objections apply for experiments as they do for interviews. Experiments might be the mentioned game-theory models or so-called real-world laboratories, like the simulation of a low-resource lifestyle for a certain period in real life (Ekardt 2019; little regarded in Nowak and Highfield 2013, 225 et seq.). Thus, social desirability and the presence of observers will influence the test persons, which already showed in the so-called Hawthrone studies in the 1930s: The participants did not raise their work performance due to different lighting as assumed, but because of the presence of observers (Lee 2000, 5). Additionally, the translation of highly complex realities (with regard to an initial situation and options for action) in a necessarily reduced experiment setting is hardly possibly; it will also always maintain a fictive character. Imagine, e.g., a game-theory situation, in which the highly complex global climate negotiations are simulated (critically Kivimaa et al. 2015, 2 et seq.; affirmatively Milinski and Marotzke 2015, 93 et seq.). Neither social desirability nor observer expectations can be avoided, nor is the sensation of a player in such a constellation easily comparable to the situation of real decision-makers, nor is it possible to detect the motives from observing the moves – which are also fictive. Motives must rather be concluded again from their – fictive – actions.

Even though it is possible to vary single conditions of the experiment, allegedly just like in natural sciences, and try to filter this way the influence of single factors. But neither the issue of desirability, nor the fictive character, nor the under-complexity disappear that way. The issue with the fictive character is that, e.g., in reality, there is usually such a mass of factors to a decision, that they cannot be usefully reduced to a mock situation, which is, e.g., only determined by three factors. Even if the experiment – as real laboratory – is set in real life, none of these issues are resolved. Though the fictive character is reduced by some, the fact remains that it is something entirely different to pretend for a month to life on low resources, under the encouraging eyes of ecologically conscious scientists – or whether this is

permanently so. At latest the real laboratories, but actually also experiments, show that it is much harder to achieve arbitrary replicability in human sciences than in natural sciences, even if this is aimed for under empiricist auspices (this goes all the more for qualitative approaches).

Finally, on all this, another example (which can only be generally outlined as the respective experiments have not yet been published). The second author of the present volume regularly takes his sons to participate in infant experiments at different research institutions in Leipzig (which are based among others in the research of Piaget and Inhelder 1972; Tomasello 2009). Following a current issue in behavioural science, a focus lies on the question how cooperative infants are in a given situation. The children are for example involved in ballgames which are supposed to show how much people act with or against each other. But, what is it really, that is proven: Is a finding on cooperation based on a ballgame really suitable to determine the degree of human cooperativeness in real – and much more complex and mostly not playful – real-life situations? What can be learned about the motives of cooperation – whether it is done to please the observer, or to serve self-interested calculations of advantages or much rather altruistic intentions of fairness? Or whether it is simply the notion of normality which a test person subconsciously has and which is shared in their environment no questions asked? Or whether emotional factors like empathy, the wish for recognition, convenience or habit play a role (on all possible factors Ekardt 2019)? Nothing of this is really revealed in those experiments. Exactly this information would however be crucial, if, e.g., in the process of a transformation towards sustainability, one wants to know what slows the transformation so far – and which kind of reactions should be expected to new political measures.

Like with interviews, all that has been said does not mean that experiments might not contain indications of behaviour, its causes and therefore the conditions of change. Nevertheless, further sources of findings are needed to make up for distorting effects. In comparison, their validity can be ranked high, if the setting is chosen in a way with hides the actual experiment from the test persons, like in the famous Milgram experiment on willingness to obedience to – alleged – authorities (Milgram 1974).

The described frictions are not only more or less neglected in many scientific discourses, or at least not treated in a way to acknowledge the substantial limitations of interviews and experiments. They are moreover not resolved if the raised methodological questions of behavioural research are left aside to just postulate a simple behavioural model like the homo oeconomicus also as a basis for governance analysis in mainstream economics. Meaning to assume an always consciously calculating and purely interest-oriented – and usually self-interest-oriented – individual. Even within the field of economics, this model is recognised as under-complex, e.g., within the behavioural-economics research (summarised in Ekardt 2019), even if the model is continually used. Anyhow, an under-complex model cannot substitute a methodologically verified determination of behaviour.

