

Working Paper

Social justice in the context of climate and environmental policy:
Systematising the variety of social aspects, inequalities and
justice principles

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Author: Dirk Arne Heyen



Öko-Institut e.V. / Oeko-Institut e.V.

info@oeko.de

www.oeko.de

Geschäftsstelle Freiburg / Freiburg Head Office

Postfach / P.O. Box 17 71

79017 Freiburg. Deutschland / Germany

Phone: +49 761 45295-0

Fax: +49 761 45295-288

Büro Darmstadt / Darmstadt Office

Rheinstraße 95

64295 Darmstadt. Deutschland / Germany

Phone: +49 6151 8191-0

Fax: +49 6151 8191-133

Büro Berlin / Berlin Office

Borkumstraße 2

13189 Berlin. Deutschland / Germany

Phone: +49 30 405085-0

Fax: +49 30 405085-388

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Abstract

The paper aims to reveal and systematise the variety of social (justice) aspects in the context of climate or environmental policy and sustainability transitions, with a focus on distributive aspects and with regard to four sub-issues:

1. the basic **dimensions of social justice** in this context – going beyond the usual typology of distributional, procedural and recognitional justice by explicitly differentiating quite distinct distribution or inequality issues discussed in different streams of literature;
2. the **social effects of climate and environmental policies** – firstly, differentiating conceptually between social change processes and social impacts, and, secondly, presenting a categorisation of the latter, covering monetary and non-monetary aspects;
3. the categories or **axes on the basis of which distributional effects can be analysed** – differentiating between distribution among different social groups, different localities, or across time.
4. the variety of **justice principles which may serve as a basis for normatively judging on distributional effects** – differentiating between the main principles equality, proportionality, and minimum threshold, with different sub-principles (criteria) within each of the three.

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1 Introduction

Concerns around social impacts, inequalities and justice in the context of pressing environmental problems as well as of mitigation and adaptation efforts have increasingly entered political, societal and academic discourses. The UN 2030 Agenda, the Paris Climate Agreement and the European Green Deal aim for a “just transition” to a sustainable society, “leaving no one behind”. Considering inequality and justice issues and trying to avoid “unjust” measures and outcomes seems important from a normative standpoint but also with regard to the acceptability and feasibility of political action (Healy & Barry 2017; Klinsky et al. 2017; Patterson et al. 2018; Williams & Doyon 2019).

In principle, justice is an ethical concept that relates to the normative judgment about impacts of actions (or states of affairs) on and between people. Yet, justice is a contentious concept, with “many different and competing conceptions, i.e. interpretations” (Stumpf et al. 2016) and, especially in the political sphere, “competing claims based on different values and interest of a multiplicity of actors” (Steenbergen & Schipper 2017). Biermann and Kalfagianni (2020), for example, find that the UN 2030 Agenda “presents a conflicting mix of normative approaches towards justice”. In environmental decision-making processes, the underlying criteria for judgments on (in)justice are often implicit (Bennett et al. 2019). Moreover, judgments usually refer to specific aspects and measures (e.g., coal phase-out) of a broader issue and focus on a particular kind of social effect (e.g. employment) along a certain distributive axis (e.g., regional distribution). Other justice aspects of a sustainability problem or a policy measure are often not taken into consideration.

While this might be particularly true for political and media discourses, there are similar problems in the academic sphere. There are several streams of stimulating research on justice in the context of environmental issues, in particular around the concepts of *environmental justice* (e.g. Schlosberg 2007, 2013; Sze & London 2008; Walker 2012), *climate justice* (e.g. Goodman 2009; Jafry 2019; Schlosberg & Collins 2014), *energy justice* (e.g. Jenkins et al. 2016; McCauley et al. 2019; Sovacool et al. 2017; Sovacool & Dworkin 2015), and, more diverse in terms of conception, *just transition* (e.g. García-García et al. 2020; Heffron & McCauley 2018; Newell & Mulvaney 2013; Rosemberg 2010; Stevis & Felli 2015; UNFCCC 2016). Quite recently, a research framework on *planetary justice* has been developed for global change research (Biermann & Kalfagianni 2020). There is also a research strand on justice in the context of nature and biodiversity conservation (e.g. Friedman et al. 2018).

However, while there is a wide range of literature on different social aspects, each strand “presents a relatively narrow view of justice” (Williams & Doyon 2019). Moreover, parts of existing research have been criticised (e.g. by Dirth et al. 2020; Schuppert & Wallimann-Helmer 2014) for a loose and inconsistent use of the justice concept, as well as for treating it in an “aspirational and uncritical way” while neglecting to address potential tensions and trade-offs within efforts to pursue sustainability in a socially just manner (Ciplet & Harrison 2020; see also Pellow & Brulle 2005). In the realm of studies on sustainability transitions, justice belongs to the under-researched and under-conceptualised issues, particularly beyond energy transitions (Köhler et al. 2019; Steenbergen & Schipper 2017).

