How Much Less is More?

Exploring GDP Efficient Sustainable Development in the Context of Planetary Boundaries and Climate Change

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Abstract

This study explored the novel concept of GDP efficiency in the context of sustainable development to investigate its utility and soundness. It is grounded in a critical perspective towards GDP as an indicator of progress and policy goal, especially the notion that GDP should grow indefinitely. With planet earth representing a limited, closed system, infinite growth presents a contradiction that threatens to disrupt the earth system and thus human habitation on the planet. Furthermore, capitalist economic activity and growth actively contribute to climate change, which threatens to exacerbate the problem of environmental degradation. Lastly, most developing countries have limited resources and thus benefit from more efficient policies to increase their citizens' welfare and opportunities.

A twofold mixed method design was employed to answer the research question, 'Which policies contribute to GDP efficient sustainable development?'. The large N quantitative section created a composite index of GDP efficient development in the dimensions of human welfare and sustainability. Sustainable development indicator data were divided by GDP per capita and their averages taken to gauge a country's development levels and relate them to its GDP. Subsequently, for each dimension, the most efficient developing and developed country was selected for further qualitative analysis, yielding a cohort of Belarus, Malawi, Bulgaria, and Burundi. Qualitative data for each indicator was analyzed to identify policies explaining the country's score and identify commonalities across these most efficient cases.

The findings showed that GDP per capita was the primary determinant of a county's index ranking as it has a higher and variance than the utilized sustainable development indicators. A country can have very low development levels but a GDP per capita that is disproportionately smaller, resulting in high GDP efficiency. The states with the lowest GDP per capita globally emerged as the overall leaders in all dimensions. The qualitative results showed public healthcare and education with advanced specialization to be most efficient in generating human welfare, as well as some corrective state intervention against inequality. For sustainability, the results were less coherent, with low CO_2 emissions and material footprint in addition to some conservation efforts emerging as important. Further research into this might adapt the methodology to reduce the influence of GDP, control for external financial influences, and use more cases in the qualitative analysis.

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Chapter One

1.1 Introduction

United States Presidential candidate Bobby Kennedy said in 1968 that 'GDP measures everything except that which makes life worthwhile' (Rogers, 2012). He was speaking about the relationship between societal values and the accounting of economic progress that supposedly supports them, a discussion that is still highly relevant today. The global economy has grown enormously since then, but many problems were not solved, such as poverty or have actually worsened in the case of climate change (Kumi et al., 2013). Millions of people are still living in poverty or experience other forms of deprivation, while global inequality is growing rather than decreasing (Hickel, 2017). The development efforts initiated in the 1950s are slow to deliver lasting improvements to the most impoverished regions, and a sustainably effective aid framework is yet to be established (Wade, 2017).

At the same time, the growing recognition of the effect of human economic activity on the global climate has made environmental sustainability a key consideration in many societal areas and decisions. While the problem definitions and corresponding prescriptions differ, there is an official understanding that climate change should be limited so as not to disrupt future generations' livelihood on earth (Hickel, 2019; WCED, 1987). Especially the burning of fossil fuels contributes to this, which has powered industrial development and provides most of the global energy today for production and transportation (Steffen et al., 2018). The past development trajectories of highly developed countries generally relied on this energy infusion to increase productivity per worker and, thus, efficiency (Szirmai, 2015). However, the new realities of climate change put the replicability of this path of rapid industrialization into question as the current impetus is reducing fossil fuel use instead of expanding it (Dauvergne, 2017). The emerging challenge in development is increasing human welfare and economic output without expanding the environmental impact of human activity so as not to accelerate climate change.