If behaviour is so hard to determine, and even more the motives and causalities can be primarily extrapolated by interpretation, essentials about motives, change

and frequently already about the behaviour itself can be acquired by another less formal source of perception. This means participant observation in the sense of an external observation to the highest degree possible (Malinowski 1932; Bernard 1994; Aull Davies 2008; O'Reilly 2012; Robben and Sluka 2007; Ekardt 2019). Motives are concluded from the behaviour and it is therefore reacted to all described falsifying factors which obstructs from a quantifiable finding in said manner. Especially with regard to questions of sustainability, some is to be said for the fact that it will be hard to go without preferably unnoticed – and preferably frequent and extensive – observation. Because especially in this social area, many maintain a very environmentally-friendly self-image, which unfortunately stands in contrast to an unchanged big ecological footprint (on the empirical findings Ekardt 2019). This will be further pursuit in the following.

2.4 Integrated Methodology and Crucial Behavioural Insights into Human Motivation

Participant observation means according to the method encyclopaedia for social sciences (Diaz-Bone and Weischer 2015, 40; see also Breidenstein et al. 2015) an observation procedure in which the observer themselves contribute actively to the activities and is personally seen, however oftentimes not recognised as purposeful observer. We are thus talking of an approach, which can be used daily and unnoticed, but can also be used more similarly to experiments and interviews by observing a clearly framed process, often repeatedly and maybe revealing the observer intentions. Concentrating on outer observable actions will lead to more formalised settings, which will then raise the question, whether this formalised way of collecting outer connections really says something about underlying motivations of the observed – which is the key interest of behavioural research (see above). Because in some way, everyone participates observingly in their social interactions at least informally, this form of collecting knowledge can be described as continuum, beginning with simple day-to-day observations reaching up to several years of ethnographic observation studies. The observer is at the scene and is able to take in the occurrences by means of all senses. Participant observation categorises its subject and records the results in some way, whereas this can happen more or less systematically (see on one hand Breidenstein et al. 2015; and on the other hand Beer 2003, 129 et seq.).

The chances of this approach become clearer taking a look at sustainability issues (more on the empirical findings following Ekardt 2019). Asking people about their values regarding sustainability or conducting experiments on this, regularly show strong ecological values and a high information status of facts on the matter. At the same time, the ecological footprint per capita, which can be traced back statistically from the absolute ecological strain, shows that the actual behaviour does not comply with these values. This could mean that interviews and experiments lead to untrue results, because the test persons want to please the interviewer or want to comply with social expectations, while really thinking that sustainability is not

important. Cumulatively or alternatively, it could be that test persons do in parts answer truthfully, however their motivation is much more complex which is not reflected in questionings and experiments. An explanation can be attempted by paying attention to the positioning of people on issues of sustainability in various day-to-day conversations – without activating particular social expectations and without creating an artificial situation. This will show, e.g., a clear focus on self-interest, besides all other very well existing values in favour of sustainability. At the same time, there are path dependencies and problems with public goods – creating the impression that there is no alternative to the actual behaviour, and also that the own contribution to the global problem is irrelevant anyhow. Equal findings can be attained through self-observation and by concluding from the biological origin of humankind, meaning socio-biological analysis, which show that people act selfishly on the one hand, but on the other also cooperate, that latter however also oftentimes with selfish, or at least group-selfish background. This knowledge is in line with the orientation towards values in the immediate social surroundings, but at the same time encounters limits, e.g., when it comes to climate protection in the interest of humankind as a whole. Coincidentally, interviews, experiments and participant observation show that people whose own life is brought into question with regard to sustainability, will declare their lifestyle as immutable and react defensively or even aggressively. Furthermore, it is possible to observe (in line with statistical data on environmental protection), that options for action which serve economic self-interest – like insulation for buildings, if the money is available – are still frequently not chosen. This shows clearly (again supported by self-observation as well as findings from evolutionary biology on human coping strategies for an over-complex world), that actions of sustainability and human behaviour in general are by no means always consciously calculatedly selfish or altruistic. Much rather, emotions come into play, like convenience, habits, denial or the ability to brush aside even the most obvious contradictions between talking and acting (which is, again, proven experimentally). Besides all this, there seems to be factor of conceptions of normality, of which, similar to emotions – and in contrast to values or self-interest – people are often only partially aware: High consumption of meat, holiday flights, and the daily car drive to work are simply "normal" in industrialised countries (and the upper classes of developing countries). This becomes very feasible when a number of observed find the hint that the observer does, e.g., not eat meat, not drive a car etc. simply amusing and somehow "abnormal".