There is thus a need to clarify the meanings of justice (ibid.; Stumpf et al. 2015) as well as potential tensions and trade-offs (Ciplet & Harrison 2020; Newell & Mulvaney 2013). Articles that compare or even integrate (some of) the different research streams (Bennett et al. 2019; Healy & Barry 2017; Heffron & McCauley 2018; Jenkins 2018; Menzemer 2020; Newell & Mulvaney 2013; Schlosberg & Collins 2014; Williams & Doyon 2019) are often limited to discussions along three commonly distinguished forms of justice: distributional, procedural, and recognitional justice. As I will try to show in this paper, this categorisation and the usual discussions of distributional justice do not adequately cover the variety of aspects around distributional dimensions, effects and justice principles.

Meanwhile, a more empirically than normatively oriented corpus of literature deals with different – monetary and non-monetary – effects of climate and environmental policies (cf., e.g., García-García et al. 2020; Lamb et al. 2020; Markkanen & Anger-Kraavi 2019 for reviews). However, single studies and even literature reviews are usually limited to certain impact categories like employment or household expenditure. While it is usually necessary to focus resources in order to adequately answer a particular research question, it is also important to be aware about and to mention that there is a broader range of social effects which might include tensions and trade-offs.

The present paper aims to increase clarity particularly (yet not exclusively) on distributional aspects in the context of environmental policies and sustainability transitions. Thus, it aims to contribute analytically to a research need identified by Köhler et al. (2019) in their review and research agenda for studies on sustainability transitions: “a concerted effort to analyse the distributional consequences of transitions ex-ante, during and ex-post”. In doing so, the paper is limited to an anthropocentric view on justice, leaving aside concepts around justice towards the non-human environment (cf., e.g., Hickey & Robeyns 2020; Schlosberg 2013; Sovacool et al. 2017 for a discussion of such concepts).

More precisely, the paper aims to reveal and systematise the diversity of social-justice (particularly distributive-justice) aspects with regard to the following four sub-issues:

1. the basic **dimensions of social justice** – going beyond the usual typology of distributional, procedural and recognitional justice by explicitly differentiating quite distinct distribution or inequality issues discussed in different streams of literature;
2. the **social effects of climate and environmental policies** – firstly, differentiating conceptually between social change processes and social impacts (based on Slootweg et al. 2001, 2003), and, secondly, presenting a categorisation of the latter, covering monetary and non-monetary aspects;
3. the categories or **axes on the basis of which distributional effects can be analysed** – differentiating between distribution among different social groups, or localities, or across time.
4. the variety of **justice principles which may serve as a basis for normatively judging on distributional effects** – differentiating between the main principles equality, proportionality, and minimum threshold, with different sub-principles (criteria) within each of the three.

The paper is based on a review of literature in two ways:

- a comparative assessment of mostly conceptual publications on environmental justice, climate justice, energy justice, just transition, and cross-cutting publications – this has not been an encompassing and systematic literature review but a review focused on key publications on each of the concepts (see key references mentioned above and reference list at the end), having started with publications that already summarised and compared the concepts (Heffron & McCauley 2018; Jenkins 2018; Menzemer 2020; Newell & Mulvaney 2013; Schlosberg & Collins 2014; Williams & Doyon 2019), and complemented by some other general works on the interconnection between environment and justice (Dobson 1998; Schultz 2009);
- a broad review of the empirical literature on a wide range of social effects of European and national climate- and environmental policy in Germany (cf. Heyen forthcoming), done as part of a research project,¹ and complemented by some recent international literature reviews on social effects of climate policy (García-García et al. 2020; Lamb et al. 2020; Markkanen & Anger-Kraavi 2019).

¹ This literature review was done as part of the research project “Social aspects of environmental policy”, funded by the German Environment Agency (UBA) (funding code 3719 16 106 0). The aim was to collect existing evidence on a broad range of social (distributive) effects as listed in Chapter 3 within the whole range of climate, environmental and nature-conservation policy. Given the thematic broadness and,

The structure of the paper is oriented towards the four sub-issues and goals mentioned above. Chapter 2 deals with the broad social justice dimensions. Chapter 3 then focuses on one of these dimensions, i.e. the different social effects of climate and environmental policies. Chapter 4 differentiates axes by which distributional effects can be analysed, and Chapter 5 systematises different justice principles by which such distributional effects can be evaluated. The paper ends with some general conclusions and recommendations for further research.

accordingly, the vast amount of peer-reviewed as well as grey literature (including existing UBA studies whose inclusion was required by the UBA), a complete review was not possible. Instead, the following approach was chosen: The relevant UBA studies since 2008 and an existing overview paper on social effects of European climate and environmental policy (Heyen et al. 2020) served as starting points. Via a snowball approach (i.e., checking the literature cited in the publications), further relevant literature was reviewed and evaluated. On the basis of the identified impact categories and the different sub-fields of environmental policy, further literature was searched for in Google Scholar using the corresponding keywords, with a focus on those combinations of impact categories and sub-fields on which little evidence has been found so far. Interim versions of the text were reviewed by numerous persons with expertise in specific sub-fields and/or impact categories. This resulted in further additions and revisions.

2 Social justice dimensions

An extensively used categorisation in the literature distinguishes between three different, yet interconnected, dimensions of social justice: distributional (distributive), procedural, and recognitional justice. Broadly speaking, *distributional justice* is about the fair distribution of benefits and burdens, *procedural justice* about inclusion and equal participation in decision-making, and *recognitional justice* (or justice as recognition) about the equal acknowledgment of and respect for all cultures, worldviews and identities (cf. Williams & Doyon 2019, mainly referring to Walker 2012). Based on more fundamental philosophical discourses, the categorisation has been established and is especially prominent in the environmental justice literature (e.g. Schlosberg 2004; Walker 2009) but was later taken up in the other strands of literature and cross-cutting publications mentioned above.

