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THE ROLE OF ECONOMIC GROWTH ON ENVIRONMENTAL IMPACT

A STUDY OF ITS CAUSES, CONSEQUENCES, AND FUTURE ACTION TO TAKE BY DEVELOPED COUNTRIES

Our planet has undergone other periods of significant environmental change before. However, the last 150 years of human activity have threatened the planet's stability, with experts saying we have entered the Anthropocene epoch; an era in which humanity, through the massive impact of the world economy, is creating major disruptions of Earth's physical and biological systems. The urgency for action is obvious, but are we directing our efforts to the right cause? This thesis wants to highlight the importance of addressing economic growth in the fight for the planet, establishing it as one of the main drivers of the ecological crisis. It analyses how the economic growth imperative has occupied its place in our societies, to then explore how to reconcile the relationship between growth and sustainability through different paths. The main findings establish that degrowth is the proposal with more potential to save the planet on time, and so more specific issues and points to tackle from a degrowth perspective are described at the end of the thesis, to guide societies and present further research points.

Key words: economic growth, environmental impact, planetary sustainability, decoupling, degrowth, affluence, capitalism

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1. Introduction

Humans have relied on Earth's natural resources since the beginnings of our history; taking what we needed. However, there are some limits to the amount of resources we can use. We must stay within a safe operating space, the so-called planetary boundaries, if we do not want to disturb our planet (and consequently our lives) beyond repair (Rockström et al., 2015). Our planet has undergone other periods of significant environmental change before; but the last 200 years of human activity have been key in the disruptions upon the Earth System stability (Sachs, 2015).

We are all familiar with the usual and more main-stream climate issues such as the fossil fuels industry or the unsustainability of fast fashion. But by analysing the political, social and economic panorama, and how slowly policies and changes happen, I had my doubts whether there was a bigger underlying cause behind these more discussed issues, with more potential to help the environment in time if targeted.

In his book, Sachs already points to our economic system as one of the main causes of the planetary emergency. And indeed, other scientists' warnings describe economic growth as the driver of unsustainable trends and environmental degradation, calling for humanity to reassess the role of growth-oriented economies and the pursuit of affluence (Wiedmann et al., 2020).

In this paper I follow a literature review methodology approach, to provide an overview of an existing issue, gathering different scientific articles, studies, data and theories revolving around economic growth and environmental impact. I want to gain a comprehensive understanding and a critical view of the issue at hand, being the main research question of this thesis: *What is the role and impact of economic growth in the current environmental crisis, and what should be done about it?* With this last part, being more directed at developed countries.

The first part of the thesis explores why (and if) economic growth plays such an important role in the planet, its potential for systemic change, and how it has ended surrounding all our social, political and economic structures.

After this, I go over different positions towards economic growth, to inspect how this challenge has to be addressed if we want to save our planet and avoid a bigger ecological disaster. Where should our hopes be put when dealing with economic growth? Can technology save us in time? Can we survive in a zero growth economy? What is the next step?

The final part of the thesis digs into more specific issues that wealthy nations, organizations, and individuals should take into account to reduce the impact of economic growth to the planet, taking after the theory I believe to be the most valid from the previous part.

With this thesis, I want to show the need for humanity to defy economic growth, and actively analyse how it is involved in our everyday actions. At the same time, I want to give a trail to follow for developed countries, and a bit more specific guidelines to further explore if we want to tackle the climate crisis before it is too late.

See Annex 1 for the definitions of economic and environmental key concepts used throughout this thesis.

2. Contextual framework and analysis of economic growth

"We are at the beginning of a mass extinction and all you can talk about is money and fairy tales of endless economic growth. How dare you!"

- Greta Thunberg, Sept. 23 2019; United Nations Climate Action Summit

2.1 Humans' impact to planet earth

History has never seen such accomplishments as the ones happening now; we have walked on the moon, we are living in the information age, and it seems like going to space on vacation is closer than we could ever imagine. At the same time, millions of people are dying of hunger, species are going extinct, and the effects of climate change are more noticeable each day.

Are we really to blame for the current threat on our planet? Scientific advances documenting human-induced climate change provoke emotional responses from society, as they challenge the prevailing understanding of the human-earth relationship, and doubt the dogmas that reign our societies (Richardson et al., 2011).

A key idea in the evolution of the human-planet relationship is the realisation that the Earth is a self-regulating system; physical, chemical, biological and human processes interact to create the environmental conditions (Richardson et al., 2011). Thus, we definitely play a role in its development, for better or worse.

In a study carried out by Steffen, W. et al in their book *Global Change and the Earth System*, a comparison between the curves describing the Earth System's transformation and human activity

since the Industrial Revolution is made [See Annex 2]. It does not directly prove a cause-and-effect relationship between the two, but it is hard to miss how the former mirrors the other (Richardson et al., 2011).

Thus, the amount of power that humans hold in controlling the planet's functioning is undeniable, leading some scientists to defend that we are entering a new geological period called the Anthropocene, where the planet is being disrupted by human activity (Sachs, 2015).

When looking at the sources behind the exponential increase of human's impact, data points to economic and population growth (Climate change 2014 report; Richardson et al., 2011; Sachs, 2015; Wiedmann et al., 2020). Technological change is seen as a retardant of negative impacts, but economic growth, as it is now, overcomes any potential benefits from it (Wiedmann et al., 2020). And, more specifically, the excess economic growth in high-income countries, as the Global South and poorer populations tend to stay within their fair share of planetary boundaries (Hickel, 2020).

Output per person has been at quite low levels throughout history, until it took off around 1750 due to the Industrial Revolution. From 1820 until now, the global economy has grown at an average rate of 1.1% per year. Not so surprisingly, the same trend was seen with the global population; it spiked up from 1 billion before 1820, to the present 7 billion (Sachs, 2015). At the same time, the opposite pattern was followed by the planet's ecosystems; 60% of them have degraded since then (Jackson, 2009).

The growth of the world's population emphasizes the urgency in finding mechanisms to share the Earth's resources among us, in what might be the greatest challenge of the 21st century. The current world's population is over 7 billion and it is expected to be around 9 billion by 2050 (Richardson et al., 2011). Following the fact that the economy should be 15 times bigger than the current one to support that many people aspiring to have the present-day Western level of affluence, do we really believe that an economy such as this one can stay within planetary boundaries? (Jackson, 2009; Magdoff & Bellamy, 2010).

The truth is that there is, as yet, no credible, socially just, ecologically sustainable scenario of continually growing income for a world of 9 billion people (Jackson, 2009).

The famous 1972 Club of Rome report, *Limits to growth*, already pictured a scenario called World3, which predicted that, if we continued in a business-as-usual manner, the global system would collapse by the middle of the 21st century due to finite resources (Meadows et al., 1972).

A revision of the "Limits to growth" report was made by the same authors in 2004 (*Limits to Growth: the 30-Year Update*); we could only hope that their original projections were far too pessimistic; they were not (Meadows et al., 2004). And they were not the only ones to advance such arguments; observations of the past 30 years have provided enough evidence to corroborate their case (Hepburn & Bowen, 2013).

Our economy needs to change if we want to limit our ecological footprint. If world output keeps expanding at the rate it is now, not only will pollution continue to increase beyond what the earth system can absorb, but we will also run out of the limited non-renewable resources on the globe (Magdoff & Bellamy, 2010).