Knowledge as one factor of motivational reasons for human behaviour is thereby typically overrated (Kanter et al. 2020), while egoistic calculations of the addressees of regulations, the addressees' emotions and values, path dependencies and conceptions of normality as well as problems of collective goods are regularly not taken into account sufficiently as motivational factors (Ekardt 2019). The latter determinants, are, however, often the reason why governance problems typically reoccur in sustainability governance and governance instruments are not as effective as wished for. Which of the (here very shortly mentioned) motivations is culturally imprinted and which are already engraved in human genetics, can be analysed, among others, by whether the certain factors occur globally or only regionally. Anyhow, all this

shows that participant observation is very promising, especially used on the frequent – not only typical for the sustainability context – dissonance between positions, social expectations and actual behaviour; this was also demonstrated in contexts which are not related to sustainability (Beer 2003, 126; furthermore Breidenstein et al. 2015; see also Schultheis 2002; Stanley et al. 2013).

At the same time, it already became clear that it is precisely the described *combination* of participant observation with other approaches like interviews, experiments and self-observation or socio-biological deductions, which is necessary and useful in the interest of an ideally critical reciprocal verification of all findings. A formalised participant observation, where the participants are officially informed, might for instance lead to the same distorting effects as empiricist research methods (Hauser-Schäublin 2008). Even in a concealed participant observation, it is problematic that the observer has limited knowledge, a subjective narrow perspective, which tends to exaggerated positive image of themselves, the limitations of the own perspectives through social background etc. (O'Reilly 2012; Hammersley and Atkinson 2007; Hauser-Schäublin 2008, 54; Niewöhner et al. 2012, 13 et seq.). In addition, participant observation can hardly capture the spread of social phenomena in a society, as broad-aiming quantitative studies might do. These limits would go overlooked, if behavioural and society research were to be based on background knowledge in line with Luhmann alone. Helpful is therefore particularly the combination of participant observation with findings from neuroscience and biochemical research, as decisions coincide with various measurable electric or material processes (Harari 2014, 2016). The latter approaches are also subject to various limitations, especially in light of the recent research status (critical on this Hasler 2012; Ekardt 2019), which emphasise the necessity for reciprocal verification.

Alone the described combination of methods serves to avoid or reduce the subjective reduced point of view, as well missing broadness of participant observation. Besides that, participant observation as such has to be conducted as accurately as possible. It initially requires that researchers have access to the respective everyday-life field and participate in its routines and special activities and processes for a longer period of time (on all of that Jackson 2002; DeWalt and DeWalt 2002; Schensul and LeCompte 2013; Diaz-Bone and Weischer 2015, 41; Bernard 1994). The long-term presence in the field is essential to gradually adopt "foreign" point of views and routines and gain distance from the own presumptions (O'Reilly 2012; Bernard 1994; Kaschuba 2012, 207). To maintain the dialectics of participant observation, different techniques of intensifying the observation as well as analytical methods of abstraction are used (these methods are comprehensively featured in, e.g., Breidenstein et al. 2015). Therefore, issues like limited knowledge and the exaggerated positive self-image of the observer need to be deliberated and thus at least strongly minimised, especially in discourse with others (see also Kelle 2007; Steinke 2000, 322).

