Towards sustainable wellbeing: Integrated policies and transformative indicators.

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Towards a postgrowth policy paradigm. Report on the theoretical framework on sustainable wellbeing and transformation

(WP1 Theories and indicators for the transformation towards a 'sustainability paradigm')

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Content

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Preface

This document provides an overview and project contextualisation of the research conducted in Work Package 1 of the ToBe project on conceptual synthesis of sustainable wellbeing as a shared vision for a sustainability paradigm, and better understanding of linkages between social, ethical, political, economic and environmental/material impacts of drivers of change.

It aims to explore conceptual connections between different theoretical case studies and conceptual frameworks proposed within WP1. The report is presented here as a process of co-creation, with many conceptual areas and connections to interdisciplinary positions in the literature explicitly marked and left open as they are currently under peer review and preparing for publication. In mapping the conceptual connections, but also the sensibility of their potential application (in something like policy paradigms maybe), the ongoing research is live-testing both the understanding of the framework proposed and its potential applicability to the challenge of a post-growth vision.

The internally coherent theoretical positions that provide novel research input for this overview, and that are presented as completed research narratives are given in the accompanying academic publications related to this work package and its tasks.

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Key Highlights

This report discusses the transformation towards a new postgrowth paradigm by combining four tasks. It develops a philosophical argument on political ontology and social change. It further builds this framework and suggests a relational understanding of sustainable human well-being. It discusses the importance of institutional planning with three concrete steps. It draws from the conceptual framework a policy tool to advance paradigm change.

CHAPTER 1 – OUR PROBLEM SETTING: OUTLINING THE NEED FOR A PARADIGM SHIFT

- The paradigm shift is required to avoid irreversible tipping points in global ecosystems and to ensure human wellbeing for future generations.
- We argue that sustainability transformation requires a foundational societal change. To do so, we need to investigate the conceptual foundations that define who we are, what we do, what we can work with and make sense of.
- We ground our theoretical framework on the philosophical stance of new materialism (chapter 2). We build our conceptual framework of sustainable wellbeing on the new materialist philosophy (chapter 3) and integrate it with the institutional framework of self-management and planning (chapter 4). In the end, we promote visual models and develop the idea of postgrowth doughnuts to be used as policy tools for sustainable wellbeing (chapter 5).

CHAPTER 2 - OUR PHILOSOPHY: NEW MATERIALISM AS A FRAMEWORK FOR SHIFTING PARADIGM

- We lay the philosophical ground of our framework through new materialism, which sets ecological concerns into the very core of its philosophy. It takes a novel, non-sociocentric perspective on questions of social change. In challenging deeply ingrained ontological beliefs about the world, new materialism also broadens our political imagination to include a variety of political possibilities that were previously derided as inconceivable.
- We argue that by ignoring the active and vibrant qualities of matter, we miss the opportunity to develop more respectful and ecologically sustainable relationships with the material world that we belong to.

CHAPTER 3 – OUR CONCEPTUAL FRAMEWORK: SUSTAINABLE WELLBEING WITHIN SUFFICIENCY SPACE

- We ground our conceptual framework in the new materialist philosophical argument on social change andF build it around key and actionable dimensions of human well-being in line with this philosophy. Our conceptual framework sheds light on need theories and points towards the importance of sufficiency.

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- We approach sustainable wellbeing from the perspective of three universal needs: health, relatedness, and autonomy. Together, they capture the notion of multidimensional wellbeing that combines both physical and psychological aspects of wellbeing. Need satisfaction is sustainable when it respects the limits of this 'sufficiency space'. Sufficiency can be understood as a just and sustainable space between necessity and overconsumption.

CHAPTER 4 – OUR INSTITUTIONAL FRAMEWORK: A CASE OF SELF-MANAGEMENT PLANNING

- We explore the institutional framework of self-management planning through the case of 1980s Slovenia. A transition to sustainable wellbeing requires planning and coordination. Historical examples of long-term planning and self-management offer lessons to learn from when theorising such paradigm shift.
- Our empirical analysis reveals the importance of harmonizing local needs between the more and less developed sub-units to avoid "environmental imperialism" in planning. Our findings are relevant for contemporary cases. In the European Union, planning is used in a way that preserves the status quo between "developed" and "developing" states without attempting to harmonize needs in terms of sufficiency, nor to entertain reducing the 'broad ecological costs' of its economy.

CHAPTER 5 – OUR POLICY TOOL: POSTGROWTH DOGHNUT AS A VISUAL MODEL FOR SUSTAINABLE WELLBEING

- Based on our philosophical, conceptual and institutional frameworks, we suggest postgrowth doughnuts as policy tools to aid transformation planning in current situation where ecological and social planning is required for throughput reduction and social provisioning for all. We recognize there are social limits and biophysical foundations, beside social floors and biophysical limits.

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1. Introduction: the need for a paradigm shift

This report presents the work done in the ToBe research project on the topic of transformation towards the economy for sustainable wellbeing. The purpose of the report is to provide a conceptual synthesis of sustainable wellbeing as a shared vision for a new sustainability paradigm, and a better understanding of linkages between social, ethical, political, economic and environmental/material impacts of drivers of transformations. By building on theoretical elaborations and desk studies of historical cases, the report discusses paradigm changes in our understandings of transformations and wellbeing. Both concepts are approached through the perspective of a relational ontological paradigm that challenges current socio- and human-centric conceptualizations. As paradigm shift requires changes in mindsets, we discuss how mindsets based on 'new materialism' relying on ontological relationality, interdependence, and entanglement of different systems should replace dominant mindsets. New vision of sustainable wellbeing resting on relational ontology seeks a balance in socially just need satisfaction within planetary boundaries.

The paradigm shift is required in a situation where humanity is stepping into a critical and unpredictable new phase of the climate crisis (Ripple et al. 2024), and six out of nine planetary boundaries have already been transgressed (Richardsson et al. 2023). The more planetary boundaries are overshot, the closer we get to the irreversible tipping points, such as drying rainforests, dying coral reefs and melting ice sheets (Gupta et al. 2024). Further reductions of emissions are thus necessary. A recent study by Slameršak et al. (2024) shows how low economic growth makes it more feasible to decrease global emissions in a way that is consistent with 1.5°C–2°C of warming. By contrast, pursuing higher growth rates seems to jeopardise the transition and it would rely more on unprecedented rates of energy-GDP decoupling.

There is thus a need to move beyond the current economic paradigm prioritizing growth, and consider alternatives like wellbeing economics, doughnut economy, and degrowth (see Laurent 2024). Together they point towards a postgrowth future. In this report, we use postgrowth[1] referring to a shift away from the growth-oriented paradigms of capitalism, which prioritize increasing GDP and consumption as the necessary instruments for need satisfaction. Postgrowth thinkers propose that societies should aim for well-being, sustainability, and social justice within ecological limits (e.g. Büchs & Koch 2017; Jackson 2021; Fioramonti et al. 2022). They point to analyses proving that in the rich countries (and for the rich in developing countries), energy consumption, material use, and other forms of "throughput" (i.e., the flow of resources and energy through economies) must be intentionally reduced to create a more sustainable and just society (e.g. Chancel 2022; Ripple et al. 2024). Postgrowth and degrowth studies also invite rethinking growth-driven economic structures and replacing them with systems that

[1] In line with terminology used in other work packages and ToBe's sister projects we see growth-critical paradigms collected under the umbrella of postgrowth (Angresius et al. 2023; Laurent 2024). We acknowledge that there are publications that see the relationship the other way round, with degrowth as the umbrella concept that includes postgrowth. As much of the strategy and advocacy for transformation research in the literature appears under the name of degrowth, it is cited as such in this report as well.

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encourage cooperation, universal well-being, and democratic participation, often through initiatives like local economies and new eco-social policies.

The scale of the change required by a genuine shift to sustainability could be compared to the emergence of an industrial society, of a sedentary and agricultural society, or a sudden disintegration of a complex imperial network of culture and material flows. It therefore entails restructuring of the economy, of the utilisation of an infrastructural stock, living ecosystems and of social practices. The transformation involves changes in the shared interpretative frameworks, normative horizons, and institutionalized mechanisms within the social structure. It occurs simultaneously at multiple levels: political, legal, social, cultural, metabolic, and, of course, ecological. At the most rudimentary level, we could say it requires a holistic *paradigm change* (from Greek *paradeigma*, meaning "pattern"), whereby established patterns of interpretation, value, and conduct are replaced with novel ones.

'Paradigm' is an easily abused term in contemporary parlance, but we can draw on it here with the same intention with which it was introduced to philosophy of science more than 50 years ago: as a well-known set of key regulative resources employed in governance of communities and their environment. Social structures, institutional arrangements, and material flows are all parts of our regulative resources in directing people's interactions with each other and non-human environment, but they also mesh with ideas, perspectives, and worldviews that communities hold. Together they make a paradigm, a policy paradigm in the narrower sense of policy studies (e.g. Hall, 1993).

Consequently, when in the remainder of the report we call for a paradigm shift, it is a shift in two major and interconnected senses. In one sense it is a paradigm shift in the ontological level and in our theories of social change: in our understandings of how change of structures and mindsets even comes about. Drawing on new materialist thinkers, we aim to replace anthropocentric and sociocentric understandings with a more relational ontology and understanding of change. In another sense, paradigm shift refers to changes in social structures. It is about institutional arrangements and cultural aspirations, a shift from vertical growth and throughput-oriented integration to a sufficiency and wellbeing-oriented coordination. Before focusing on choosing policies suitable for transformation, this report will outline their broader conceptual foundation: an understanding of human wellbeing suitable for a desired sustainability transformation.

The transformation we anticipate must change the fundamental attributes of the socio-ecological system. Research concerned with climate impacts and biodiversity loss, summarized for example in IPCC (Schipper et al. 2022) and IPBES reports (IPBES, 2019), envisages the desired transformation as changes in the socio-ecological system that strengthen the resilience of both ecosystems and society. It calls for resilience to physical impacts of ecological changes, but also resilience to unavoidable social consequences of those physical impacts. In interconnected socio-ecological systems, resilience cannot be achieved simply by doing more of the same more intensely, as "the same" is unprepared to deal with the new conditions on a global scale.

Rather, a mark of such resilience is the ability to transform into a society that maintains sustainability, progress, and emancipation, even when deviating from the stable Holocene conditions in which the globalized human societies and complex globally networked humanity evolved (Gupta et al. 2024). This

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adaptability is crucial for thriving in our evolving geophysical environment. Even though the demand to shift to a postgrowth paradigm seems novel, we can learn from historical situations in which societies have practiced and contested different visions of long-term planning in the context of limits to growth. For this reason, in this report we discuss the lessons learned from self-management and planning in 1980's Slovenia.

Paradigm change does not happen easily and there is notable resistance, but the change is quick once it sets off. Originally, paradigms were not intended to be structurally likened to gestalt images, but the simile has stuck so that the first thing most people think of when called to ponder paradigms today is "the duck-rabbit" image (Mlađenović, 2017). Once you see the duck in the image you can no longer see the rabbit, though you were initially convinced that it is the rabbit image. The change is sudden and complete. Seeing thigs differently may seem shocking at first, but once the duck starts to emerge the image, transformation is unstoppable however unlikely it seemed to begin with.

The paradigm shift that transformational mindset relies on sees a resilient but not rigid, ecologically fair and diverse, and proudly self-aware Europe in a diverse but aligned world. We propose to start making tentative conceptual connections between the essential ontological elements of that vision.

This report begins by discussing our philosophy: a new materialist political ontology and theory of social change. Next, we scrutinize a relational understanding of sustainable wellbeing based on needs-based approach and elaborate on the idea of sufficiency space. Following that, we explore the institutional framework by discussing the importance of long-term planning. In this chapter, we elaborate on lessons learned from a self-management of policymakers when facing limits to growth through an empirical case study on planning in1980s Slovenia. Lastly, we discuss the significance of policy tools and mental models for a new policy paradigm and introduce postgrowth doughnuts as inspirations for visualizing the change.

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2. Our philosophy: A New materialist political ontology and theory of social change

In what follows, we first discuss political ontologies to justify how shifting policy paradigms require revisiting foundational assumptions. After discussing the caveats of historical materialist ontology, we elaborate on a "new materialist" framework challenging those conventional paradigms that have traditionally shaped socio-political thought and action. We emphasize the need for a more holistic and ecologically attuned ontological imaginary which can be a fertile ground for a new approach to societal transformation.

2.1 What is political ontology?

Emerging from a period in the 1980s and 1990s when social theory and humanities were experiencing an "ontological turn" – which sought to overcome the then-ubiquitous fixation on epistemology and linguistic philosophy[1] – political ontology appeared as a branch of political theory. Political ontology's most notable chronicler, Stephen K. White, recounts the ontological turn as a consequence of the burgeoning realization in Euro-American political thought that we live in "late modern times." (2000, p. 4) By that he means a growing awareness of the conventional and contingent nature of our most elementary assumptions about the self and the world. After a period of consensus to "keep metaphysics out of politics,"[2] those assumptions were once again made explicit and became the subject of contestation and, in the context of politics, *politicization*.

Political ontology's twofold focus has been on the ontological assumptions underpinning different political arguments and theories, and on the political implications of different ontological positions. By "ontological assumptions," we mean metaphysical assumptions on the nature of being: what there is, how is it, and in what relation. Political ontology inquiries into these foundational assumptions rather than focusing only on the traditional questions of politics such as the just distribution of rights and resources, the legitimacy of coercive governmental institutions, and negotiating value pluralism in a political community. Political ontology covers issues such as sources of value on which a political theory or a tradition relies to generate normative statements, the larger background against which it positions

[1] The previous (epistemological and linguistic) emphasis on the *re-presentation* of the world – concerned with the methodology of securing knowledge and the centrality of language in any such endeavor – began taking a back-seat to the more foundational questions about the very *being* of entities ("subjects" and "objects" in this case) involved in such a picture of the world, and the nature of their relationality.

[2] For the most famous articulation of this view, see Johns *Rawls' Justice as Fairness: Political not Metaphysical* (1985). Although this view received its most famous articulation by liberals concerned with political co-existence in pluralist societies comprised of citizens with differing "comprehensive doctrines", there are many other notable varieties of "anti-" and "post-metaphysical" political thought found in analytic and structural Marxism, pragmatism, postmodernism, and legal positivism.

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itself, its conception of temporality and historicity, its image of the self and its human and nonhuman entanglements, its concept of agency and causality, and its existential relationship to finitude and natality.

Take, for example, the liberal-communitarian debate about their rival conceptions of the political subject. Beginning in the early 1980s, communitarian political theorists developed comprehensive critiques of John Rawls' image of the subject as a detached, decontextualized, and autonomous decision-making self, spotlighting it as the problematic foundation of contemporary liberal political theory. To recall, Rawls' influential *A Theory of Justice* (1971) proposes a thought experiment in which principles of justice are chosen by rational individuals – behind the "veil of ignorance" – deprived of all knowledge of their personal characteristics and social context, thus ensuring impartiality and fairness. But, as communitarian critics such as Michael Sandel (1982) persuasively argued, there simply is no such self: each subject is constitutively embedded in its community and cultural milieu, which shape their values, desires, and choices. Our moral and ethical obligations, Sandel contended, arise specifically out of those communal ties and are not primarily matters of voluntary agreements – as neo-Kantian social contract theory would have us believe. A richer and more realistic political theory, communitarians argued, would therefore recognize and incorporate a significantly more social and communal conception of the self.

Or take, for another example, Val Plumwood's *Feminism and the Mastery of Nature* (1993). In a pioneering work of eco-feminism, Plumwood argued that the majority of Western philosophy is pervaded by dualistic thinking, which creates ontological divisions and hierarchies that privilege certain entities (humans; particularly male, Western ones) over others (women, non-Western people, and non-human nature). Such a dualistic ontological imaginary, she shows, is not just an inconsequential philosophical whim of bearded elder Westerners throughout centuries, but carries tremendously harmful political implications, as it serves to ground the logic of domination that has for centuries legitimized the subjugation and exploitation of women, non-Western peoples, and non-human nature. Plumwood delves into the historical development of ontological dualisms such as mind vs. body, man vs. woman, and human vs. nature to show how intimately linked they were with the broader political context of colonization, environmental exploitation, and patriarchy. She proposes an alternative ontology grounded in the eco-feminist values of interdependence between human and nonhuman nature, respect for nonhuman agency, and the rejection of hierarchical binary-thinking.

The formula of political ontologists is thus as follows: make explicit and problematize the tacit ontological commitments of a given political theory and inquire into the political implications of their ostensibly apolitical ontological views. While ontological views do not downright *determine* a set of political positions, as Stephen K. White (2000, 162) explains, they do "engender certain dispositions toward ethical-political life that alter the affective and cognitive direction one takes into specific issues." We might describe them as elementary frames or "grids of intelligibility" within which more specific conceptualizations – such as those pertaining to notions of freedom, justice, equality, distribution,

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conflict, legitimacy, etc. – are made and contested.[1] Importantly, White argues, ontological views are not solely (and perhaps not even primarily) cognitive in their constitution and effects, but also 'aesthetic-affective'. In other words, they are not just representational – simply disclosing the world in a certain way – but they also engender and cultivate a certain attitude and sensibility toward that world. The transition between ontological imaginaries can hence be described as a sort of "conversion." In other words, to inhabit a different ontology does not just mean to view the world differently, but also to live in it differently[2].

This is where the potency of political ontology for thinking about and enabling social change lies. It (1) provides resources for expanding our political *imagination*, (2) enables richer modes of political *persuasion*, and (3) is arguably a more meaningful platform for political *mobilization*. First, by problematizing various fundamental and yet taken-for-granted assumptions about the world, political ontology opens up our political imagination to a range of possibilities that could previously not even be considered.[3] Second, by aiming at the "aesthetic-affective" register, political ontology enables modes of persuasion that are not limited to logical exposition, nor even to the written or spoken word.[4] Third, by operating at the level of our most elementary metaphysical beliefs, political ontology serves as a much deeper fountain of motivation for political mobilization and social engagement. It is important to add that political ontology need not claim to have access to ultimate, foundational truths about the nature of reality which are unchanging and serve as incontestable grounds for ethical and political life. It may both insist on the presence of metaphysical assumptions in political theorizing – urging engagement with them – *and* at the same time maintain that those metaphysical assumptions are always speculative, provisional, and contingent. In other words, assumptions are both *essential* and incorrigibly *contestable* (as will be discussed in the context of human needs in chapter 3).

[1] We borrow the term "grids of intelligibility" from M. Foucault (2003). One should not forget our inexorable tendency to hold, at the same time, conspicuously clashing views, including ontological ones. One should therefore not assume too neat and internally coherent of an ontological imaginary.

[2] From non-western perspective, Arturo Escobar (2018) reinforces this idea by proposing in 'Designs for the Pluriverse' that inhabiting a pluriverse means not only imagining multiple forms of life, but also building multiple worlds based on ecological justice and relationality.

[3] See, for example, Asenbaum, H., Machin, A., Gagnon, JP. *et al.* symposium "The Nonhuman Condition: Radical Democracy Through New Materialist Lenses." *Contemporary Political Theory* 22, 584–615 (2023).

[4] See, for more, see "Of Microperception and Micropolitics: An interview with Brian Massumi." (2009)

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2.2 Historical materialist ontology

Much like Marxism out of which it sprung, "historical materialism" has been the subject of copious scholarly studies and interpretations.[1] We can summarize some of its central features. Firstly, historical materialism views history as primarily driven by changes in the means of production and social relations arising from economic structures. Secondly, it describes the forces of production (technology, labor, resources) as developing over time in a way that conflicts with existing relations of production (social classes, property relations, etc.). Finally, it identifies social classes – in capitalism, the owners (capitalists) of and the workers (proletariat) of the means of production – as the antagonistic agents of said conflicts. It easily relates with the materialism of the state-crisis schools outlined above, and their inherent sociocentrism and linear determinism.

While different schools of thought on historical materialism vary in emphasis and additional theoretical elaboration, there are four underlying ontological views that are helpful to highlight for our purposes.

(1) Historical materialism is self-avowedly anthropocentric and rests on a firm distinction between the nonhuman and human domains, which is itself predicated on human exceptionalism. It focuses on human animals and their collectives as primary entities among all others, usually in relation to their supposedly unique capacity for agentive action, out of which arises both their distinctive impact on the world, and their normative importance.

(2) Historical materialism tends to conceive of the nonhuman world as a set of passive "objects" and a pool of resources to be transformed and dominated by human "subjects" and their labor. Its lauded goal of human emancipation is built on a modernist notion of human mastery over nonhuman nature.

(3) Historical materialism provides a somewhat deterministic view of historical developments, whereby the economic "base" is what conditions – to a large degree – "superstructural" elements of politics, religion, law, and culture. In other words, agency, creativity, and intentionality of individual actors are deflated in favor of "structural" economic factors and collective agency of social classes. These collectives are, of course, explicitly limited to humans.

(4) Finally, historical materialism often includes a rather linear conception of temporality, grounded in modernist notions of progress and growth, and driven by technological advancements and

[1] It is difficult to even enumerate all the different schools of thought that have offered a distinct interpretation of this concept. From analytical Marxism, structural Marxism, cultural Marxism, and critical theory to world-systems theory, feminist Marxism, post-structural Marxism, and value-form Marxism. For a brief selection of key studies, see: G.A. Cohen's *Karl Marx's Theory of History: A Defense* (1978), Perry Anderson's *In the Tracks of Historical Materialism* (1983), Ellen Meiksins Wood's *The Origin of Capitalism: A Longer View* (2002), and David Harvey's *A Companion to Marx's Capital* (2010).

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the resolution of class conflicts leading to an eventual communist society. Although it calls for the fruits of growth to be democratically distributed, economic growth and development of productive forces are similarly valorized.

Granted, there are schools of thought within Marxism with attenuated versions of the most problematic aspects enumerated above. For instance, ecological Marxists like John Bellamy Foster (2000) would surely object to the first two points, political Marxists like Ellen Meiksins Wood (2002) to the third, and critical theorists like Theodor W. Adorno and Max Horkheimer ([1944] 2002) to the last. Notwithstanding these stimulating newer iterations of historical materialism, its prevailing reading – the one that has had by far the biggest impact on both the broader world and scholarship – evinces a markedly modernist ontological imaginary, with its centering of distinctly human essence, mastery over nonhuman nature, and triumphalist images of human progress and growth.

Even those readings of historical materialism that understand themselves as fully embracing ecological concerns – such as Kohei Saito's *Marx in the Anthropocene: Towards the Idea of Degrowth Communism* (2023) – uphold certain ontological views that hamper conceptual strengths and political success of ecological political movements. Namely, Saito's reading of Marx doubles down on a dualist ontology predicated on an indispensable rift between the social (human domain) and the natural (nonhuman domain) (2023, p. 3). Drawing on the Hungarian Marxist György Lukács, Saito describes society as "arising" from nature, but then becoming "qualitatively different" from it due to distinctly human social relations "mediated by human language, social labor, and other activities." (91) Saito underlines "the unique character of human labor compared with other animals" (20). His account of capitalism's "unique" mode of "organizing human metabolism with their environment" explicitly rests on a human exceptionalist ontology of "purely social qualities." (2023: 91) Furthermore, Saito reaffirms the importance of focusing on "the uniquely human agency" and criticizes attempts, such as that of Bruno Latour, to move away from such an anthropocentric conception of action (2023, p. 125). In describing human collectives and their behavior, Saito's book abounds with the varieties of the adjective "unique".

For readers of Marx, these views are unsurprising, as Marx himself frequently distinguishes humans ("man") as fundamentally different from the rest of nature. For instance, in *The German Ideology*, Marx describes human animals as having unique social relations that allow them to produce and reproduce their material conditions (1978, p. 150). Moreover, in *Capital Vol I,* Marx underlines the "exclusively human characteristic" of conscious and purposive labor, through which they shape their environment in an intentional and planned fashion rather than through mere instinct. In recounting the uniqueness of the "specifically human labor process," Marx points to the "use and construction of instruments of labor," appealing to Benjamin Franklin's definition of "man" as "a tool-making animal." (1990, p. 286) Historical materialism thus reiterates a whole host of problematic ontological dichotomies – nature/society, passive/active, body/mind, irrational/rational, instinctive/conscious, animal/human – which both (a) perpetuate dated binary oppositions, and (b) present them as hierarchically arranged so that the first pair is always subordinated to, and perceived as lesser than, the second.

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Many varieties of eco-Marxist interpretation of historical materialism, Saito's included, foreground the theme of "metabolic rift". While the term itself was coined and popularized by contemporary scholars – namely John Bellamy Foster's *Marx's Ecology: Materialism and Nature* (2000) – it traces back to Marx's writings on the disruption in the "metabolic" relationship between society and nature, in particular on how the capitalist mode of production wrought havoc on natural processes in agriculture and nutrient cycles. For example, in chapter 15 of *Capital, Vol. I* ("Machinery and Large-Scale Industry"), Marx discusses the capital-led separation of town and country and the resulting environmental degradation, particularly the exhaustion of soil fertility. Capitalist production, Marx writes, "disturbs the metabolic interaction between man and the earth." (1990, p. 637) Similarly, in chapter 47 of *Capital, Vol III* ("The Genesis of Capitalist Ground-Rent"), Marx describes how capitalist approach to agriculture "produces conditions that provoke an irreparable rift in the interdependent process of social metabolism, a metabolism prescribed by the natural laws of life itself." (1991, p. 949) Eco-Marxists such as Foster and Saito build on Marx's work by arguing that the issue of metabolic rift does not just pertain to agriculture, but to the capitalist mode of production as a whole. The metabolic rift, for them, represents a broader ecological crisis instigated by capitalism.