Some authors have added further dimensions to this triad. For example, some studies on energy justice include *cosmopolitan justice* as a fourth dimension (McCauley et al. 2019; Sovacool et al. 2019; Sovacool & Dworkin 2015). Since this mainly extends the other dimensions to a universal and global scope, I argue that this is not a conceptually separate justice dimension but a cross-cutting question of scope which is also considered in Chapter 4 as a spatial axe of distributional justice. Similarly, I argue that *intergenerational justice* (mentioned, e.g. by Patterson et al. (2018) as a justice dimension along the others) is not a conceptually separate dimension but captures the temporal axe by which social effects and justice can be analysed (cf. Chapter 4). Some authors (e.g. Heffron & McCauley 2018) mention *restorative justice* as another justice dimension – but again, I argue that restoration for injustices in the past is a rather cross-cutting issue that can be applied to all the other justice dimensions. Finally, Silveira (2016) discusses the *capabilities approach* by Nussbaum (2000) and Sen (2009) as a fourth justice dimension next to three standard ones, but I argue that the issue of equal capabilities is rather a possible justice principle for normative judgments (cf. Chapter 5; Silveira (2016) itself additionally discusses the capabilities approach as a moral principle).

However, I argue that the typical categorisation (distributional - procedural - recognitional) has two important shortcomings, namely with regard to the understanding and labelling of distributional justice. Firstly, procedural and recognitional justice also include distributional aspects: e.g. whether resources to participate in decision-making, or the respect for different cultures, are equally distributed. Secondly, in different streams of literature, the term distributional justice covers very different aspects of inequality, namely:

- the distribution of environmental pollution and risks, or of the access to environmental resources, and its impacts on human health (risks) – which is the main issue in the environmental justice discourse (e.g. Walker 2009, 2012) and, with regard to climate change impacts and vulnerability, in the climate justice discourse (e.g. Barnett 2006) as well. Furthermore, it is a central topic in studies on energy justice (e.g. McCauley et al. 2019; Sovacool 2021);
- the responsibility for causing these environmental problems – an issue mainly addressed in the context of climate change by the climate justice discourse (e.g. Barnett 2006) but also in analyses of resource use as “ecological footprints” (e.g. Wackernagel & Beyers 2019);
- the distribution of socio-economic benefits and opportunities, costs and risks (e.g. employment, or access to and affordability of energy) from socio-technical systems (e.g. energy system) – a key issue in the discourse on energy justice (e.g. Sovacool & Dworkin 2015); and/or
- the distribution of burdens and benefits from climate and environmental policy measures or, more generally, from sustainability transitions – which is the main issue in the discourse on just transition (e.g. Healy & Barry 2017; Newell & Mulvaney 2013; Stevis & Felli 2020), also an important issue within climate justice (e.g. Moellendorf 2012; Page 2008) and energy justice (e.g. Jenkins et al.

2018; Sovacool 2021), and the key issue of many empirically focused publications on social effects of climate policy (García-García et al. 2020; Lamb et al. 2020; Markkanen & Anger-Kraavi 2019).

I therefore suggest to differentiate more precisely between the following five justice dimensions and one further cross-cutting dimension, preferring to speak of inequalities instead of injustices at this stage (cf. Chapter 5 for different justice principles to normatively judge on distributional inequalities):

1. the (socially unequal) **causation of environmental problems**: This is about who (which countries, social groups, generations – cf. Chapter 4 for different distributional axes) contributes to what extent to resource use, climate change, and other environmental pressures.
2. the (socially unequal) **distribution of environmental “goods & bads”**: This is about how health-related environmental pressures (e.g. noise, air pollution) or access to intact environment, biodiversity and ecosystem services (e.g. clean air, clean water, fertile soils, green spaces) are distributed between different social groups and spaces, and over time.
3. the (socially unequal) **distribution of socio-economic benefits and costs from socio-technical systems**: This is about how such benefits and opportunities, costs and risks (regarding employment and working conditions, or access to products and services, for example) are distributed between different social groups and spaces, and over time.
4. the (socially unequal) **access to information, decision-making, legal protection and innovation processes**²: This is about who (which social groups, which countries, which generation) has access to the above-mentioned assets, not only formally but also regarding capabilities and resources (e.g. education, financial resources, power, time).
5. the (socially unequal) **recognition of people**: This is about who (which social groups and communities, also which generation) is respected and whose identity, culture, worldview, knowledge, needs or interests are valued.

The status quo along all these dimensions can be influenced by sustainability transitions and underlying climate and environmental policies, adding a final cross-cutting dimension:

6. the (socially unequal) **distribution of benefits and burdens from sustainability transitions and related policies**: This is about the intended and unintended social effects of such transitions and policies, and the distribution of (not only monetary) benefits and burdens between different social groups and spaces, and over time.