Furthermore, the orthodox economic perspective on economic development advocates primarily growth of gross domestic product (GDP) as this indicates the size of an economy (Szirmai, 2015). However, as an indicator, GDP favors scale over substance and therefore measures quantitative expansion over qualitative development (Daly, 2013; Victor, 2010). It further includes expenditure on social 'bads' like crime or pollution that is not correlated with substantive economic development or human welfare improvements (O'Neill, 2012; Sen,

1988; Szreter, 2003). Most importantly, it is uncertain whether GDP growth can actually be sustained long enough for all countries to reach highly developed status within the capitalist economic system (Daly, 2008). While GDP accounting is based on goods' market values which are socially constructed, it is also correlated with physical resource throughput and cannot be decoupled from this (Daly, 2013; Victor, 2010). And as resources are limited on this closed planet, an infinite expansion of resource use is neither feasible nor desirable as it correlates with environmental degradation (Boulding, 1966; Dyllick & Hockerts, 2002; Kumi et al., 2013).

Currently, a considerable amount of economic activity is extractive or polluting in a way that depletes natural capital and overuses ecosystem services like carbon sinks, making it deeply unstainable (Dyllick & Hockerts, 2002; O'Neill, 2012). The challenge is thus to find economic development models that foster qualitative improvement and human welfare with limited growth in GDP and the associated environmental degradation (Hickel, 2019). To that end, this study uses the novel concept of GDP efficiency, which captures the relation between units of GDP, human development indicators, and measures of environmental sustainability. High GDP efficiency describes policies that generate increases in human welfare with limited growth in GDP and correlated material throughput as this decreases ecological sustainability. In the environmental dimension, it is similar to the indicator of material footprint, which divides resource throughput by GDP to establish a comparative measure (Hickel, 2019). In addition to resource extraction and usage, ecological indicators like carbon dioxide (CO_2) emissions and the use of ecosystem services are considered as these are leading consequences of human economic activity (Steffen et al., 2015). To understand how countries can achieve more GDP efficient development in these two key dimensions, this study poses the following research question:

'*Which policies contribute to GDP efficient sustainable development*?'.

As this concept was not previously covered in the literature, a novel index measure will be created with indicators and calculation derived from theory about socioeconomic sustainable development. To highlight this element of the study, the first sub question asks: '*What is GDP efficient sustainable development and how can it be measured?'.*

To focus the subsequent explanatory section on policies in the dimensions of human welfare and ecological sustainability, two sub questions are used. As Szreter (2003) finds, the relationship between economic growth and human wellbeing is not certain or linear; it depends

on the specific national policies that channel GDP gains towards these ends. These entail the provision of social services, human rights, and political participation, among others. Therefore, the second sub question is: '*What explains human welfare development in the most GDP efficient countries?*'.

The third concerns the ecological impact of the current capitalist economic model and its expansion through GDP growth-focused policies (Kumi et al., 2013). It asks: '*What explains the low negative environmental impact of the most GDP efficient countries?*'. The impact here is most likely to be proportionally smaller for more GDP efficient countries that gain generate more development from exploiting the environment less.

1.2 Approach

To answer the research and sub questions, this study employs a twofold mixed-method research design to include both the quantitative side of GDP efficiency and the qualitative composition of policies that explain it. The large-n quantitative section presents and discusses the calculation of indexes of GDP efficiency for all countries in the two dimensions human welfare development and negative environmental impact or the lack thereof. The measures are constructed using cross-sectional data from development databases such as the World Bank's (WB) Development Indicators. The composition of the indicators contributing to the index will be derived from theory about socioeconomic development and relevant ecological aspects. Outcomes are measured in a human welfare dimension, and one focused on negative impacts on the environment. Socioeconomic factors like income distribution, education, and healthcare are included, but also subjective happiness. For the ecological dimension, key indicators are CO_2 emissions, usage of natural resources, and use of ecosystem services. These values are then matched with each countries' GDP as the established measure of the size of their economies to arrive at a comparative GDP efficiency score. This is done for all countries, and special attention is paid to developing countries expected to stand out due to generally smaller GDP, which still achieve high human welfare and little ecological deterioration.