The irreversible exhaustion of finite natural resources will leave future generations without the possibility of using them. While some of these finite resources (such as forests and fisheries) can be renewed by natural processes when situated in a flexible and attentive environment (not the case as for today), others are limited forever to the existing supply (oil, gas, minerals, aquifers...). And for resources such as water, air, and soil, they are in danger of reaching their limited capacity to absorb negative impacts, and become useless (Magdoff & Bellamy, 2010).

There are numerous, interrelated, and increasing ecological problems coming from a system geared to the infinitely expanding accumulation of capital. What needs to be reduced is not just carbon footprints, but ecological footprints, which means that economic expansion on the world level (and especially in the rich countries) needs to be reduced or even cease (Hickel, 2020; Magdoff & Bellamy, 2010). While we keep living in a growth-oriented economy, any efficiency improvement that could help us reduce our impact is harnessed to advance the objectives of growth instead (Hickel, 2020).

The climate emergency changes the notion that growth is automatically good for everyone and everything, forcing us to face the brutal inequalities of the global economy (Hickel, 2020).

2.2 Intervention points and systemic change

But why is economic growth one of the main drivers of environmental impact? It is easy to understand how exponential increases in population increase the pressure we put on the ecosystems. But why do we give more importance to economic growth than to fossil fuels? Than to corrupt governments that dump waste on underdeveloped countries? The meat industry? Should not all these factors be at the same level, as they contribute to the same disastrous cause?

Meadows proposed a hierarchy of intervention points for leveraging change [See Annex 3]. In it, she classified the transformational capacity that different interventions had upon the properties of a given system, with some of them being likely to cause transformational change, while others only prompt minor changes in outcomes (Abson et al., 2016).

Despite a growing number of climate change mitigation policies, greenhouse gas emissions have continued to increase since 1970 (IPCC, 2014). Until now, it seems like humanity has failed at finding lasting solutions to the environmental threat (Wiedmann et al., 2020).

It is already clear for some experts that mere technical adjustments in the current productive system will not be enough to solve the dramatic and potentially catastrophic problems we face (Magdoff & Belamy, 2010).

Governments can (and do) pass laws and implement regulations to curb the worst environmental problems. Carbon pricing, green taxes, subsidizing renewable energy… we are familiar with these policies. And no one believes we should stop using these tools; such interventions are important and can generate beneficial outcomes. But they are unlikely to lead to a radical transformational change because they allow the economy to continue on the same devastating trajectory, an economy of perpetual growth and profits. These policies mostly belong to the lowest impact category of the Meadows' hierarchy; they foster quick fixes rather than underpinning the ultimate driver of our disastrous path (Abson et al., 2016).

The focus has to be moved to an integrated, system-oriented approach to reach systemic change. A systems thinking agenda goes beyond disciplinary boundaries and focuses on dynamic interrelationships of all the elements that shape and affect sustainability issues (Abson et al., 2016). It is in this systemic view that economic growth presents itself as the ultimate area to target.

Indeed, economic growth is located at the top level of impact of the Meadows' hierarchy. It belongs to the intent category, which affects the norms, values and goals pertaining to a system; economic growth has structured the fundamental workings of the economic, political and social systems (Abson et al., 2016; Magdoff & Belamy, 2010) and, consequently, holds the most power to change our current path.

Growth imperatives are found at multiple levels, making the pursuit of economic growth the quintessential goal for every individual, and making society and economy unstable without it, because of their dependency to it (Wiedmann et al., 2020).

But why is economic growth never questioned? Discourses about climate change and sustainability have increased in political spheres, but economic growth is never pinpointed. To what do we owe this inertia?

Some will point to fossil fuel companies and similar industries and the grip they have on our political systems. Indeed, their efforts have shaped national and international climate treaties and policies, blocking substantial action when possible, despite being aware about the dangers of climate breakdown (Hickel, 2020).

But even more importantly, there is the role of influence of the rich and developed countries, as it is in their best interest to not question the economy or society (while holding more power in dictating how the system works at the same time), and avoid challenging economic growth at all.

Existing income inequalities translate into equally significant impact inequalities. Indeed, the global climate crisis is largely driven by the global rich, with the world's top 10% income earners accounting for almost half of the environmental impact. In contrast, the world's bottom 10% income earners exert only around 3–5% of environmental impact (Hickel, 2020; Wiedmann et al., 2020). Imagine the potential reduction in ecological impact by only reducing the income of the very rich a bit (which would not put their wellbeing in danger, due to wealth excess) (Hickel, 2020).

It all comes down to the very powerful forces that are strongly opposed to the measures that tackle economic growth. At the end, only those measures which do not interfere with the basic accumulation imperative of the system have a slight change to be implemented (Magdoff & Bellamy, 2010).

We have to change systems not for any ideological reason, but simply because the emergency demands it (Hickel, 2020). Any potential transition to sustainability needs to be backed up by radical lifestyle changes; the involvement of existing societies, economies and cultures is needed. But as they are built in the structural imperative for growth, they themselves difficult any societal change (Wiedmann et al., 2020).

2.3 The System - Capitalism and economic growth

Even in nature there is a self-limiting logic to growth; everything grows to a point of maturity, and then maintains a state of equilibrium (Hickel, 2020). Who implemented the idea that the economy has to grow indefinitely?

The failure to arrive at a world climate agreement in Copenhagen in December 2009 was not only a failure of world leadership; it showed the inability of the capitalist system to address the threat to life on the planet (Magdoff & Bellamy, 2010).

Capitalism has only been around for two and a half centuries, but it is within these 200 years of existence that the world's natural systems have gone under threat. It is not like humans have never impacted the environment through our ways of living before. And markets and trade have existed for centuries as well and, by themselves, do not pose any danger to the planet (Hickel, 2020). What is wrong with capitalism, then?

The difference is in the size and long term consequences of the impacts and devastation created these past years. The huge increase in population, globalization and better technologies paired with an economic system with no bounds, have allowed a more rapid destruction, extending human impact to the entire earth, increasing inequality, affecting financial stability and resource consumption, and vast increases in environmental pressure (Magdoff, 2011; Wiedmann et al., 2020).

What makes capitalism different from other economic systems in history is that it is organised around the imperative of constant expansion or growth (Hickel, 2020; Wiedmann et al., 2020). And not growth for any particular reason, as growth is needed in some situations to reach a fair living standard, but growth for its own sake (Hickel, 2020).

Individual decisions are not made in a vacuum, but are shaped by surrounding structures and provisioning systems (Wiedmann et al., 2020). And in this current provisioning system, the goal of every individual is the accumulation of capital and making of profits, creating a system run on private self-interest in which no one protects the common interest (Magdoff & Bellamy, 2010).

Thus, growth becomes the prime directive of capital, under a totalitarian logic: every industry, every sector, every national economy must grow, all the time, with no identifiable end-point (Hickel, 2020). We live under the idea that our lives depend on it.

We are all trapped in the system; even people concerned with the health of the planet or more sceptical about the system cannot escape this same capitalist economic system. Hence, we are unable to come up with an economic system that does not put emphasis on growth and profits (Magdoff & Bellamy, 2010).

So that capitalism imposes economic growth is a fact; it is its way of working. The ways that capitalism spurs economic growth are intricate and abundant, but as the goal of this thesis is not

to analyse the capitalist system in its entirety, I will just briefly mention the most important ones, which will also help us understand some of the actions proposed at the end of the thesis.