Let us take some critical distance from the concept of metabolic rift and examine its assumptions. Metabolic rift theory not only presupposes a firmly dualist ontology of "nature vs. culture" and human exceptionalism, but also projects a mythical balance into the antediluvian past (pre-capitalism), which it seeks to recover. Eco-Marxists in this way problematically reiterate the Biblical "Fall of Man" narrative, whereby the "Capitalocene" (Moore 2017) serves the function of the "original sin", banishing us from the unsullied harmony of the "Garden of Eden", which we are called on to retrieve. This narrative rests on a simplistic dichotomy between a pure past (of metabolic equilibrium) and a fallen present (of metabolic rift). It thus projects into the past a historically inaccurate image of a pristine balance, ignoring both (a) the historical evidence of the ecological and climate turbulence that has been the norm, rather than an aberration, throughout history, and (b) the ecological impacts (deforestation, soil erosion, overhunting, etc.) of pre-capitalist human societies.[1]

Furthermore, with Capitalocene playing the role of the original sin, metabolic rift[2] theory couches its critique in a deeply moral logic of an innocent past and a corrupt present, which demands atonement

[1] For more on (a), see: P. Brannen's (2017) *The Ends of the World: Volcanic Apocalypses, Lethal Oceans, and Our Quest to Understand Earth's Past Mass Extinctions* and B. Fagan's (2004) *The Long Summer: How Climate Changed Civilization*. For more on (b), see: S. Krech III's (1999) *The Ecological Indian: Myth and History* and J. Perlin's (1989) *A Forest Journey: The Role of Wood in the Development of Civilization*. Needless to say, attesting to nature's volatile history and the complex role that human societies have played in it even before "Capitalocene" does not mean to dispute the conclusively anthropogenic nature of contemporary climate change.

[2] Capitalocene presentation wants to negate anthropocentric explanations upon which humans on the whole initiated and shaped the material shift resulting in present day unsustainabilty. Philosophically, this perspective

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and an expiation of sin. Such a narrative lends itself all too easily to moralizing critiques whose persuasion power and political effectiveness quickly run their course.[1] Lastly, by crudely tracing all "evils" to a single "Pandora's box," metabolic rift theory risks providing simplistic solutions that are bound to prove inadequate and disappointing. Like other reductivist political theories, eco-Marxists are limited in their political imagination, rhetorical persuasion, and power of mobilization.

To conclude, even the self-avowedly non-Promethean versions of historical materialism, such as Saito's eco-Marxism, rest on an ontology inadequate for a conceptually robust and politically successful ecological political platform. It is therefore perhaps a time for ecological political theorists to leave this "old" (historical) materialism behind and turn to another materialist ontology, with considerably more affinity with their own worldview: namely, new materialism.

2.3 New materialist ontology

New materialism situates ecological concerns into the very core of its philosophy. Its ontology (as theory of being, even better described as a theory of becoming[2]) inspires different modes of both knowing (epistemology) and acting (ethics). New materialist thinkers have thus called this novel framework an "ethico-onto-epistem-ology," as it highlights the constitutive inseparability of these three fields of philosophy that have traditionally been seen as distinct: ethics, ontology and epistemology (Barad, 2007, p. 90). The concept underlines the ways in which being, knowing, and acting are entangled, whereby the material and the discursive co-constitute each other in a dynamic interplay. Our ethical responsibilities emerge from our entanglements with the world: our theory of being and modes of knowing are intrinsically linked to how we are inclined to act. New materialism challenges deeply ingrained ontological beliefs about the world such as human exceptionalism, passivity of nonhuman nature, linearity of causality, and the triumphalist views of human progress. In this way it also broadens our political imagination to include a variety of political possibilities (such as post-growth, sustainable communities) that were previously derided as inconceivable. The entrenched vision of a 'good life' as one of endless growth loses its aura of incontestability within a thoroughly different image of the world.

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wants to apply a holistic view upon which 'metabolic rift' is meaningless because there is no clear Cartesian distinction between Society and Nature. What is crucial for us here is that there is a suggestion, both in metabolic rift and Capitalocene's ascendance perspectives, that there was a better time, better situation, a state of balance which had suddenly become corrupted, but which could return again. We do not wish to advocate for transformation as some sort of restoration.

[1] For more on this, see J. Bennett and M. J. Shapiro's (eds., 2002) *The Politics of Moralizing*.

[2] New materialism is a process philosophy, and so its ontology is better described as a theory of *becoming* than a theory of *being*. It understands reality as composed of interrelated processes and events, rather than discrete, unchanging substances and "things." Ever since Heraclitus, process philosophers have highlighted the interconnectedness and continual becoming of all things, arguing that the world is fundamentally characterized by relationality and change, rather than separateness and permanence.

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Over the past few decades, new materialism has emerged as a philosophical movement that seeks to theorize the active and agentic nature of matter.[1] New materialists have sought to challenge dominant metaphysical traditions – including mechanistic materialism and transcendental idealism – and the entailing dualisms such as subject/object, mind/matter, human/nonhuman, and culture/nature. New materialist arguments revolve around the view that the material world – including, but not limited to, human animals – is not an inert and passive collection of objects, but an assemblage of dynamic processes, influencing and being influenced in complex ways. In rejecting human exceptionalism, new materialists emphasize the creative and dynamic role of nonhuman and more-than-human forces in shaping the world. They draw on non-deterministic natural sciences – such as systems biology, quantum physics, complexity theory, neuroscience, and planetary sciences – to illustrate how matter is inherently active and capable of self-organization, independent of human intervention. By focusing on ontological relationality, interdependence, and entanglement, new materialists try to foster a more ethical and ecologically sensitive understanding of, and approach to, the world.

Since we have taken political imagination, persuasion, and mobilization as the categories in which political ontology offers advantages over other modes of political theory, and have found historical materialism lacking in these regards, let us see what new materialism offers in these respects. Jane Bennett (2010, 111), a foremost new materialist thinker and a political theorist, enumerates three advantages of building an ecological political ontology on the narrative of "encountering a vital materiality" over more traditional green alternatives founded on "caring for an environment". First, Bennett argues, while the concept of 'environment' is defined in contrast to the concept of human culture, with the former serving as the habitat or surrounding of the latter, the notion of 'materiality' applies more evenly to nature as a whole, human and nonhuman alike. She writes, "I am a material configuration, the pigeons in the park are material compositions, the viruses, parasites, and heavy metals in my flesh and in pigeon flesh are materialities, as are neurochemicals, hurricane winds, E. coli, and the dust on the floor" (Bennet 2010, 112). The rubric of materiality helps "horizontalize the relations between human, biota, and abiota," resisting ecologically toxic notions of "the Great Chain of Being" – ubiquitous in one form or another in Western philosophy[2] – and bringing us closer towards a "greater

[1] For an overview, see Coole and Frost's (eds.) *New Materialisms: Ontology, Agency, and Politics* (2010) and Dolphijn and Van der Tuin's (eds.) *New Materialism: Interviews & Cartographies. London* (2012).

[2] The concept of the "Great Chain of Being" (from Latin *scala naturae*, or "ladder of being") refers to the ontological hierarchy of entities, proposed in ancient Greek philosophy and further developed during the Middle Ages and the Renaissance, but whose heritage lives on in many contemporary philosophies. It envisions a strict hierarchical structure with the most perfect and divine entities at the top and descending through various levels of lesser beings: with God at the top, followed by angels, humans, animals, plants, and finally inanimate matter. This hierarchical ordering reflects the belief in a universe arranged in a divinely ordained sequence where each entity has its specific place and purpose. The concept has had an immense influence in the Western thought by reinforcing notions of order and hierarchy in the natural world and human society, justifying social and political structures on the basis of this natural order.

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appreciation of the complex entanglements of humans and nonhumans" (ibid). New materialists like Bennett do not simply theorize matter as an abstract category in a philosophical system, but always study its diverse empirical forms, comprising our very bodies and the world we inhabit. On the other hand, Bennett (2010, 129) incisively notes, for all its proclaimed materialism, historical materialism is curiously disinterested in *matter* itself and is instead preoccupied with "human power-laden socioeconomic structures".

Second, Bennett (2010) notes, in a world of dynamic matter we see that various systems – such as ocean currents, ecosystems, political and social systems, weather systems, quantum systems, epidemics etc. – periodically diverge off the predicated trajectory. They follow unpredictable developmental paths, as they are driven by emergent rather than linear or deterministic causality. For new materialists, nature is neither purposive nor blindly mechanistic. Their ontology resists *both* the teleological organicism *and* the machine image of nature – variations of which are found in other ecological movements and in those of their opponents – thereby avoiding some of the pitfalls associated with historical materialism.

New materialism's concept of agency, as well as its criteria for who or what qualifies as an 'agent', differs significantly from traditional views of agency as a linearly traceable capacity of conscious and that kind of intentional action that is assumed to be uniquely attributable to human animals. Bennett (2010, viii) substitutes the language of "agents" with Bruno Latour's notion of "actants", which she defines as "sources of action that can be either human or nonhuman… that which has efficacy, can do things, has sufficient coherence to make a difference, produce effects, alter the course of events". (

Finally, the third advantage of a new materialist ethico-onto-epistem-ology compared to an "environmental" one, Bennett contends, is that the former does a much better job at capturing the "alien quality of our own flesh," reminding us of the "very radical character of the (fractious) kinship" between the human and the nonhuman. As an example, Bennett takes the crook of one's elbow.

The crook of your elbow is not just a plain patch of skin. It is a piece of highly coveted real estate, a special ecosystem, a bountiful home to no fewer than six tribes of bacteria. Even after you have washed the skin clean, there are still one million bacteria in every square centimeter. […] They are helping to moisturize the skin by processing the raw fats it produces. […] The bacteria in the human microbiome collectively possess at least 100 times as many genes as the mere 20,000 or so in the human genome. (Wade, 2008, in Bennett, 2010, p. 112)

Reflecting on the incredible amount of bacteria comprising our body, Bennett (2010, 112) concludes, "the *its* outnumber the *mes*". The language of human "embodiment", she argues, is thereby insufficient; for there is no "soul" or "mind" that is somehow "encased" in a body. For Bennett (2010, 112-3), "we are, rather, *an array of bodies*, many different kinds of them in a nested set of microbiomes". She calls for a cultivated attentiveness to the "indispensable foreignness that we are," in order to reorient ourselves to the world and stop "producing and consuming in the same violently reckless way" (ibid,113).

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Calling for a flatter ontology – which resists narratives of human exceptionalism and ladders of being – than the dominant Western traditions of philosophy allow for, Bennett 2010, ix-x) acknowledges that her eco-philosophy is "motivated by a self-interested… concern for human survival and happiness". New materialism, she explains, does not have to outright reject *self-interest* as a motivating source for ethical conduct, because it cultivates a much broader definition of both "self" and "interest" (ibid). Bennett (2010, 13) calls for "greener forms of human culture and more attentive encounters between people-materialities and thing-materialities" and seeks to inspire a more inclusive notion of selfhood that takes into account the intricate webs of material relations that comprise and sustain us.

New materialism challenges anthropocentric assumptions and human hubris. Bennett (2010, ix) explains why ecological sensitivity is an integral part of its ethico-onto-epistem-ology:

The image of dead or thoroughly instrumentalized matter feeds human hubris and our earth-destroying fantasies of conquest and consumption. It does so by preventing us from detecting (seeing, hearing, smelling, tasting, feeling) a fuller range of the nonhuman powers circulating around and within human bodies. These material powers, which can aid or destroy, enrich or disable, ennoble or degrade us, in any case call for our attentiveness, or even "respect" -- . The figure of an intrinsically inanimate matter may be one of the impediments to the emergence of more ecological and more materially sustainable modes of production and consumption."[1]

Viewing matter as passive and purely utilitarian collection of objects fosters a destructive human attitude toward the nonhuman world, encouraging exploitation and consumption without regard for the nonhuman forces that influence and sustain life. By ignoring the active, vibrant qualities of matter, we miss the opportunity to develop more respectful and ecologically sustainable relationships with the material world that we belong to.

An additional advantage of a new materialist ontology is its theory of agency and political mobilization. New materialists proliferate agency across the human and nonhuman materiality rather than deflating agency in favor of determining powers of economic structures or restricting agency to socio-economic collectives of human animals. In a world of emergent causality, with unpredictable developmental paths and trajectories, where everything can make a difference, political mobilization is both *easier* and *more consequential*. Relevant here is the concept of 'micropolitics': subtle, quotidian forms of power relations and influence that operate at small scales. They are in contrast to the more discernable, large-scale structures of power that are the subject of 'macropolitics'. Interactions at a micro-level, oftentimes

[1] Bennett (2010, pp. ix-x) notes that her argument is "motivated by a self-interested or conative concern for human survival and happiness" and that she wants to "promote greener forms of human culture and more attentive encounters between people-materialities and thing-materialities."

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small and seemingly insignificant affective shifts, may quickly scale-up to influence broader political dynamics.[1]

Rather than expecting the Revolution as the ultimate rupture both new materialism and ecological movements encourage continuous, daily micropolitical action and organizing for enhancing societal transformations. Living examples of this organizing in the post-growth context include community gardens and urban farming, skill-sharing workshops, time-banks and alternative local economies, bike-sharing, zero-waste and slow-food organizing. A shrewd ecological macropolitical strategy thus relies on a robust micropolitical one.

Closely related to this is a new materialist theory of political persuasion. New materialist ontology understands itself not only as a view of the world, but an aesthetic-affective mode of inhabiting such a world. It thus reveals modes of persuasion that go beyond theoretical exposition, and even language itself. For instance, William E. Connolly (2017) writes about the 'visceral register of cultural life', referring to the somatic, pre-cognitive levels of affective experience and how they influence political thought and behavior. Connolly views the visceral register as an essential component of political life, arguing that political engagement and persuasion are deeply entangled with these pre-conscious, affective bodily responses.

Without attending to the "subliminal, affective modes of cultural communication that stretch below the linguistic register," Connolly (2017, 5) contends, political theorists remain blind to the complexities of affect-imbued perception, identity- and judgement-formation, constituency proclivities dynamics, and how these help generate new political movements, for better or worse. In his 2017 work *Aspirational Fascism*, Connolly applies a new materialist theory of political persuasion to study similar modes of affective communication – both rhetorical[2] and bodily practices[3] – between the early stages of the Nazi

[1] For more on this, see Connolly's (2002) *Neuropolitics: Thinking, Culture, Speed* and the aforementioned Massumi (2009).

[2] Describing Trump's unorthodox speaking style, which was initially ridiculed by the pundits, Connolly writes: "His style is not designed first and foremost to articulate a policy agenda. It draws energy from the anger of its audience as it channels it. It draws into ta collage dispersed anxieties and resentments… The speech montages then transfigure these anxieties into anger as they identify convenient targets of outlet for that anger. Trump's animated gestures, facial expressions, finger pointing, strutting, signature phrase clusters, and recurrent twirls around the stage to call out the roaring acclaim of the audience amplify the words he recites. They incite and direct anxiety into anger as they recall a time in America in which white triumphalism felt secure." (2017, pp. 12-13)

[3] Connolly shows how aspirational fascist movements promote a bodily demeanour of toughness and ruthlessness, including an adoption of a stern, rigid posture, and a bellicose attitude that signifies strength and determination. This hypermasculine comportment is combined with military-style uniforms, carrying of weapons, marching in formation to a particularly evocative style of music, and an elaborate ritualism and symbolism. (2017, pp. 31-72)

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movement led by Adolf Hitler and contemporary MAGA movement led by Donald Trump. Because "there is never a vacuum on the visceral register of cultural life," Connolly (2017, 17) warns political theorists of ignoring affective contagion in cultural life. A new materialist theory of political persuasion does not shy away from affective communication but affirms it and employs it for purposes of socially just and ecologically sustainable political goals. It therefore provides a much richer source of tactics for ecological movements to employ for persuading and mobilizing new constituencies. It also points to the importance of visual models in shifting the paradigm (see chapter 5). Next, we discuss how the focus on more-than-human agency in the new materialism opens new perspectives for social change.

2.4 Towards a new materialist theory of social change

Instances of social change are ubiquitous; some might even argue that "social stability" is a much harder phenomenon to identify. But what moves human societies to change course? The questions of how to account for social change has been at the core of social and political theory since its inception. Drawing on the more-than-human turn in social sciences and humanities, this report joins in that debate by proposing a new materialist approach to the study of social change. We contest nature-culture bifurcations and human exceptionalism afflicting modern social inquiry. It is novel because it resists deterministic assumptions stuck in obsolete images of mechanistic nature.

In thinking about social change, the primary theoretical aim of new materialism is overcoming of sociocentrism – namely, of accounting for human social processes and dynamics only by way of other human social process and dynamics, resting on a tacit notion that agentive capacity is limited to a special subgroup of bipedal primates that have self-congratulatorily named themselves "wise" (i.e., *Homo sapiens*). But what do we talk about when we talk about social change?

While there are plentiful ways to approach theorizing "social change," it might be helpful to begin with the three key historiographic questions: What?, Why? and How? (Stanford, 1998, 128-129; Stone,1979, 5) The "What?" questions are concerned with (a) defining the concept in question, namely "social change," and (b) inquiring into its applicability for describing various historical phenomena. The "Why?" questions are concerned with defining the cause(s) of a particular social change. Finally, the "How?" questions are concerned with the mechanism(s) of the said causation, that is, of a social change under examination. Each of these lines of inquiry is plagued by a certain set of philosophical problems, which are further thematized by theorists of social change.

To begin, the "What?" questions quickly run into definitional problems, particularly in fields that are self-avowedly interpretative, such as social sciences and economics. Depending on the school of thought one comes from, their understanding of social change will be different, sometimes incongruously so (Connolly, 1974; Gallie, 1956; MacIntyre, 1973) As Alasdair MacIntyre (1973) explains, the key paradigmatic instances of phenomena to which concepts in social inquiry refer to are endlessly contested. This is not because of the lack of empirical evidence to settle those debates, but because of

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the incongruity of conceptual apparatuses and grids of intelligibility with which social thinkers approach these concepts and identify their empirical instantiations.

The Cambridge Dictionary defines "social," in the adjective form most-pertinent to our present study, as "relating to [human] society and living together in an organized way." It defines "change," in the noun-form, as "the act of becoming different, or the result of something becoming different." It then bears asking whether the syntagm "social change," as opposed to the simple amalgamation of the two separate concepts that constitute it, engenders a different meaning reflecting its nature as an endlessly contested concept. Indeed, Britannica defines "social change" through (particular) sociological lenses: "the alteration of mechanisms within the social structure, characterized by changes in cultural symbols, rules of behaviour, social organizations, or value systems." Finally, one ought to scrutinize the tacit metaphysical assumptions implied by the concept, as they understand it. For example, does the adjective "social" assume a qualitative difference from the change that is qualified with the adjective "natural," and if so, in what way? Furthermore, does the noun "change" imply a certain default ontological stability as the metaphysical norm against which we identify change as an aberration? Would a more process-oriented metaphysic admit of such a framing and, if not, what would "change" mean within its conceptual apparatus? Finally, if we do accept the dictionary definition of "change," what is the spatio-temporal scale at which we measure it, and why do we choose that one as a standard over others? After all, there are few debates as dominant in a field as those of "continuity vs. change" in historiography.

The "Why?" questions wrestle with an equally difficult set of problems, since they tackle the famously perplexing issue of causality in social sciences.[1] Going back to the 18th-century Scottish philosopher David Hume, the father of modern philosophy of science, causality has most often been defined in two ways: as (1) constant conjunction and/or as (2) counterfactual dependence (Froeyman, 2009, 119-120).[2] Whereas in the "constant conjunction" definition, A is the cause of B, if every A is followed by a B; in the "counterfactual dependence" definition, A is the cause of B, if B would not have occurred were there not an A before it. The issue with the "constant conjunction" definition is that it is clearly too demanding. For example, just because a pedestrian was hit by a car on a crosswalk during a red light, it does not follow that every time there is a red-light on a crosswalk a pedestrian will be hit by a car. Approaches to causality in this vein have hence moved towards a probability-raising nature of A in causing B, rather than A necessitating B. The issue with the "counterfactual dependence" definition is identifying

[1] The role of "causal" accounts has been a controversial topic in the philosophy of social sciences. The most popular alternative, particularly relevant between 1950s and 1970s, was the "covering law" (also called "deductive-nomological") approach, developed by the German-American logical-empiricist Carl Hempel. See Kincaid (2012) and Uebel (2017).

[2] It is important to add that both definitions come out of a broader empiricist tradition, which has been dominant in the philosophy of science, but is much different than, say, Aristotelian approaches to causality.

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sufficiently comparable cases to test the counterfactual, in particular when it comes to larger and more complex phenomena such as social change.

The primary limiting factor in both cases seems to be the problem of manifold causes, most famously posed by the 19th-century English philosopher John Stuart Mill (1843, 292).

It is seldom, if ever, between a consequent and a single antecedent, that this invariable sequence subsists. It is usually between a consequent and the sum of several antecedents; the occurrence of all of them being requisite to produce, that is, to be certain of being followed by the consequent. In such cases it is very common to single out one only of the antecedents under the denomination of Cause, calling the others merely Conditions. […] The real Cause is the whole of these antecedents; and we have, philosophically speaking, no right to give the name of cause to one of them, exclusively of the others.

In short, although in both ordinary language and in sciences we often identify one or several causes to a given event, there is arguably no limit to the number of causes that have led to it. The common way scientists have gone about this problem has been to isolate one or several causes as most consequential, while relegating others to the status of mere "conditions." For example, it makes little sense to include the Big Bang event 13.8 billion years ago, or the chemical reactions that led to carbon-based molecules 4.4 billion years ago, in the comprehensive set of causes that led to every single social change that has since occurred. Although such an inclusive approach to causality is philosophically defensible, a need for some type of selection based on relevance to a given context in which the phenomenon in question occurs is obviously needed.

Among the first to articulate a standard for precisely this type of selection were H.L.A. Hart and Tony Honoré (1985, p. 33). They argued, in short, that we select for relevant causes by identifying them as "abnormalities" against "things going on as usual," meaning that we screen for factors that "make a difference," and, in so doing, cause deviation from the usual course of events. Importantly, Hart and Honoré recognize the relative nature of said selection, as it is based on the viewpoint of an agent doing the selecting. It is thus possible, and indeed common, that partitioning of causes vs. conditions is done differently by different interpreters, even of ostensibly same events. For instance, Hart and Honoré (1985, 35) write:

The cause of a great famine in India may be identified by the Indian peasant as the drought, but the World Food Authority may identify the Indian government's failure to build up reserves as the cause and the drought as a mere condition.

Given this viewpoint of contingent nature of selecting for causes, some philosophers of science hold causation to be a 'perspectivalist' concept (Menzies, 2007; Price, 2007). Some others, such as causal pluralists, go yet further and contend that "the apparently simple and univocal term 'cause' is… masking an underlying diversity" of relationships that are all grouped under the same concept (Godfrey-Smith, 2009, 326). Peter Godfrey-Smith thus argues the concept of causation itself ought to be seen as an "essentially contested concept." (2009, 327)

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While Hart and Honoré's method of selection for causes is in a sense "negative," meaning that we screen for "abnormal" conditions against the standard of "normal" conditions, some philosophers of science have since formulated a "positive" approach (Woodward, 2005). On this view, sometimes called "manipulationism," A is the cause of B, if a hypothetical intervention into or manipulation of A would have entailed a concomitant change in B. For instance, while storms (A) cause a sudden fall in atmospheric pressure, as evident in the falling values on barometer (B), changing the level of mercury in the barometer to induce a contrived fall in its values will not cause a storm.

Although heuristically helpful, both "positive" and "negative" approaches to selecting for causes – among the totality of antecedent events that could be said to have causally participated in any subsequent event – end up having to rely on an inductive method when operationalized in sciences. Since the very notion of "selecting for causes" emerged in response to the problem of manifold causes, first articulated by John Stuart Mill, it is unsurprising that he also endowed the modern philosophy of science with the "five methods of induction," as an epistemological counterpart to his ontology of causation. In the case of social sciences that concern us here, Mill's "method of difference" has had a particularly important influence (Froeyman, 2009, 118). In short, the method of difference suggests one identifies factors that are present in an occasion when the phenomenon in question (social change) occurs and is absent on an otherwise similar occasion when it (social change) does not occur. In the scientific idiom, we could say that the independent variable (the cause) is identified as that which is different between comparable cases, and which thereby explains the difference in the values of the dependent variable (the outcome) in said cases. Nonetheless, the notion of "comparable cases" itself raises enormous difficulties. The "problem of induction" remains arguably the most difficult, and certainly the most famous, problem in all of philosophy of science (Henderson, 2022).