Another methodological addition to the described approaches seems appropriate. It consists in considering the fact that external (e.g., geographical and technical) as well as policy framework conditions will obviously influence the behaviour of consumers and enterprises for instance. Besides the natural circumstances, this also

brings the alternating influence of all involved parties into play; because behind politics there are for example again people. With all this, broad assurance of analyses is possible, however not alone in using, e.g., experiments. If for example (Jakob et al. 2017), experiments result in the finding that in a day-to-day situation – which is not sustainability-related – parties concerned will rather clean up after themselves, it is not made plausible that people are generally prone to face the consequences of their actions and long for a massive climate policy. That this is not the case is shown simply by the fact that climate change is not addressed effectively, even though the issue is perpetuated daily by our usual lifestyle.

2.5 Does Human Motivation only Explain Individual Behaviour or Social Developments Including Governance Problems as Well?

The proposal of an integrated methodology in behavioural research provokes the reply whether such a methodology is really capable to explore the social macro level or will merely cover the micro level, especially when making statements on sustainability. After all, there are, ironically sharpened formulated, obviously a great many differences between the Second World War as macro phenomenon and, e.g., a marriage as micro phenomenon. This does not eliminate the possibility that people always follow the same set of behavioural instincts, regardless whether they act seemingly on a micro level or rather a macro level. Exactly this will be briefly shown in the following: The separation between micro and macro, respectively the clear division of individuals and structures makes less sense than sometimes assumed and is in last consequence not tenable in the context behavioural research in the sustainability discourse, which is why there is no objection to using the described methodological approach on seemingly small processes as well as rather large-scale processes (see already Ekardt 2019).

Such a thesis might cause astonishment. Apparently, one needs to choose whether to trace back processes in a society to individuals – or whether the society or at least the structural parts of society are viewed as autonomous, collective entity. Sustainability issues like climate change can serve as an example that the opposition of micro and macro does not follow through, if we ask ourselves the question: Which parties is social change really about? Merely about politics including its body of legal instruments? Or about the enterprises? Or about citizens? Or about the lobby organisations? At the bottom line, climate change and most resource and sink problems are caused by many small, in itself seemingly irrelevant actions, which most people, especially in industrialised countries and the upper classes of developing countries, do on a daily basis, frequently without thinking twice about them. This includes eating, heating, daily mobility, holiday planning or bigger decisions like the choice of a place of residence. Theoretically, every citizen of the Global North could massively speed up the climate and energy transition personally on a daily basis. I can avoid holiday flights, not use motorised individual transportation, minimise my consumption of animal products, heat little and insulate effectively,

use energy-efficient products and live in the city centre instead of the periphery with the need to commute, cover the remaining need for electricity with climate- and resource-friendly solar power, and generally buy less. Houses can be built in a way that they need zero external energy and still keep cosy in winter. And do I really need all those kitchen and entertainment appliances, which are energy-intensive to produce? And the likewise very energy-intensive greenhouse-fruits in winter?

One could however also ask: Why politics, which consists just like citizenship and enterprises of people with human behavioural instincts, does not force people into a more sustainable way of life and economy? Or why do not enterprises switch faster to sustainable products? And this is where interdependencies come into play. There are always costumers to a certain type of economy, who will permanently buy many new products, without asking about circumstances of production and who find ecologically exemplary produced products too expensive. Likewise, enterprises are in the loop, as they make certain offers to customers or not, create certain desires for a product and aim to maximise their profits, thus keeping the spiral of growth and high resource use alive. However, the interaction of the involved is not as simple as to be able to say in Marxist tradition that this were one-sidedly created exploitation and estrangement. Production and consumption are, as suggestive the offers may be, not just one-sidedly forced (more so, because the achievement of freedom in modern societies are generally appreciated), and many smaller and bigger players provide demand and supply and play a role in the process. This is still true if one thinks that people today are determined like never before in a profound way by many subtle mechanisms in work, leisure, romantic relationships, emotions, identity. Even if this determination works by means of alleged autonomy (one-sidedly on this Schreiner 2020, 104 et seq.; Gorz 2009, 7 et seq.; Foucault 2006).