As other authors have already pointed out, the different justice dimensions are highly interrelated: For example, mis- or malrecognition as well as exclusion in participation can lead to unequal distribution of costs and benefits (Fraser 2001, 2005; Schlosberg 2012). At the same time, a lack of resources (distribution) can lead to malrecognition, and both can be barriers to participation. Synergies can thus arise when tackling inequalities within at least one dimension. However, there might also be tensions, for example, between ambitious, timely climate policies and inclusive processes (cf. Cipler & Harrison 2020; Sovacool et al. 2017; Sovacool 2021).

The next section conceptualises the sixth justice dimension mentioned above – the social effects of climate and environmental policies – in more detail.

² Openness and inclusion in innovation processes is an issue addressed in studies on sustainability innovations and transitions (e.g. Smith & Seyfang 2013).

3 Spotlight on social effects of policies

What kinds of social effects can result from climate and environmental policies (but also a lack of them)? As mentioned above, single studies usually focus on a specific kind of effect, mostly employment and/or disposable income while others deal with more immaterial issues of well-being (cf. Heyen forthcoming; Lamb et al. 2020). This chapter aims at a categorisation of such effects (cf. Subsection 3.2). Beforehand, however, it makes an important conceptual distinction between social change processes and social impacts – a differentiation which has already been made by others but, to the best of my knowledge, has not been reflected so far in the discourses mentioned above (apart from two German studies analysing distributional effects of environmental policies, cf. Heyen forthcoming, Jacob et al. 2016).

3.1 Differentiating between social change processes and social impacts

Aiming to link environmental with social impact assessments (mainly of infrastructure projects) and criticising the inconsistency of impact categories within tools for the latter, Slootweg, van Schooten and Vanclay have argued for a distinction between social change processes (as well as biophysical changes) and the resulting social (or human) impacts (Slootweg et al. 2001, 2003; van Schooten et al. 2003; Vanclay 2002). The categories can be defined as follows:

- **Social change processes** refer to economic, social, technical, or infrastructural changes triggered, whether directly or indirectly, by policy measures. Relevant examples in the context of environmental policy are shifts in employment in the course of structural change, increases or decreases in road traffic, or energy-related renovations of buildings (Jacob et al. 2016). Other examples include price changes of products or new infrastructures and services.
- **Biophysical changes** (and the resulting **biophysical impacts**) refer to changes in the natural environment triggered, whether directly or indirectly, by policy measures, especially with regard to environmental quality and the availability of natural resources.
- **Social impacts** refer to the effects resulting from social change processes and biophysical impacts, as they directly affect individuals, households, social groups or communities and are experienced by them physically, psychologically, or financially. Perception and evaluation depend, among other things, on attitudes and adaptive capacities of those affected (ibid.; Vanclay 2002). Examples include concrete effects on health or financial burdens.

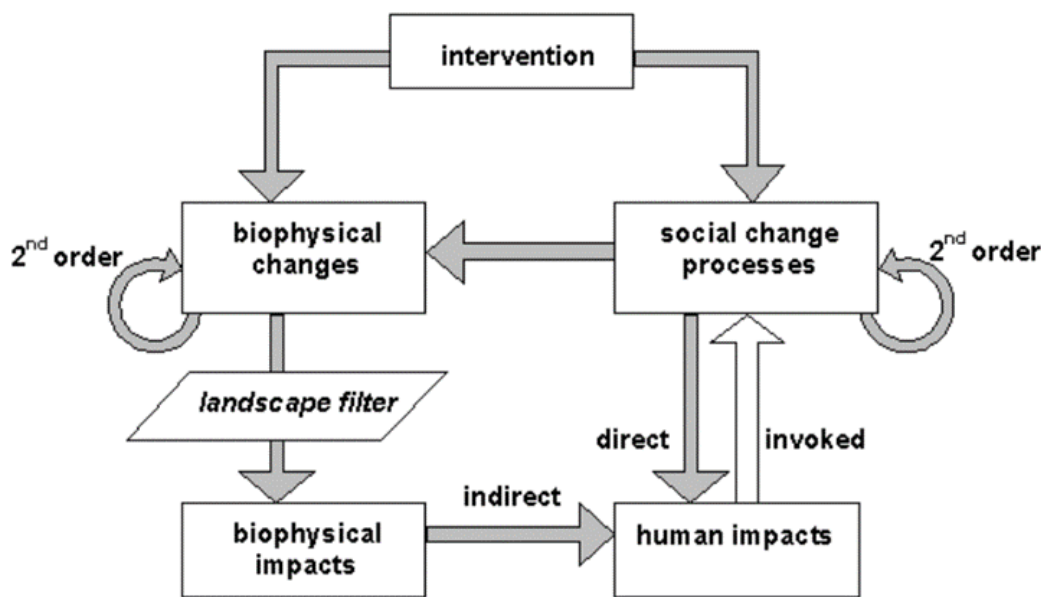
Figure 1, taken from Slootweg et al. (2001), heuristically illustrates the underlying cause-effect chain from a policy intervention to social impacts (here called human impacts). Although some arrows already indicate the existence of feedback effects, it should be made clear that this figure still simplifies – for good conceptual reasons – the complex and dynamic cause-effect chains that usually exist, with interdependencies and repercussions between several change processes.