The externalisation of negative impacts. Capitalism allows humans to easily externalise social and ecological costs they create through consumption and production (Hickel, 2020), as the purpose of the system is not to provide the basic needs or a job for everyone, nor to protect the environment (Magdoff, & Bellamy, 2010). We live in the present; business owners and managers generally consider the short term in their operations because of unpredictable business conditions and demands from speculators that want short-term returns (all due to capitalism workings), facilitating the ignorance that there is a limited supply of natural resources to use (Magdoff & Bellamy, 2010).

Competition. Capitalism creates an illusion of competition all around; workers have to compete in the labour market to earn a living; firms have to compete in the market if they want to survive and not go bankrupt. Under normal economic conditions, this capitalist competition is expected to lead to aggregate growth dynamics (Wiedmann et al., 2020). Quickly summarized, this expectation comes from the lock-in we find ourselves in as labour productivity rises, and we need more economic growth to keep employment constant.

Consumption. Another key factor is affluence. Rich households drive biophysical resource use through high consumption and by implementing consumption norms across the globe (Wiedmann et al., 2020). The system is built in such a way to incentivize individuals to consume more and more if they want to have a good life, either through positional goods (the need to accumulate capital and goods to be perceived as better than the average person) or efficiency consumption (in order to stay competitive, individuals have to buy time by investing in goods and services to manage high workloads) (Wiedmann et al., 2020). Other techniques such as planned obsolescence through provoked inefficiency and advertising strategies by creating artificial needs increase superfluous (unnecessary) consumption (Hickel, 2020; Wiedmann et al., 2020).

Economic indicators. Lastly, capitalism has managed to put GDP, a purely economic indicator, at the front of every country and policymaking for wellbeing. Nothing normalizes economic growth as GDP does; GDP-growth is an index of the welfare of capitalism, not of the welfare of humans (Hickel, 2020). Under capitalism, global GDP needs to grow by at least 2% or 3% per year, for the economy not to collapse. A 3% growth means that the economy doubles every 23 years, and it keeps being doubled from its already doubled state. This would not be as worrying if GDP was not coupled to energy and resource use; but it is (Hickel, 2020).

Following this analysis, the perception that we need economic growth to solve our problems, for progress, and for our welfare is not surprising (Wiedmann et al., 2020).

Capitalism cannot be sustained without growth; it cannot do without its basic driving force and the accumulation process. It has no limits, and the environment exists as something to be exploited to increase the economy, and not as a place in which human beings must live together with other species (Magdoff & Bellamy, 2010).

3. Reconciliation between economic growth and the environment

"We cannot save the world by playing by the rules. Because the rules have to be changed."

- *Greta Thunberg, 2019; No One Is Too Small to Make a Difference*

Once we realize the importance of economic growth in our ways of living, and the amount of power that this system has in our ecological impact, we have to ask ourselves, how can we move from this status quo? Can economic growth be stopped or changed?

Economic growth cannot cease overnight, both because of the suffering it would bring to millions due to our dependency on it but also because of the huge opposition it would encounter by multiple parties.

In this section I analyse the biggest theories speculating about what can be done with economic growth, and how we can reconcile it with the planet, so I can zoom in afterwards to more specific and tangible actions that rich societies should start implementing, to solve the climate emergency.

3.1 The Kuznets Curve

Could growth eventually save us? Could we replace all the natural resources with artificial ones, achieved thanks to a wealthy and ever-growing society? Perhaps we could even save these same natural resources if we have enough income to focus on renewable energy and green products.

The environmental Kuznets curve is a hypothesized relationship between environmental degradation and income per capita, named after Simon Kuznets (Stern, 2004).

The relationship states that at the beginning of economic growth environmental degradation and pollution increase, but that beyond some level of income per capita (due to associated

technological progress and shifts in society's preferences or needs), the trend reverses, so that at high income level, economic growth actually leads to environmental improvement (Stern, 2004).

This gives the curve an inverted U-shape, and supports the idea that economic growth could be sustained indefinitely, as long as most nations achieve a high enough level of income (Hepburn & Bowen, 2013); so basically to overcome the negative impact of humans on the environment, we should stick with (and accelerate in some places) economic growth.

Indeed, a higher income, achieved through economic growth, facilitates the demand for a cleaner environment. Richer societies are more capable at dealing with market failures in the environmental level (as they can buy their way out if it, at present), as well as having a comparative advantage in acquiring products and services that are less environmentally harmful, which tend to be more expensive or less available (Hepburn & Bowen, 2013).

Other findings state that as nations become wealthier or have a higher standard of living, citizens become more interested in environmental issues or are more willing to make sacrifices to protect it (Milfont & Markowitz, 2016).

Nevertheless, the majority of studies about the Kuznets curve show that it is econometrically weak and that there is little evidence that countries follow this U-shaped path as their income rises; there is no clear evidence that the relationship holds at a global level (Hepburn & Bowen, 2013; Stern, 2004).

As to date, rich countries play a much higher role in the pressure on the planet. The richest 1% emit thirty times more than the poorest 50% of the human population (Hickel, 2020). The affluent citizens of the world are responsible for most environmental impacts and are central to any future prospect of retreating to safer environmental conditions (Wiedmann et al., 2020).

The hopes cannot be put in income level without sparing a glance to the consumption and production patterns, hidden intentions behind powerful nations and organizations, and the general lifestyles of developed nations. Wealth allows more options to choose from; but there is no point on it without the right mindset or incentives behind to choose the right path.

3.2 Green growth and decoupling

Green growth is situated inside the eco-modernist ideology, which pleads that it is possible to reconcile economic growth with environmental impact through technological change, what is also known as decoupling (Grunwald, 2016; Hickel & Kallis, 2019; Jacobs, 2012).

It defends that growth is an intrinsic condition of human existence that cannot be altered, even if permanent growth is a fairly recent phenomenon as seen in the first part of this thesis, and denies that there are proven planetary limits to growth (Grunwald, 2016).

Green growth is considered to be the son of the sustainable development notion, a concept brought up decades ago and popularized by the Brundtland Report. The problem was that the concept of sustainable development lost track since its introduction in 1992, because countries' commitment to it had not been sufficient to stop ecological impact (Jacobs, 2012), so the idea needed a face wash to motivate radical change again.

So green growth's main argument is about reaching absolute decoupling thanks to technology and, to a smaller degree, the creation of jobs in green sectors on account of measures and stimulus packages from governmental green programmes (Grunwald, 2016; Jacobs, 2012).

But what is exactly decoupling? Can we put our hopes into it in order to avoid a conclusive ecological disaster before it is too late?

Decoupling describes the phenomenon of continued economic growth without a corresponding increase in environmental pressure, by putting all faith in technological efficiency (Hepburn & Bowen, 2013).

Until now, there has been clear evidence of relative decoupling, which implies a reduction in the environmental pressure per unit of economic output, but still keeping a positive relationship between both variables (so impacts still happen, but at a slower rate than GDP increase) (Jackson, 2009). For example, global energy intensity is 33% lower now than it was in 1970 in the OECD countries, thanks to efficiency and innovation (Hepburn & Bowen, 2013).

Yet, relative decoupling is a necessary but not sufficient condition to remain within ecological limits (Hepburn & Bowen, 2013). What we need to stay within them is an absolute decoupling, which means that the environmental impact variable has to decline in absolute terms (Jackson, 2009).

Some evidence of absolute decoupling has been observed, but only regarding few and concrete resources (such as forest cover in rich countries). When it comes to climate change, no absolute decoupling has been registered (Hepburn & Bowen, 2013).

The remaining question is, will it be ever possible, or should we already rule out absolute decoupling? To answer this question, we turn to the IPAT equation, invented in the 70s, and any potential technology advancements.