Finally, the "How?" questions are aimed at describing the process of causation itself, often described as the "mechanism" of a particular causation (Machamer et al., 2000). Anton Froeyman (2009, 119) describes mechanisms in philosophy of science as coming in two varieties: "complex-system mechanisms" and "mediating mechanisms". In the complex-system mechanisms, cause and effect are either placed at different levels (e.g., at the population level vs. at the individual level) or, if they are at the same level, the mechanism which links them is at a different level. For instance, the behaviour of an organism is accounted for by focusing on the parts that comprise it. In contrast, in the mediating mechanism, the causal process is sought on the same level. For example, behaviour of one organism is traced to the causal process describing the behaviour of other organisms, rather than parts that comprise it or broader population that it is a part of. The central problem that the "How?" questions run up against, much like the "Why?" questions, is that of needing to vastly reduce complexity for purposes of intelligibility, without at the same time losing their explanatory power.

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2.5 New materialist vs. heroic and structural theories of social change

In the literature, the theories of social change are approached from the perspective of heroic and structural theories. Perhaps the easiest way to introduce the typology of heroic, structuralist, and new materialist theories of social change is to briefly examine it on a familiar case-study.In presenting these theories, we thus sketch how they have been applied to evaluate arguably the most debated episode of social change in Western historiography, namely the fall of Western Roman Empire.

The extent to which we can even speak of the fall of Western Roman Empire as an empirical example of the concept of "social change" is itself not fully agreed upon. This debate partakes in the broader historiographic quarrel around privileging continuity vs. privileging change in its narratives, with some historians challenging the very language of "fall" embedded in this episode. Furthermore, even when recognized as a paradigmatic instance of historical social change, the end of Western Roman empire at the end of the 5th century CE has since the 1980s most often been described with an ostensibly non-evaluative language of "transformation" and "transition", rather than that of violent collapse and catastrophic downfall (Ward-Perkins, 2005). This marked a significant turn in the historical perception of the ending of Western Roman Empire, given that it has previously been framed as an indisputable case of decline, the temporality of which was either "sharp" or "slow," depending on one's historiographic lenses. Historian Bryan Ward-Perkins (2005) summarizes the shift:

There is no hint here of "decline," "fall," or "crisis," nor even of any kind of "end" to the Roman world. "Transformation" suggests that Rome lived on, though gradually metamorphosed into a different, but not necessarily inferior, form. (p. 4)

Lastly, even when this episode is identified as a clear case of "social change," and even when its consequences for the inhabitants of the Western Roman Empire are depicted in unambiguously negative terms, the debate rages on regarding its causes. Put differently, even among the scholars who agree on the "What?" questions surrounding this topic, the "Why?" and "How?" ones remain hotly contested. Whereas some historians foreground the role and agency of great individual actors (Roman emperors, Roman military generals, Germanic chieftains, Gothic kings, etc.), others privilege broader social, political, and economic dynamics (economic downturns due to inflation and shortage of labour, political instability due to frequent assassinations and civil wars, increasing social divisions, military decline, etc.). While most contemporary historians favour the latter, or at least integrate the two, the said division of approaches is helpful for the purposes of typologizing different theories of social change.

Heroic theory of social change, sometimes also called the "Great Man" theory of history, was most famously articulated by the 19th-century Scottish philosopher Thomas Carlyle (1841):

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For, as I take it, Universal History, the history of what man has accomplished in this world, is at bottom the History of the Great Men who have worked here. They were the leaders of men, these great ones; the modellers, patterns, and in a wide sense creators, of whatsoever the general mass of men contrived to do or to attain. (pp. 1-2)

The adjectives 'heroic' and 'great' need not imply an ethical evaluation. Although they are also often described as charismatic, brave, and visionary, these 'great' figures are primarily seen as more agentful than regular people, but not necessarily morally superior to them. After all, these include everyone from Buddha, Jesus, and Muhammed to Atilla the Hun, Genghis Khan, and Ivan the Terrible. The gendered aspect of the great men theory should not escape us either.

Even though the heroic theory of social change may at first sight seem rather outdated, this approach permeates popular consciousness. Whether it is an airport bookstore, a local library, or a television history channel, heroic theory of social change dominates popular representations of history. It is also hidden in the calls for leadership for sustainability transformation and call for blueprints outlining how each one of us will live in the post-growth world, for example.

The leading alternative to heroic theory could be aptly called structural, as it emphasizes not the role of individual actors but that of broader cultural, political, and economic structures that generate conditions which these "great" individuals, much like all others, navigate. In modern Western historiography, it was not until the French Annales school and the English Marxist school in the mid 20th-century that the focus on "social history" and structural forces became the norm. The French historian Lucien Febvre in the 1930s famously referred to this shift as "histoire vue d'en bas et non d'en haut" ("history from below and not from above"), and the phrase was further popularized in English language by the English historian E. P. Thompson's 1966 essay "History from Below." Take, for example, the work of the British Marxist historian G. E. M. de Ste. Croix, who employs historical materialist lenses to explain "the decline and fall" of the Roman Empire. De Ste. Croix (1981) spotlights the mode of production and the resulting structure of class struggle as primary drivers of said change. He accentuates structural factors over those of individual actors and agencies, regardless of the social station or the political office of said individuals. Also for Marx, rather than a history of great men, "[t]he history of all hitherto existing society is the history of class struggles" (Marx and Engels, 2002, p. 219). It bears noting that most structural approaches to social change are not Marxist.[1] What these accounts share is not their focus on the same structural factor (e.g., economic, in the Marxist tradition understood through the mode of production), but their focus on structures as such. As their accounts are not limited to a lifespan of a

[1] For several decades now, explicitly Marxist versions of structuralism have fallen out of favor in historiography. In the case of Late Antiquity that concerns us here, the debate now seems to foreground the identity, movements, and the role of "barbarian" tribes in the fall (or "transformation") of the Western Roman Empire. For more on the three-way debate between the Vienna School (e.g., Walter Pohl), the Toronto School (e.g., Walter Goffart), and the Oxford School (e.g., Peter Heather), see Rutenburg and Eckstein (2007); Gosh (2015).

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particular individual, structural approaches to social change involve a much more expansive temporal focus, sometimes tracing certain developments over the course of centuries.

The problems of "Why?" and "How?" of social change remain. Even when historians of various stripes concur on a historical episode instantiating the elusive concept of social change (the "What?"), some account for it by way of biographies of the leading individuals involved, whereas others seek broader social, economic, and political patterns that have engendered it.

2.6 New materialist theory of social change: three case studies

The problem with both heroic and structural approaches, according to a new materialist theory of social change, is that they are fatally anthropocentric. In theorizing social change, anthropocentricism – a view that humans are in some way (usually in reference to their unique capacities, moral standing, and hence normative importance) central or highest entities among all others – often manifests as sociocentrism. I borrow the term from the political theorist William E. Connolly (2017, 15-6), who defines it as "the propensity to interpret or explain [human] social processes by reference to other [human] social processes alone… often bound to notions of human exceptionalism." In the words of Jonathan Kennedy (2023, 22), "[o]ur planet is still understood as little more than a stage on which humans act out their parts".

The dangers of sociocentrism are avoided by the new materialist theory of social change. There are three reasons to contest sociocentrism that underpins the two leading theories of social change. First, (1) it perpetuates an ecologically toxic metaphysics of human exceptionalism; second, (2) it severely limits the explanatory power of said theories; and third, (3) it lends itself to ethico-politically noxious orientations. Since doing justice to these claims would probably require a book-length manuscript, only a cursory overview of the philosophical reasoning is presented below.

To begin, human exceptionalism is a metaphysical postulate with unequivocally toxic ecological consequences. It is a view that a specific genus of bipedal primates that has self-servingly named itself "wise" (i.e., Homo sapiens) is essentially unique and therefore of higher normative standing. As environmental philosopher Thom van Dooren (2014, 132) explains, in the history of Western thought there has been a long list of lacks that was drawn on to separate the human from nonhuman animals: "be it the possession of language, mirror self-recognition, rationality, moral agency, or any number of other characteristics". Each of these ideas, he notes, inform and reinforce one another "in a way that ultimately yields a picture of humans as thoroughly and essentially different from the rest of the animal kingdom" (ibid, 131). Understanding ourselves as essentially different and hierarchically higher in relation to nonhuman nature, with which we are constitutively entangled, has led to egregious treatment of nonhuman life, environmental degradation, and ecocide.

Secondly, theories of social change that interpret or explain [human] social processes by reference to other [human] social processes alone severely constrain their own explanatory power. However subtle

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in their depiction of key personas, structural dynamics, and centuries-long [human] processes that have led to the social change, sociocentric theories necessarily miss out on a big part of the story by not considering a vast variety of nonhuman processes and dynamics operative within, above, and outside them. We do not aim to add multifarious nonhuman causal factors for adding's sake, but for purposes of better accounting for the case of social change in question and thus enabling a more successful steering of it.

Thirdly, by interpretatively confining agentive activity to human individuals and collectives, sociocentric theories of social change tend to inspire ethico-politically noxious projects of either (a) Promethean mastery or (b) oppressive organicism. The former, having an aggrandized and romanticized view of human agency, tend to interpret all problems society faces as instances of insufficient mastery and organization. It thus insists on ever increasing intervention and social control, opening doors to authoritarian political formations. The latter tends to seek shelter in visions of organic belonging with firmly teleological images of polity and social structure, eventually sliding into authoritarianism of the ancients. Consider, as an example of the former, the Silicon Valley venture-capitalist Marc Andreessen's "The Techno-Optimist Manifesto" (2023) describing a "*techno-capital machine, the engine of perpetual material creation, growth, and abundance".* This evinces a Promethean aspiration for endless control and mastery through techno-capitalist growth, grounded in a hyper-modernist image of human exceptionalism and supremacy. The structures of domination upon which human mastery is built and the resulting negative externalities are conveniently omitted.

In what follows we elaborate on these dangers of sociocentrism and the new materialist theory of social change by discussing three historical cases. We revisit the fall of Western Roman Empire and discuss wartime Egypt and French revolution from a new materialist perspective to social change.

Case #1: The Fall of Western Roman Empire

American historian Kyle Harper's (2017) *The Fate of Rome: Climate, Disease, and the End of an Empire* offers a new-naturalist account of social change. Harper's study shows just how significant, and yet neglected in historiographic scholarship, were the nonhuman actors and agencies such as volcanic eruptions, solar cycles, climate instability, and infectious diseases in bringing about Rome's downfall. These, Harper (2017) hastens to add, should not be understood as separate from, or determining of, the previously spotlighted human (individual and/or collective) actors and agencies, but imbricated with them in constitutively more-than-human dynamics and processes:

The fate of Rome was played out by emperors and barbarians, senators and generals, soldiers and slaves. But it was equally decided by bacteria and viruses, volcanoes and solar cycles. Only in recent years have we come into possession of the scientific tools that allow us to glimpse, often fleetingly, the grand drama of environmental change in which the Romans were unwitting actors. […] The end of Rome's empire, then, is a story in which humanity and the environment cannot be separated. (Harper 2017, 4-5)

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Challenging sociocentrism in social theory is no small task, for it requires contesting both the ontology of human exceptionalism and the entailing epistemological edifice (approaches to, and methods of, representation and knowledge-making) that has been built upon it. The new materialist theory of social change thereby ought to entail both a challenge to the firm ontological boundary between human and nonhuman actors and agencies and offer novel approaches to studying and representing them. While Harper's intervention into historiography is not itself groundbreaking[1], the thoroughness of his new materialist intervention into the "fall of Rome" debate is rather novel.[2] Harper (2017) significantly expands the historiographic toolkit by drawing on the so-called "natural archive" that expresses itself in many forms such as cave stones, tree rings, human bones and genes. This is used in order to bring new methods of knowing the past, many of which testify to mercurial agencies beyond our own.

Through these novel methods of studying history, Harper gleans manifold nonhuman actors and agencies that played a rather big role in Western Roman Empire's downfall but have not been paid sufficient attention. Socio-centric studies seem to have relegated multifarious nonhuman casual agencies to the status of mere "conditions," due to their own ontological assumptions concerning nonhuman nature, which precluded them from even considering the type of evidence ("natural archive") that Harper extensively draws on.[3] Harper (2017, 19) notes, "[m]ost histories of Rome's fall have been built on the giant, tacit assumption that the environment was a stable, inert backdrop to the story". But what if, some scholars have started asking, focusing solely on intra-human relations, processes, and dynamics is simply insufficient in telling the story? To make use of a dramaturgic analogy, what if various nonhuman forces (e.g., earthquakes, volcanic eruptions, and solar cycles) and agencies (e.g., viruses, bacteria, and parasites) are not static, nor gradual ("glacial"), background props to plot-driving human protagonists under the limelight of social sciences, but volatile and often creative actors with their own complex background stories, pursuing their own plots, and rendering their own interpretations?[4] Harper (2017, 290-1) writes,

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[1] Environmental history has been an established field for some time now, with pioneering figures such as Alfred W. Crosby and William H. McNeill paving the way already in the 1970s. See, for example, Crosby (1972) and McNeill (1976). Outside of the field of history, what is here called "more-than-human" turn has been pressing against the axiomatic sociocentrism across humanities and social sciences since the 1970s and 1980s.

[2] Historical epidemiologist and environmental historian Timothy P. Newfield begins his book review (2019) for Bryn Mawr Classical Review with the following: "The Fate of Rome is the first book of its kind. No other monograph has so infused Late Antiquity with state-of-the-art paleoscience or highlighted the place of climate and disease in the story of Rome's fall."

[3] Harper writes, "[t]he urgent study of earth science and the genomic revolution are teaching us that climate change and emerging infectious diseases have been an integral part of the human story all along. The hard question has become not whether, but how, to insert the influences of the [nonhuman] natural environment into the sequence of cause and effect." (2017, p. 19)

[4] On the creativity and the "teleodynamic" character of nonhuman actors and agencies, see Connolly (2014).

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Bacteria, viruses, and other parasites are not an inert part of the machinery; they are, rather, agents operating in their own interest, seizing such opportunities as they happen to be presented. This perspective casts the triumphs of humanity in a more humbling and, perhaps, uncertain light.

By stressing these nonhuman actors and agencies, new materialist theorists of social change are not trying to do away with the human part of the story, but to incorporate it into manifold nonhuman dynamics, relations, and processes, be they of human design (e.g., dams and weapons) or not (e.g., ocean currents and solar cycles), at macro-scale (e.g., earthquakes and volcanic eruptions), meso-scale (e.g., plants and animals), or micro-scale (e.g., viruses and bacteria). Although Harper focuses on nonhuman nature ("environment"), primarily in the form of planetary processes and pathogens, it is of paramount importance for a new materialist theory of social change to resist nature-culture bifurcation upon which, tacitly or explicitly, sociocentric theories rest.

Case #2: Wartime Egypt

The essay "*Can the Mosquito Speak?*" (2002) by the British political scientist Timothy P. Mitchell explicitly takes on the nature-culture binaries underpinning social inquiry. Mitchell tells a story of the two-fold invasion on Egypt in 1942, one that is frequently told and the other that is mostly lost to memory. The first was that of Erwin Rommel's Afrika Corps, which crossed the border from Libya and were met at al-Alamein by the British Eight Army. In a bloody tank battle that became the first decisive land victory for the Allied forces in World War II, between 50,000 and 70,000 soldiers were killed, maimed, or went missing, with over 17 million land mines remaining after the battle and continuing to take lives for decades to come.

The second invasion came from Sudan, via the Nile valley, and was far deadlier, with an estimated 100,000-200,000 people dying in its wake. However, these invaders did not arrive carrying rifles, airplanes, and tanks; they were not even human. The *Anopheles gambiae*, a mosquito native to sub-Saharan Africa, and, until 1942 unknown in Egypt, carried in its stomach a deadly version of the malaria parasite (Plasmodium falciparum). At that time there was no already-developed immunity among the Egyptian population. Mitchell tells us that 750,000 people contracted the disease in the three years of the epidemic, with up to 200,000 dying from it.

As if this twofold invasion weren't enough, Mitchell explains how the World War II and the Malaria epidemic interacted with a third deadly threat to Egypt – a severe wartime food shortage – which had a rather complex backstory of its own (Mitchell, 2002, 20). By 1933, the great Aswan Dam underwent an expansion, marking the culmination of a comprehensive network of dams, barrages, and canals initiated in the mid-19th century. This extensive infrastructure facilitated year-round irrigation across most of Egypt's agricultural lands. While previously reliant on the Nile's annual flood to nourish the soil with silt and nutrients, only a fifth of the Nile valley now benefited from this natural fertilization. Consequently, chemical fertilizers became indispensable, with Egyptian farmers consuming a staggering 600,000 tons annually by the late 1930s. An international consortium dominated Egypt's

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fertilizer market, spearheaded by the German conglomerate I.G. Farben, whose subsidiary pioneered the synthesis of ammonium nitrate. However, the outbreak of war disrupted the supply chain, leading to a severe shortage of fertilizer. This scarcity caused agricultural yields, particularly for wheat and other staples, to plummet by up to a quarter. To mitigate the crisis, the government implemented food rationing for urban areas and British troops. Additionally, fertilizer rationing, and land-use controls mandated landowners to transition half of the country's cotton fields to food cultivation. In the southern regions, where sugarcane prevailed over cotton as the primary commercial crop, no such controls were imposed. Consequently, sugarcane plantation owners expanded their acreage by as much as 30 percent during the war, exacerbating food shortages in the most malaria-afflicted areas (and inadvertently creating more breeding grounds for mosquitoes).

Mitchell's analysis of Egypt's catastrophe in 1942 shares with Harper's analysis of Western Roman Empire's demise a new materialist approach that does not shy away from the complexity of manifold more-than-human agencies interacting to bring about these events. Mitchell (2002, 22) writes, "[d]ams, blood-borne parasites, synthetic chemicals, mechanized war, and man-made famine coincided and interacted" to create a perfect storm. The connections between these, he notes, were similarly complex: "hydraulic, chemical, military, political, etiological, and mechanical" (ibid, 27). To study this web of relations, Mitchell's non-sociocentric mode of analysis requires him to abandon the siloed character of modern scholarship and engage fields beyond his own. Lest we forget, a novel ontology requires a novel epistemology.

The problem Mitchell identifies in contemporary social theory is like that of Harper's: namely "all [its] actors are human. The protagonists of the history of the nation, of modernity, of capitalism, are people. Human beings are the agents around whose actions and intentions the story is written." (ibid, p. 29) Aware of the implications of his argument, Mitchell takes one of the central challenges in the philosophy of science, namely selecting for causes, head on. Mitchell (2002. 34) asks,

But why insist on all these additional agencies, circulations, and forces? Surely the task of social science, like all science, is to simplify, to identify a limited number of more decisive agents. Why not accept a simpler but more powerful story, one that can depict the big picture and even identify certain patterns or predictions?

Why make things more complex? Mitchell offers two responses. (1) A Geertzian fidelity-to-the-world one: "that if the world is a complicated and indeterminate place, with many agencies and forces at work, then an accurate picture of that world will be a complex and indeterminate one." (2) And a Foucauldian power/knowledge one, which has more to do with the role of expertise and knowledge-making, simplification and rationalization, in the context of the 20th century politics. Namely, Mitchell (2002, 34) argues, "politics itself was working to simplify the world, attempting to gain for itself the powers of expertise by resolving it into simple forces and oppositions." New materialists like Mitchell note the ways in which our knowledge-making practices work upon the world we study, rather than merely describe its unsullied dynamics.

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Case #3: The French Revolution

Let us also consider the French Revolution as perhaps the most famous modern example of a social change – at least in the European context. Beginning in 1789 with the famed assembly of the Estates-General (comprised of the clergy, nobility, and commoners), and then leading to the formation of the French revolutionary National Assembly (formed primarily by the representatives of the "Third Estate," namely commoners), and culminating with the overthrow of the monarchy, subsequent "Reign of Terror", and the eventual rise of Napoleon Bonaparte, the French Revolution led to a thorough restructuring of French society, and many others across the world in turn.

Unsurprisingly, heroic accounts of the French Revolution spotlight the role of individual human actors, such as King Louis XVI's weak leadership and indecisiveness in addressing country's problems, the queen consort Marie Antoinette's extravagant lifestyle as a symbol of aristocratic excess, Maximilien Robespierre's political influence as a Jacobin leader, Georges Danton's skilful rallying of mass support for the revolution, and Jean-Paul Marat's incendiary writings that brought the masses onto the streets. On the other hand, various structural accounts underline the causal role of unsustainably high social inequality, the economic crisis aggravated by rising food prices and increased taxation, political instability of the regime, and the spread of subversive Enlightenment ideas.

Unlike structuralist who seek to deflate agency, by downplaying creativity and intentionality of individual actors and highlighting instead the determining force of political, economic, and/or cultural structures, new materialists proliferate agency, by identifying creative causal powers across human and nonhuman nature. For example, environmental historians studying the French Revolution now stress a new set of protagonists: (1) the Little Ice Age (a widespread drop in global temperatures from 14th to mid-19th century), (2) the Icelandic Laki volcano eruption in 1783/4 (whose ash covered the skies, blocking the sun and throwing Europe into darkness), and (3) a severe El Niño event in 1788-1794 (which transformed seasons, making winters longer, springs wetter, and summers drier and hotter) (Bloom, 2020; Grove, 2006; Witze & Kanipe, 2014). All three of these have wreaked havoc on the French agriculture and crop yields, leading to food shortages and disastrous economic recession, increased state debt, widespread hunger among the poorer classes, and boiling social unrest.

The importance of failed crop yields preceding the French Revolution could not be overstated. The peasants and the urban poor, which comprised majority of the population, heavily relied on cheap wheat derivatives, such as bread, for feeding their families, and spent majority of their income on it. Bread was a symbol of availability and affordability, providing dietary sustenance for the masses and ensuring social stability. Given its importance, during the times of bad harvest, the crown capped grain prices, maintained emergency stores, and ensured grain distribution. In the 1760s, under the guidance of king Louis XVI's economic adviser Turgot, government began implementing a free-trade economic philosophy called physiocracy – which held that all wealth came from agriculture (rather than trade and industry) and sought accordingly to deregulate and abolish taxes from agrarian economy. This laissez-faire economic policy, coupled with poor harvest yields in the mid-1770s, resulted in severe bread

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shortages and high prices, eventually leading to the large-scale riots called "Flour War" of 1775, culminating with the invasion on Versailles. The riot was quelled by the re-introduction of wheat price controls. But in the 1780s, the situation worsened. Adding onto the colder temperatures and erratic weather patterns caused by the Little Ice Age were the eruption of the Icelandic Laki Volcano in 1783 (which released enormous amounts of sulphur dioxide into the atmosphere, significantly cooling the Northern Hemisphere) and a severe El Niño event in 1788 (which led to droughts, floods, and unseasonable temperatures). Their combined effects were particularly pronounced in the catastrophic crop yield of 1788, which lead to the well-known "bread riots" of 1789, climaxing in the storming of the Bastille on July 14, 1789, thereby launching the French revolution.

Studying the causal mechanisms involved in the French Revolution from the new materialist perspective entails a multi-disciplinary investigation of a diverse set of more-than-human processes. It focuses on political, volcanic, economic, solar, agricultural, psychological, oceanic, and nutritional processes and their curious interactions. A mode of causation involved in such events is perhaps best described as "emergent," for it refers to the emergence of the new effects that cannot be fully captured before their production, are not understandable through the classical concepts of efficient causation, nor are they reducible to the standard notions of "chance."[1] Connolly (2004, 342-3) describes it in the following way:

Emergent causality, when it occurs, is causal … in that a movement at the immanent level has effects at another level. But it is emergent in that, first, the character of the immanent activity is not knowable in precise detail prior to effects that emerge at the second level, second, the new effects become infused into the very being or organization of the second level in such a way that the cause cannot be said to be fully different from the effect engendered and, third, a series of loops and feedback loops operate between first and second levels to generate the stabilized result. The new emergent is shaped not only by external forces that become infused into it but also by its own previously under-tapped capacities for reception and self-organization. So, the new emergent is the result of a spiralling movement back and forth between relatively open systems.

Given the complexity of dynamics it posits, some might criticize the new materialist theory on the grounds that it makes social change drastically more challenging to study. To do so, however, would be to move from a methodological (epistemological) difficulty to an assertion about its substantive (ontological) merits. Unsurprisingly, a new materialists ontology does not square with the sociocentric epistemologies we have become accustomed to. New modes of knowing arise.

[1] For more on "emergent causality," see Connolly (2004) and (2010).

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2.7 Conclusions on the new materialist philosophy

We have discussed the importance of updating dominant political ontologies away from classical materialist and socio-centric directions. To recap, a new materialist approach takes a novel, non-sociocentric perspective on both the "What?", "Why?", and "How?" questions of social change. First, given its view of human societies as constitutively embedded in and thoroughly entangled with the nonhuman nature, a new materialist approach understands change to be an ontological norm in human societies, much as it is in the rest of nature. In talking about "social change," it is the abrupt temporalities of a particular change, with respect to a particular collective, that are investigated. Furthermore, the subject of said change is not only a human collective, but a rich more-than-human web of relations in which that human collective subsists. Second, the "Why?" questions surrounding a given social change are approached in a non-monocausal, non-reductive, and non-anthropocentric way. Agentive dynamics precipitating a given social change are not restricted to human individuals and collectives but are also found in a variety of processes in the nonhuman world. Finally, causal mechanisms involved in said narratives are approached with multi-disciplinary lenses and described in an unapologetically elaborate manner, appropriate to the level of intricacy of the events being described, shunning the reductive determinations characteristic of sociocentric approaches.