Why is it important to distinguish social and ecological changes from social impacts? In some studies, social impact assessments and public debates, social and ecological changes are rashly presented and judged as social (justice) effects, probably because they can be observed or even measured more easily than their downstream social impacts (Vanclay 2002). For example, it is inferred that a phasing-out of coal means continued job losses, rising energy prices means increased cost burdens, or environmental quality means health. However, the social impacts ultimately felt by people are usually influenced by many factors: various policy measures and social change processes, personal adaptation options, and/or feedback effects. Social change processes that seem problematic at first sight do not necessarily need to have a negative impact on individuals or negative impacts might be prevented or mitigated by further policy measures (ibid.).

The employment effect of an energy transition, including a coal phase-out, for example, is, among other things, influenced by the supply of alternative employment opportunities, labour market flexibility, personal skills and mobility (García-García et al. 2020). In the end, more jobs might be created than lost (cf. *ibid.* for a review of relevant literature), although sectoral, social and regional distributional effects should also be taken into account (cf., e.g. Sievers et al. 2019). Taking the second example, the effect of rising energy or carbon taxes on household energy costs is not only influenced by the direct price effect but also by adaptation behaviour (energy-saving investments or behaviour changes), revenue recycling and adjustments in transfer payments (e.g. Eisenmann et al. 2020; Gawel et al. 2015; Schumacher et al. 2016). Taking the third example, the extent to which a poor environmental quality influences individual health, not only depends on proximity and exposure to environmental “bads” but also on personal vulnerability and adaptive capacities (e.g. Bolte et al. 2012; Walker et al. 2005).

Thus, it seems important to look at final net effects on people when talking about social impacts – although social and biophysical changes can be seen as important influencing factors which may be used to serve as some kind of proxy for social impacts if data along the cause-effect chain from a policy intervention to a social impact is missing.

Figure 1: Cause-effect chain from policy intervention to social (human) impacts



Source: Slootweg et al. 2001 (“landscape filter” means a prioritisation of relevant impacts depending on natural space and land use in the context of assessments of local infrastructure projects which is of less relevance in the context of this working paper).

3.2 Categorising social impacts

Attempts at a generic and thematically broad categorisation of social impacts are surprisingly rare in the research literature around climate and environmental policy. Exceptions like the one by Fullerton (2011) are usually narrowly disciplinary (here economic) and neglect certain (especially immaterial) effects. Broad category lists are mainly developed in the context of practice-oriented tools for social impact assessments. However, social change processes and social impacts are often confused here, and categories overlap (Vanclay 2002).

Acknowledging that any generic category list is probably influenced by the respective disciplinary background, interests and biases, and might not be suitable for all contexts (*ibid.*; Üрге-Vorsatz et

al. 2014), I will nevertheless present the categorisation of social impacts developed within the UBA research project mentioned above (cf. Heyen forthcoming). It has been continuously developed and discussed within the course of the broad review of empirical literature to integrate all research findings on social impacts of environmental policies in Germany. The aim was to end up with a typology that is as broad as possible in terms of different kinds of social impacts discussed, and at the same time contains a manageable number of well distinguishable categories.³ Furthermore, the categories' labels were supposed to be as comprehensible as possible, little open to interpretation, and as little normative as possible.

Thus, the following social impact categories are distinguished (cf. Heyen (forthcoming) for a large range of literature references on each of these categories):

1. **Employment:** This is about the policy effects on the existence, loss or possibility of (re-)taking up paid employment as well as its qualitative characteristics, such as working conditions and aspects of secure or precarious employment. While the structural change to a green economy and the associated job reduction/creation in individual sectors are social change processes, the net effects and their distribution are decisive for social impacts: who or which social groups (in which regions) find a job and under what conditions.
2. **Income, revenue & expenditure:** This includes all financial policy effects at the household level, i.e. on net income (wages, transfer payments), other revenues (from self-employment, financial investments, renting) and on expenditures (e.g. for energy, mobility, food). In terms of social impacts, it is important to look not only at influencing factors such as price developments, but at net effects which also take into account energy savings and transfer payments.
3. **Assets:** This refers to indirect policy effects on people's assets. For example, depending on other influencing factors, real estate can increase in value as a result of measures against traffic noise, or possibly decrease in value as a result of a new wind farm in the vicinity.
4. **Health:** This is about how policy affects people's physical as well as mental health and health risks, in particular through the reduction of environmental burdens (e.g. noise, heat, bad air quality) or access to environmental resources (e.g. clean air, green spaces). However, in order to draw conclusions from biophysical changes and impacts to health impacts one has to also consider vulnerability and adaptation capacities.
5. **Care work, everyday life and leisure:** This refers to the policy effects on the conditions and scope of care work, as well as the possibilities and efforts of everyday life and leisure activities. This includes the maintenance of social relationships and participation in social and cultural life. Environmental policy influences, for example, the prices and infrastructures of various modes of transport (social change processes) and thus the choices available and the time spent on journeys (social impacts) which can affect social groups differently.
6. **Psychosocial effects:** This category includes effects of policy measures and discourses on people's social recognition and self-esteem, as well as on sensations such as fun, enjoyment, enthusiasm or guilt, which may be associated with certain consumption habits or experiences. Environmental policies can reinforce or restrict certain habits and sensations felt with them, and indirectly socially valorise or stigmatise certain behaviours, social groups, or professions.
7. **Political participation:** This is about the extent to which environmental policy enables people to participate in and influence political-administrative decisions and thus in shaping their living

³ It is important to note that the different impact categories can still be highly interrelated. For example, losing employment can have psychosocial and health effects, while the personal state of health can also influence employment opportunities.

conditions. Both formal participation in infrastructure approval procedures and informal formats, such as online consultations, citizen dialogues or planning workshops on the living environment, are relevant here. Different social groups often get involved to different degrees.