The IPAT formula equates the impact that humans have on the environment through a function of three factors: population, affluence and technology [See annex 4].

For absolute decoupling to happen, technology must be sufficiently large to overcome the effect of population and affluence on the planet; understandably, the structural shift in technological progress needed for this to happen is currently quite unreachable and unrealistic (Jackson, 2009).

For example, in order to lower emissions enough to achieve the 2°C global temperature change target, the impact has to fall 4.9%. This solely implies a reduction in population (highly improbable), a technology increase of 7%, and for affluence to be close to 0 (highly improbable as well) (Hepburn & Bowen, 2013).

Another discussed barrier is the fact that the hurtful impact of affluence growth to date is at par with any environmental beneficial effect that technology has brought to society (Jackson, 2009; Wiedmann et al., 2020). And bear in mind that low-income countries are expected to reach middle and high income countries' consumption patterns, further aggravating the impact that technological solutions will have to overcome (Wiedmann et al., 2020).

Lastly, another factor that makes absolute decoupling unlikely is the reality that renewable energy, electrification, carbon-capturing technologies and any other technological service still require big amounts of natural resources, as well as energy demand (Wiedmann et al., 2020). There is no empirical evidence that absolute decoupling can be attained worldwide with continued economic growth or that we are able to achieve it before global warming and other tipping points of the Earth System (Hickel & Kallis, 2019).

We must not forget either about the rebound effect when it comes to efficiency; it has been proven that in developed countries, increased efficiency in products or services which could benefit the environment are surpassed by the increase in use of these same products and services. Rather than being part of the solution, improved efficiency becomes part of the problem, driving demand up in a backfire effect (Hauschild, 2015).

The authors of "Limits to Growth" already warned about thinking of technology as the magic fix to solve the growth challenge. In their scenarios, even with the most effective technologies, the world collapses at some point (Meadows et al., 1972).

Even if absolute decoupling is not likely to happen on time, we need for technology to play an important role in navigating this challenge. Perhaps pairing efficient technology with a structural shift in society, individuals and governance could, in time, lead to absolute decoupling sooner than we would expect.

3.3 Degrowth

The degrowth theory advocates for an economy which does not need to grow. An economy that puts first human prosperity and ecological stability instead of the constant accumulation of capital (Hickel, 2020). It acknowledges the limits of the Earth's systems, the inability of technological efficiency to meet growing demands, and the need to down-shift society's throughput (Menton et al., 2020).

By shrinking the economic system to a lower and more sustainable level, as well as going through an income redistribution, we give more space for human cooperation and the ecosystem (Hickel, 2020; Wiedmann et al., 2020).

Degrowth is not about "less of the same" (Hickel, 2020), it is aware of the current injustices, and proposes a different way of organizing social and economic relations to achieve a qualitative world; a radical rethinking of human organization, which enters in confrontation with the current one (Singh, 2019). It is not just about modifying some dials within the economic growth framework, but a quest to transform the socioecological panorama (Menton et al., 2020).

It even recognizes that geographies of degrowth have to be uneven, requesting an equitable downscaling and a new definition of sufficiency (Magdoff & Bellamy, 2010; Singh, 2019). It takes into account the differences between the Northern and the Southern nations, obliterating the Western paradigm of development and helping the global North achieve a globally equitable steady state economy[1] (O'Neill, 2011) and allowing for a self-determined path of social organization and development in the South, based on Environmental Justice[2] activism (Singh, 2019).

[1] A steady state economy is a system that allows qualitative development but not aggregate quantitative growth. An economy with a constant flow of throughput at a sustainable level, with population and capital stock free to adjust to the size that can be maintained within the regenerative capacities of the ecosystem (Daly, H., 2008).

[2] Intersectional socio-environmental movement. It brings together the environment, racism, and civil rights, emphasizing the dynamics and unfairness caused environmentally in the Global South (Menton, M., et al., 2020).

We need to break the idea that all sectors of the economy have to grow non-stop; we saw during the COVID-19 pandemic which industries were essential and which were superfluous. Thus, it has to be decided which sectors we want to grow (like clean energy, public healthcare, essential services) and which ones have to degrow (fossil fuels, private transport, the beef industry), eliminating the parts of the economy purely designed to maximise profits and not to meet human needs (Hickel, 2020).

What seems more worrying about this proposal is the fact that making nations decrease their economic growth would probably make them enter an economic recession; can it be avoided? How are we to maintain our wellbeing if GDP decreases?

Firstly, it must be noted that degrowth does not call for a reduction in GDP directly, but concludes that is the probable outcome of the changes it proposes (Wiedmann et al., 2020). But it is clear that slowing down production and utilization of resources would slow down GDP which, more likely, would trigger a recession or collapse in some countries (a natural response when a growth-dependent economy stops growing) (Hickel, 2020; Wiedmann et al., 2020).

Friedman (2005) argued that economic growth provides bigger welfare benefits and fosters social and political liberalization through increased opportunities, tolerance, economic and social mobility, fairness and democracy. Economic growth is partly responsible for some of the biggest advancements technologically and intellectually, as well as facilitating the meeting of need in most developed countries (Hepburn & Bowen, 2013; Magdoff & Bellamy, 2010).

The relationship between GDP and human welfare, however, falls on a saturation curve with sharply diminishing returns; after a certain point the relationship between economic growth (GDP) and wellbeing stops. Growth needs to be inclusive and environmentally sustainable to not leave people behind nor undermine the Earth's life-support systems (Hickel, 2020; Sachs, 2015).

Clearly, current growth does not fit in this definition; its benefits are unequal. Inequality in OECD countries is higher than 20 years ago. The majority of income from growth goes straight to the rich, who have gotten richer, while the middle class has stagnated (Jackson, 2009). Politicians and economists' solution is more growth, convincing everyone to buy into this mindset; but we are trapped in a never-ending circle, because the benefits of growth get stuck at the top (Hickel, 2020).

Scientists called in 2018 on the European Commission to stop using GDP growth and pay more attention to human and ecological wellbeing (Hickel, 2020). Nations can excel socially with around $10,000 per capita, staying inside planetary boundaries. $10,000 per capita is less than the

world average GDP, meaning that these new life standards proposed by degrowth theory are more than achievable without any additional GDP growth, just by redistribution and public goods (Hickel, 2020).

China provides an example of how economic growth does not increase wellbeing for all. China's economy has transformed from rural to urban, agricultural to industrial and service-oriented; life expectancy, public health and education have increased. However, inequalities between the urban and rural worlds have increased drastically, and all this growth has put them at the top global polluters (Sachs, 2015).

The change in this relationship means that GDP should not be as important as it is now, so the consequences of its decrease are not as big as first imagined. We must focus on redistribution of income and resources, liberating people from needless work, and investing in public goods to make humanity thrive (Hickel, 2020). Wealth should not only be limited to material wealth, but include human needs, capacities, pleasures and so on (Singh, 2019).

We must not confuse degrowth with austerity measures; austerity calls for scarcity in order to generate more growth, cutting public investment in social goods and welfare protections, forcing the less benefited to increase their productivity if they want to survive. Degrowth calls for abundance to render growth unnecessary (Hickel, 2020).

Without the pressures of artificial scarcity, and the basic needs met, the imperative for people to compete for infinite-productivity would disappear. Indeed, the economy would produce less as a result, but the thing is that it would also need less. Private riches and GDP might shrink, but public wealth would increase (Hickel, 2020).