There is a similar interconnection between politicians and voters. A radical politics of sustainability, e.g., only stands a chance if it reaches a certain degree of support; this is even rudimentary true in dictatorships. In turn, I, as citizen am only able to induce such an option, if it is offered to me by political decision-makers, for instance in an election. However, it is also possible to become politically active myself. And no one is legally required to eat meat or fly on holidays, even if the legal permission (and the profit-interest of enterprises) have their share in creating these common desires. Another interaction takes place between the media and politics, in which gradual personalisation, production, aestheticisation of politics gradually push back social discourse about real material issues (Ulfkotte 2014, 114 et seq.; Bussemer 2007). And there are more interactions: Politics today is organised in an international multi-level system, so different policy levels can reinforce or slow each other – just like citizens, enterprises and lobby organisations influence or slow each other.

This shows initially that the complex interaction of different parties to a successful or failing transformation towards sustainability need to be expected. Negatively formulated, it can also be called a multiple vicious circle between political decision-makers and citizens, as well as customers and enterprises, which encourage each other in maintaining the status quo rather than to a transformation towards sustainability. This interconnectedness seems trivial. However, e.g., in economics, it is

simply defined away in asserting that human preferences are purely egoist and also completely stable (more on the criticism of that Ekardt 2021a). Although this might help to create nice models, this is of little use to move forward empirically. This can be said without the necessity to explicitly assess and accurately explain the sociological actor-network theory with its many implications.

But, despite all interactions, is it really possible to think about change without a clear line between the personal and the collective level? The examples suggest that. However, it is an old dispute among the disciplines of behavioural research, whether explaining human conditions have to be divided into the individual and the collective/ social level (Giddens 1986; Habermas 1981; Greve 2015, 9 et seq.; Mead 1934). And yet, every controversy leads astray, which asks whether to use individualistic (according to, e.g., economists) or collectivistic terminologies (according to, e.g., sociologists) or combine both. Because even a collective or structural level would again express the concrete motives of people or the interaction of groups of people, or at least their side-effects and aggregated consequences of actions. In turn, every individual is of course a product of the structures, into which it is socialised. More precisely said: We will encounter all relevant motivational factors in ourselves, but also in structural – but again human – solidification. Capitalism, for instance, has evolved based on human intentions and is maintained by concrete people – knowingly about its (partially unintended) consequences. Also, those who believe that sustainability fails due to capitalism, have to understand therefore, what it is that drives people to establish and maintain capitalism.

Political retention of power or entrepreneurial accumulation of capital are therefore in lastly collective versions of factors, which can also be framed as, e.g., self-interest and path dependencies and also play crucial roles in individual lives. Another reason for abandoning talking of alleged micro and macro level is, that in last consequence, it is simply unclear where the line to be drawn between both. For instance, I contribute to capitalism every day with my seemingly small actions – is this micro or macro level? Or, how about if there is a political dispute about an individual person, like the Federal Chancellor – it remains notoriously unclear what is micro and what macro level. Of course, we can talk of social change, if all of us move, or of individual change, if only few people move. The idea that these are two entirely different levels, however, is not applicable.