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3. Conceptualizing sustainable wellbeing in the context of postgrowth paradigm

As this report seeks to inform the European policymakers on how to foster wellbeing – often considered as an overarching goal in policy making and an 'ultimate end' in our economies (e.g. Daly 1973) – we next conceptualize sustainable wellbeing in the postgrowth context. To this end, we both approach wellbeing in relational, non-anthropocentric way and elaborate on needs-based understanding of sustainable wellbeing resting on this relational ontology. In relation to the previous section, we discuss what a 'beyond human exceptionalism' understanding of human wellbeing is that resists the caveats of socio-centric thinking. We argue that rethinking the ontological assumptions and problematic distinctions involved in modern dualistic thinking (Datta 2015) is crucial because welfare theories and policies are always based on some kind of assumption about human nature, either explicitly or implicitly. Policies and indicators on wellbeing and sustainability are also based on certain assumptions about how people relate to each other, to other species and to nature.

3.1 Wellbeing resting on relational ontology

Dominant mindsets in western industrialized countries[1] are based on human exceptionalism paradigm that do not consider the co-existence of human beings and natural environment. People are seen primarily as social beings, detached from an objective nature outside of humans. A narrow homo economicus conception of a human being assumes that individuals are rather isolated and seek to maximise their own interests. However, such a view is at odds with the research evidence on the importance of social relationships and altruistic behaviour characteristic to us as humans. The significance of relationships as preconditions of wellbeing and health are well-documented in empirical studies (see e.g. Waldinger & Schulz 2023).

The view of isolated individuals is as well absent from indigenous worldviews and Eastern and Southern traditions that focus on relational ontology in which "actors, both human and non-human, living and non-living- and their actions are not only explained as relational, but also as spiritually interconnected" (Datta 2015, 103). Relationality, rooted in non-Western philosophies emphasize interconnectedness, reciprocity, and holistic approaches to wellbeing, challenging the anthropocentric and utilitarian paradigms that dominate Western thinking. A new post-growth policy paradigm could thus benefit from expanding current understandings of relationality and sustainability beyond the confines of Western epistemologies and learning from the plurality of ways of being and knowing in the world. As Kothari et

[1] We acknowledge the limitations of this report in fully capturing the diversity of worldviews and mindsets across cultures. The authors, originat ing from western, industrialized contexts, recognize that our perspective is shaped by specific epistemological and cultural frameworks. To address these limitations, we seek to draw inspiration from non-Western philosophies, including indigenous worldviews, and relational ontologies rooted in Eastern and Southern traditions.

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al. (2019, xxix) write in arguing for a 'pluriverse' – a world confluence of alternatives to universalistic model of 'development' – transformation should be grounded on "a relational logic; a world where everything is connected to everything else".

As discussed in the previous section, new materialists focus on ontological relationality and interdependence. The paradigm shift we propose requires problematizing human/nature dualism and mechanistic interpretations of humans and nature. Instead of instrumental values, the relational ontology nurtures intrinsic and relational values (IPBES 2022). Recognition of the intrinsic value of nature is central to any interaction between humans and nature (Haila & Levins 1992). Humans do not have any greater intrinsic value than non-human nature and the value of nature is not based on its utility or usefulness to humans. All living things have intrinsic value, but there is a biological hierarchical relationship between human beings and nature: humans cannot survive without nature, but nature can survive without humans. However, the emphasis on the intrinsic value of nature in the context of sustainable wellbeing does not mean that humans should not use and benefit from nature to satisfy their needs. Instead, we shall be aware of the purposes for which humans use natural resources and to critically examine whether the exploitation of nature destroys natural processes that are essential for ecosystem resilience and all living organisms (Haila & Levins 1992; Kortetmäki et al. 2021). A more robust understanding of how ecosystems are essential to human wellbeing is helpful in this effort. Rather than approaching ecosystems in terms of functions and processes that can directly or indirectly benefit human wellbeing, as quantified "ecosystem services", we should focus on the relationships between humans and more-than-human nature (IPBES 2022). Human wellbeing can only be pursued in the context of "constellations of biotic, abiotic, human, and non-human relations" (Kolinjivadi 2019, 39).

Previously, Helne and Hirvilammi (2015) have suggested that sustainable wellbeing should be based on a 'relational paradigm' that sees all life forms on Earth as interconnected and humans as relational beings. Relationality implies "a shift from a mechanistic understanding of the world to a holistic, interconnected, living systems understanding" (Böhme et al. 2022, 2066). The ontological assumptions are consistent with the basic tenets of the new materialist ontology discussed above. Here, we suggest that the relationality that should underpin all wellbeing policies and sustainable economies should be based on three ontological assumptions (see also Hirvilammi and Kortetmäki 2025, forthcoming):

A human being exists in the web of relationships, not isolated

Human beings live embedded in rich and complex networks. The relational approach departs from individualistic ontology by emphasizing how personal, relational, and collective aspects of wellbeing are all interconnected and to some extent interdependent (White 2017). From a human development perspective, it becomes clear that intersubjectivity always precludes subjectivity. The 'self' is constructed through constant interaction with other people, making the individual self indistinguishable from others (Crossley 2011).

In addition to intersubjectivity between human beings, the relational ontology extends the conception of the self towards the natural environment. This turn is illustrated by Arne Næss's notion of the 'ecological self' (2008, 83). Based on his deep ecological thinking, he argues that by recognising one's dependence on nature, one empathically identifies with the natural environment. This identification

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enables people to understand that protecting nature not only serves the interests of nature and other species, but also their own interests. Nature conservation is the care and protection of the human self: it is 'an act of self-love' (Næss 2008, 85).

Humans are 'active organisms oriented towards developing and refining their capabilities by interacting with the physical and social environment' (Niemiec et al 2010, 175). Human needs can thus only be satisfied through interactions with other forms of life and through participation in various social-ecological processes. In the relational thinking, people are not only individuals but also part of systems and networks. Individual, collective, and environmental aspects of wellbeing are all interconnected and to some extent interdependent (Helne & Hirvilammi 2015; White 2017). The relational approach to wellbeing is also in line with the new materialism, where wellbeing is understood as "always and necessarily situated and relational, an effect of mutually constitutive interactions amongst the material, organic and emotional dynamics of places" (Atkinson 2013, 138).

Viewing human wellbeing as fully dependent on, and manifested in, the web of relationships has important implications for policymaking. From a relational perspective, wellbeing can be conceptualized beyond its subjectively experienced manifestations. Rather than focusing on the improvement of individual well-being, or for individual experiences alone, policymaking should take into account social coherence and the resilience and integrity of the social-ecological systems. Well-being depends not only on the biophysical limits of natural systems, but also on the socio-economic dynamics that influence access to and distribution of resources.

Human beings are fully dependent on Earth system and ecosystem processes

Nature is what sustains us. Human wellbeing "ultimately rests on biosphere capacity and the interplay with the Earth system" (Folke et al. 2016, 1). We exist only because of many close relationships with non-human life and processes, including ecosystem processes necessary for human well-being like nutrient cycling, climate regulation, and water purification. The earth system stability that is currently at risk should be preserved (Richardsson et al. 2023), as human existence is only possible on a planet with a sufficient oxygen content in the atmosphere and an ozone layer to protect humans from the sun's harmful radiation. Nor can innovation and technological development override the laws of thermodynamics and basic ecological principles. Human development is subordinated to these processes and to the laws of thermodynamics, which ultimately set limits to wellbeing and social institutions (including the economy). The use of natural resources must therefore adapt to the limits of the ecosystem regenerative capacity (Daly and Farley 2010).

Instead of the parasitic, one-sidedly exploitative relationship in which "the human species, a very recent guest, is possessing, devouring and polluting the earth and possibly destroying itself in the process", relational thinking recognises the symbiosis as famously discussed by Michel Serres in The Natural Contract published in 1990 (Johnson 2024, 85). Essentially, we are biological beings based on the material, energy and information flows of nature. However, this does not exclude the social and spiritual dimensions of human life: human beings should be understood not only as biological beings but also as moral and responsible agents striving for a good life (Becker 2006). Drawing on the relational ontology, this responsibility much be evidenced through reciprocity and respect for the rights of nature.

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Humans exist always in and as part of nature

Ontological human/nature dualism is untenable because of the constant material and energy flows between humans and the rest of nature[1]. As social-ecological systems are intertwined, we belong to the same metabolism (Folke 2016). Humans are concretely part of nature in the sense that there is a constant flow of matter and energy between what is in common parlance considered 'personal', 'social' or 'nature'. No clear boundary can be drawn between 'external' nature and human activity. As discussed above, human body is an ecosystem, "bountiful home to no fewer than six tribes of bacteria" (Bennet 2010, 112). This relational co-existence and relations between human, biota, and abiota (Bennet 2010) is also visible at the level of DNA. Environmental DNA interacts with human cell DNA via the gut, skin and respiratory track, which act as mediators between the environment and the human. Through this metabolism, loss of environmental DNA as macrodiversity can have direct effects on microdiversity (including the cells within the human body). Thus, loss of the macrodiversity is associated with the alterations of the indigenous microbiota (Haahtela 2013).

From this perspective, it becomes clear why human well-being should be pursued in a way that also allows other forms of life to flourish and the Earth's ecosystems to thrive (Helne & Hirvilammi 2015). This task brings us to the notion of planetary wellbeing. As a recently introduced non-anthropocentric concept, it refers to well-being as the satisfaction of needs in a way that contributes to the functional integrity of living beings. Planetary well-being is a state in which the integrity of the Earth system and ecosystem processes remains unimpaired to the extent that species and populations can persist into the future and both human and non-human organisms can achieve well-being (Kortetmäki et al. 2021). The well-being of an ecosystem is more than just the sum of the individuals within it.

The consideration of planetary well-being involves looking at the preconditions that underpin different ways of being well. While the functional integrity of individuals comprises their well-being, the functioning of certain planetary and ecosystem-level processes constitutes the common condition for the well-being of most life forms (Hirvilammi & Kortetmäki 2025, forthcoming). Planetary wellbeing broadens the perspective to recognize the importance of the integrity of those larger-scale processes that are central to and create conditions conducive to the well-being of human and non-human individuals, ecological systems, species, and populations.

3.2 A conceptual framework for understanding human wellbeing rooted in relational ontology

Sustainable wellbeing can be broadly and tentatively understood as ensuring a good life for all within planetary boundaries – now and in the future. It is wellbeing that contributes to individual, community and global well-being without exploiting other people, more-than-human nature, or future generations. Wellbeing is commonly understood as multidimensional phenomenon that cannot be measured by a single indicator. However, what is meant by wellbeing and what we need for a good life are open and

[1] In this report, we use the term 'nature' although this is problematic from the relational ontology perspective as strictly speaking there is no clear distinction between nature and non-nature. However, we find if necessary to use the distinct concept of nature when elaborating on a more sustainable human-nature connectedness.

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controversial questions – both in science and policymaking. Theoretically, human well-being is seen as a complex concept that can be approached from different perspectives (Ryan and Deci 2001; Gough et al. 2007).

Recently, many actors involved in a beyond GDP research discussion and policymaking have begun to use the notion of sustainable and inclusive wellbeing (Hoekstra et al. 2024; Costanza et al. 2024). This term appropriately promotes the use of the language of wellbeing and highlights the importance of wellbeing as an ultimate goal in policy. In the context of rising global inequalities the explicit focus on inclusion is also justified. However, the discussion is surprisingly silent on what wellbeing actually means and what the components of wellbeing are. This gap can be addressed by elaborating on a holistic and rigorously defined conceptualisation of multidimensional, sustainable wellbeing based on relational ontology.

As discussed above, ontological assumptions are necessarily both essential and contestable. In ToBe, our approach to wellbeing therefore combines essentialist and more contested constructivist interpretations of wellbeing. We reject cultural essentialism and biological reductionism, which could lead to an understanding of wellbeing as something fixed and deterministically produced (Sayer 1997). It must be recognized that human wellbeing is dependent on the Earth system stability that exists beyond social constructs and that we, as human organisms, have innate needs related to health and wellbeing. This more essentialist interpretation recognizes that all human beings share certain basic needs and cannot avoid meeting these needs. However, we advocate the anti-essentialists ideas by rejecting determinism. Planetary boundaries are also subject to interpretation and democratic debate (Kallis 2019; Brand et al. 2021). Despite the existence of universal needs and biophysical boundaries, people do not have fixed identities or cultures. Rather, wellbeing is a dynamic, situated and socially constructed process (Bilbao-Nieva & Meyer 2024). This means that shared ideals and understandings of wellbeing can change and will change as societies change. What is considered good in particular societies is contested and context-dependent, and there will always be different conceptualizations and culturally varying interpretations of wellbeing. How human needs are met, how planetary boundaries are conceived, how different components of wellbeing are valued, and where the personal and societal boundaries are set, all point to the importance of shared principles, normative questions and valuations (Brand et al. 2021; see also chapter 5 in this report).

Wellbeing is actively produced and reproduced by social structures and institutions as part of everyday activities and policymaking. Therefore, the conceptualization of sustainable wellbeing is also contingent on paradigmatic ideas and mindsets and on policies and practices. This also explains the importance of new conceptualisations as part of a paradigm shift.

Wellbeing theories have provided multiple definitions of universal human needs or capabilities essential for wellbeing which is useful when delineating a shared vision. The question of whether the constitutes of human wellbeing can be understood universally or whether they differ according to cultural context divides wellbeing theories and scholars. A prominent example of this disagreement can be found at the heart of the capability approach, a framework that has been applied when studying sustainable wellbeing (e.g. Rauschmayer et al. 2011; Hirvilammi et al. 2016). Famously, the founder of

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the capability approach Amartya Sen (e.g. 2009) has refused to draw up a specific, cemented and complete list of essential human capabilities out of the respect for people's own valuations, while Martha Nussbaum (2000) has defined a list of universal capabilities. She argues that we need a certain, commonly defined understanding of what rights in human life should be protected in all societies and what kinds of activities are central to human life. Her list of ten capabilities includes universal values formulated as "being able to live to the end of a human life", "being able to have a good health", "being able to use senses, to imagine, think and reason" and "being able to live with concern for and in relation to animals, plants, and the world of nature" – to name but a few (Nussbaum 2000, 78-80). The identification of universal capabilities is considered important because it provides a political tool and a basis for evaluating wellbeing and social outcomes of economic policies.

Many influential need theorists in the field of sustainable wellbeing research also advocate the existence of universal needs (Doyal & Gough 1991; Max-Neef 1991). Following this, we find it important to establish a framework with universally understood needs. Yet, as wellbeing is contested and lifestyles are culture-specific considering pluriverse, alternative forms of organization, we do not aim to define a cemented list of what specific need satisfiers should be universally included when promoting and measuring sustainable and multidimensional wellbeing. Our theoretical framework sheds light on ontological assumptions, human needs and points towards the importance of sufficiency. The framework consists of three universal needs derived from previous literature (health, relatedness, autonomy), which can be used when drawing visions and designing more concrete policies to promote wellbeing within planetary boundaries.

Sustainable wellbeing from the perspective of needs

Research discussion on sustainable wellbeing has intensified in the last decade when scholars have increasingly called for a more sustainable understanding of human wellbeing and provided their perspectives and definitions (see O'Mahony 2022). Together with the previous research discussions on sustainable wellbeing (e.g. Büchs & Koch 2017; Gough 2017; Helne & Hirvilammi 2017; Lamb & Steinberger 2017), we focus on universal human needs and the processes of need satisfaction.

Need theories perceive well-being as a state in which it is possible for people to have their needs met. Human needs are plural, non-substitutable, satiable, and cross-generational (Gough 2017, 45-47). Unlike preferences or wants, needs imply rights, ethical obligations, and claims of justice on public policy institutions and economic structures. They are necessities that must be met, or significant harm will result.

Different need theories have provided diverse lists of universally recognized needs. Next, we briefly introduce five theories that have either reached a significant influence in the field and/or have been explicitly developed in the context of sustainability transformation.

One of the best-known need theories is *Abraham Maslow's* (1954) theory which includes physiological needs and the needs of safety, belonging and love, esteem, and self-actualization. According to Maslow (1954, 102), these needs unite people regardless of cultural differences, although he does not claim that this list of needs extends equally to all people. *Manfred Max-Neef* (1991) has identified nine fundamental human needs: subsistence, protection, affection, understanding, participation, leisure, creation,

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identity, and freedom. These are axiological, value-related needs that are common to all but the way in which they are satisfied changes culturally and over time. Satisfiers vary according to different "existential categories" of being, having, doing, and interacting, and they include, for example, social practices, subjective conditions, spaces, and institutions. Food and housing are thus satisfiers of the need for subsistence rather than needs per se (Max-Neef et al. 1991, 17). However, this distinction is often blurred in environmental literature, where food, clothing or energy are explicitly understood as basic needs.

Len Doyal and Ian Gough's theory of human need (THN) is a major welfare-theoretical opening of the 1990s, combining philosophical-theoretical reflection on the concept of well-being, the development of a concrete indicator of well-being and moral-ethical guidelines for public policies. In their theory, Doyal and Gough (1991) argue that all people share the universal goal of reaching minimally impaired social participation. They define two basic needs: physical health and the autonomy of agency (which refers to mental health, cognitive understanding, and opportunities to participate). To satisfy these basic needs, certain universal need satisfier characteristics are necessary, including adequate nutritional food and water, protective housing, non-hazardous work and physical environment, appropriate healthcare, security in childhood, significant primary relationships, physical and economic security, safe birth control, and basic education. These universal need satisfiers emphasize the importance of enabling societal conditions for need satisfaction.

To acknowledge the importance of psychological wellbeing and the relationships between societal and psychological processes, wellbeing researchers often apply the Self-determination theory (SDT) developed by *Edward L. Deci and Richard M. Ryan* (e.g. Deci & Ryan 2000; Ryan & Deci 2001). In SDT, all human beings share psychological needs for competence, relatedness, and autonomy. Competence is defined as a deep-level, generalized need, as "nonspecific tendency of humans, for whom a curious, assimilative nature is a defining feature" (Deci & Ryan 2000, 253). Relatedness is a need that "reflects a deep design feature of social organisms" (ibid., 253). Like other animals, humans as social organisms seek to organize themselves with respect to larger social entities to function optimally. Autonomy reflects "a deep inner design of the human organism toward self-cohesion and the avoidance of self-fragmentation" (ibid., 254). Deci and Ryan (2000, 227) define psychological well-being as the degree to which people are able to satisfy these three needs. The satisfaction of these needs is associated with effective functioning whereas the absence of environmental conditions that support the satisfaction of needs leads to thwarting.

In an effort to operationalise quality of life in the context of sustainability, Antonietta Di Giulio & Rico Defila (2021) have proposed a theory of Protected Needs. For them, protected needs are the needs that "(1) deserve special protection within and across societies because they are crucial to human wellbeing, and are, at the same time (2) needs for which special societal protection is possible, because they are needs for which a governmental/community responsibility can reasonably be assigned" (Di Giulio & Defila 2021, 121). Protected Needs are classified into three groups. The first group focuses 'upon tangibles, material things' and it includes first three Protected Needs: "1) To be provided with the material necessities for life, 2) To realize their own conception of daily life, 3) To live in a liveable environment." The second group focuses 'upon the person' including following three needs: "4) To

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develop as a person, 5) To make their own life choices, 6) To perform activities valuable to them." The third group of needs focuses 'upon community' and includes three last protected needs: "7) to be part of a community, 8) To have a say in the shaping of society, 9) To be granted protection by society". The formulation of these protected needs resonates with Doyal and Gough (1991) when they emphasize that societies should ensure necessary conditions for individuals to meet these protected needs.

In addition to needs as such, it is important to establish links between different modes of existence and more specific needs. Another way of approaching needs-based well-being is the HDLB-framework where wellbeing consists of four broader need categories, or different dimensions of wellbeing: Having, Doing, Loving, and Being. Inspired by a Finnish sociologist *Erik Allardt* (1993) who conceptualized "the central necessary conditions of human development and existence" in three words Having, Loving and Being, *Tuula Helne and Tuuli Hirvilammi* (e.g. Hirvilammi & Helne 2014; Helne & Hirvilammi 2015; 2019) have developed their normative theory of sustainable wellbeing and discussed its importance in the context of sustainability transformation. In contrast to Allardt, they have given the dimension of Doing an independent status. In their framework, having refers to the needs for material resources and a sufficient standard of living. Doing refers to the needs for meaningful and responsible activities. People also have needs for belonging: to love and to be loved, which makes close relationships significant for well-being. This Loving need category includes relations not only with other humans but also with more-than-human nature. In its broadest sense, Being is a mode of existence involving presence, creativity, personal growth, self-knowledge, and freedom to be oneself. The actualization of these dimensions points to the importance of holistic and balanced wellbeing. More recently, Frank Martela (2024, 376) has further developed this framework by arguing that having, loving, doing, and being should be seen "as separate modes of existence or modes of being, each emphasizing one way humans exist in the world". With a mode of existence, he refers to "a basic way of being in and relating to the world" (ibid.). In this context, 'having' does not refer to possessive behaviour or increasing consumption but to the fact that as "biological-material beings" (Martela 2024, 376) we require energy and natural resources that provide us food, clothing, shelter and other necessities (Hirvilammi & Helne 2014, 2169).

Health, relatedness, and autonomy as a foundation of sustainable wellbeing

Based on the above review, in ToBe we approach sustainable wellbeing from the perspective of three universal needs: health, relatedness, and autonomy. These three needs bring together the theory of human need by Doyal and Gough, self-determination theory by Deci and Ryan and multidimensional wellbeing theory by Allardt by adding relatedness to THN and by replacing the third "competence" need in SDT by health. This conceptualization also rephrases and redirects the three dimensions of wellbeing by Allardt by using more descriptive terms. Both the list by Maslow and the list of nine protected needs can also be classified into these three categories. Together, these three needs capture the notion of multidimensional wellbeing, which combines both physical and psychological aspects of wellbeing. They can also be linked with the three "basic and interacting dimensions" of wellbeing as presented by McGregor and Pouw (2017): a material dimension, a relational dimension and a subjective dimension.

We argue that despite culturally changing ways of meeting needs, human wellbeing is always shaped by the need satisfaction related to health, relatedness and autonomy. It is difficult to imagine how anyone can survive and thrive without some level of satisfaction of these three needs. In this sense,

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needs are necessities. If they are not met, "serious harm of some objective kind will result" (Gough 2015, 1195).

The need for health directly acknowledges the biological background of human needs. As mammals, we have needs to survive and maintain health. Certain genetic and biological constraints as well as ecosystem processes directly affect our wellbeing. To survive in daily life requires abilities that poor physical health often interferes (Gough 2015). The importance of health is reflected in empirical studies of the perceived needs of people living in diverse local and cultural contexts (McGregor et al. 2009).

The need for relatedness is also part of human nature. For growing and healthy development, individuals need love and belongingness. We are social beings: persons “whose identity and functioning can only be fully understood as emerging through their relationships with others" (McGregor & Pouw 2017, 1125).

Relatedness through participation in communities and everyday situations is necessary for wellbeing (Deci & Ryan 2000). Relatedness needs recognize the significance of close primary relationships and social participation. It is about belongingness in forms of being a member of communities and building identities through collectives (Allardt 1993; McGregor et al. 2009). Relatedness is associated with the experiences of close, deep connections with significant others, with a willingness to trust and rely on others, and to care for them (Niemiec et al. 2010, 176). Interdependence with others refers not only to other humans but also to other species as it touches on our deep need to coexist with all creatures that share our common biosphere (Helne & Hirvilammi 2015).

The need for autonomy refers to self-regulation and the ability to make “competent informed choices about what should be done and how to go about doing" (Doyal and Gough 1991, 53). In modern anthropocentric tradition, autonomy is often approached in an individualistic fashion where independent and self-sufficient individuals are governed by rational choices. However, in line with relational ontology and to emphasize that “autonomous beings are, of necessity, socially situated and interdependent" (Oshana 2013, 1), the term ‘relational autonomy’ has been introduced. The ways in which people can assert their needs for autonomy, their commitments and motives for action are always constituted by societal positions. The notion of autonomy also takes into account how individuals are socially and ecologically embedded and how their identities are formed and shaped by relationships and intersecting social determinants (e.g. ethnicity, race, class, and gender). Autonomy is thus “a relation, not an individualistic, capacity" (Doyal and Gough 1991, 76-80) or separateness, which more broadly challenges the notion of self-sufficient individuals as detached from planetary and social systems.

In Allardt’s theory the needs for autonomy refers to “the need for integration into society and to live in harmony with nature” (Allardt 1993, 91). Regarding this dimension, wellbeing is associated with personal growth and self-actualization whereas illbeing is associated with alienation (Allardt & Uusitalo 1972, 12). The opposite of autonomy is the experience of feeling controlled or “pressured to think, feel, or behave in certain ways” (Niemiec et al. 2010, 176). With autonomy needs fulfilled people have a capacity to self-regulate and to integrate values to guide behavior. Their behaviour emanates from the self and they behave in ways that are congruent with their values and beliefs. They are also more flexible

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when facing challenges (Niemiec et al. 2010, 170). These are the qualities that are needed in paradigm shifts, where individuals begin to question existing worldviews and adapt to new circumstances.