A lot of factors need to align to make degrowth possible; too many to ever be possible, maybe. Strong limits and social justice in policies (thus a great involvement of governments and international organizations), a change in economic structures, a reform of the current institutions (as they have been born within the capitalist skeleton) to allow an increase of social control over economic actions and a more refined democratic system, and a change in lifestyles, social norms and cultures through grassroots action (Wiedmann et al., 2020).

There also remains the possibility that continued economic growth is an essential condition for a lasting prosperity, as we might be too far up in our dependence to it. Basic capabilities are threatened when economies collapse, and growth has been (until now) the default mechanism for preventing it. Here we encounter the dilemma of the degrowth proposition; growth may be

unsustainable, but degrowth appears to be unstable and tricky to implement in such a way that avoids collapse (Jackson, 2009).

4. Path to the future - actions to be taken by developed countries

"Right here, right now is where we draw the line. The world is waking up. And change is coming whether you like it or not."

- *Greta Thunberg, Sept. 23 2019; United Nations Climate Action Summit*

After the analysis of the most prominent propositions to save the planet, it appears that degrowth is the philosophy with most probable beneficial implications for the ecosystem and humanity, but which also needs more global support, convincing, and systemic change at all levels to ever happen. It directly challenges economic growth (and by consequence capitalism), defying the positions that wealthy nations, wealthy organizations and wealthy individuals hold in our current world.

Still, it does not mean we have to toss our hopes aside and pray that technology and renewable energies can save us in time. There are some long-run changes that rich countries and communities could start implementing (and some are already doing so), which could start the systemic change required for degrowth to happen, and the ecological disaster to be avoided in time.

The reason why this part is only focused on rich nations is due to the data and statements we have seen in previous points. Wealthy nations and individuals make up for the majority of the environmental impact and write down the social norms to be followed globally. Therefore, and similarly to economic growth within the whole system, developed countries have the most potential to reverse the situation.

The transition to an ecological economy will not happen overnight. We must live through a dynamic, multifaceted struggle for a new cultural and productive system, to create a new social metabolism based in egalitarianism, community, and a sustainable relationship with the planet. The trick is that such a system must develop from within the capitalist system, without being part of it, until the initiatives become powerful enough to transition to a completely radical new society (Magdoff & Bellamy, 2010).

Abson et al. (2016) propose two basic and broad steps to move to new social and economic systems.

The first is restructuring; formal institutions (written rules and agreements that are binding) and informal institutions (social norms, customs, and such) have to be restructured. Institutional change has the biggest potential to influence transformation and action, through societal paradigms, collective choice rules and short-term operational rules. Obviously, it is difficult to restructure institutions, as they tend to be self-reinforcing and resilient. Perhaps the COVID-19 crisis can be used to trigger this change, as it has shaken and pressured all institutional grounds and nations.

The second one is rethinking; human action is anchored to the past, to how things have been done previously; we rely on established knowledge and institutions. We must challenge our path dependency, unmasking the different factors that play a role in our environmental impact.

The adjustments' proposals I present next both involve restructuring and rethinking, showing how important are social rules and structures in the way to move forward.

These proposals have been identified when making the literature review of the previous parts of the thesis, while issues were being analysed, and solutions (or directions to be explored) arose. I will not explain the solutions to each issue, but rather what should change and why, putting a name to them. As I see it, these proposals act as future explorative paths to take individually and analyse in further research, to come up with more specific solutions and ways to implement them.

4.1 Wellbeing and economic indicators

As seen in previous sections, GDP has become the most important indicator for a country's wellbeing while strictly being an economic indicator, normalizing the idea that we need constant economic growth to survive.

Apart from the increase in the use of energy, resources and waste as GDP grows (Hickel, 2020), the indicator leaves out non-monetary costs and benefits like household labour or environmental degradation, natural and human capital, capital depreciation, income distribution and defensive expenditures (Chelli et al., 2013).

GDP appears to be an outdated metric to determine a nation's population welfare, even if it presents an accurate picture of its economy (Ellsmoor, 2019). We need to replace it as the measure of prosperity, and move to different indicators (Wiedmann et al., 2020).

Some countries have already moved their attention to it; New Zealand's Prime Minister Jacinda Ardern was in the spotlight in 2019 with her promise to abandon GDP growth, and use different metrics to measure happiness (tracking everything from loneliness to trust in government

institutions) (Hickel, 2020). Alongside, they announced a new budget dedicated to local communities, laying a foundation for a different governmental approach to decision making and re-prioritizing the nation's economic power (Ellsmoor, 2019).

Their finance minister stated that despite having quite high GDP growth rates, this growth was not translated into higher living standards or better opportunities for many citizens of New Zealand (Ellsmoor, 2019).

Nicola Sturgeon and Katrín Jakobsdóttir, the respective Prime Ministers of Scotland and Iceland, also followed suit (the fact that all three of these leaders are women is also something to notice) (Hickel, 2020). Countries taking decisions such as these start international debate around economic growth and new approaches to it, accelerating and making more visible both the issue and its potential solutions.

Some prominent alternatives to GDP for now are the GPI, the ISEW or the HDI.

The Genuine Progress Indicator (GPI) measures personal expenditure (the same starting point as GDP) and adjusts for income inequality, and social and environmental costs (Hickel, 2020). It is interesting to note that it grew alongside GDP until the 70s, where it started to flat out and even decline, as the social and environmental costs of growth increased enough to cancel out any gains of consumption (Hickel, 2020).

The Index of Sustainable Economic Welfare (ISEW) adds new parameters of GDP: it takes into account inequalities, adds health and education in the public expenditure, considers domestic and volunteering labour, long-term climate change costs, defensive expenditures, social costs and natural capital[3]'s depreciation (Chelli et al., 2013).

Finally, the Human Development Index (HDI), is an indicator composed of different well-being indices (education, GNI and life expectancy), emphasizing people and their capabilities to assess development. However, it does not reflect on inequalities, poverty, human security, empowerment, etc. (Chelli et al., 2013; UNDP definition).

Despite the road we take in choosing a new indicator for well-being, it is naïve to think that if we stop measuring GDP, the constant pursuit of growth will stop. Obviously, and as with all changes

[3] World's stocks of natural assets which include geology, soil, air, water and all living things (World Forum on Natural Capital).

we have been seeing throughout the thesis, it needs to be paired (or trigger) a change of mentality and lifestyles all around (Hickel, 2020).

4.2 Redefine the Western living standards

In a world with 9 billion people aspiring to have a Western average income, carbon intensities would have to fall by more than 11% per year to stabilize the climate. By 2050, global carbon intensity should only be 6 grams per $ of output, almost 130 times less than it is today (Jackson, 2009).

A recent study of The Worldwatch Institute estimated that a world which used biocapacity per capita at the level of the contemporary United States could only support 1.4 billion people (Magdoff & Bellamy, 2010).

It is obvious that the current living standards of rich societies need to be changed. The present rates of throughput cannot be maintained at the current levels much longer.

The good news is that we do not really need these high rates of throughput to have a decent standard of living for everyone (as seen in the relationship between GDP and wellbeing, in the degrowth section) (Hines, 2005). Evo Morales, president of Bolivia until 2019, said in the 2009 Copenhagen Climate Conference: “Living better is to exploit human beings, to plunder natural resources [...] In those promises of capitalism, there is no solidarity or complementarity [...] That’s why we’re trying to think about other ways of living lives and living well, not living better. Living better is always at someone else’s expense. Living better is at the expense of destroying the environment.” (Magdoff & Bellamy, 2010).