It is clear that not every social situation was intentionally induced by someone. Certainly no one intended climate change in this way. Of course, individuals aggregate to structures. And individuals do not always act rationally and consciously (Ekardt 2019; Greve 2015 who points out that individual actions cannot draw their meaning from collective attributions alone, already because these attributions are again actions, thus causing an infinite regress). In this sense, this volume suggests neither a methodological individualism nor a methodological collectivism, but much rather assume that these are no empirically viable opposites (in its intentions similar: Habermas 1981; Giddens 1986; Mead 1934; lastly also Greve 2015, 26–27). In short: The individual person is simultaneously cause and effect of social influences and pressures. To reflect this and the reciprocal influence of individuals or for

instance their orientation on (partially) shared values and conceptions of normality, no separation between micro and macro is needed.

If this were different, not only participant observation, but at least also experiments (and maybe surveys) would have to be thrown out entirely for analysing processes of society. Because the cooperation of millions of people can hardly be captured in an experiment, if assuming that such a cooperation is something categorically completely different that the actual interaction within a small group of people.

2.6 Typical Governance Problems, Based on Behaviour Analyses

The combined respectively triangulated approach to analyse human behavioural motives does not only result in an analysis of the causes of non-sustainability respectively the conditions for a transformation towards sustainability. As touched upon in the introduction, this is the necessary basis of a multi-method qualitative governance analysis in form of a search for effective measures and concrete policy instruments to reach the respectively supposed targets, especially for instruments that have never been put into practice and that can therefore not be observed in reality (see in more detail Ekardt 2019):

- First of all, with regard to existing or alternative policy instruments, the listed approaches to text content, implementation studies and possible comparisons are useful, but as already mentioned, these alone are usually not sufficient, especially when it comes to instrument concepts and levels of ambition that have never existed before.
- Then, as seen, human behaviour patterns and especially behavioural motives can be analysed multi-methodically. As seen, surveys and experiments, as economists like to conduct, can also contribute to this assessment (e.g., to price elasticities among the addressees), however, all of which have their limits described in detail above; and in particular it is not enough to assume that every actor is purely selfish and constantly consciously-calculating as the economic mainstream does with game theory. In this respect, the above-mentioned multi-methodological approach to behavioural research must take effect (see also Kuckartz 2014; relying too strongly on the formal methods up to real-world laboratories and experiments Lang et al. 2014; Schäpke et al. 2015; Scholz 2011).
- The behavioural motives (described in detail in Ekardt 2019 and briefly in the last section) that can be found with this methodology form a basis for making certain expected governance problems plausible to a high degree (e.g., rebound effects, shifting effects, etc.). The behavioural scientific access to governance problems is crucial for the examination of instruments for effectiveness on the basis of the given goals (and strategies) for sustainability. This applies not only to hypothetical governance options, but also to instruments that are already in place, because it is often difficult even in those cases to answer which social

developments can really be attributed precisely to the governance instrument to be examined. With regard to sustainability issues, these governance problems are particularly:
  - rebound effects (including welfare effects);
  - shifting effects to another region, another sector or another environmental strain;
  - lacking ambition, measured against the targets;
  - enforcement deficit;
  - the problem of depicting which means that the precise depictability, measurement, calculation and recognition of sustainability stocks can be challenging and make it very difficult to address single harmful actions and its consequences.
- The last two problems are especially relevant in the sector of land use, potentially including forestry, since this sector is characterised by highly heterogeneous structures – in general and in terms of biodiversity and GHG (Hennig 2017; Ekardt et al. 2018a, 2020).
- The existence of just those governance problems cannot be simply detected in reality, because, as stated earlier, we are dealing with governance constellations, which have never existed before (e.g., with a complete decarbonisation within a few years). At the same time, other empirical insights besides behavioural research are also important. The fact, that macroeconomically, e.g., GHG emissions can be shifted, actually can be measured in parts (however, with great difficulties), by determining the greenhouse-gas intensity of products based on technical data, and then combines them with statistical data on imports and exports (Peters et al. 2011). Regarding the rebound effect, this is admittedly already more difficult, because the causality between various single aspects is hard to pin down (on the discussion Santarius 2015). The therefore necessary approach for behavioural research is important even for the assessment of the effectiveness of currently practiced governance options, even if it is often hard to determine, which social developments are really just induced by the governance instrument.
- The references to the governance problems show that supplementary factors such as the obvious characteristics of the instruments and other scientific, technical and economic conditions significantly contribute to identifying certain instruments to likely be effective or ineffective. However, as mentioned earlier, there is much to suggest that the multi-methodological governance analysis outlined in this way should be carried out qualitatively and that supposedly exact quantifications should be used more cautiously than has been the case up to now. This is because the behavioural motives alone and the governance problems based on them cannot be quantified comprehensively and precisely, but only selectively. But then, it is also not possible to use them mathematically, or it can only be calculated by accepting the problem that a large number of assumptions are made that do not have to apply in this way. In doing so, even meaningful probabilities for the occurrence of certain factors cannot be mathematically determined, because these same probabilities are generally not known; however, this