The qualitative section is focused on the sub questions that emphasize the explanatory dimension of the study through the analysis of national policy regimes. The two highest-scoring countries from each dimension will be chosen with a development status bias to include at least two developing countries. Four states will be included in the small-*n* co-variational analysis. It

aims to find causal elements for their GDP efficient development results by investigating government policies regarding the factors, as mentioned earlier, included in the index. Additionally, their socioeconomic contexts and location will be considered as these can contribute considerably to development outcomes. To focus the comparative inquiry, analytical dimensions will be used to find commonalities in the most GDP efficient countries, for example, whether they provide public healthcare to their citizens.

1.3 Relevance

The scientific relevance of this study lies in the novelty of the approach to sustainable development. Conventional thinking here tends to follow the idea of green growth on how to alleviate the detrimental impacts of economic growth on the planet and peoples (Hickel & Kallis, 2019; Szreter, 2003). Nevertheless, taking planetary physical limits seriously, this approach puts the desirability of GDP growth into question and focuses on its relationship with the goal of development, human welfare improvement. By exploring this, new questions and perspectives arise that can be used in development discourse and research and thus advance the scholarly understanding of sustainable development.

The societal relevance is twofold. As mentioned in the beginning, development is an ongoing process, and far from complete, therefore, a better understanding of what policies are effective in furthering human welfare is still valuable. After decades of experimentation aiming to stimulate growth, this study aims to center the wellbeing of citizens instead of economic growth at all costs. Especially countries that struggle to grow might benefit from an improved understanding of which policies create human welfare most directly without having to wait for growth to materialize. The second relevant aspect concerns sustainability and planetary limits. The reality of climate change commands increasingly urgent attention to the problem, and this includes thinking long-term about the limits to human economic activity on this planet (Boulding, 1966). By taking these planetary limits seriously, new frameworks and policies can be found that promote sustained high levels of human welfare while decreasing the environmental impact of humanity. In doing this now, a planned and deliberate transition is possible as opposed to rapid changes driven by crises and loss.

1.4 Outlook

The paper is structured in three main sections that are connected by the approach outlined above. Following this introduction is a literature review that gathers relevant insights on sustainable development and GDP growth. The most important theories are then synthesized into a theoretical framework that grounds and informs the subsequent analysis. To make this feasible, it is conceptualized and operationalized in the methodological section, which explains the details of the analysis. With that in place, the GDP efficiency indexes for each dimension are calculated, and the results are presented with a discussion of the findings. This enables the qualitative section where cases are selected, analyzed considered individually, and then compared along the dimensions established by the theoretical framework and methodology. Closing the analysis is a wider discussion of the results from both sections towards recommendations for practice, followed by a conclusion and suggestions for further research.

Chapter Two: Literature & Theory

2.1 Literature Review

To ground this study in the existing literature and answer the first sub question, this section presents a review of previous scholarship. The review sets out from a critical perspective on GDP as a measure and policy objective and then relates it to development and sustainability. Thus, the emphasis is on critiques of orthodox ideas regarding economic and environmental policies that contribute to the new concept of GDP efficiency. The chapter is structured around the main themes of economic growth, sustainable human development, and planetary boundaries and ecology.

2.1.1 GDP & Growth

This section concerns GDP and its growth and how to quantify economic processes, in particular, how these can be conceptualized and measured. The prime measure for almost a century now has been GDP, introduced by Simon Kuznets in 1934 to gauge the size of the U.S. economy, which had hitherto been unknown (Lepenies, 2016). The U.S. government needed this to assess the contraction of the economy during the great depression, and therefore this measure is primarily focused on the quantitative volume of economic activities (Sen, 1988). The current definition of GDP in the System of National Accounts is a co-creation between the UN, IMF, WB, OECD, and EU and is widely accepted as the global standard (Bergh, 2009). It defines GDP as "the sum of gross value added of all resident producer units plus that part (possibly the total) of taxes on products, less subsidies on products, that is not included in the valuation of output. … GDP is also equal to the sum of the final uses of goods and services (all uses except intermediate consumption) measured at purchasers' prices, less the value of imports of goods and services. Finally, GDP is also equal to the sum of primary incomes distributed by resident producer units." (United Nations, 2009, p. 34). This extensive definition encompasses three approaches that theoretically add up to the same amounts, but in practice, the first is privileged over the others. GDP figures then mainly represent the gross value added of all domestic economic actors at market prices.