As Vanclay (2002) wrote, “others may well group impacts in different ways”. Moreover, scholars working on countries with institutions that are more fragile than those in Germany might explicitly include social impacts such as (forced) resettlement or (limited) access to legal protection.

However, the category list presented already gives a broad overview of the quite different social impacts that environmental policies can have – and can help to identify tensions and trade-offs. The same policy can have positive social effects within one impact category, and problematic ones in another. As mentioned earlier, most studies focus on one kind of impact (e.g. employment effects of an energy transition measure) and find positive or problematic effects there, while they disregard other kinds of impacts (e.g. the measure’s health effects). It is rather in literature-review and research-agenda articles that tensions across impact types are considered, for example positive effects on employment or energy access and, at the same time, problematic effects around land-grabbing and resettlement by large-scale renewable-energy projects in developing countries (cf., e.g. Köhler et al. 2019; Newell & Mulvaney 2013; Sovacool et al. 2017).

To further uncover concrete impacts and tensions, we also need to look at effects of unequal distribution between different social groups, locations or across time. Because even within the same impact category, a policy instrument can affect people quite differently. Or, as Ürge-Vorsatz et al. (2014) note, even with a little or no net effect, policy impacts on individual groups or localities can be highly negative for some or highly positive for others. This leads us to the next chapter.

4 Axes of distributional effects: social, spatial and temporal

Studies analysing distributional effects, whether resulting from policies or the status quo of environmental pollution, for example, often focus on a particular distribution axe such as income level (often in studies on energy- or climate-tax impacts, cf. Lamb et al. 2020), ethnicity (often in studies on environmental inequality, cf. Walker 2009), regions (often in studies on employment effects from energy transitions, cf. García-García et al. 2020), industrialised vs. developing countries, or current vs. future generations (both often in climate justice studies such as Page 2007).

In the following, I try to systematise the wide range of possible axes used for distributional analyses in the literature reviewed here, broadly clustering social, spatial and temporal aspects:

- **Social:** distribution between different social groups...
 - along socio-demographic criteria: e.g. gender, ethnicity, age, civil status, household size...
 - along socio-economic criteria: e.g. income level, employment status, job category...
 - along consumption / way-of-living criteria: e.g. car ownership, commuting, renting...
- **Spatial:** distribution between different localities (towns, regions, countries)...
 - along socio-demographic criteria: e.g. age pattern, ethnicity share...
 - along socio-economic criteria: e.g. GDP, industrial structure...
 - along socio-spatial criteria: rural vs. urban areas, small vs. big cities
- **Temporal:** distribution across time
 - between different points in time for the same generation / people
 - between different (including past and future) generations (“intergenerational justice”).

Of course, criteria can also be combined to analyse distributional effects, for example, commuters with low or high income, or families in rural or urban areas.

Moreover, the axes are not only relevant for considering the different dimensions around distributional justice – they are also relevant for considering procedural and recognitional justice, i.e. who is respected or who is included and who not (cf. Chapter 2).

5 Justice principles for judging on distributional effects

After having analysed distributional effects, the question arises which distribution can or should be seen as (un)just, particularly in contexts of scarcity (Dobson 1998). As elaborated in this chapter, quite different justice principles can be applied, influenced by different philosophical traditions (cf., e.g. Biermann & Kalfagianni 2020), and leading to different judgments or, when applied to new measures, to different outcomes (cf., e.g. Bennett et al. 2019). As, among others, Schuppert & Wallimann-Helmer (2014) argue, “as long as we do not clearly identify the normative yardsticks we use, any normative assessment of existing empirical research ultimately will be flawed”.

However, as already argued in the introduction, underlying justice criteria are often implicit, and a reflection of different principles for distributive justice is missing in many academic, especially empirical studies (but sometimes even in conceptual articles like that of Heffron & McCauley 2018). In the environmental justice discourse, for example, “justice as a concept is used loosely and inconsistently”, and inequality often simplistically equated with injustice (Schuppert & Wallimann-Helmer 2014). Meanwhile, studies around responsibilities, obligations and rights in the context on global climate policy often discuss different justice principles (Grasso 2007; Moellendorf 2012; Page 2008; Ringius et al. 2002; Shue 1999). The same holds true for most conceptual studies on justice.

Within these studies, we find quite different categorisations: sometimes with only very few principles (e.g. Miller 1999: desert, need, equality; Ringius et al. 2002: equality, equity, exemption in case of lack of capacity; Silveira & Pritchard 2016: equality, equity, utility; Young 1994: equality / parity, proportionality and priority; Stumpf et al. (2016) add sufficiency as a fourth principle to those from Young), or with a large range of principles (e.g. Bennett et al. 2019: utility, equality, proportionality, needs, merit, and rights). While there is a substantial overlap, comparing the different categorisations and definitions of their categories reveals many differences and inconsistencies.