We have to move from the idea that enough is little and that we have to go after a higher lifestyle to be happy when we already have enough; nothing is enough for someone for whom enough is little (Magdoff & Bellamy, 2010). The world can perfectly maintain 8 billion people at the level of lower-income nations at present-day, but we need to respond quickly, lowering the standards in rich countries, so that developing and under-developed countries do not mirror our behaviors (Hines, 2005).

Again, this happens through a general change of mentality in the population, but also by adjusting the consumption patterns, and the incentives and messages from governments and powerful organizations.

4.3 The Intellectual economy

John Stuart Mill (1848) already asserted that the material economy would eventually reach a stationary state because it is bounded by the ecosystem, while our intellectual development knew no boundaries as they do not depend on material input (or not as much) (Hepburn & Bowen, 2013).

We can already see it; many activities categorized as services rely on a relatively small quantity of material inputs. At the same time, thanks to innovation, many physical products' have been digitized (devices to listen to music, being able to read books online…), and converted into what are called knowledge-products, since we entered the Digital Era few years ago. The relevant and useful aspects of these products lie in the content that can be extracted from them, so their physical presentation or presence is not that important (Hepburn & Bowen, 2013).

Slowing down material use would take pressure off ecosystems; less deforestation, less habitat destruction, less biodiversity collapse and less energy use by the economy (Hickel, 2020).

We have to abandon the idea of growth (tightly linked to resource and material use) for the idea of development, which constitutes intellectual progress and improvements in well-being (Hepburn & Bowen, 2013).

All the income spent annually to increase the material economy (quite big numbers, approximately US$1 trillion) should be reduced, and taxes currently put over labour and intellectual activities, should be moved towards materials and resources' use and extraction. This income could be redistributed to social and environmental areas, following the degrowth's philosophy, with some of it being destined to the intellectual economy as well (Hepburn & Bowen, 2013). R&D in sustainability and decoupling would take advantage of this income, reducing the costs of clean technologies and green products, affecting the different dynamics that need to change to reach a degrowth state and save the planet (Hepburn & Bowen, 2013).

4.4 The Sharing economy

Capitalism places value on ownership, making individuals see ownership of whatever they need or want at that moment the most desirable (and sometimes only) way to have access to it. A lot of the stuff we consume is necessary but rarely used. Manufacturers (as victims of capitalism) want everyone to own a garage full of things that could be easily shared (Hickel, 2020).

Hopefully, the sharing economy has appeared (or re-appeared, in fact) in the past few years; individuals are paying to temporarily access to products and services rather than buying them (Matzler et al., 2015).

The main proposal of collaborative consumption is easy: obtain value from goods that are not being entirely exploited by their owners, through the pooling of resources, products or services. The sharing economy represents fewer costs, more convenience, and environmental impact reduction, all in one (Matzler et al., 2015). The more we share, the less of Earth's resources are consumed, creating a more efficient and sustainable mode of consumption (Hickel, 2020; Matzler et al., 2015).

The Internet has been one of the main drivers in the growing and creation of sharing systems, facilitating connections between people who want to share their possessions (Matzler et al., 2015). For example, the company Airbnb Inc., which allows people to put their unused rooms, flats or houses on an online marketplace, for people to rent for certain nights (Matzler et al., 2015).

Matzler et al. (2015) differentiate three different ways in which the sharing economy can work. First, product service systems which allow individuals to share multiple products owned by companies or private persons. Secondly, redistribution markets that allow peer-to-peer matching for the re-ownership of a product (second-hand platforms). Lastly, collaborative lifestyles in which people who share similar interests help each other with less tangible assets such as money, space, skills or time.

The value of the sharing economy is indubitable, and what is even more important is the sub-conscious changes in society's mindsets it brings, as sharing and re-using goods becomes normalized. Still, it has to overcome the barriers posed by multiple product-intensive manufacturers, who see their business in risk because of it.

4.5 Challenge consumption patterns

The growth of the sharing economy and the need to change the living standards already explicit some ways to challenge the current consumption patterns. But they are much more ingrained in our way of living than we could think and we still need to cover the basic needs; in which other ways can consumption be questioned?

The starting idea is that we need to consume better but less, adopting simpler and sufficiency-oriented lifestyles to address overconsumption. We have to reduce consumption so that it falls within planetary boundaries, while fulfilling human needs (Wiedmann et al., 2020).

We have the challenge to both address necessary consumption (to satisfy human needs and guarantee a minimum level of prosperity) in poor communities and address superfluous consumption in wealthy countries (Wiedmann et al., 2020). A floor and ceiling strategy of sustainable consumption should be established, to avoid poverty and damaging the Earth with unnecessary consumption. Society has to refocused around need rather than artificially-created wants (Hickel, 2020).

Consumption patterns need to be shifted away from resource and carbon-intensive goods and services; in some cases, this even means shifting from high to low tech options (the ones that are less energy intensive, like using a dryer vs hanging wet clothes), and going global to local (Wiedmann et al., 2020).

Psychologists have pointed out that it is fairly easy to influence and manipulate people to consume beyond their needs (Hickel, 2020). The framework of rich societies makes individuals engage in overconsumption through methods such as insufficient options for socialising, employment, transport and information, a high exposure to consumer temptations… and other different types of consumption drivers, which have been already mentioned in the section about capitalism (Wiedmann et al., 2020).

Even in the food sector, a good we need to consume no matter what, the waste due to consumption patterns and social norms is huge. Up to 50% of all the food produced in the world is wasted each year. Ending food waste would cut global emissions by 13% without representing a loss of access to the food we need, as it ends up being wasted anyway through the supply chain (Hickel, 2020). In high-income countries, all food not described as perfect is discarded, supermarkets use unnecessarily strict sell-by dates and overstock food so that it easily goes to waste when there is not enough demand, and use bulk discounts or buy-one-get-one-free schemes. This means that households end up throwing away between the 30 and 50% of food they buy (Hickel, 2020).

This analysis of food waste can be done for almost everything we consume; we have to look at the hidden motives and motivations behind us buying that thing, and ask ourselves, do I really need this? Even when the impact of such good is relatively lower than its close substitutes.

Affluence needs to be addressed by reducing consumption, not just greening it (Wiedmann et al., 2020). We have to move from the current system organised around exchange-value (the price of a good) and focus on use-value (Hickel, 2020).

5. Conclusions

A successful management of the future human-Earth relationship demands consideration of the whole system; treating symptoms individually (like the causes of global warming, or carbon emissions) will not be enough to ever reach a sustainable point or save the planet in time.

By taking the bigger picture in, with every interrelation and dynamism between all the issues that policy makers are trying to tackle at present, we conclude that the ultimate, most powerful and underlying cause of these discomforts is the growth imperative that reigns everything we do.

It is evident how our societies and mindsets are structured around monetary wealth and maximising economic growth targets. The notion that we need constant growth to improve everyone's lives must stop. As shown, the relationship between income and wellbeing eventually breaks, and we discover that wealth only trickles down to a lucky few. We do not need more growth, we need its redistribution.

Economic growth builds ecological destruction into the inner nature and logic of our present system of production, and this is what makes it so difficult to challenge. We are in need of a radical transformational change at individuals, organizations, and governments' level if we want to save the planet before it is too late.

After exploring different paths, each with its ups and downs, degrowth presents itself as the ideology that demands for this radical change across all sectors and parts of our society, without forgetting that a one-size-fits-all theory will not suffice, due to the present inequalities across countries. Of course, focusing on degrowth does not mean we have to forget about technology, green growth or financial resources; at the end, they all partake in systemic change.