The aspect of the quality of processes is disregarded in favor of scale because it would be near impossible to measure at this level (Lepenies, 2016). This bias towards size is arguably the most significant flaw of GDP as a measure because it privileges scale over qualitative

development (Daly, 2008; O'Neill, 2013). Furthermore, GDP only captures market transactions that are formally accounted for, thus missing non-market activities, household work, and only guesstimating the informal sector (O'Neill, 2013; Sen, 1988).

Because of these reasons, a growing GDP is also questionable as a top government policy objective, especially in developed countries (Lepenies, 2016). Expansion of economic activity is not per se undesirable considering factors like population growth and trade. But the ultimate value for economic development lies in the qualitative improvement in production and service delivery. This increases productivity per worker and general economic efficiency, which are ultimately closer to the meaning of development than growth in scale (Szirmai, 2015; Victor, 2010). Kuznets himself warned that "distinctions must be kept in mind between quantity and quality of growth, between costs and returns, and between the short and long run. Goals for more growth should specify more growth of what and for what" (Kuznets, 1962, p. 29). When these considerations are made democratically, GDP growth can be universally beneficial and facilitating development by more fairly allocating the wealth created (Szreter, 2003). But, since the neoliberal turn in the 1970s, the discussion on growth has been 'settled' in favor of continuous growth at all costs with less consideration for distribution (Bergh, 2009; Daly, 2008). This is achieved, among others, through the expansion of market mechanisms across societies, privatization, and the removal of economic decisions from democratic influence (Kumi, 2013; Wade, 2017). The general framework for society and the economy had been found, and the Washington consensus institutions propagated it across the world (Daly, 2008; Phillips, 2017).

This turn also had implications for development policy as state-led industrialization and similar approaches were no longer viable (Szreter, 2003). Instead, export-oriented economic development policy was promoted and demanded by the Developed countries following the neoclassical theory of economics (Wade, 2017). It states that every country should maximize the value it generated from its endowments in capital (K), labor (L), and, more recently, ecological or environmental resources (E) (Szirmai, 2015). Developing countries have abundant cheap labor and often natural resources, but little capital, and thus should focus on these economic sectors of basic production and primary goods. This way, they can utilize their comparative advantage and contribute most efficiently to the global economy while Developed countries contribute through capital intensive research, technology, and services (Wade, 2017).

Though this generates efficiency in theory, in practice, it hinders developing countries' efforts as this specialization impedes growth into the other more capital-intensive sectors (Daly, 2013). It is argued that this structure essentially locks in global economic relationships to some degree as the underlying logic of globalization does not encourage significant structural change, as also explicated in dependency theory (Phillips, 2017). The neoliberal growth model is further said to have a questionable track record in generating lasting economic development, instead generating shorter growth spikes between recessions or crises (Bird & Rowlands, 2017). And due to its reliance on foreign direct investment (FDI), low labor costs, and limited state involvement or taxation, it generally creates high inequality in- and between countries (Wade, 2017; Wilkinson, 2014). High inequality, aside from being normatively problematic, also has a range of adverse societal effects on education, personal health, and social life (Tuters, 2012). For these reasons, this study is critical of neoliberal growth models and aims to highlight potential alternatives should they emerge from the analysis.

2.1.2 Human Development

Development is a broad and multifaceted concept for which much has been written over time; therefore, this review does not aim to be exhaustive but rather focuses on the aspects relevant for this study. These are, namely, health, education, income distribution, and subjective happiness as a means to increase human welfare and well-being, which are generally considered ends of development (Constanza et al., 2007).