Aiming for an encompassing list, structured along main principles and their more precise sub-principles (criteria), I tried to select those terms among overlapping options that usually share a common understanding and that are as little as possible open to interpretation or overlap with other concepts. Therefore, I do not use the terms desert⁴, equity⁵, and priority⁶ (see the footnotes for further explanation). What these concepts mean to the authors they use them, is included in the list below by other, more precise terms that are also used in the discourse.

As main (headline) principles for distributive justice, I distinguish between the following three, in a similar way like Young (1994) but avoiding the term “priority”: 1) equality, 2) proportionality, and 3) minimum threshold⁷. For all three and especially the first two principles, one can and should further

⁴ “Desert” can be seen as a sub-form of the proportionality principle; Miller (1999) uses the term “proportionality to desert”. Since “desert” may refer positively to merit or negatively to deserved punishment, it seems better to differentiate between more precise terms such as “merit” and “moral responsibility”.

⁵ “Equity” is rather an umbrella term for which different justice principles can be applied (e.g. Young 1994), and which is often used as a synonym for justice (e.g. Müller 2001). Some authors who use the term “equity” refer to the same concept as other authors using the term “proportionality” (e.g. Ringius et al. (2002) mention proportionality as “a defining characteristic of equity”).

⁶ “Priority” means that certain claim holders should be prioritised. While it is usually understood as prioritising the worst-off (e.g. Page 2008, Stumpf et al. 2016, both referring to Parfit 1997), this should be made more explicit by using clear concepts (principles) such as equal outcome or basic needs.

⁷ While “minimum threshold” it not a term used in the typologies mentioned, it is nevertheless a concept employed in the discourse on distributional justice. Rawls (1971) speaks about “inviolable minima”, Shue (1999) about “adequate minimum”, Brock (2009) about the “minimum floor principle” with a “minimum set of protections and entitlements”, Caney (2010b) about human rights as “moral thresholds”, Bennett et al. (2019) about “minimum thresholds of basic human rights”, Stumpf et al. (2015) about a “sufficiency threshold”. Social thresholds or foundations are also key to Doughnut Economics (Raworth 2017).

distinguish between quite different sub-principles (criteria, currencies) which might again lead to very different distributional outcomes (cf., e.g. Mane (2001) with regard to equality; Müller (2001) and Stumpf et al. (2016) with regard to proportionality). This seems to be partly overseen by some authors who give a one-sided definition of the terms (e.g. Bennett et al. (2019) and Silveira & Pritchard (2016) focusing their definition of equality on equal treatment only).

I come up with the following list of main- and sub-principles for distributive justice:

1. Equality:

- **Equal treatment:** means that everybody is treated equally by a policy, e.g. gets the same amount of money from a carbon-tax-revenue recycling, or that every country is obliged to reduce its GHG emissions by the same amount. It should be noted that, where inequalities already exist (as is usually the case), these can be entrenched by an equal treatment.
- **Equal outcome:** means that treatment should be in a way that people are equally well off in the end – which could yet be based on different “currencies” such as goods and resources, or welfare or well-being (cf., e.g. Mane (2001) and Page (2007) for discussions on that).
- **Equal opportunities / capabilities:** means that everybody has “equivalent arrays of life options” (Arneson 1989, 2001), an equal “access to advantage” (Cohen 1989), or according to the often cited capability approach developed by Nussbaum (2011) and Sen (2011, 2013) that resources should be distributed in a way that all people have the necessary, roughly similar capabilities to “function” and live their life according to their values and objectives. This means, for example, that someone with a handicap or a harsh physical environment might need a higher share of certain goods according to the capability approach (cf. e.g. Grasso (2007) or Page (2007) for discussing this as a justice principle in the context of climate change).
- **Equal ecological space:** means that everybody has the “right” to consume resources or pollute the environment to the same extent (within a sustainable overall budget). This principle is put forward, for example, in the climate justice discourse, looking at equal per-capita emissions (e.g. Moellendorf 2012) and opportunities for future generations (Page 2007). It is also used in the concept of “ecological footprints” (Chambers et al. 2000).
- **(Formal equality & equal consideration:** mean that everybody has equal moral standing and all claims are considered equally (Stumpf et al. 2016), which is, however, rather a principle for procedural and recognitional justice than for (materially) distributive justice: It can still mean distribution according to other principles than equality (Schuppert & Wallimann 2014).)

2. Proportionality, based on:

- **Problem causation / contribution:** means that those who cause (have caused) a problem should (proportionally) contribute to its solution, e.g. pay for mitigation or adaptation measures (“polluter-pays principle”). This might also include historic contributions of previous generations, as especially discussed in the context of climate change (e.g. Caney 2005; Miller 2007; Moellendorf 2012; Neumayer 2000; Page 2008; Ringius et al. 2002; Shue 1999).
 - **(Moral) responsibility:** means that only those damages which fulfil additional fault criteria – namely voluntary action and knowledge about its harmfulness – need to be compensated (Moellendorf 2012; Müller et al. 2009; Page 2008).
- **Beneficiary pays:** focusing on the effects rather than the causes of polluting activities, the principle means that those who have benefitted (economically) from polluting activities in the past shall contribute to the costs of combating negative externalities. This principle is particularly discussed, again, in the context of climate change (e.g. Page 2008).