Rich countries have an immense role to play in the road to sustainability as they are more responsible for the planetary impact while also holding more power to change the panorama. The general directives mentioned at the last section have to be used as starting points for change, they act as future explorative paths, as I have not given any direct solution to solve them. Every aspect of our society plays a role that either has to be changed, erased or enhanced, thus we have the task of questioning everything that surrounds us and find specific solutions to move forward.

Hopefully, the increasing social and environmental unrest will force us to face the present reality, and realize what is truly behind these crises, questioning the logic behind needing constant economic growth to improve our lives. The post corona moment provides the perfect (and maybe last) chance to learn from our vulnerabilities and mistakes and create a new vision of a more equal and sustainable world.

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7. Annexes

ANNEX 1 - Definitions of key concepts used throughout the thesis

Anthropocene: proposed geological epoch in which humanity is creating major disruptions of Earth's physical and biological systems (Sachs, J., 2015).

Capitalism: socio-economic system in which private individuals or businesses own capital goods. The production of goods and services is based on supply and demand in the general market, known as a market economy (Investopedia, 2020). Such a system rests on the ideals of the independence and freedom of individuals, and where the proper function of the government is to protect the rights of the individual citizen (Machan, T., 1990).

Earth System: Earth's interacting physical, chemical, and biological processes. The system consists of the land, oceans, atmosphere and poles, and includes the planet's natural cycles (the carbon, water, nitrogen, phosphorus, sulphur and other cycles) and deep Earth processes (IGBP).

Economic growth: increase in the production of goods and services over a specific period, which tend to be measured in nominal or real (adjusted for inflation) gross domestic product (GDP) (Amadeo, 2020; Hepburn, C. and Bowen, A., 2013; Investopedia, 2021).

Environmental impact and crises: when talking about environmental or planet impact I will be referring to all the negative human-made impacts on the planet such as ocean acidification, air and soil contamination, increase in temperature, soil erosion, droughts, increase in CO_2, persistent and mass-scale fires, ice loss acceleration, large-scale die-offs...

GPD: measure of the market value of all final goods and services produced in the economy for a given year. When talking about GDP in this thesis, we will be referring to real GDP, which unlike nominal GDP, accounts for inflation (Hepburn, C. and Bowen, A., 2013).

Planetary boundaries: absolute limits for human-made impact on the environment that current and future societies must respect in order to stay within a safe operating space for humanity, to not generate large-scale abrupt or irreversible environmental changes. The nine planetary boundaries are climate change, biosphere integrity, ozone depletion, ocean acidification, biogeochemical

glows, land-system change, fresh water use, atmospheric aerosol loading and introduction of novel entities (Rockström, J. et al., 2015).

Sustainability: development that meets the needs of the present without compromising the ability of future generations to meet their own needs (Brundtland Commission, 1987).

ANNEX 2 - The human-Earth relationship graphs - Richardson et al., 2011

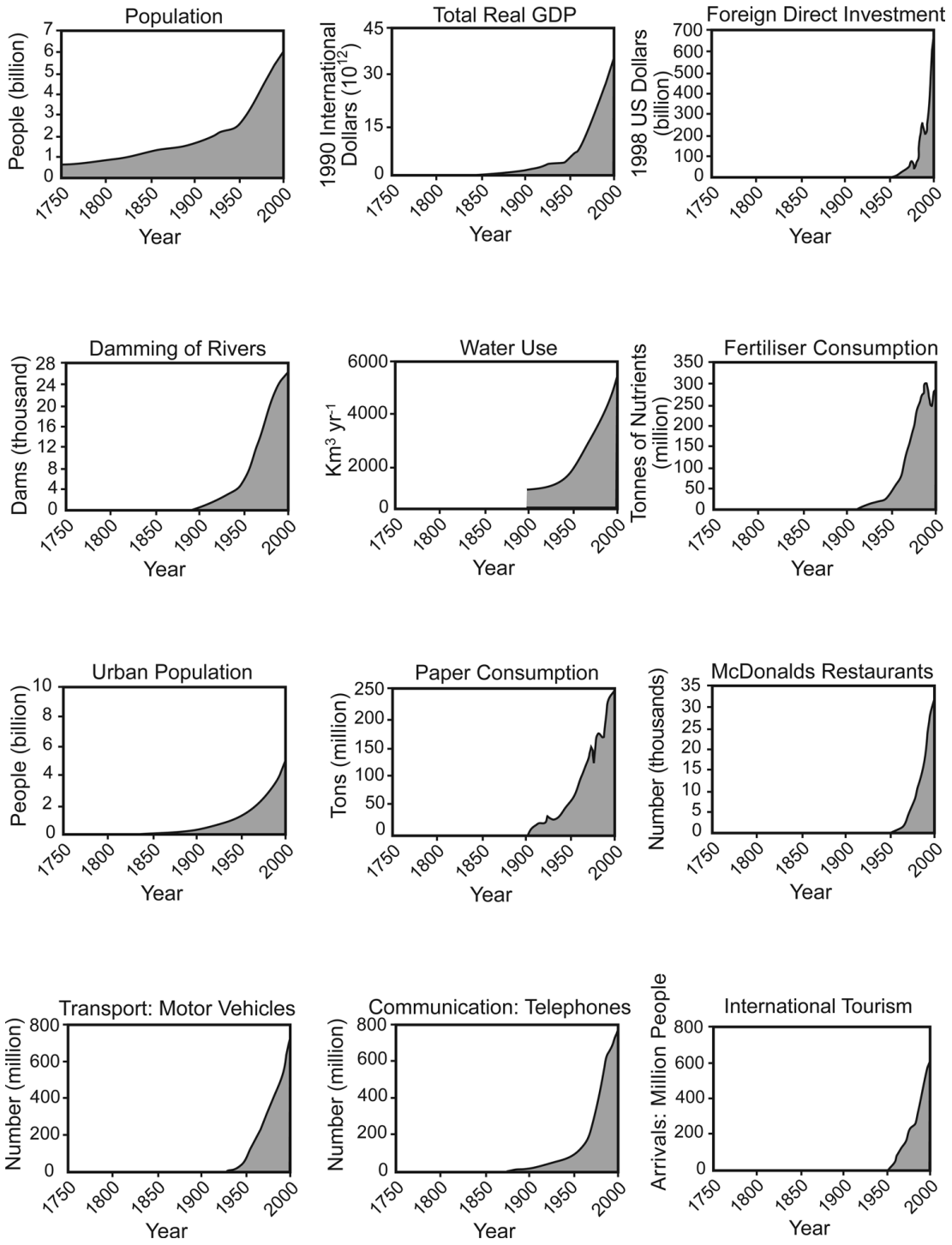

Figure 1: The increasing rates of change in human activity since the beginning of the Industrial Revolution. Significant increases in rates of change occur around the 1950s and illustrate how the past 50 years have been a period of dramatic and unprecedented change in human history. Source: Steffen et al. (2004), extracted from Richardson et al. (2011).