A principal author on the meaning and purpose of development is Amartya Sen, whose work contributed to a shift in the focus of development efforts and studies (Cooper & Sen, 2000). He argued in favor of moving away from a narrow economic view towards a broader sociopolitical perspective that emphasizes opportunities and positive freedoms, not just employment and consumption opportunities (Sen, 1988). These arguments raised questions about the means and ends of development that generated reflection and novel methods, but limited application in practice (Phillips, 2017). Major actors like the World Bank and IMF paid lip service for a while but maintained their market-focused policies after critical voices were dismissed (Szreter, 2003).

Later work expanded these welfare indicators to general measures of quality of life (QoL) to encompass both opportunities and freedoms but also the personal perception of well-

being and happiness (Constanza et al., 2007). This perspective combines the quantitative, objective opportunities available to a person and the needs they fulfill with their qualitative, subjective experience of life within these actualities as the importance attached to each need varies individually. Human needs are factors like subsistence, security, reproduction, but also immaterial ones like affection, identity, and freedom, which all humans need to some degree. Meeting these is enabled by opportunities that can be conceptualized as social, human, built, and natural capital representing diverse resources contributing to QoL, for example, community, shelter, farming, and sciences, respectively (Constanza et al., 2007). To increase QoL is then to grow and maintain these capital stocks through policies that contribute to them in meaningful ways, for example, by giving material security while advancing economic agency and social communities (Kumi et al., 2013; O'Neill, 2012). This will increase the fulfillment of needs and, thus, general welfare and happiness among a population. The importance of subjective well-being is further supported by the finding that there is no direct positive relationship between income and happiness in the long term (Easterlin et al., 2010). Rather, happiness increases with income short term, but over time people adjust to higher standards and develop new needs, lowering happiness to previous levels. Additionally, the relationship becomes increasingly spurious at higher income levels, where wealth gains only generate marginal welfare and happiness increases (Easterlin et al., 2010).

While this paper will not adopt this framework directly, it informs the conceptualization of the ends of development to be primarily about the full range of human needs as opposed to the more intermediate means of employment or economic growth. As Szreter (2003) shows, historically, the relationship between GDP growth and population welfare is tenuous without democratic political control of distribution to channel the created wealth towards public goals. This observation holds until today where some indicators of welfare, contrary to expectations, do not reliably rise with GDP. Regarding nutrition, the correlation has been found to be weak and highly dependent on pro-poor policies that specifically target and favor people in poverty (FAO, WFP, & IFAD, 2012, p. 27). For health indicators like life expectancy, there is a positive relationship that saturates after national income levels of around 6.000$ per capita are achieved (Hickel, 2019; Preston, 2007, p. 486). This saturation curve is also visible when using alternative indicators of development or general progress. The Genuine Progress Indicator, which factors in environmental factors like pollution and social ones like income distribution, grew with GDP until 1978 (Kubiszewski et al., 2013). Then it peaked and stagnated or even

declined for some countries, further supporting the tenuous link between GDP and human wellbeing (Easterlin et al., 2010; Szreter, 2003).

However, the role of economic development cannot be understated either, as it significantly shapes the material realities in developing countries and developed countries alike (Wade, 2017). The capacity of a country to produce goods and services will determine the amount of wealth available to its citizens through income and other benefits, moderated by trade with external actors. To increase this, the primary way is to improve the productivity of workers as this means substantive economic improvement of processes and outputs (Szirmai, 2015). While this is a somewhat narrow conceptualization, it is consistent with recent history in which economic development increased rapidly after the industrial revolution (Szreter, 2003). That period saw an unprecedented deployment of technology to increase productivity, which increased outputs manifold and enabled many other societal improvements. However, the demand- or labor side of the economic process is also critical to economic development (Szirmai, 2015). The availability of a healthy and well-trained workforce to perform tasks and services is essential for productive economic activity (Hanushek, 2006). It is, therefore, economically relevant whether a developing countries' population is thriving or merely subsisting as this also affects economic outputs through each individual's performance in their work (Szreter, 2003). This is relevant as there is arguably a threshold below which these factors seriously impede the economy, and the role of development policy is to surmount it for the entire population.