- **Ability / capacity:** means that everybody should act according to his/her capacity, e.g. financial resources, to solve a problem (e.g. Caney 2010a; Moellendorf 2012; Shue 1999).
- **Merit:** means that people should benefit according to their efforts or inputs in contributing to providing a good or solving a problem (Bennett et al. 2019; Ringius et al. 2002).
- **Custom / historical entitlements:** means that a distribution should be based (i.e. entrenching the status quo) or at least take into account an existing allocation, existing formal or informal rights (entitlements) as established usage or custom (cf., e.g. Ringius et al. 2002; and Dobson 1998, referring to Nozick 1974). This principle is often applied in the context of resource use (e.g. fish catch rights), including indigenous people’s rights, but also in the context of climate change and emissions trading where it is discussed as “grandfathering” (Benett et al. 2019; Mollendorf 2012; Ringius et al. 2002).
- **Utility:** means that any distribution should benefit those who can gain the greatest increase in happiness, so that overall happiness (welfare) is maximised (e.g. Grasso 2007, referring to utilitarian philosophers such as Jeremy Bentham and John Stuart Mill).

3. Minimum threshold:

- **Basic needs:** means that preferential treatment should be given to those people (or countries) most in need, so that basic human needs, including a decent standard of living, or a certain level of well-being are secured, i.e. people “have enough” – a principle that is sometimes called “sufficiency” (e.g. Stumpf et al. 2015, 2016, referring to Frankfurt 1987) and that is especially applied in a global and/or intergenerational perspective, e.g. in the climate change discourse (e.g. Brock 2009; Page 2007, 2008; Ringius et al. 2002; Shue 1999).
- **Basic / human rights:** means that any outcome must ensure that a minimum set of everybody’s basic / human rights, protections and liberties, are respected, in particular, not to be arbitrarily deprived of one’s life, not to have others cause serious threats to one’s health, and not to have others deprive one of the means of subsistence (Brock 2009; Caney 2010; Miller 2007).

Since Nussbaum and Sen as the authors behind the capability approach mention “basic capabilities”, their approach might also be linked to the minimum threshold principle (instead of the equality principle), cross-cutting basic needs and basic rights (cf. Nussbaum (1997) and Sen (2005) for their own discussions on the interlinkages between basic capabilities and human rights).

While the first two basic principles (equality and proportionality) define a relational standard of justice, the last principle (minimum threshold) defines an absolute standard. All principles have their normative as well as practical strengths and weaknesses (cf., e.g. Page 2008), so there is neither a simple nor a general answer to which justice principle(s) should be applied. The choice might depend on the specific issue at hand (e.g. climate change mitigation or adaptation, cf., e.g. Klinsky et al. 2012), the type of relationship between the people involved (Miller 1999), and/or specific local (political, cultural) contexts (Silveira 2016). People can differ on their preferred justice principle even within the same country on the same issue, for example influenced by their political thinking. A response to this can be to combine different principles, e.g. the fulfilment of basic needs as a bottom line combined with some kind of proportional distribution beyond that (cf., e.g. Miller 1999). However, even such a combination of principles might not be a fits-all solution in case of tensions and trade-offs when trying to tackle inequalities along several justice dimensions (cf. Chapter 2), impact categories (cf. Chapter 3), or distributional effects along different social, spatial or temporal criteria (cf. Chapter 4).

6 Conclusions

Many studies on social (justice) effects in the context of environmental policy and sustainability transitions are characterised by a narrow focus on particular impact categories and/or a narrow (often implicit) understanding of justice. This might lead to premature judgments on justice without looking at potential tensions and trade-offs and without considering alternative ethical considerations.

Against this background and based on a broad review of literature, the present paper was aimed at revealing and systematising the broad variety of justice dimensions, impact categories, distributional axes, and justice principles – all of which together make justice a contentious concept.

It is not the aim of this paper to conclude with specific research questions on particular issues – this has already been set out at length by most studies cited here (and, in addition, recently by Cronin et al. 2021). Instead, some general recommendations shall be made.

While it is usually necessary in academic work to focus resources on particular issues in order to adequately investigate a research question, it is also fundamental to keep in mind and communicate that there is a broader range of aspects that have not been addressed in a study, but that are also important as a basis for assessing (un)just effects of a policy instrument, for example.

More precisely, this paper has shown that future studies should set out more clearly

- which justice dimension(s) (cf. Chapter 2) they investigate, which not, and why;
- which impact category/-ies (cf. Chapter 3.2) they investigate, which not, and why;
- which distributional axe(s) (cf. Chapter 4) they investigate, which not; and why;
- which justice principle(s) (cf. Chapter 5) they consider and apply, which not, and why.

Moreover, when studying social effects from policies, it is important to differentiate between social (as well as biophysical) changes and social (human) impacts (cf. Chapter 3.1). With regard to the latter, it is recommended to focus on net impacts that take into account the entire range of relevant social processes, possible adaptation reactions and feedback loops, including unintended ones.

By doing so, research might better contribute to informed public and policy debates on social justice in the context of environmental policies and sustainability transitions.

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