Universal needs, diverse need satisfiers

The distinction between needs and need-satisfiers is crucial when transforming economies towards sustainable wellbeing, as it illustrates that relatively permanent and shared needs can be satisfied in different ways and with different means. To illustrate the distinction, in the past the needs for relatedness were satisfied by searching partners at social gatherings whereas now the dating apps are used for the same purpose. Many of the current need satisfiers have unsustainable environmental impacts and therefore, a transformation towards sustainable wellbeing requires replacing existing need-satisfiers with more sustainable ones (e.g. Guillén-Royo 2020; Gough 2017; Brand-Correa et al. 2020). For example, the having-needs such as the need for subsistence could be fulfilled with plant-based diet instead of carbon-intensive meat products.

Max-Neef (1991) has classified 'positive' singular and synergic satisfiers and 'negative' violators or destroyers as well as pseudo- and inhibiting satisfiers which helps understand that not all consumption or activities promote wellbeing per se; some of them can have counterproductive effects for need satisfaction. For example, high material consumption or long working hours can be inhibiting satisfiers for leisure and creation (regarded as fundamental needs by Max-Neef). If communities and societies identified synergic satisfiers it could help them to reduce environmental impacts (e.g. Guillen-Royo 2020; Lindellee et al. 2021) and tackle unsustainable, growth-based 'need satisfier escalation' (Brand-Correa et al. 2020).

Discussion on need satisfiers directs the focus towards 'provisioning systems' as material, structural, and social preconditions for need satisfaction. Need satisfiers are the means that are needed to reach the ends. According to O'Neill et al. (2018, 89), the framework of provisioning systems is linked to "the Ends-Means Spectrum" prevalent in systems thinking. To expand the spectrum, O'Neill et al. analytically established the link between resource use and social outcomes in terms of 'provisioning systems'. Their understanding was that these provisioning systems mediate the way biophysical resources are used and transformed into social outcomes. Provisioning systems comprise both physical (e.g. infrastructure, technology, manufacturing) and social systems (e.g. government, communities, markets) (O'Neill et al. 2018, 89) which then both influence what need satisfiers are available and socially desirable in given societies.

The provisioning systems framework has been used when focusing on the interaction between biophysical resource use and social outcomes and when trying to understand how political-economic dimensions such as institutions and actors interact with energy and material stocks and flows (O'Neill et al. 2018; Fanning et al. 2020; Plank et al. 2021; Vogel et al. 2021). The framework appropriately focuses on changing intermediating factors rather than social outcomes as such. This suggests that a sustainability transformation does not require changes in universal needs as such, but it demands transforming need satisfiers. Such changes entail new practices, roles, and responsibilities between different provisioning elements such as state institutions, households, and markets (Fanning et al. 2020; Hirvilammi et al. 2023).

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Figure 1. illustrates the relationships between needs, need satisfiers and 'nature' by applying and modifying the 'Daly triangle' from ecological economist Herman Daly. In it, wellbeing is an ultimate end as situated at the top of the triangle: it is "desired for itself" (Meadows 1998, 43). On the other end of the triangle is biophysical foundation to show that human ends cannot be realized without functioning ecosystems and biophysical resource use. In this triangle, need satisfiers – e.g. adequate nutritional food and water, protective housing, access to health services, significant primary relationships, social support, education, leisure time, meaningful work, and economic security – are understood as intermediate ends; they are the output that economies are expected to deliver but only instruments to achieve something higher.

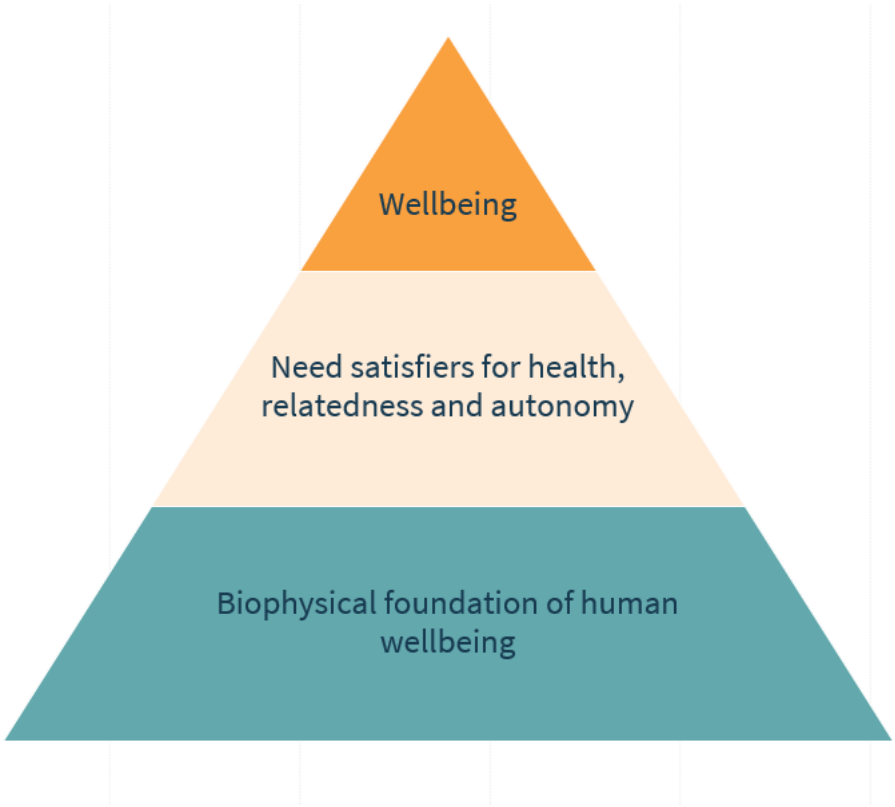

Figure 1. Triangle of sustainable wellbeing

3.3 Sustainable wellbeing within sufficiency space

Previously in ToBe, sufficiency has been defined by Èloi Laurent (2024, 7) "positively as a situation in which limited resources are used to satisfy reasoned needs and normatively as a situation in which universal decent living standards are compatible with planetary boundaries" (Laurent 2024, 7). Recent years have witnessed an increasing research and policy interest in sufficiency as a concept to be used when emphasizing demand-side solutions to climate change and challenging lifestyles based on

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overconsumption of natural resources. According to Laurent, sufficiency is a common goal for the postgrowth approach because it is where the three most influential post-growth streams – degrowth, doughnut economy and wellbeing economy – converge.

The aim of reducing consumption and production while ensuring that needs are met is to be achieved by adopting sufficiency as a guiding principle for policymaking. For Laurent (2024, 19), sufficient level of human well-being is "one that is not excessive nor insufficient". Sufficiency is about reducing overconsumption while also ensuring decent need satisfaction. It can be understood as a just and sustainable space above the floor of necessity but below the ceiling of surplus as unnecessary consumption and production (e.g. Gough 2023).

Need satisfaction is sustainable when it respects the limits of this 'sufficiency space'. Within this space, the minimum refers to the satisfaction of universal needs; the minimum level necessary for people to be able to live a good life. There are many alternatives for determining what is considered minimum, as the plethora of different poverty measures shows. According to previous research by Rao & Min (2018) a decent standard of living includes necessities that are consumed and produced either at the household, community, or at the national level. To concretize, they argue that requirements of decent living standards at the household level include nutrition, shelter, basic amenities, clothes, phone, access to internet, and access to motorized transport. At the community level, all people should have access to health clinics, physicians, clean air, schools/teachers, and public transportation. At the national level, necessities include roads, utility networks, public space, health care expenditure, education expenditure, and information infrastructure. These are examples of the need satisfiers that should be available for all.

Sufficiency is rooted in an ancient idea of good living (Spangenberg 2016) and moderation: it is an equilibrium or optimal state between poverty/lack and excess. To operationalize sufficiency space, the maximum can be set in relation to the minimum when it refers to the level at which no one's actions threaten the opportunity for a good life for others (Di Giulio & Fuchs 2014). This understanding is inspired by principles of sustainability and social justice. As inequality is a breeding ground for status competition, the lack of a maximum limit encourages conspicuous consumption that leads to a rat race to the top. Another option is to understand maximum in terms of an ecological ceiling as suggested when advocating doughnut economies (Raworth 2017). This perspective considers both the social foundation for a good life for all and the ecological ceiling that is illustrated by referring to planetary boundaries.

Inspired by Kate Raworth's first report by Oxfam in 2012 and the book *Doughnut economics* (2017) and the subsequent work done by Doughnut Economics Action Lab, the doughnut has been used as a framework both in science and practice. Doughnut is a visual tool to show that a safe and just space for humanity lies in between the ecological ceiling and the social foundation (Raworth 2017), or between pressures on the world ecology and the maintenance of natural and social need satisfaction (Domazet et al. 2020).

The idea of a doughnut is similar to that of environmental space, which was developed in the early 1990s to specify and describe an ecologically and socially sustainable standard of living from a global

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perspective in the context of finite natural resources (Spangenberg 2002). The concept of environmental space was used by Wuppertal Institute and Friends of the Earth Europe, for example. It aimed to illustrate the limits of sustainable standards of living by highlighting that, on a global scale, all people should have sufficient living conditions, but their activities should not exceed the ecological limit of resource use. This limit referred to the total amount of energy, water, agricultural land, non-renewable resources and forests that can be exploited annually in the world without compromising the ability of future generations to exploit it to the same extent. Similar to the doughnut framework, the objective was to define social and ecological criteria for production and consumption patterns by also considering the minimum socially necessary use of environmental space per capita (Spangenberg 2002).

In ToBe, we have modified the idea of sufficiency space and doughnut when visualizing the ToBe framework for sustainable wellbeing (see Figure 2). Instead of a static endpoint or 'outcome', sustainable wellbeing is approached from the perspective of boundaries and thresholds and the doughnut is used to illustrate sufficiency space: a safe and just space for sustainable wellbeing. Later in this report, we introduce another modification of the doughnut: a postgrowth doughnut.

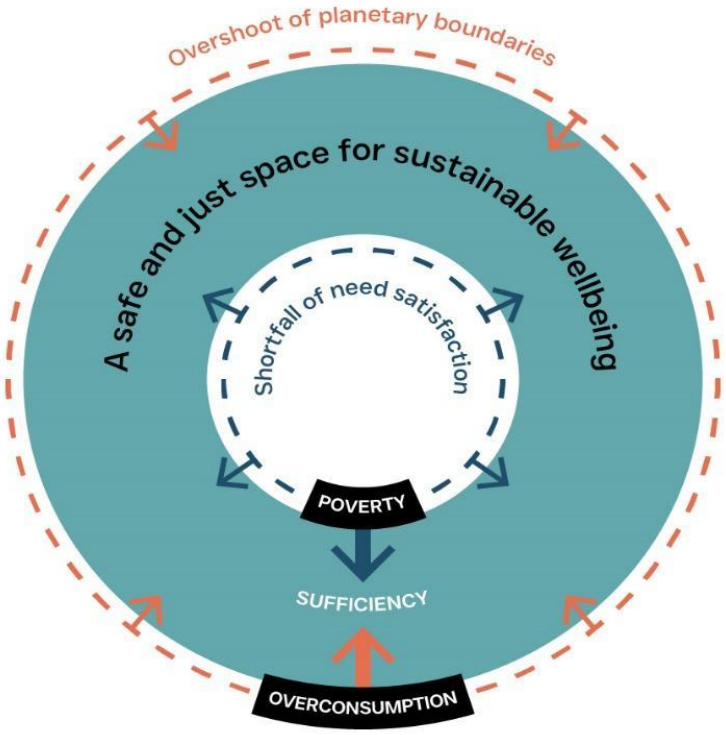

Figure 2. ToBe visualization of a safe and just space for sustainable wellbeing

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In addition to needs theories, the vision of sustainable wellbeing shall be informed by different theories of distributive justice, which help to decide on what basis resources, benefits, and harms should be distributed. At first glance, one could assume that the goal of ensuring wellbeing for all might seem to require strict egalitarianism where it is suggested that everyone should get the same amount. This line of thinking is relevant and can be seen when sustainability scholars have proposed certain caps or boundaries for environmental impacts and social outcomes. For example, Akenji et al. (2021) have estimated the 1.5 lifestyle carbon footprint by assuming that everyone should have an equal share of the remaining global carbon budget. Studies inspired by the doughnut economy and planetary boundaries frameworks have also established equal per capita thresholds and boundaries for social outcomes and biophysical boundaries without further considerations of differences between different population groups or countries (O'Neill et al. 2018). The demand that everyone should be allowed the same quota is based on the understanding that all individuals have an equal right to environmental protection and need satisfaction regardless of their country of origin, race, or gender. This is a morally justified argument when considering intragenerational justice in terms of material resource use and, for example, access to energy, education, or political voice as the societal preconditions for wellbeing.

However, a very strict egalitarianism in terms of social outcomes can be challenging for if it leads to a society where people do not have any freedom to choose their own lifestyles (see Bohnenberger 2020). Policies for sustainable wellbeing should not be built on a cemented list of what specific need satisfiers are universally applicable or which exact goods and services should be universally either included or excluded. To avoid this situation, the new policy paradigm should be informed by sufficientarianism and limitarianism as guiding principles of distributive justice (Robeyns 2019). Both derive the limits from the understanding of needs and can be seen as "mirror images", as they both focus on sufficiency but from different perspectives (Gough 2023). Together they contribute to achieving sustainable wellbeing within the sufficiency space, which is "above the floor of necessity but below the ceiling of excess" (Gough 2023, 2). This just and sustainable space can be defined with the help of normative arguments supporting both minimum and maximum limits.

Sufficientarianism is a normative theory of distributive justice arguing that "everyone should have enough, or sufficient, to meet a basic threshold for a good life (Rippon et al. 2020, 25). It claims that society should bring all individuals above the sufficiency threshold, but it also accepts societal inequalities as long as everyone has enough (Rippon et al. 2020, Alcantud et al. 2022). Sufficientarianism is thus primarly concerned with ensuring the minimum but would not endorse ecological or social restrictions on the satisfaction of others' needs if everyone is sufficiently well off.

This is why sufficientarianism should be combined with the perspectives of economic limitarianism as proposed by Ian Gough (2023). The normative claim in limitarianism is that "no one should hold surplus money, which is defined as the money one has over and above what one needs for a fully flourising life" (Robeyns 2019, 252). In addition to considering the poverty line, the limitarianism also advocates a riches line because it is assumed that "a world in which no one would be above the riches line would be a better world" (Robeyns 2019, 253). Robeyns supports this argument by referring to empirical studies that show that above a certain level, additional money does not contribute to wellbeing. She also makes two key normative arguments in favour of the riches line. First, she draws attention to the problematic

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interlinkages between financial inequalities and democracy. The existence of super-rich and massive inequalities risk undermining democracy because rich people are able and likely to spend their surplus money trying to influence politics and gain political power. Democracy might also be at risk because of the economic power of the firms owned by the rich. Second, Robeyns argues for economic limitarianism in a world with urgent unmet needs. As long as the world experiences extreme global poverty and significant local or global disadvantages that could be addressed by public financial resources, there is a moral argument for prioritizing unmet needs at the expense of the desires of the rich. Surplus money should be redistributed to satisfy unmet needs.

The limitarianism can also be supported from the perspective of climate actions in the world where wealth and emissions are highly intertwined. As shown by Lucas Chancel (2022), the per-capita emissions by the wealthiest top 10% of the global population are almost half of all emissions (48%). The carbon inequality is rather extreme when the top 1 % of the global population emits more (16.9%) than the global bottom 50 % combined (11.5%). The limitarian approach to addressing inequality and wealth accumulation is morally justified in a situation where the emissions of the 77 million richest individuals are significantly higher than those of the 3.8 billion poorer individuals (see Chancel 2022).

3.4 Conclusions on relational and sustainable wellbeing

In this chapter, we have discussed the importance of reconceptualizing human wellbeing on the basis of relational ontology. Sustainable wellbeing can broadly be understood as ensuring a good life for everyone within planetary boundaries, now and in the future. Wellbeing theories have provided multiple definitions of what is meant by 'wellbeing'. Combining an essentialist and constructivist approach, our framework for sustainable wellbeing is based on three human needs that are considered universally shared: health, relatedness, and autonomy. The recognition of these three needs helps to define indicators of multidimensional and sustainable wellbeing (see Dethier & Roman 2024).

While needs are universal, need satisfiers are culturally dependent and relative to provisioning systems in each specific context. Through our framework we argue that needs should be met within sufficiency space, visually encapsulated within the Doughnut (Raworth, 2017). Drawing on sufficientarism and limitarianism as distributive justice perspectives, we justify why wellbeing policies should focus on the need satisfaction between a floor of necessity and a ceiling of excess (Gough, 2023). Sufficiency policies are needed when promoting sustainable wellbeing in the European context.

The current view of 'homo economicus' mistakenly ignores humans' fundamental dependency on each other and more-than-human nature. Instead, it should be recognized that while human beings have specific cultural and technological characteristics, they are one species among other interdependent species. The proposed ontological assumptions that should underpin and guide all policies for sustainable well-being are the following: (1) A human being exists in the web of relationships, not isolated, (2) Human beings are fully dependent on Earth system and ecosystem processes, and (3) Humans exist always in and as part of nature.

What are the implications of our conceptualization of sustainable and relational wellbeing for post-growth transformation? From the perspective of relational ontology and ecological economics,

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economies should be seen as subsystems of societies which cannot exist without nature as life-support systems (Folke et al. 2016). Social systems are embedded in the biosphere which is the "thin layer of planet Earth" integrating all living beings and their interplay with Earth system dynamics such as the atmosphere, water cycle, land use changes, biochemical flows etc. (ibid, 2). These systems provide life support for all species on the planet (Rockström et al. 2023). It is thus misguided and erroneous to claim to care for human wellbeing while simultaneously degrading these support systems. Nature is the foundation of wellbeing. Even though this is obvious, it is too often forgotten in our 'developed' Western societies. In post-growth paradigm, people thus need to "re-learn what it means to be a humble part of 'nature'" and "leave "behind narrow anthropocentric notions of progress based on economic growth" (Kothari et al. 2019, xxviii).

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4. The institutional framework: a case of self-management planning

In this chapter, we discuss the importance of long-term planning and elaborate on lessons learned from a self-management institutional framework when facing public recognition of limits to growth. Following the development of the philosophy within which to interpret the problem of transformation, followed by vision and conceptual framework in which to express the paradigm, we now explore the importance of planning – even with partial information. Learning from historic institutional framework and planning process we discuss cases of wholesome bottom-up planning development aiming for a transformation in a desired direction. The nascent research in lessons of planning not focused on the notorious cases of the Soviet Union (Spufford, 2010; Klitgaard, 2023) calls for a much broader outlook than we were able to provide within the confines of this research project. Yugoslavia and Slovenia provide cases in point for developing but Global North countries, and ones perhaps familiar to European readers. But future lessons of planning a transformation need a comparative framework with examples from other temporalities and localities, as well as their integration with foundational pillars of sustainable wellbeing and novel political ontology.

We argue that a reconstruction of economic model aimed at sustainable wellbeing requires planning and coordination to transform the present growth model into postgrowth and regenerative prosperity on a shared planet. This is not only logical but is by now even a mainstream claim in degrowth and postgrowth research (Durand, Hofferberth, & Schmelzer, 2024; Koch 2024). Planning is crucial to avoid both the 'irrational' recession stages of the capitalist economies, and foreseeable major disruptions to the transition process. Degrowth invokes a 'reduction of throughput by design, not disaster' (Victor, 2019). The said 'design' implies a possibility of planning, of purposeful, managed, intentional and democratic (Parrique, 2020) reduction of some aspects of the social metabolism and socio-cultural characteristics, as well as increase in those deemed woefully insufficient now. In the interest of justice, but also of feasibility of transitions away from the crisis (cf. Introduction), the said planning ought to be broadly inclusive and participative.

4.1 Self-management and planning in Yugoslavia and Slovenia

This section introduces institutional infrastructure through which a long-term plan selection and coordination was conducted in the self-management economy of 1970s Yugoslavia. The long-term plan, once agreed upon provide a back casting guide for development of local, as well as short and mid-term plans. Economic activity and most importantly the production to satisfy needs can be organised in worker-run companies (self-managed enterprises), which in turn tend to be embedded in wider social movement and attentive to the communities they are situated in. It is this feature that makes them important components of a strategy of transition from crisis to resilience and allows them to focus on

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maximizing social self-determination, which is important for the said 'design' over productivity and profitability (Karyotis, 2019).

On the level of political ontology (cf. Chapter 2), broadening of visions away from capitalist productivity and profitability, allows the communities to question the division between the social, the economic, the political and the environmental spheres, so fiercely resisted by the capitalist modernity. Such visions of a society directed by 'associated producers' have been a feature of many historical currents of social justice (Karyotis, 2019). The under-researched case of Slovenia, a federal constituent republic of then Yugoslavia, provides instructive guidelines and experience of institutional set up to coordinate and initiate large-scale bottom-up planning, a real historical integration of the awareness of 'planetary boundaries', and do's and dont's of planning a decades long transformation.

Democratic self-management at the workplace is seen as a methodological instrument for desirable planning - an "effective way to bridge the chasm between this vision of the future and the day-to-day struggle within capitalism, thus becoming an essential component of prefigurative politics" (Karyotis, 2019, p. 333). Such prefigurative politics is another element of the nascent novel policy paradigm, a practice of politics that attempts to construct alternative socio-metabolic organisation in the present. The very replacement of hierarchical decision making with horizontal co-creation of planning makes it easier to substitute the narrow growth imperative with humane considerations related to wellbeing and sustainability.

Moreover, the pressing imperative to address the climate breakdown makes this a necessary organisational step rather than a theoretical position, claims Thomas Piketty (2020). Confronting the limits that planetary boundaries and escalating climate change present for the infrastructure and welfare distribution, he concludes that participatory self-management should be applied to the sites of production, which are themselves truly situated in the communities they operate in. The key to this version of organisation of capital stock management and production is that it is not dictated by experts and officials but co-constructed by the participants themselves within a certain realistic framework.

Such governance and planning processes can be found in the historical case of socialist Yugoslavia in the second half of the 20th century. This has indeed been an erroneously absent case of contemporary debates in the field of planning, woefully overlooked in recent publications on planned degrowth and democratic planning in general. On the other hand, those publications remain mostly on the level of conceptualizations and propositions with respect to the planning format, policy paradigms and strategies needed. We propose instead to delve into the historical lessons of planning for environmental justice and throughput stabilisation (and eventual reduction) drawn from Yugoslavia, and most notably its most technologically advanced federal state Slovenia (a federal state within Yugoslavia and contemporary EU member state). Given the topics of the overall research project and the changes in 50 years long Yugoslavian history, we focus specifically on the post-1971 reorganization of planning and context of international discussions on 'limits to growth'.

The discussion in this and the following section is based on archival research with surviving documentation (conducted in the Yugoslav Archives, the Serbian State Archives and the Media Archive

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"Borba" in Belgrade, and the Slovenian State Archives in Ljubljana) and interviews with relevant actors.[1] Our focus is on the specific discursive lessons for planning processes and wider participative coordination drawn from the specific case of long-term Slovenian balancing between growth and degrowth visions. Nonetheless, given that many contemporary readers may be utterly unfamiliar with the relevance of the Yugoslavian case for a transformative theoretical framework for sustainability, this section gives a brief contextual introduction. Yugoslavia was a southeastern European socialist country that did not belong to either of the two power blocs of the 20th century (Western or Soviet). It envisaged a development path that was neither market- nor state-driven but based on nested self-organization: a system called "self-management". Initially, it has achieved among the fastest growth rates of the post-war period, with average annual GNP growth of around 11.3% in the years 1957-1960. Most importantly for an initially mostly rural subsistence economy, at the same time Yugoslavia's industrial production average grew at the rate of 14.1%, or 14.6% in construction.

Various historical processes, both internally driven and externally conditioned - with awareness of global planetary growth limits being one among them – led to ideological and regulatory adjustments of the system in the early 1970s, combining self-management with regulated market economy. By early 1980s, the crucial period for the planning discourse we are mapping out, the prolonged economic crisis pushed the national economy to the brink of sovereign default and the International Monetary Fund (IMF) bailout induced neoliberal market reforms. Nonetheless, recent research points out that despite the crisis the Yugoslav socialist economy proved more resilient in mitigating negative social outcomes, than the middle-income EU countries (e.g., Italy, Greece, Spain) in the period from 2008 to 2013. Whilst the real purchasing power in Yugoslav households notably decreased over the respective period, the provisioning for the basic material and social needs remained stable, with access to public services, such as healthcare, housing, education, and childcare, continuously improving (Slameršak, 2024). Nonetheless, the overall story of Yugoslavia is not one of triumph of sufficiency and conviviality over competition, accumulation, command and control, but one of political infighting and violent dissolution. Many contemporary Western analysts saw misgivings and (labour) inefficiencies in the complex self-management coordination and decision-making (Comisso, 1980), with the societies increasingly failing to catch-up with the neo-liberal Western expansionism and globalised commodities production (Gagyi, 2021). On the other hand, it is acknowledged that the main contribution of workers' participation, enterprise democratization and decision decentralisation lie in the greater motivation and commitment to work, which provide both increased outputs and resilience in the time of crises (Lakić et al., 2023; Whitehorn, 1976). The downside of this is that worker participation is seen as

[1] When drawing lessons from history of peripheral states like Yugoslavia, researchers are often asked to provide a total picture and full context, which is not the case when lessons are drawn from core regions of the world system. As the lessons learnt stem from a social and environmental history of a federal state's operation over five decades that include the global Great Acceleration (Steffen, Broadgate, Deutsch, Gaffney, & Ludwig, 2015), arms race and population boom, we will not present a thorough overview of a complex history of several generations of a multiethnic and internationally engaged state. This would be as futile as extracting simple socio-ecological lessons from 70 years of European post-war history.