then thwarts calculations. The same applies to other scientific, technical and economic findings. In each case unclear causal relationships between various factors and, especially in sustainability issues, the ultimately global framework of reference are further complicating factors (extensively and critically on all of this Dieckhoff 2015; Dieckhoff and Leuschner 2016; Ekardt et al. 2018b; as example of an approach in favour of calculations Bodirsky et al. 2015). This will often be exemplified in the following. Instead, it would not be enough to pay attention to external factors such as political majorities or characteristics of institutions (on these aspects Abson et al. 2017; Droste-Franke et al. 2015; Newig et al. 2016; Juerges and Newig 2015; Klein 2014; Klinsky et al. 2012; Herrmann-Pillath 2015a, b) – which are important, but which in turn are an expression of the motivational situations mentioned. In any case, only optimally designed instruments or instruments that are strongly deficient can be compared – the popular exercise of evaluating an idealised instrument against a misconstrued other in practice takes us nowhere.

With all this, there are finally two more implications. Firstly, the fixation on numbers of the empiricist paradigm encounters various limitations. Because, without exhausting space in this contribution on the details: Not only is behaviour not countable. Also, facts of climate, biodiversity, ecological assessment and scenarios are largely not countable either (on the letter again Dieckhoff 2015; Dieckhoff and Leuschner 2016; Ekardt et al. 2018b; on the first Ekardt and Hennig 2015). It is even less feasible (Ekardt 2021a) to substitute a normative justification of sustainability with an alleged cost-benefit analysis, which quantifies everything, meaning to make it countable. Also, the common search for seemingly empirically derived, but actually normatively intended (however generally not really legally or ethically based) sustainability indicators, which are in turn partial to the logic of quantification, thus raises manifold questions.

Secondly, the acquisition of knowledge in sustainability questions remains bound to be transdisciplinary due to the size of the challenge. Transdisciplinary means in this context to start thinking from the research questions at hand and not along the boundaries of a discipline, or even a school, which will accordingly have to work with a great number of approaches and arguments (on this also Bergmann et al. 2010). Citable literature exists for about any thinkable hypothesis, especially in behavioural research, while the respective fields of research often show certain tendencies to self-evidence, secured by notoriously leaving aside all other disciplines, schools and findings (on the problem of especially the human inclination of simplification, even in scientific circles Ekardt 2017). Seen in this light, there is no further justification that different behavioural sciences ignore each other oftentimes mostly. Reservations of most sociologists against socio-biologists, neurologists and economists therefore urgently need to be re-evaluated – this goes in the other direction as well. Comparing the findings of different disciplines, triangulating methods and thus assessing them critically, could bear the chance of actually interesting findings. It might be accurate that this might sometimes be challenging for the individual scientist – especially since sustainability issues profit from not just sweepingly

believe the starting points in *natural sciences*, like scenarios with their thousands of underlying assumptions. Ultimately, this imposition seems unavoidable.