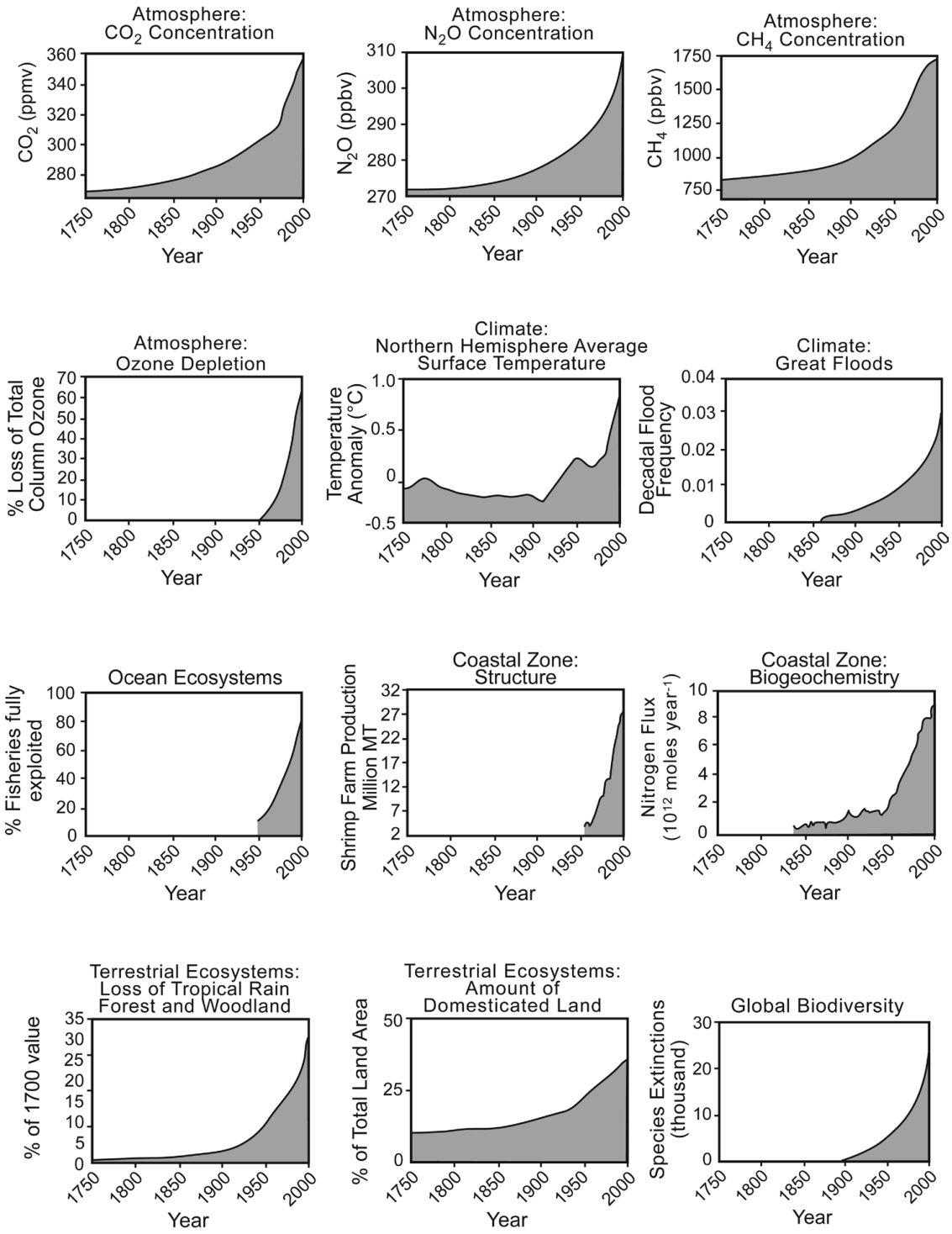

Figure 2: Global-scale changes in the Earth System as a result of the dramatic increase in human activity. Source: Steffen et al. (2004), extracted from Richardson et al. (2011).

ANNEX 3 - Meadows' (1999) leverage points hierarchy – Abson et al., 2016

Donella Meadows argued that the transformational capacity of interventions depends on which properties of the system they act upon, and so she proposed a hierarchy of intervention points for leveraging change.

In it, twelve leverage points are identified, ranging from 'shallow' (places where interventions are relatively easy to implement but have little effect to the overall functioning of the system) to 'deep' leverage points (more difficult to alter but with more potential to result in transformational change).

At the same time, the leverage points are classified into four broad types of system characteristics that interventions can target (from shallowest to deepest): parameters, feedbacks, design and intent.

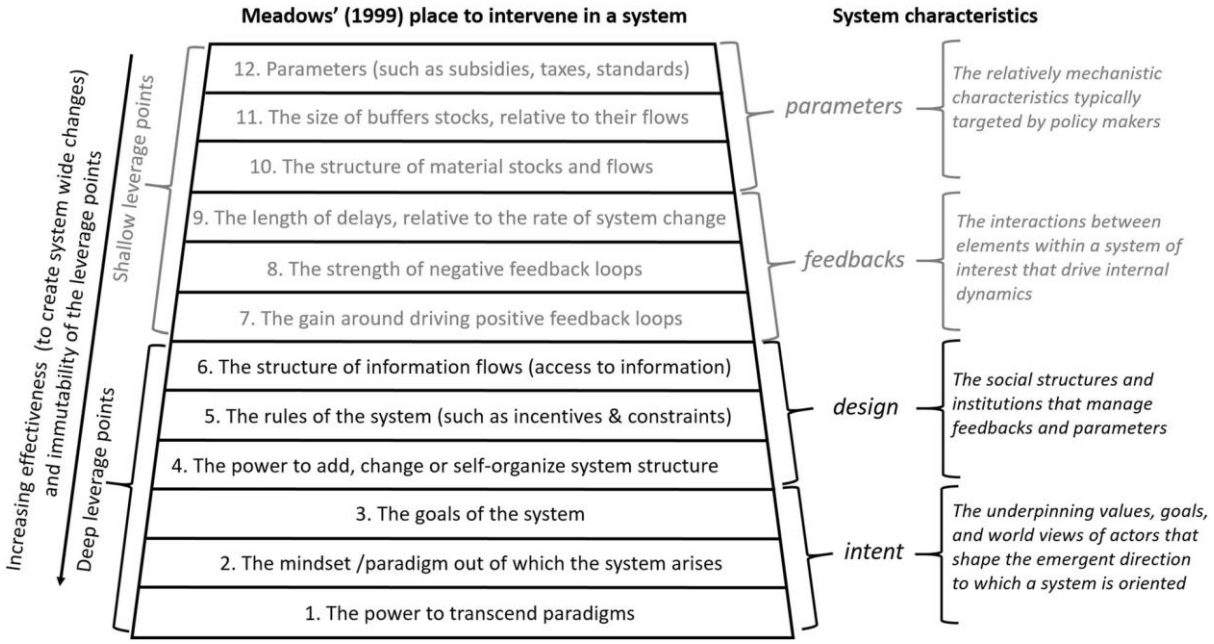

Figure 3: Hierarchy of intervention points by Meadows (1999). Source: Abson, et al. (2016).

Deeper system characteristics shape and constrain the different interventions available at shallower levels. The intent's paradigms and values are key in shaping design, which, in turn, determines the characteristics and strengths of the feedbacks provided. Therefore, all these three levels ultimately shape the way parameters are and the way they can be intervened.

ANNEX 4 - The IPAT equation – Hauschild, 2015

$I = P \cdot A \cdot T$

The IPAT equation represents the impact (I) that humans have on the environment through a function of three factors: global population (P) and affluence (A), which increase impact, and technology (T), which decreases it, and has the role to offset P and A increases.

Affluence, the material standard of living, is measured in GDP/person.

The technology factor is measured in impact per provided service, I/GDP. From the inverse of technology comes the so-called eco-efficiency, the created value per impact: GDP/I.