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shareholding within a competitive enterprise, which can lead to the same overall deleterious environmental and social effects if the goal of profit maximisation is followed (Law, 1976).

The planning process, rather than the distribution of eventual profits, is our main concern here. It is understandable, though, that the one influences the other, as the goal of the plan can be either increased accumulation or broader social or environmental wellbeing beyond the realms of the single enterprise community (Lebovic, 2014). By 1970s this leads not only to uneven development between regions and cities, but also to overall ability for the government to direct the development strategies and long-term plans. Therefore, a real tension arises between the government planning aspirations and the actual capacity of workers' collectives to integrate their visions and wellbeing conceptions into those plans (Lakić et al., 2023). Subsequently, the very democratic and participative nature of the system is jeopardized, and possibly subdued to the control by professional elites (Comisso, 1980; Marković, 2011). This is crucial for our understanding of the possible drivers of split within the long-term plan of Slovenia. Moreover, as our research indicates, there was an awareness among specialised professionals of the crisis of the growth model dominant since 1950s, particularly with respect to environmental stability.

Not only are there parallels with contemporary awareness of environmental limits, but the situation at the time was also present globally, as evidenced by the Stockholm Conference on the Human Environment in 1972. Yugoslavia was one of the member countries of the Conference's preparatory committee, and the topics of the conference as well as its conclusions were widely present in the national public discourse at the time. The global discussion on the limits to growth was reflected in the national intellectual discussions and popular media discourse. For example, a national newspaper interviewed the delegation members, bringing forth statements like this:

"At the Stockholm conference (...) you could see that solving man's [sic] *environmental problems is not a technical issue, but an important political issue. (...) If you ask me, we should analyze what our society should look like in the next 20 to 30 years, how it should be organized and how it should live, because the environment in which it will live depends on this."* (P. Novak in *Borba, 1972).*

Beside bringing the holistic view of society inseparably enmeshed with the (global) environment, it calls for a planned approach to addressing eco-social challenges. In the particular ideological key of the time, and with reference to the experience of the creators of both the modernisation programme and the specific economic model, the called for goal was one of "total self-management" (Prelog, 1973). It would include the ontological consideration of the beyond-human world, the 'environment', together with the social realm and management of the material flows for industrial production and social reproduction. Thus, by early 1970s there was a general awareness of the need to include environmental management or restoration into national and enterprise plans. It was already one of the main features of Yugoslav type of planning that the process of planning extended the principles of self-management to the whole of society (Vanek, 1967).

The plans were not legal requirements in specific detail applicable to social organisations and enterprises, but they provided a broad set of guidelines and constraints directing the individual strategies and short-term operations of the economic and social actors (Vanek, 1967). By the late 1970s

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this led to increasingly complex coordination between the individual enterprises, or even their subunits, and the overall social reproduction and national development goals (Comisso, 1980) in both creation and execution of plans. We must also recognise a fundamental conflict (hinted at and discussed, but certainly not at the forefront of the understanding of social reproduction) between "the maximization of profit (return) per worker" (Vanek 1967, p. 380) and the long-term environmental stability. The plans were complemented by indirect legal and political instruments such as tax policy, depreciation rules, laws of minimal social provisions and the like (Lakić et al., 2023). Most importantly for our presentation of planning, state (and federal republic) level planning and legal instruments to navigate its implementation were expanded from late 1960s. This included econometric modelling, especially in Slovenia.

The structure of planning and the great expectation placed on the "negotiated economy" and "self-management agreements" between various units and levels (Comisso, 1980), should have balanced the profit-maximisation and long-term sustainability goals. The 'self-managed agreements', concluded and signed between various institutions - from the post office to the factory – were a suitable means of overcoming centralized planning and the laissez-faire approach in the macroeconomic environment of Yugoslavia (Babić, 1981). In addition to the planning connecting institutions and labor organizations at the level of enterprises ("self-managed planning"), there was aggregate 'high-level' planning ("social planning") at the level of municipalities, federal republics and the very general "whole Yugoslavia" plan. Complexity is the other side of the coin of avoiding the 'might is right' approach of the market, but it must be taken as a lesson that needs special attention, even with the multitude of digital tools available today that were not available in the 1980s. Many enterprises coordinating diverse inputs are today reliant on such tools, but primarily for the benefit of maximizing profit margins.

In the Yugoslavian case, an extremely complex web of relationships emerged, as the number of organizations and institutions that had to reconcile their particular interests was exponentially greater than in any other country in the world. Article 59 of the federal constitution stipulated that workers in all labour organizations and communities had the right and duty to draw up their own plans and programs for the work and development of their own organizations. They were also expected to coordinate them with other institutions so that the whole of society could "master" its own "social reproduction" – in line with K. Marx's theoretical ideal social reproduction schemes from the second volume of *The Capital.*

This lofty ideal, like fully participative transformation for sustainable wellbeing, can easily run into problems of conflicting interests where power relations rather than universal resilience and prosperity dominate the choice of particular strategies. In the absence of a devastating, ever-present and all-pervasive environmental crisis, as well as adherence to universal right to emancipation and embodied energy distribution (Brajdić Vuković & Domazet, 2022) planning itself can entrench extractivism and inequalities. A monitoring framework comparing the constraints and eco-social goals in a variety of domains, such as the doughnut framework, might help make the abstract constraints more vivid and relevant to the daily particularities.

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In the Yugoslavian case, the *Law on the Fundamentals of Social Planning and the Social Plan of Yugoslavia* (Službeni list SFRJ, 1976) defined certain 'general social interests' in order to ensure that the nation had an opportunity to prioritize certain aspects of self-managed agreements that contributed more effectively to e.g. general health and education. Additionally, the higher level (large) plans – such as the federal republic or whole federation plans – were also based on scientific analyses and best available model projections of long-term development (Borak, 1986, p. 3). The Slovenian long-term plan falls into this category. To resolve conflicting interests of various actors within mid-term (5 year) plans, guidance was sought from the long-term plans. The latter provided a conceptual framework within which to specify the common general goals or orientation, and a framework within which to identify and resolve conflicts of interest between the self-managed entities (from enterprises to civil society associations).

A foundational lesson for us to apply also to the reading of the case study in the next section, is that a long-term plan provides a language, a conceptual framework within which different actors can negotiate (Borak, 1986, p. 90). The long-term vision, a general plan respecting constraints and threats and speaking to the commonly held aspirations, provides a space for mediating discussion. In a framework of aspiration of self-management for the whole of society, planning process becomes a sort of less threating but sufficiently referendum on the choice of futures, if developed right. The long-term development plans were usually drawn up by the republican or federal authorities based on inputs from powerful entities like the banks, the large industrial enterprises, research institutes and think-tanks, and many other specifically motivated associations. Unlike in Soviet centralized command planning, the long-term plans in the Yugoslavian instantiation become a kind of forum in which the competing self-managed interests could be resolved in a collective coordination.

A serious conceptual and operational intellectual challenge then became one of 'harmonization' of the plans: short- and mid-term plans had to 'flow' from the long-term plans, whilst federal republic's plans had to coordinate with each other and the overall federal plan. An adequate theoretical framework and the attendant policy paradigm have to reconcile the potentially competing interests and the ethically and materially established constraints. Institutionally this set up resembles what Durand and colleagues (2024) postulate as a necessity of future transition planning, an institution for a democratic deliberation of "multisystem dynamics". In Yugoslavia, and more specifically Slovenia, such institution itself was influenced by the contemporary concerns for global limits to growth, as well as environmental justice and uneven development. Slovenia, the wealthiest and most industrially advanced Yugoslav federal republic, developed the most detailed long-term planning process and also suffered instructive conflict between pressures of competitive growth and intellectual awareness of its negative impacts. One of the most controversial plans of this kind was the "Slovenia2000" project.

4.2 The story of developing the long-term plan in 1980s Slovenia

In line with ToBe's aim to lead to better understanding of linkages between social, ethical, political, economic and environmental or material impacts of the drivers of change, this section presents the lessons of the process of developing adequate policy paradigms from the *Slovenia 2000* plan. It has neither the scope to describe the sufficient detail of the plan's construction and subsequent updates,

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nor the broader geopolitical trends spanning two decades of neoliberalism, crisis of socialist block's social contracts (Bartel, 2022) and eventual war and transition to capitalism in what is now known as former Yugoslavia (including Slovenia). To focus on the lessons, we extract a subset of findings from the research into overall mapping of reception of the global limits to growth discussion from the 1970s (connected to the Stockholm conference mentioned in the previous section, as well), and political contestation for domination within contemporary Yugoslavia. Whilst they are both significant for the complete understanding of the complex interlinkages between drivers of change within this case-study, they require familiarity with too much historical, socio-economic and political peculiarities of the case to be included in this report. Their most pertinent aspects will be briefly presented where needed to provide the relevant understanding. It would be ethically and intellectually inadequate for the complex history of a mid-size European state and a well-known international actor to be reduced to a simple do-this don't-do-that motto. However, the history of the *Slovenia 2000 plan* can provide useful lessons for the present day desirable social change. We must remember that the instruments of planning were already well developed by the 1980s. The public was sensitized to the constraints of unabated material and energy throughput locally (through pollution reports) and globally (through Stockholm conference coverage) but was also wedded to development aspirations of a poor European state.

This is particularly pertinent from the perspective of the European role in the global context and the need to address the participative development of post-growth flourishing beyond the richest capitals of 21st century elite decadence. For the purpose of this report, the story of discussion between throughput-limiting and unabated-growth visions surrounding *Slovenia 2000 plan* provides lessons for middle-income developing countries addressing the challenges of alternative development in the 21st century. As a backbone of growth ideology and catch-up enrichment globally, these then impact the theoretical framework for sustainable welfare paradigm in the high-income heavily globalization-dependent rich countries of core Europe.

Institutional paradigm

Planners in Slovenia realized that they needed to set a long-term goal to guide their five-year plans mandated by the early 1970s new federal constitution of Yugoslavia. The development of a framework for medium-term plans had to be derived from a framework of long-term goals and constraints. The […] *Long-term plan for Slovenia for the period of 1986-1995, and in certain areas until the year 2000* (published in the Official Gazette of the SRS of 4th August 1978) was the first long-term plan in Slovenia and the first to include environmental protection in an integral way (Borak, 1986, 89). This document also attracted the most public attention among contemporary plans, eventually receiving no less than 158 amendments (Borak, 1986, 90). It was also one of the most extensive such plans, running to 99 pages, a third of which contained econometric analyses of growth trends in energy use, population etc. It also contained one of the largest pools of coordinating bodies: a total of 196 units contributed to the final coordinated planning.

A central institution dedicated fully to the plan's coordination, framing and narrative expression, the Institute for Social Planning (ISP) in Ljubljana, Slovenia, acted as the guardian of the plan document. It liaised with the universities, banks, the executive branch, workers' associations and industry management to ensure that it was truly a social plan (Borak, 1986, 90). A method for the planning

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process was defined in a planning Council meeting in 1980. One of its first tasks was the definition of what reaching a 'developed' stage meant for the particular Slovenian case. It was a sort of an intellectual sketching of the end-goal of the societal progress imperative. Similar to sustainable wellbeing we seek to identify in this project, the Yugoslav plans based their ultimate vision on the concept of emancipation. Emancipation was further operationalized through liberation from toil, automation of production, national self-sufficiency and egalitarian power position with rich and high-development states. One of the means for this was also abandonment of previous models of extensive growth of throughput due to their physical constraints and known international and local destructive consequences.

The important lesson from the institutional framework and the processes employed in the Slovenian case is that the transformation planning is easier to accomplish starting with the vision and distant goal. The general ethical principles guide the definition of the long-term vision. But to narrow down the scope of possible visions it is important to assess the imperatives resulting from the present situation and known trends. This is presented as Step 1 below, describing the problem and explaining the need to deviate from the status quo. Step 2 then describes the choice of three options, scenarios that describe most obvious possible responses as deviations from status quo trends. These are then compared against the principles defining the final vision to help with deliberation on the choice of the most desirable, or optimal scenario. This is not so unusual in planning processes that many collectives undertake, but the case here describes the process on the level of the state. Finally, when the most desirable vision is selected, in Step 3 a wholesome long-term plan is developed from it, including the various consequences that can be deducted from it, the specifications of what must change for other things to keep going. But this process also allows for a public opposition, for a democratic protest against the hidden consequences of the plan that the planning officials and political leaders may not have wanted to spell out. It is an instrument of broadening democracy. That is our final discursive lesson from the Slovenian case-study.

Step 1 – the diagnosis to establish that there is a problem with carrying on as before

The general society-level planners first analysed the limitations of the preceding growth models to determine where the problems with contemporary secular stagnation, intensifying pollution and persistent inequalities stem from. This was a unique approach even within Yugoslavia, resting on overarching socio-economic analysis rather than a synthesis of individual sectoral trends. Slovenian public had by this time become acutely aware of both social inequalities and environmental pollution within the federal republic and the federation overall. The researchers were even more clear about the downsides of the growth-fetish. The previous decade saw overall economic growth and increased employment rate, but stagnating productivity and educational attainment of the labour force (Borak 1986).

The growth of fixed capital was almost constant at 7% of GNP, which means that the problem was not the lack of investment, but its utilization. The researchers working on the general 'social plan' blamed this on the fetishizing of the quantitative increase of the production factors, at the expense of resilience and understanding of sustainable steady-state potential within an increasingly globalizing economy.

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Contextualizing the global limits to growth debate, and the resistance of developing countries within the UN to accept it as a new normal, the Slovenian general planers recognized that "as the most developed Yugoslav republic, Slovenia was the first to reach the limits of growth" (Borak, 1986). With its local environmental pollution reaching unsustainable levels, and public awareness of the approach to global environmental limits to growth, Slovenia had to look for a way beyond the ongoing quantitative expansion as the source of its population's wellbeing.

Methodologically this was Step 1 of the long-term plan and presents the first lesson for our case. In essence, it consisted of analyzing the actual historical trends to reveal the problems with the previous growth models. We have multiple sources of this kind of information today, both in simple public awareness of the global environmental crisis and the visible extreme inequalities between the average rich and average poor (not to mention the extremes). The simple messages that the development path followed in the second half of the 20th century is no longer available (Hermann, 2022). But even social research today in European core and semiperiphery indicates the awareness of the limits to old growth path (Eversberg, 2020; Brajdić Vuković et al., 2022). In the Slovenian case this was to be followed by modeling projections of development for Yugoslavia and comparative countries, the Step 2 or prognosis. Given the choice of pushing for growth or environmental and social wellbeing in a range of scenarios, the prognoses already brought the information about alternatives.

Step 2 – the prognosis outlining different alternative directions that can be taken to address the problem

Different scenarios ranged roughly between degrowth and 'green' growth (neither phrase was in use then), aligned with more familiar conservation and ecomodernisation. The idea was to assess which scenario is more globally compatible and better suited to achieve the originally defined emancipatory goals, given the various novel and known constraints. That is, the planners understood that not only is Yugoslavia socio-economically specific, but also that linear modernization narratives in which all countries go through the same stages to attain the same outcomes is not a realistic depiction of the global development or material flows. The matching of the scenarios with the ultimate goal (for example sustainability, prevention of catastrophic climate change, prevention of biodiversity collapse, avoidance of wars of global migration; Welzer, 2012) is intended to make the lofty abstract goal more concrete and form a coherent conceptual framework useful for what we would call 'a policy paradigm' based on the preceding sections.

It is important to note that the eventual transformation planning did not take place in a vacuum. By the time this methodology of the long-term plan was agreed upon by the institutions guiding the research and possible prognoses, 1980 was on the way out and global developments took a different turn from the hopes of the Stockholm Conference. The global energy (predominantly oil distribution) crisis had re-emerged in the form of rising energy prices. The infamous 'Volcker Shock' sent the external debt of countries like Yugoslavia soaring and forced them to draw down on IMF loans alongside the preparation of the plan to overcome industrial development bottlenecks and seek parity with the European core. In summary, in a turn away from pre-1970s trends, the loans and austerity-driven centralization of

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governance in conjunction with the oil price rise made Yugoslavia's energy and commodities too expensive to spread wellbeing through them.

Taking this context on board, the planning coordination developed three broad long-term (two decades) futures scenarios, roughly: A) recession with rising authoritarianism, B) quantitative growth on all possible fronts leading to colonial-style dependence on foreign powers, and C) strategic economic specialization and intense participative transformation of the economy. The names reflect the benefit of hindsight our analytical position allows. Roughly they can be put as (A) continuing along the Business-as-Usual path, (B) greater externalization of environmental costs and stronger integration into contemporary international markets, and (C) a wholesale transformation with limits to growth in mind. The experts producing the plans themselves had preferences between them, especially given the proclaimed values of ultimate goal of emancipation (thus against authoritarianism and imperialism), evident in what these short descriptions put the accent on. The general scenarios were each further developed into consequent socio-economic and environmental sub-studies, as well as attendant international relations projections. The latter took the limits to growth concerns into account and envisaged the falling growth rates in the West and rise of Asia (predominantly China). The sub-studies are also the least well preserved historically as they only served as working material and input for the next step (Step 3 – the treatment).

It is clear for our purposes how the three types of study, regardless of their motivation in sudden and contingent shocks of energy cartel and international standard appropriation, were narratively meant to convey the dangers of doing nothing or following old patterns. Neither recession-rooted authoritarianism (A) nor the loss of autonomy on a global stage (B) were compatible with the general goal of emancipation, even if they were in some respects easier than pulling up a nation's economy by the bootstraps. Most of our interest is therefore turned to the invitation for strategic transformation of option (C). Despite its ecomodernisation-sounding shorthand, this scenario admits of degrowth readings (with increased autonomy and democracy and focus on qualitative over quantitative) as well green growth ones (techno-specialization and greater volume of international trade, under eco-socialist governance).

Step 3 – the treatment or how to get from here to the desired option

Unsurprisingly, the Council guiding the institutional networks developing the Slovenian long-term plan (Slovenia 2000) rejected options A and B as suboptimal or even contradictory to the final objective of the plan, and chose the option C. It was to be further elaborated into a guiding social plan up to year 2000, from which a policy paradigm would emerge by rational analysis. A paradigm in this sense sketches the institutions and policy proposals, not the concrete policies that all instances of society would live by for two decades. In fact, these proposals were themselves discussed in forms of alternatives that the basic units of organized labour (BOAL) could choose between in reaching negotiated 'self-managed agreements'. The increasing authoritarianism and subservience to foreign debt sidelined the desirable broad discussion between pro-environmental and socially just future and one of expanding cheap and available commodities. Growth again became the simple and necessary answer to pressing problems, regardless of the 'long-term' costs (and again, 'long-term' is itself 20 years behind us).

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What this meant in concrete terms was the introduction of a plan that aimed to catch-up with the industrialised countries, by relaying on labour-saving and ecomodernizing measures (Borak, 1986). Or rather, it was a plan of specialization in exports to wealthier countries, in the field of energy-efficient and resource-saving production. Different industries in Slovenia were to conform to this, for example in electrical and electronics industries with digitalization and wider utilisation of micro-circuitry together with software development. Moreover, the plan concludes that the environmental protection and restoration demands of the general public will be honoured, and that "restoration of a global ecological equilibrium" (Borak 1986, 90) will be contributed to. Evolution of the final plan document suggests that the next iteration (post-2000) would have placed an even greater emphasis on the environmental aspect of the 'total self-management' – a specific Yugoslavian ideological response to the challenges of limits to growth. As it turns out, the ecomodernising twist had a fair share of pollution displacement mixed in, eventually inviting a very instructive controversy.

A lesson for us is an explicit presentation of the long-term projections with social, infrastructural and environmental elements equally represented and interconnected for coordinated planning. It is an intellectual space where exact reckoning between pollution control (most importantly greenhouse gas emissions) and continued growth, and desirable but unavailable technological fixes plays out. The explicit inclusion of environmental aspects and goals of environmental stability, protected areas and resource use, changed the way planning worked hitherto and in other federal republics of Yugoslavia. It added a novel standard, a concrete plan with maps overlaying population density, energy use, transportation network, protected heritage and conservation of nature.

In the 1980s already the plan invoked the need for energy efficiency in industrial production and circular economy principles to address the social and ecological balance (Borak 1986). Through coordination between productive enterprises the plan stipulated the requirement for pooling of energy and natural resource flows, as well as labour and financial resources. Such coordination was one of the major instruments of the planned throughput reduction (compared to the previous decades and the stagnating extensive growth model), exactly opposite of the tendencies for stock hoarding and competition that launched the fossil capitalism (Malm, 2016).

4.3 A counter-plan – using philosophical vision to challenge the green growth plan

So far, the historical case-study of Slovenia may not feel instructive enough in situating the transformation imperatives and strategies into a realistic setting. Namely, the methodology of the planning for change is not exclusive to socialist Slovenia, and the outcome presented here is known to have paid mere lip-service to global ecological equilibrium' and ecomodernizing tendencies towards efficiency (through national resource and energy coordination). Therefore, we should take into account the context of the crisis beset mid-1980s (Gligorov, 2021), as another lesson for present-day degrowth transition. Even the best of plans can be thwarted by the chaotic context and changes beyond planners control. But there is more, evident in the development of the political discourse that appeared as a reaction to the official plan document. The political and civil society, especially the engaged research

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community could not stay silent about the material and ethical shortfalls that the plan concealed. This is the strongest lesson for our time.

The plan as it stood at the time could simply not square the goals of reaching high development status, paying off the foreign creditors (united behind the IMF proscriptions of austerity) and investment in ecomodernization of industrial production. Energy companies were particularly hard hit as they relied on debt-financed foreign fossil fuel imports, which led to greater exports but shortages in the national supply. Increasingly, the planning became contingent on good social deals and barter, rather than on technological development and resource efficiency innovation. All of this made the ability to plan (especially to look into the long term) much harder and the society and economy resorted to making-do and quick fixes available at the moment. Moreover, in the prioritisation of the socio-centric crisis negotiation, the environment again took a cost-cutting hit.

Soon enough this led to a particularly poignant case of PCB pollution near an electronics industrial site in Slovenia, prompting protests by local residents and a wholesome analysis of the case by a group of geographers from the University in Ljubljana. Dušan Plut, a geography postgrad and political figure who popularised the case, and several others published a popular book that offered a post-growth 'counterplan' to the official Slovenia 2000 document (Plut, 1985). It rested on the abandonment of the catch-up goal, and the linear modernising path that lies at the heart of the climate breakdown and ecosystem collapse if we consider it the only way to a globalised wellbeing. The official *Slovenia 2000* they contended, ended up prioritising industrial growth, urbanisation, private consumption and land use change, which would have resulted in a 30% increase in resource use and pollution (Plut, 1985). After this additional environmental loading, remedial measures would have been taken – like the developing countries' response to 1972 Stockholm calls for growth curbing. But most importantly, the counterplan called out a social injustice too, one striking at the heart of the federal state's foundational principles.

Slovenia 2000's plan was based on 'environmental imperialism' to source cheap electricity from southern Yugoslavian states reliant on coal-mining and thermal powerplants. The counterplan drew its popular appeal from the accusation lobbied at the Slovenian energy industry of transforming Bosnia and Herzegovina, and Kosovo into "environmental colonies". There lignite coal mining was expected to almost triple in 20 years (from 7.7 million tonnes in 1983 to 22 million tonnes in 2000) to satisfy the Slovenian energy supply plan. This was to destroy 7000 hectares of arable land and cause a resettlement of 80,000 people, in addition to increased local air pollution (Plut 1985, 123).

The counterplan stated explicitly that Slovenia was solving its own environmental problems by relocating them to other parts of Yugoslavia, whilst profiting from cheap energy and labor. This was a serious shortcoming for a nominally socialist state, developed through self-management and coordination of equally valued individuals and regions. If people were willing to turn a blind eye to projections of environmental degradation, a planned offsetting of the dangerous pollution on the poorest and those least benefiting from the endeavor was a compromise too far.

It is important to note that in the context of planning, these threats carried more gravitas than if they'd just been hypothetical warnings based on unmitigated business-as-usual projections. Here, it was a

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direct consequence of the plan of action that presented a policy framework for all actors, no matter how beneficial they might have liked themselves to be. The obligation to comply with the plan which is deliberately resigning compatriots to sickness and underdevelopment may have been a much harder pill to swallow for the mass of Slovenian workers in different sectors. Moreover, the provocative counterplan did not just lay out the criticism, but also proposed a possible remedy to the eco-social injustice. It suggested a steady state economy for the federal (self-management directed) Yugoslavia, with much higher internal redistribution and coordination based on no-growth constraining principles. Some analysts called it the first eco-socialist self-management proposal (Andrej Kirn in research interview, 2023), preceding many contemporary utopistic visions of prevention of global environmental and social breakdown (Bellamy Foster, 2023).