2.7 Focus on Transnational Level and Crucial Issues of Instruments – Insights from Debates on Negative Emissions on Wetlands and Geoengineering

The current governance analysis aims at determining to what extend various policy approaches such as economic policy instruments, subsidies and detailed command-and-control regulations are suitable within forest governance and in which exact combination they will reach maximum impact, measured against the climate and biodiversity targets and the above-mentioned governance problems (based on the resumed behavioural findings). Recognising the need for a coherent land-use policy, we also take the main drivers of deforestation into account (such as livestock farming and fossil fuels in various respects). As effective policy instruments addressing overarching sustainability issues should be implemented on a preferably broad geographical scale, the main focus of the governance analysis will be on the transnational policy level, using the example of the European Union (EU), as well as the international policy level (Ekardt 2019; Stubenrauch 2019; Garske 2020). So far, a consistent forest governance on transnational level is widely missing, as it is the case in the EU (see Sect. 5.2). By now, command-and-control approaches focusing on the regulation of single actions concerning forest management are mainly implemented on nation state level. For reasons of space, we discuss the national level only at some exemplary points though.

A main focus of this volume – in terms of governance problems – lies on the question of a reliable depictability and predictability of GHG fluxes (and biodiversity), in other words, on the already mentioned difficulty to precisely determine the amount of carbon additionally saved in forests as a sink over time as well as other ecological factors. The precise measurement of GHG fluxes is a precondition for the adequate design of policy instruments. This has to be considered within the qualitative governance analysis and the choice of the policy instrument. As mentioned earlier, the focus on opportunities and limits of negative emissions – and on the problem of depicting in particular – continues our earlier studies on peatlands, on large-scale geoengineering, on land-use-based mitigation and others (Wieding et al. 2020; Ekardt et al. 2018a, 2020; Stubenrauch 2019; Garske 2020; Ekardt 2019; Garske et al. 2020; Ekardt and Hennig 2015). These studies have inter alia discussed the status quo and possible solutions for the problem of depicting climate and biodiversity effects in land use despite landscapes are typically very heterogeneous. E.g., the targets on zero emissions and stopping biodiversity loss imply that not only emissions from degraded peatlands have to be avoided, but conservation and rewetting of peatlands are also necessary to figure as sinks to compensate for unavoidable residual emissions. With regard to peatlands, we have demonstrated that measuring, depicting, and baseline definition are difficult for greenhouse gas emissions. In the absence of an easily comprehensible governance unit such as fossil fuels or

livestock products (see Weishaupt et al. 2020), economic instruments reach their limits. This is remarkable in so far as economic instruments can typically handle governance problems and react to various behavioural motivational factors very well. Still, peatlands can be subject to certain regulations and prohibitions under command-and-control law even without precise knowledge of the emissions from peatland use, which could be shown using the example of the EU and German legislation (see Ekardt et al. 2020). By these means, we contributed to governance research also by illustrating that even comprehensive quantity-control instruments for fossil fuels and livestock farming – which would address various environmental problems and reflect findings from behavioural research regarding motivation towards sustainability – require complementary fine-tuning through command-and-control law. One of the major intentions of the present volume is to transform this debate to the topic of forests and find out which governance solutions may work in this field.

Another intention is to strengthen our elaborations upon nature-based solutions in terms of negative emissions in contrast to risky geoengineering (on this see Wieding et al. 2020). Most scenarios on instruments limiting global warming in line with the 1.5 °C temperature limit of the Paris Agreement rely on overshooting the emissions threshold, thus requiring the application of negative emission technologies later on. Subsequently, the debate on carbon dioxide removal (CDR) in terms of geoengineering has been reinforced during the last years. It has been shown that the potential risks of high scale technological options such as geoengineering are huge and the effectiveness remains questionable. Furthermore, we have demonstrated that from the perspective of human rights, the Paris Agreement, and precautionary principle the phasing-out of fossil fuels and the reduction in consumption of livestock products as well as nature-based approaches such as sustainable – and thus climate and biodiversity-smart – forest, peatland, and agricultural management strongly prevail before geoengineering.

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