This was indeed a peculiar expression of the contemporary degrowth tendencies, contextualised to the Yugoslavian discourse, policy paradigm and global position. The ancient notional invocation of the self-managed eco-socialism with a humanist perspective was operationalised in Plut and colleagues' counterplan, as they envisioned a "society that adapts its processes […] to the natural cycles of matter and energy" and stabilises their throughput through self-managed reflexion and planning (Plut 1985, 129). Starting with environmental footprint, which was the motivation for exposing the downside of growth imperatives together with planned strengthening of 'environmental imperialism', the counterplan proposed a two-stage footprint capping and reduction. Growth, meanwhile, had to serve the necessary ecomodernization and pollution clean-up in the first phase (10 years), and then be abandoned as a measure and a goal in favour of "adherence to natural cycling of matter and energy" (Plut,1985, 125). Many specific policies akin to present-day strict environmental protection measures and taxation for technically unavoidable pollution (and directed towards health protection and restoration for those affected) were suggested as implications of this general policy. In addition, it included better environmental education and incentives for energy-efficiency or sufficiency at household level.

On top of that, the counterplan proposed putting several development options before the electorate in regular popular referenda, from the growth-intensive to environmentally-conservative. This public deliberation was never realised, and the *Slovenia 2000* only took place at the expert level with the abandonment of the authoritarianism and resource-dependence options. Threats of environmental imperialism and its consequences should also be publicly debated, which could only be addressed by considering limitations on the Slovenian energy demand. However, the counterplan itself was rejected by the major publishing houses over its subversive and pessimistic outlooks but nonetheless sparked a public controversy. Dušan Plut himself was moved to publicly resign from the leading Communist League after 20 years of membership, due to what he called "the increasing failure of the party to solve the ecological contradictions" of the time (Plut 1987a; 1987b; Pregl 1987). Two years later he was elected into leadership of one of the first post-socialist green parties, which itself eventually split over growth vs. ecological justice issues. Looking back, Dušan Plut reflected on the divisions in the green movement that proved an obstacle to prioritizing environmental stabilisation over material development– a lesson for the Slovenian Green Party (Dušan Plut in research interview, 2023).

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Finally, all this long-term planning and debates around the counter-plan came to nothing, which is our final lesson from this case. Yugoslavia disintegrated in a violent conflict Slovenia acceded to the EU and its GDP continued to rise together with the environmental burden and social inequality, whilst a welfare index stagnated since the 2008 global crisis (Soupart & Bleys 2024). Today, 40 years after the counterplan's proposals, Slovenia is far from a steady state economy or an eco-social self-management society.

4.4 Conclusions on the importance of planning

This chapter summarises the lessons from the case-study of the 1980s Slovenia and Yugoslavia and connect them to the present day planning attempts. The instruments and the course of construction and implementation of Slovenian national long-term plan *Slovenia 2000* trace their framing to the Limits to Growth discourse after the Stockholm Conference. It provided the conceptual framework in which to lay the ground for a debate on reaching a steady state self-managed society in the early 2000s. Whilst the concept of 'ecological equilibrium' was used already as a reaction to the Stockholm conference from mid 1970s, the concrete steps to address its combined social and environmental implications have played an important role in understanding the difference between the official plan and the scientists' counterplan. It is crucial for us that a wider public discourse about a particular issue and the leadership's narrative response are important in framing the problem and the acceptable solutions.

Yugoslavian planning instruments teach us about discursive tools to lay out the path to steady-state society through long-term plans, an idea that is not even debated in official strategies today. As a unique example of "federalized" long-term planning that developed in the early 1970s, the Yugoslav example has shown that the problem of harmonizing local needs between other republics or federal units is an issue that must be addressed if what Dušan Plut called "environmental imperialism" is to be avoided in planning. The institutional framework of coordinated bottom-up planning, following a top-down delineation of the long-term vision, is our another lesson. Further ones are the procedural Steps 1 to 3. Finally, civil society can use the philosophical guidelines drawn on to conceptualise the long-term vision to call into question the hidden consequences of the adopted plans, which allows a broader social debate about the social and ecological costs of those plans. This is an important historical precursor for the global responsibility of European sustainable wellbeing aspirations, and the role an engaged civil society plays in turning plans into reality.

Planning has the advantage over market mechanisms. Anticipated externalities or cross-sectoral effects can be detected much earlier in the planning discussion, similar to the methodology outlined in Steps 1 to 3. In the case of the European Union, however, the issue is not that it does not use planning, but that it uses planning in a way that preserves the status quo between the 'developed' and the 'developing' states without even attempting to harmonize need satisfaction towards a globally understood sufficiency space (see chapter 3). It does not attempt to seriously reduce the 'broad ecological costs' of its economy. In most recent cases, a continued and current demand for raw materials – the basis for increased lithium exploitation necessary in 'green transition' – was simply inserted into the plans of the peripheral European countries, rather than considering a planned downsizing of extractive industries in core countries and their aggregate material consumption.

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5. Policy tool: postgrowth doughnut as a visual model to ground sustainable wellbeing

This final chapter revisits the notions of paradigm shifts and policy paradigms discussed in the introduction and highlights the importance of visualisations for a new policy paradigm. We argue that visualisations enable comprehending the conceptual framework that a transformed policy paradigm is expressed in. They can be used to evoke public debates on new political ontologies, visions, and metrics, and they are useful tools when advancing all three steps of planning presented above. As one proposal of visual models, we introduce postgrowth doughnuts[1]. It works as inspiration for visualizing the goal and direction of change, as well as highlighting the aspects of the contemporary global and local social metabolisms that must be considered as a *differentia specifica* from the unjust and unsustainable status quo.

Following the invocation of the need for a new policy paradigm, the outlining of the foundational philosophy, vision and conceptual framework, as well as presentation of a historic case of appropriate policy development, this chapter brings together the conclusions from previous chapters to propose a visualisation than can assist with creation of the desirable new policy paradigm. The post-growth paradigm itself requires more and detailed work, but we might struggle to even envision what it might contain, where to begin, what to pay attention to first and how to involve the public outside the narrow expert circles usually populating project consortia such as ours.

Whilst a visualisation as schematic as a doughnut is not a detailed macro-economic model that many have learnt to expect as solution provider for contemporary challenges, it is a principle theory base or a phenomenological model (cf. section 5.1 below). Such models are employed in principle theories, as opposed to constructive theories, which use the more familiar causal-mechanical or input-output models. Yet, history of science warns that forcefully and hastily advancing a novel constructive theory, using hitherto familiar elements of old ontologies, leads to a deeply misleading conceptual construction that impedes progress within the narrow window for intervention.

[1] There is a cornucopia of research currently being published on the diversity of definitions of degrowth and postgrowth, and the umbrella term role of one or the other. In the spirit of consortia coordination we follow the definition here that was proposed by our colleagues in WP3 (Angresius et al. 2023) that sees postgrowth as an umbrella term that includes a range of growth-critical and growth-agnostic options (see also Laurent 2024). Similarly, the related projects REAL and MERGE employ 'postgrowth' terminology when largely talking about the content resulting from degrowth research and publications. As we don't use the doughnut visualisation to specify the trends of the GDP index or its role, both designations are acceptable. Some of the literature though, and the original design of the visualisation concept, will inevitably draw on the name 'degrowth doughnut' as used in existing and forthcoming research publications (e.g.Domazet et al. 2023).

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5.1 Understanding transformation and changing mindsets

Following the task of proposing a better understanding of linkages between social, ethical, political, economic and environmental/material impacts of drivers of change, this section explains the notions of paradigm shifts and policy paradigms, as well as non-causal understanding of complex processes. The latter is presented under principle theories heuristic, a technical term for a conceptual bridging framework connecting the old and new worldviews. It is seeking a sustainability paradigm (after a paradigm shift) by investigating a conceptual framework that 'gestalt-shifts' mindsets and narrows down choice of pathways of the desirable societal change.

Paradigm shift and policy paradigms

In ToBe, we assume that the sustainability paradigm shift has a comprehensive scope, i.e. that the structure of the interactions of its component elements is not known or even knowable. A balance between cutting carbon emissions, reorganising commodities distribution, ending poverty, ensuring social justice, and preserving biodiversity is critical for implementing a transformation that provides emancipatory development for those who need it and maintains a biosphere sustainability.

However, it has to be acknowledged that the mechanism by which different elements interact and affect other crucial components remains unspecified if not unknowable. The sought-after balance is impossible without 'a deep and sustained, nonlinear systemic change, generally involving cultural, political, technological, economic, social and/or environmental processes' invoked by the research community (Linnér and Wibeck, 2020). The scientific advice to policy in the discourse of the IPCC defines the desirable transformation as "a change in the fundamental attributes of natural and human systems" (IPCC, 2022, 6), i.e. a change that will have desirable effects in both natural and social systems, as they are standardly conceived in contemporary parlance. We are thus seeking strategies that rely on understanding of at least the basic trends in interactions between justice and renewable energy technologies, or that rely on decoupling human wellbeing from expectation of aggregate national economic growth. All this refers to a major social transformation with changes in technologies, operations, and institutions, but also in the formulation and use of knowledge and in changing mindsets.

In his influential book *The Structure of Scientific Revolutions* from 1962, Thomas Kuhn took the word 'paradigm' from linguistics – where it was originally used to cover different linguistic forms that have a common root – and extended it metaphorically to the regulative framework in scientific exploration. He introduced a canonical model to correctly produce and synthesize knowledge in a given scientific discipline. Once a particular scientific model becomes inadequate due to empirical breakthroughs or theoretical unification, particular segment of scientific knowledge undergoes an abrupt revolutionary transformation, also called a 'paradigm shift'. Kuhn himself objected to many forms of this popular uptake, but it's hard to deny that similar elementary ontology and a concrete, non-rule-like regulative structure (Shapin, 2023) can be applied to many domains of life.

It is thus easy to see 'paradigms' everywhere, even in the way our communities handle their reproduction, progress, and sustainability. For the purposes of transformative theoretical framework in

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ToBe they present a useful concept referring to non-linear, abrupt and wholesome change. The intensity of biosphere destruction and climate breakdown under current development paradigm, the one of imperative of economic growth within global competitiveness, necessitates an abrupt change rather than piecemeal correction (Allen et al., 2018). A paradigm shift is required to stabilize the planetary habitability, to stabilize the geophysical base of even the most technologically advanced societies, and to safeguard the conditions of global social justice.

We are particularly keen to understand the emerging post-growth oriented new economic development frameworks such as wellbeing economics, doughnut economics, and degrowth, and their intersection with public policies (i.e. social policy, emissions capping and regulation, transformative innovation policies that include innovative social organisation). But this is sought after in a way that does not simply affect a single reductionist indicator (dimension of social organisation or material infrastructure) whilst letting the connected aspects collapse or take odious turns (Herrmann, 2022). Current paradigm appears paralyzed by the inability to 'square' human flourishing with the planetary boundaries (Schlesier, Schäfer, & Desing, 2024) and global justice.

In line with this assessment of the situation, research in transition strategies is increasingly mindful of calls to prioritize a clear articulation of the vision for the future as a desired end-state (or a range within which a dynamic series of states sits; Ernst et al. 2018, Kovacic and Giampietro 2015). The vision should be communicated with the public and the stakeholders in advance of strategy development, even when not minutely delineated at every step. Historically such a 'vision scan' can be realistically constrained by a principle-theory framework of social justice and environmental sustainability. The vision can be articulated through the appropriately scaled values of indicators of biophysical, socio-economic, and cultural performance in doughnut visualisations. Societies need a simplified problem portrait to debate and then actively integrate the vision of a realistic transformation, which will steer clear of the tipping points and failures in reaching important care, restoration and development thresholds.

A conceptual framework for defining the problems and impactful responses should be rooted in a shared vision of the desired end-state. As Sgouridis et al. (2022) argue the said problems require a policy and modelling ecosystem that can deliver a radical transformation from the present state towards the shared vision. The drawback with the existing models of transformation and welfare provision is that they are built on the presently best available science and its preferred causal mechanical explanatory paradigm. These in turn rest on the ontology of sociocentric and classical materialist worldviews (cf. Chapter 2), as well as an epistemology that relies on the premises of the system as we know it today (Koppelaar et al. 2016; Trutnevyte et al. 2016). Thus, our models of action and change, as well as interaction and flourishing, at best hamper, and likely misrepresent, the possibilities of emerging viable transition pathways. A new paradigm cannot emerge as long as policymaking operates within the existing development ideology and explanation of social metabolism (Kerschner et al. 2018; Saltelli and Giampietro, 2017; McDonald and Shalizi 2022).

Reconceptualizing wellbeing is one avenue of the desirable transformation (see chapter 3), but sustainable wellbeing cannot be achieved solely through different target setting and novel quantification of sufficiency. It must involve the metaphoric realignment of a horizon together with

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mapping-out novel pathways towards it; a vision of the wholesome dynamic new state to sail towards. We seek to delineate models of sustainable wellbeing society and economy, and then to understand the policy paths towards them in a variety of contexts. This cannot be done on a detailed level within the scope of this action, but the precedents in paradigm change suggest that even 'blunt tools' may contribute to the desired reversal of a trend.

Principle theories heuristic for paradigm change

The said blunt tools can be provided by *principle theories* or phenomenological models that have been used in science to bridge the intellectual gap between the old theoretical paradigm and the new – initially sketchy and tentative – theoretical proposal. The detailed specification of various ontological commitments of the new theory and their empirical justification will take a long time to finesse, but the main points of the new worldview can be demonstrably established through a principle theory. As Albert Einstein put it in a letter to a biographer Carl Seelig, rather than directly constructing new theoretical frameworks, first search for the formal conditions which constrain the number of such possible frameworks.

The distinction between principle and constructive theories is probably Einstein's most original contribution to the philosophy of science (Howard and Giovanelli, 2019). A constructive theory provides a brick-and-mortar model for the processes it describes; for example, describing gasses trapped in a container in terms of basic particles undergoing regulated interaction with each other and walls of the container. Or a policy implementation through institutional renegotiation and assessment of ideological goals expressed by a (Gramscian) political society. The subsequent detailed specification and justification will yield a causal model, or a constructive theory, but might take too long to work out in detail (Giovanelli, 2020).

A principle theory is built out of a finite set of self-standing and well-confirmed empirical generalizations, general rules, and limitations observed to apply to many different processes regardless of their substantive make-up. Thermodynamics, a theory of the heat processes in solid bodies or gasses regardless of their specific structure is the original example used by Einstein. A reification of a value set held broadly enough in a society with awareness of power balances might be an example from social (policy) processes, regardless of the institutional structures through which those values connect to impacts.

It is often argued in the philosophy of science that constructive theories provide a better understanding of natural processes and are thus the goal of science. Modern materialist philosophical conceptual expectation is most happy with all the experienced phenomena supervening on regulated interaction of a small set of agents and building blocks, a *mechanism* of reality. Historical materialism also is a mechanistic worldview, a theory of change conceptualised through causal interactions of material substratum and social structures supervening on it (see chapter 2).

But in times of crises of paradigms (i.e., rapid shifts in worldview; radical reassessment of a phenomena), progress in visualization and understanding is impeded by premature attempts to put together a constructive theory. Or in the case of fundamental crises, elements and rules making up a constructive theory may be entirely unthought of yet and it's thus difficult to come up with a wholly imponderable

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worldview. In the global predicament modelling with old tools constructed out of old ontology is impeding the visionary transformation rather than helping to lay the ground for it.

When we forcefully and hastily try to put a constructive theory together out of the elements hitherto familiar, but ontologically unsuited to the task, a deeply misleading conceptual construction is likely to arise. As discussed with the case of historical examples in the previous chapter, it often impedes progress within the narrow window for intervention. On the other hand, principle theories provide the intellectual channelling of efforts, a training of the gaze in the right direction even if as yet out of focus. They unify the efforts of disparate actors and train them on the common set of targets, whilst bringing into simultaneous consideration aspects of reality erroneously parcelled into ethical, social and material realms.

History of science, of understanding the world beyond initial appearances, records examples of progress attained by initially concentrating efforts on the establishment of the valid principles constraining possible processes and their hitherto unexpected relations to direct experience. Example from physical sciences suggests (Giovanelli, 2020) that this can enable us to gain intellectual insights into desired transformations without seeing the exact causal implications between the myriad of key variables in ecological and social systems, and social psychology.

For example, in trying to understand sustainable wellbeing, a constructive theory might go along the lines of analysis of institutions, legal frameworks, and historic processes of development; while a principle theory could be a model built on universal normative claims about ecological stability and justice and a description of processes on the planet (or a particular biome) in more-than-human terms (see chapter 3). Indeed, initial invocations of eco-social policies, to add sustainability to welfare, were both normative in delineating a vision and transformative with respect to the inadequacies of the present system (e.g. Hirvilammi & Helne 2014). As Laruffa points out in a recent critique of the mechanistic and technocratic approach to eco-social policies, original vision of eco-social policies was built on the understanding that capitalist growth and profit imperative created the current unsustainable and unjust condition (Laruffa, 2024). The emancipatory theory to build its replacement on must also be politically performative and dare to put forth normative claims and policies, as well as comprehensive (more than technocratic) critiques.

One aspect of the crisis of paradigm in global environmental policy (or politics) is evident in what Neil Carter, in an overview handbook on global 'politics of the environment', calls a 'paradox of international cooperation' (Carter, 2007). Namely, in the bare political (thus ideological and institutional, but perhaps not sufficiently material and socio-structural) theoretical understanding of international relations through a dominant paradigm (known as neo-realist or institutionalist) conflict and mistrust ('power politics') have been the norm. International environmental cooperation then requires a specific explanation, and a better understanding of its drivers and hindrances. In a word, a paradigm in which global environmental protection and popular emancipation would not be an aberration but a norm.

Kuhn himself never liked the popular reception of *The Structure of Scientific Revolutions*, namely because it was taken by different groups (academic and political) to serve different purposes, way beyond his original analytical objective (Shapin, 2023). Moreover, he almost abandoned the use of the

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term 'paradigm' in his later academic writing, whilst still taking time to defend and clarify the various uses it was put to in *The Structure*. His initial use was to denote the key regulative resource in scientific inquiry, whilst in our case it slowly morphs into overall regulative resource in maintaining planetary eco-stability and seeking human flourishing or wellbeing. It is not too farfetched to see the delineation and implementation of the integrated and balanced perspectives and actions that seek widespread and just wellbeing without destroying the foundation it rests on as a form of scientific inquiry, a search for the agential understanding of the world and one's (our) position within it. Whilst this even broader interpretation of the nature of science and its 'paradigms gone wild' would probably not be condoned by Kuhn, the genie is well out of the bottle in environmentalism and policy studies, and we are desperate for appealing metaphors to move out of stalemate and despair. The way relativity theory was also born out of despair with problems encountered by Newtonian mechanics of macroscopic bodies in motion (Brown and Timpson, 2006).

Paradigms present a powerful conceptual instrument for us, as they suggest non-linear and non-incremental change, as required to stabilize the habitability niche for the planetary biome and human societies. Either we face a catastrophic downturn brought on by the collapse of interconnected physical and social systems, or we implement seemingly dramatic changes in how wellbeing and sustainability are produced.

However, 'dramatic' - used for accent here - does not preclude understanding what can be, should be and has been done. In the same way that the later Kuhn strongly renounced initially implied 'incommensurability' of competing (sequential) paradigms, our task here is to look for a transformative theoretical framework on which to base a policy paradigm. We are looking for a framework that is able to integrate an awareness of the (political) agency of more-than-human nature with (i) the interplay between distribution of embodied energy through human society (Brajdić Vuković and Domazet, 2022) and (ii) the ideological complexes prevalent in it (Eysenck, 1954; D'Alisa and Kallis 2016).

Environmentally minded political thought, at least in Western scholarship, has for decades been looking for a paradigmatic lens through which to reshape our understanding of the ancient society-nature dichotomy. The approach to begin with 'broad brushtrokes', as in the example of John Rodman's 1980 essay "Paradigm Change in Political Science: An Ecological Perspective":

I trust the reader will agree with three propositions: first, that we deal here not with mere "words"; but with metaphoric language which shapes perception that thereby helps constitute the realm being described; second, that it is probably futile to try to discover whether the image of [cosmos] always precedes the image of society or vice versa; and third, that we should therefore focus on the reciprocal dialectic whereby our images of [the cosmos] and our images of society shape one another (Rodman 1980, 67).

Rodman signed up to the expectation (ascribed to Ophuls, 1977) that the novel paradigm in political science and policy description of the socio-ecological process will evolve in practice instead of being created by theory or policy design, only to be ratified by the theory at a later stage. But the work on sustainability transformation may not have time to wait for that, especially as there are no signs in the policy paradigms arena of sufficiently contentious paradigm presently emerging from incremental changes to the dominant globalized neoliberalism and economism. Moreover, from the 1980

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perspective it may have been hard to foresee the deliberate and powerful neoliberal push for a paradigm rooted in markets and growth over welfare and sustainability (Bauman, 2006). On the other hand, degrowth scholarship is precisely focused on coagulating diverse practices of socio-ecological visioning into an overarching framework capable of integrating social justice and environmental sustainability (Saitō, 2024).

5.2 Visualizing principle theory models

We argue that a suitable policy paradigm (Hall, 1993) within which to frame the integrated environmental and social planning and governance can be more easily accepted if aided by common visual mental models. These should display the socio-metabolic constraints and distance to various targets. As discussed in chapter 3, the doughnut visualisation provides a conceptual framework for sustainable wellbeing within sufficiency space. Here we expand this argument by discussing how doughnut visualisation can be used as a possible conceptual framework for the post-growth policy paradigm for three reasons. First, it is a communication instrument for a planned reduction of the excessive throughputs alongside justice and wellbeing. Second, it is normative in ascription of fair and sustainable targets, definition of aspects of good life and popular values attuned to sustainable wellbeing. Third, it is a phenomenological model in a way that it collects seemingly disparate variables and targets but does not attempt to hypothesize the detailed mechanism of the causal interaction between them (Giovanelli, 2020). We wrap-up this report with a brief illustration of the potential of doughnut visualisations to inform the paradigm shift and new policies as democratic governance instruments for a desirable, and not only necessary, transition.

The doughnut calls for reconceptualization of economic theory and policymaking, turning the latter away from prioritisation of a single index (GDP) towards an economic vision that seeks to prioritize regeneration and redistribution in the very fundamentals, to ‘bring humanity into the doughnut’ (Raworth, 2017). It thus objects to the neoclassical economics’ conception of a human as the infinitely rational homo oeconomicus, and wishes to account for the richness of human nature. As discussed in chapter 3, humans are fundamentally sensitive beings, dependent on social relationships, and deeply embedded in more-than-human nature. Resilience and futures exploration require that models of transition and adaptation account for these qualities of human nature. The embeddedness argues against the atomistic worldview and endorses relationality in which the well-being of society depends largely on the planet's ecosystem stability (Polanyi, 2014). Furthermore, in line with principle theory methodology, the vision is honest about the absence of linear causal-mechanical interactions in social and economic transactions and the need for dynamic and evolutionary understanding of the snapshot situation of boundaries and foundations, accepting the complexity of the global system (Raworth, 2017).

To serve as a comprehensive vision-based tool, doughnut visualization has to also recognize that this system is not a blindly ticking clockwork nor an isolated organism under controlled laboratory conditions. Doughnut visualization has been criticized for being structurally impotent to address the dominant power relations, societal values, and dominant cultural norms as the main drivers of boundary transgressions (Brand et al., 2021). When only combining the planetary boundaries outer ring

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with 'social foundations' inner ring, the basic doughnut economics' structure of nature-society relations suggests a trade-off between destruction of nature (boundaries) and attainment of human wellbeing (thresholds) as a necessary foundational logic. It thus remains trapped in the ecomodernist efficiency-of-provision paradigm. It also functions under dichotomous materialism in which aspiring humanity is struggling against constraining nature, rather than a novel political ontology of new materialism we build this framework on (see chapter 2).

By placing the boundaries exclusively in the natural domain, the original doughnut model allows for mainly technocratic approaches to boundary transgression as the dominant solutions to the environmental sustainability problems, in contradiction to new materialist philosophy. Currently available technocratic fixes of the boundary transgressions don't incorporate the existing knowledge of important constraints, namely the known root causes of unsustainability (Gómez-Baggethun and Naredo, 2015). In its structure, the original doughnut model leaves the social development aspirations as boundless as it ignores the necessary societal boundaries paradigm emerging out of concrete examples. By introducing social and cultural boundaries, and conversely aspirational thresholds for nature regeneration, a degrowth-inspired modification of the doughnut model seeks to incorporate "a change of analytical and political perspectives: rather than thinking of the planet as bounded, [it insists] to think of the planet as potentially abundant – as long as we limit ourselves collectively and make space for others to share the resources it has to offer in a responsible way among current living and future generations" (Brand et al., 2021, 276; see also Kallis 2019).

Modified doughnut visualisations address the tensions between limits and aspirations by recognizing socio-structural and socio-political tipping points to pull away from and the thresholds to be attained (Domazet, 2025). They thus aim to overcome the paralysis between the needs and limits; a rationality split between the unattainable and the dangerous, a cost-benefit rationality characteristic of the currently hegemonic growth model. A quantified and easy to grasp visualisation that is informed by biophysical and social indicators and driven by empirically quantified social and ecological policy targets (Durand et al., 2024) can be structured as a (postgrowth or degrowth) doughnut. Changing mindsets require a wholesale participation of the global population, a reversal of centuries of modernist (and lately neoliberal) national aspirations, and a vision of international goals aided by a striking visual tool. Planning priorities and monitoring diverse contributions is aided by a visualisation that combines the biophysical and social worlds with awareness of attitudes and values prevalent among humans.

The doughnut visualizations depict the complex socio-ecological changes in a manner that respects their multidimensional characteristics and does not aim to reduce them to a supposedly essential subset of properties (like pure economic growth or just environmental sustainability). A novel policy paradigm of sustainable wellbeing based on relational ontology is aware of the strong material, symbolic and even institutionalised interconnection between the social and the environmental – the various communities we are all embedded in. Like doughnut visualisations it integrates in its basic design and definition the reference to reduction of environmental impact and the broadest possible welfare provision. Quantitatively they both track energy provision within a political unit with carbon reductions (as in energy efficiency), or social housing with new skills in low carbon construction, or human health with average nutritional profiles.

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Doughnuts provide a conceptual framework compatible with design, evaluation and monitoring of eco-social policies as "public policies explicitly pursuing both environmental and social policy goals in an integrated way" (Mandelli 2022, 340). Mandelli's definition that stresses "integration and explicitness as the two defining features of eco-social policies" (ibid.) chimes with the explicit quantification of distance to target on a range of measures, and integration of the environmental and social (and eventually, even political, attitudinal or cultural) indicators in the doughnut visualisations (Domazet et al., 2020). But that is difficult, nigh impossible, to do without some guidance as to what different policy goals are more meaningfully integrated than others. Doughnuts narrow down the selection of key environmental and social measures, whilst their degrowth iteration (Domazet et al., 2020) include a second 'analytical' dimension – the link to global fairshare contribution to material and energy throughput.

Moreover, doughnuts invite a consideration of a broader range of characteristics and targets, and agnosticism about their mutual causal interaction. This agnosticism leaves the space for a new materialistic understanding of social change (see chapter 2).

5.3 Postgrowth doughnuts – an inspiration to visualize change

Research in various disciplines and meta-analyses for policy development increasingly point out that degrowth thinking is essential in reorienting rich economies towards sustainability, universal needs satisfaction, social justice, sustainable wellbeing and greater democracy (e.g. Weiss and Cattaneo, 2017; Kallis et al., 2018; Büchs and Koch, 2019; Haberl et al., 2020; Schipper et al., 2022; Creutzig et al., 2022; Vogel and Hickel, 2023). However, reorienting from a present unsustainable and ideologically unbounded linear expansion to smaller, frugal, ecologically diverse and publicly wealthy societies requires a planned reduction of some aspects of the social metabolism. The areas in transition include, for example, energy and resource use, inequality (Hickel, 2021) and automobility (Durand et al., 2024). It also requires improvements – including quantitative increases - of human wellbeing (Hickel, 2021), individual autonomy and healthy food production.

To foster and navigate how these reductions and increases come about from an economic and social-cultural system that is often valuing the exact opposite requires a conceptualization of a set of goals and an idea of a transformation plan that sharply turn away from the present system. The degrowth literature wants to avoid both the 'irrational' recession stages of the capitalist economies, and foreseeable major disruptions to the transition process. It calls for purposeful, managed, intentional, and democratic reduction of some aspects of the social metabolism and socio-cultural characteristics, as well as increase in those aspects deemed woefully insufficient from the perspective of sustainable wellbeing for all (Parrique, 2020; chapter 3). It builds on the democratic organization, counter-hegemonic visioning, and sustainable need satisfiers for ensuring justice and sustainability. This is in stark contrast with a neo-liberal conceptualization of an exponential increase in economic value creation as the foremost societal goal, which ought to eventually be decoupled from its negative externalities (displaced destruction and dispossession).

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Postgrowth doughnuts are conceptual tools to aid planning and strategizing in the degrowth scholarship and practices, where ecological and social planning is required for throughput reduction and social provisioning for all (Durand et al., 2024). It complements the doughnut visualisation and doughnut economics' invitation to upturn economic thinking (Pulselli et al., 2016; About doughnut economics | deal, no date), and utilises mutual learning from comparative advantages and shortfalls between (more or less) adjacent units of analysis. It is an attempt of a paradigm shift in line with the degrowth politics and accompanying social transformation (Nelson, 2024; Dale and Fleckenstein, 2023), but also a response to an initial stand-off between the ecological transition and improvement of socio-economic conditions. As Durand and colleagues argue, qualitative invitations for a better world free from known destruction and injustices are paralysed between needs-based and limits-based rationality imposed by the full world concept, and the cost-benefit rationality of the best-known economistic strategizing (Durand, Hofferberth, & Schmelzer, 2024). A guide to sizes of different challenges and potentials, "informed by bio-physical and social indicators and driven by deliberately stated social and ecological targets" (Durand, Hofferberth, & Schmelzer 2024, 140351) is visually summarised in the postgrowth doughnut.

We know from extensive research that in relation to global environmental regeneration and socio-cultural wellbeing there are currently globally both overshoots and shortfalls (O'Neill et al. 2018; Fanning et al. 2022; Diaz et al. 2024; Gucciardi & Luzzati 2024). The safe and just space for sustainable wellbeing specifies overshoots (especially in relation to environmental impacts) and shortfalls in various need satisfactions (including restoration of flourishing more-than-human life). The sustainable wellbeing's aim for sufficiency of resource use and infrastructure for good life, as well as deliberate upkeep of environmental stability and social security for all, and democratic participation in maintenance of sustainable wellbeing, are in the first instance quantified in this visualization. It is the first, expert choice based, quantified distance to target assessment for a range of real-life aspects constitutive of the concept of sustainable wellbeing and sufficiency space presented in Chapter 3.

We are aware that the complex biophysical and social challenges and the unjust and unsustainable dominant modus operandi make the necessary planning seem impossible and/or the desired goals unattainable. However, postgrowth doughnut addresses this planning and problem-solving task by presenting a broad set of key indicators ('vital signs') related to postgrowth-informed targets and principles of social organisation in a quantified and easy to grasp chart as shown in Figure 3. The latter characteristic stems from the simple distance-to-target visualisation, a circular holistic presentation of a broad set of concepts and the simple colour scheme (green: good, red: bad) for performance assessment. Coupled with the principle-theory heuristic for paradigm change it presents the operational space within which to define transformative strategies. Future intellectual endeavour may reshape the causal modelling integrating complexities of social dynamics, human intentionality and possible non-human agency, and Earth-system trends.

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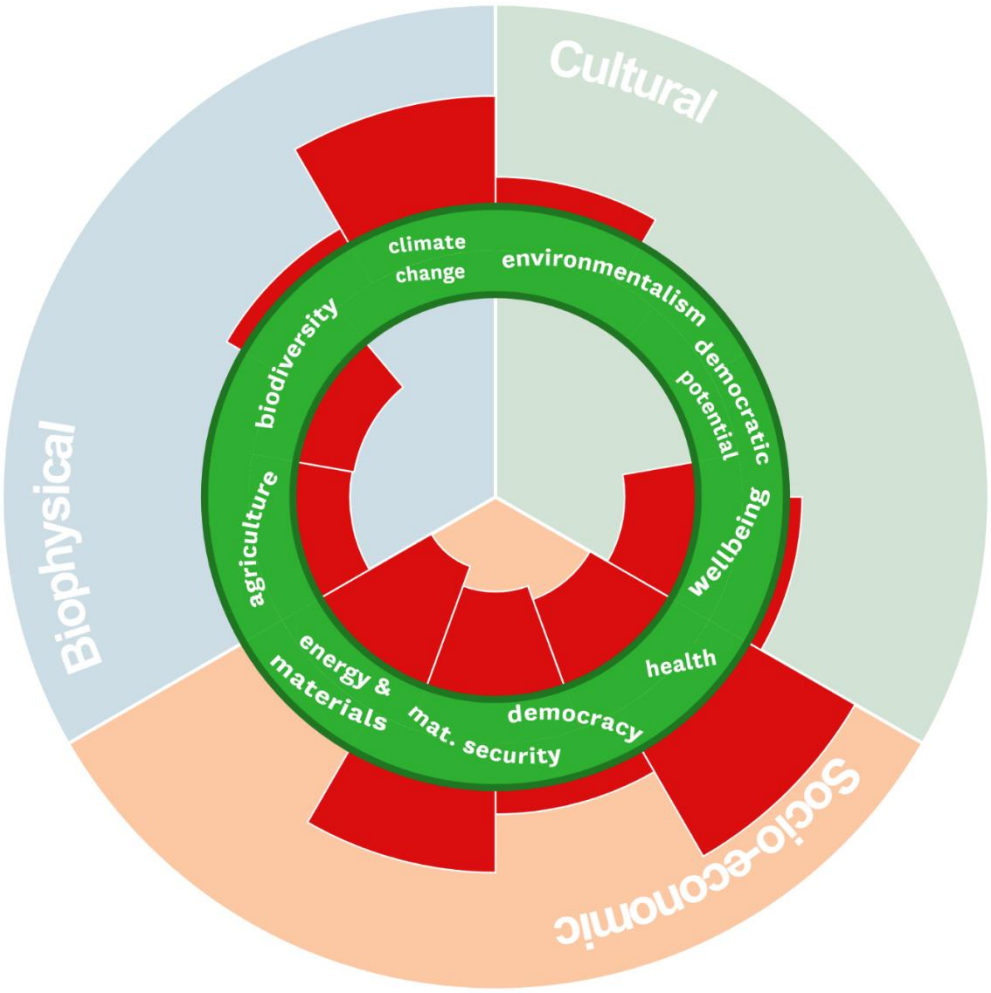

Figure 3: Conceptual elements quantified and visualised against distance to target in a Postgrowth Doughnut. Themes to be reflected in indicators are listed along the doughnut ring. Sizes of red wedges are for illustration only and do not represent current variable values for any region or country. Based on the degrowth doughnut concept developed at Institute for Political Ecology (http://ipe.hr/en/degrowth-donut/) and described further in Domazet et al. 2020 and Domazet et al. 2023.

The postgrowth doughnuts provide visual and operationalized analytical and communication tools with quantified fair boundaries of sustainability and justice norms that transformation pathways must fit it in. The causal-mechanical models built on the presently best available science epistemically rest on the premises of the system as we know it today (Koppelaar et al. 2016; Trutnevyte et al. 2016). They then at best hamper, and likely misrepresent, the possibilities of emerging viable transition pathways, i.e., they operate within the existing development ideology and explanation of social metabolism (Kerschner et al. 2018; Saltelli and Giampietro, 2017). They can then lead to disastrous deviations from reality as illustrated by underrepresentation of the intensity of historic ice-ages (Woillez et al., 2020), or the deviation between economic modelling and historic economic data (McDonald and Shalizi 2022).

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A review of our dominant modelling processes, in for example energy systems transition, shows that causal-mechanical modelling alone cannot adequately incorporate the requirements of a rapid transition and expose the inherent (initially invisible) biases that result in projections that poorly match the reality of hitherto initiated transition pathways (Sgouridis et al., 2022). In contemporary research of strategies and change there are calls to prioritise a clear articulation of the vision for the future desired end-state which can be communicated with the public and the stakeholders in advance (Ernst et al. 2018; Kovacic and Giampietro 2015). Based on the experience of a radical paradigm shift in physical sciences, the scope of possible pathways to the envisioned end-state can realistically be narrowed down by principle-theory expectations of universal norms that all possible process have to obey.

We argue that the postgrowth doughnuts can be used to exemplify a set of measurable parameters of a vision of the desired end-state, for which the transition steps will be democratically constructed after the guiding constraint space of pathways has been established. Postgrowth doughnuts define the vision through topics addressed and quantified distance-to-target visualisations, which purposefully avoid the unrecognized technocratic bias in causal-mechanical models of environment-society interaction (Sgouridis et al. 2022). Doughnut visualisation does not just warn about the critical approach to (environmental) tipping points, but also about the success or failure of social distribution systems to provide sustainable wellbeing and restorative potential. It is a systemic overview of the drivers towards and anchors drawing away from the brink, with indication of their different intensities in different locations and communities.

In an interconnected and pluri-perspectival world unexpected strengths and weaknesses of a community's reproduction and resilience practices can be uncovered by comparing doughnut visualisations. A circular visualisation of a finite size deliberately avoids selecting some aspects as 'more central'. It treats, for example, carbon dioxide emissions, healthy life expectancy, per capita energy use, and mutual distrust in societies as coequally important. Whilst providing for focus of attention on the most prominent differences, it prevents ignoring the differences in less conceptually connected thematic areas. Visual comparison is, of course, to compare two (similarly structured) images by eye, by placing them side by side or by overlaying them. It is similar to well-known technique in scientific and engineering applications of visual comparison with a standard chart or reference as a means of simplifying complex phenomena. Postgrowth doughnuts use the visual comparison as a common method of data analysis, a process of inspecting, cleansing, transforming, and modelling data with the goal of discovering useful information, informing conclusions, and supporting decision-making.

Visual methodologies, a collection of methods used to understand and interpret images, have been used for a while now as qualitative research methodologies in anthropology and sociology (Glaw et al., 2017), and engineering and technology (Joos et al., 2022). Postgrowth doughnuts share their aims and techniques but are nonetheless a separate practice strongly connected to quantitative methodology because of its distance to target assessments (e.g. Gucciardi & Luzzati 2024). As Pauwels (2015) suggests, visual research is not just a study of the images but is an analytical working 'through' visuals and visualisations. Eventually what we perform is a data storytelling exercise that uses data-based visualisations to tell a story of societies' potential, and not a storytelling 'with data' (Matei and Hunter, 2021). Doughnuts present a conceptual framework and analytical base to draw the audience's attention

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to possible unexpected relations between different countries' Safe and Just Operating Space deviations (Pulselli et al., 2016; O'Neill et al. 2018).

The current paradigm's market-based assumptions, conceptual frameworks, economic theory and philosophy, as well as ethical norms hide the root causes of global socio-ecological crisis (Buller, 2022). This hinders the identification of leverage points for systemic change. In first instance, there is a need for an intellectual analysis of the root causes and their relation to slowing down the churning, to lessening environmental impact and distributing the benefits of 'development' more equitably. A framework for such an analysis is given by the phenomenological doughnut model. Its very framework provides the first intellectual step for the 'practical' change towards a postgrowth paradigm by communicating the contradictions of contemporary economies. As discussed in chapter 4, the first step in institutional planning is the diagnosis showing the problems of the current situation.

As the original doughnut conceptually implies a trade-off between destruction and development, between 'natural limits' and 'social foundation', a degrowth-inspired modification recognizes there are also upper social limits as well as biophysical foundations. It acknowledges that in the climate- and extinction- constrained 21st century economy respecting biophysical thresholds should also form a 'development' goal for humanity and the attendant more-than-human nature. A logical subsequent task is to sketch the outlines of a novel policy paradigm, restructuring of the models of production and consumption "beyond incessant growth, towards sobriety and the fulfilment of human needs" (Durand et al. 2024, 1). Postgrowth doughnuts, with accompanying narrative of boundaries and thresholds in different domains of life can help to avoid major socio-metabolic disruptions within a transition process.

5.4 Principles for a post-growth paradigm

Phenomenological models include principles that narrow down the eventual choice of and parameters in which to express the strategies and policies of desirable societal change. They seek framing desirable vision in simple rules as generalized principles of desirable social metabolism and attainment of wellbeing rather than proposing fully formulated causal models. In this way they leave it open to different actors to choose diverse ways to achieve the goals. Phenomenological models or principle theories are blunt tools, but readily available and useful in times of crises of paradigms when a closing window of opportunity forces us to act with decisively and really transformatively.

Paradigm change does not require a ready-made blueprint with all causal relations identified and modelled. This has indeed never been the case with previous paradigm shifts. For example, Milton Friedman did not provide an exact roadmap and prediction/scenario of what will follow if the global economy is deregulated. Rather, he – along with other advocates of neoliberal ideologies – suggested certain normative claims backed by some empirical evidence based on existing economic parameters: a basic phenomenological model of unrestrained market corrections and economic growth.

A new paradigm in macroeconomic steering was forcefully advocated with normative claims that states should not intervene in market economies and previously publicly owned services should be privatized. Its key parameters were reduced to economic growth in terms of GDP, profits and capital accumulation as possessed by private companies and stakeholders. This was a kind of mantra that started to gain

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ground even though it was never unilaterally agreed and there was no consensus nor empirical evidence around the benefits of this new paradigm. It was accompanied by a focused vision on a reduced set of economic structures at the expense of environmental, social and ethical considerations.

Similarly, we should not demand that postgrowth/degrowth scholars be able to provide a ready-made blueprint with all causal relations to be fully explored and predicted with simulation models. As with previous paradigm shifts, the current situation is about debating over normative claims and significant parameters. It is about identifying and fully acknowledging anomalies in existing models and planning the pathways that can overcome existing challenges and provide a more sustainable future. But it is also about bringing on board the forgotten ontological segments, the more-than-human world and non-sociocentric change. In the present circumstances, and learning from paradigm change in the history of science, it is totally fine that we do not have a blueprint for a postgrowth transformation fully laid out!

Yet, it would be an understatement to dismiss degrowth/postgrowth scholarship as devoid of robust empirical evidence or spinning off mere ideological claims. On the contrary, the postgrowth paradigm envisioned in this report takes seriously the material realities and real-world challenges caused by the tight links between economic growth, emissions, and material throughput by calling for real changes in the world economy to avoid the global collapse of ecosystems and climate catastrophes. It is not based on false assumptions of the resilience within Earth system boundaries: it does not believe that the boundaries can be made more slack if we just keep pushing harder in this business-as-usual model. It takes a humbler approach by acknowledging that we as humans should change social and economic systems because we are dependent on ecosystems; not the other way round. That is, we can't assume that we can fix the problems of living nature if the economy just grows, and we have more money to pay for nature restoration. The degrowth paradigm is not based on false promises of unprecedented and unimplemented technological innovations that would enable decoupling and green growth. Taking seriously the biophysical realities and planning social and economic systems to adjust to that reality is not a normative claim.

However, it is normative to argue that the pathway towards a safe space for humanity within planetary boundaries should be socially just. As well, it could be argued that the transition should let the majority of the global population go extinct or that we should not take care of the goals of social justice as long as the biophysical boundaries are respected. Implicitly and perhaps unconsciously, the green growth paradigm is advocating this future by expanding extractivist overconsumption of the global rich, legitimating the suffering of the global poor and widening social conflicts. Obviously, this trajectory is not be aligned with the global sustainable development goals addressing both environmental and social sustainability, or with the UN declaration of Human rights. This is the unconventional legacy of the green growth paradigm that the new paradigm also seeks to challenge.

Postgrowth paradigm is normative when claiming that the reduction of material throughput should be made in a way that simultaneously enhances wellbeing of all people, now and in the future. Like Friedman, who advocated that economic policies should be based on certain normative principles, postgrowth scholars see that economic policies should be based on two explicitly outlined normative principles:

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(1) It is necessary to safeguard the Earth system stability. In the current situation, where six out of nine planetary boundaries have already been transgressed (Richardsson et al. 2023) and signs of alarming climate impacts are becoming everyday news, this claim should be put into practice by reducing material throughput fast and continue to do so as long as humanity is within a safe operating space.

(2) It is necessary to respect everyone's needs and a real-existing endeavour for a dignified life and avoidance of suffering. In practice, this would require global redistribution of resources from overconsuming population groups to those who still lack resources for a decent life (Hickel 2020). The increase in throughput is justified when targeted to those people for whom that is necessary to satisfy basic needs that are already satisfied for all others, like food, housing and access to education and healthcare. Reduction must be global and overall, not present everywhere and everywhen. Sufficient redistribution of resources should be based on the principles of sufficientarianism and limitarianism as discussed in chapter 3.

By following these principles, policies based on postgrowth paradigm seek to facilitate a rapid decarbonization of economies and reduction of material throughput while ensuring that there is enough for all. It points towards a pathway to co-existence where planet can be a safe home for people and other species.

Postgrowth paradigm does not only list the boundaries that have to be pulled back from, but also the aspirations to attain. Understanding transformation and changing mindsets begins with outlining of the goals that will be achieved through collective paradigm change. Indicators to track that goal already exist, as well as partial understanding of their causal connections to each other and to local and global context.

A new paradigm is envisioning a society where people understand the importance and priority of renewable energy and degrowth-compatible transformation, whilst striving to supply almost all of their energy from renewable sources and protect fertile soils from erosion under already locked-in climate change. They increase wilderness areas for biodiversity havens and restore or safeguard forests as terrestrial carbon sinks, but also as contributors to average life satisfaction that exceeds most of the contemporary averages of happiness measures. As proposed here, the postgrowth doughnut quantifies wellbeing in internationally comparative measures of subjective wellbeing. The societies provide instruments for the longest healthy life expectancy and overwhelmingly participate in the democratic governance of their polities (unlike in most developed societies today), to prevent anyone in their midst from living at risk of poverty (absolute and relative).

The societies provide instruments to participate in the democratic governance to prevent anyone in their midst from living at risk of poverty (absolute and relative).

Except for renewable energy provision, there are many societies in the Global South already attaining these targets today, whilst the instruments from the Global North to enhance some of them like healthy life expectancy or average life satisfaction are available with minimum economic cost. Access to higher education for present day youths, awareness raising campaigns, serious corruption prevention and

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building social trust are measures tracked in order to also address entrenched power dynamics, institutional inertia and cultural anthropocentric tendences. And that is just a start.

Participative processes will add knowledge of what people really feel is preventing them from moving on. Doughnut visualisations are ready, and you can almost picture it yourself if you allow yourself to. Attainment of these targets is not hypothetical. Societies can adapt experiences of other societies that have reached particular targets to their circumstances, whilst teaching them how to implement those they are successful in. Restoring nature's diversity and resilience and aiming for social justice and sustainable wellbeing through democratic participation is not a complete theoretical novelty. The history of welfare states in post-war European countries are examples of democratic changes. Getting people to agree on the need for energy decarbonization and postgrowth future might be a bit more unprecedented, but is a widespread common sense calling for a clearer articulation.

No development text or event these days is ignorant of invocations of 'degrowth', even if they are interpreted erroneously or even maliciously. Even those who are not fond of the term, like UN's Special Rapporteur on extreme poverty and human rights, Olivier De Schutter, independently invoke the central tenets of this transformation (De Schutter 2024). De Schutter invites a global planning approach, a creation of a roadmap that starts with existing regulatory mechanisms but eventually results in a whole new policy paradigm. Planning is no longer a pariah in intellectual neighbourhood of sustainability and development thinking. We show here (chapter 4) what previous experiences with planning in the context of planetary boundaries and local ecosystem stability can teach us, especially in the context of discursive unification of sustainability and justice. Moreover, De Schutter invokes a wholesome ontological transformation in the language and institutional setup in which we describe the desired change, a unification of ecological sustainability, justice, inclusiveness, dignity and wellbeing – an emancipation of human and more-than human recognised as a legitimate interest. Finally, in line with the decades of beyond GDP discussion (see e.g. Costanza et al. 2024) and the proposed targets and indicator groups in the postgrowth doughnut, he invokes the need for institutions to change the way that they measure everything. Rather than measuring what they are concerned with they should measure where they want to be. Postgrowth doughnut visualisations using de-colonial priorities and cognizant of the wholesome transformation, could be such a framework structure to usher in a new paradigm.

5. 5. Conclusions on transformative change

This chapter has explored the idea of paradigm shifts and the need for transformative change in society to achieve sustainability. It introduces the concept of 'principle theories heuristic', a framework to bridge old and new worldviews aiming to shift mindsets. A paradigm shift refers to a profound, non-linear change in societal systems, such as the balance between carbon reduction, social justice, and biodiversity preservation. Achieving this shift requires deep, systemic transformation across cultural, political, technological, economic, social, and environmental dimensions.

The challenges of transformation in the 21st century require a policy and modelling ecosystem that can deliver a swift and radical transformation from the present state, whilst providing broad transparency and accountability of strategies and goals. Our desired theoretical framework ought to be consistent

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with a just and rapid socio-metabolic transition, but also to illuminate the unsustainable aspects of the modern social metabolism that need to be replaced (Cherp et al. 2018, Hanger- Kopp et al. 2019).

A key aspect of the transformation is the use of principle theories, which offer initial guidelines for understanding complex systems without requiring fully detailed causal models. These theories are critical in addressing the limitations of existing models, which often rely on outdated, mechanistic worldviews. By focusing on principles, such as ecological stability and justice, societies can navigate the complexities of sustainability, guiding the development of policies that promote systemic change and a more equitable and sustainable future.

We propose postgrowth doughnuts as tools for visualizing the transition from unsustainable economic systems to degrowth-oriented societies focused on sustainability, social justice, and universal wellbeing. Unlike the neoliberal paradigm, the postgrowth doughnut emphasizes the need for planned reductions in areas like energy consumption and inequality, alongside improvements in human wellbeing and ecological stability. It serves as a tool for both analysis and communication, using a simple distance-to-target visualization (red wedges) to highlight current challenges and progress toward sustainability. The doughnut's circular design reflects the interconnectivity of different societal issues, preventing the prioritization of any single metric over others.

The first step in tackling the complexities of socio-economic transformation offers a clear, accessible framework for decision-making, ensuring broad participation in defining strategies for a just transition. Postgrowth doughnuts thus represent a move towards a paradigm shift, advocating for a societal model that balances environmental limits with human needs, avoiding the pitfalls of technocratic, market-based approaches.

The proposed postgrowth policy paradigm brings a new ontology (relational), new metrics (circular and multidimensional, material and ethical, subjective and objective), and planned pathways to honestly supersede the dominant growth model and seriously advance the global goals for sustainable wellbeing.

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