2.1.3 Sustainable Development & Environment

The second major dimension of analysis is the interplay between economic growth, sustainable development, and environmental impact, as this is rapidly gaining global relevance under the theme of sustainable development (Kumi et al., 2015). The effects of human industrial economic activity on climate change and ecological degradation are by now well established but have yet to receive serious attention by policymakers (Hickel, 2019; Steffen et al., 2018). Since 1992 states have nominally committed to averting climate change in multiple treaties through emission reductions, but compliance and implementation, especially by significant polluters, are sorely lacking (Dauvergne, 2017; Victor et al., 2017). The focus of this section is to evaluate the desirability and necessity of economic growth through industrial economic

activity in the context of a finite earth system and increasingly severe climate change and environmental degradation.

2.1.4 Planetary Boundaries

To consider the general viability and desirability of infinite economic growth, one should assume a global perspective as this concerns the whole planet. The question is then whether this finite environment presents a limit to the growth of human economic activity or if that can be expanded independently from material constraints. Boulding (1966) coined the terms ‘cowboy’ and ‘spaceman’ economy to describe two differing perspectives on the setting of human economies. The cowboy economy is open, limitless, plain, expansive, well-measured in GDP, and generally favored by orthodox economists. In contrast, the spaceman economy, named in reference to the notion of spaceship earth, is closed, circular, and best measured in the degree of quality and maintenance of capital stocks (Boulding, 1966). These capital stocks are natural resources but also reservoirs of ecosystem services that ought to be preserved to sustain future generations (Steffen et al., 2015; WCED, 1987).

Earth is considered a mostly closed subsystem that exchanges only energy and information but not matter with the surrounding system, the universe (Georgescu-Roegen, 1986). This exchange happens mostly through solar radiation or sunlight, which is partly reflected by clouds in the atmosphere but still presents the prime energy source for planet earth. While humanity might eventually be capable of importing significant amounts of resources from other planets, this is an uncertain future prospect and insufficiently reliable to plan around. Recognizing this relative isolation supports the concept of the spaceman economy where infinite expansion, especially of material throughput, is not feasible and infringes on the opportunities of the posterity to sustain themselves (Georgescu-Roegen, 1986).

In addition to energy, information, and knowledge are also not constrained by the earth’s planetary boundaries; they can leave the closed subsystem and expand independently from material limits (Boulding, 1966). This means that information is a viable source of economic growth beyond planetary limits and has become increasingly central in highly developed service economies where most material needs are met (Szirmai, 2015). The question is then whether knowledge can completely substitute the material inputs in the economy so it can continue growing without increases in material footprint and use of ecosystem services

(Hickel & Kallis, 2019). Conventional economic theory assumes high or complete substitutability of the factors labor (L) and environment (E) by capital (K) (Szirmai, 2015). This substitution happens mostly through efficiency gains and technological solutions, both enabled by capital intensive knowledge production or research (Victor, 2010). However, evidence from physics and ecological economics challenges this assumption for various reasons. Regarding the overuse of essential ecosystem services, the substitutability of K for E is limited because much of the resulting degradation is irreversible and at scales outside of human control (Georgescu-Roegen, 1986; Steffen et al., 2015).

Furthermore, knowledge and information are worthless without a material basis to apply them to, and they are seldomly inherently valuable but rather instrumental for other ends (Daly, 2008). While they are complementary with E through efficiency and conservation, they are mutually limiting due to the link between the material and the informational world (Daly, 2013). Humanity will always need physically produced goods that require material inputs regardless of the efficiency of the process, so K cannot substitute E and L. Therefore, GDP growth cannot realistically be disconnected from material throughput, whose expansion is limited by planetary limits and its detrimental effects on ecosystems (Hickel, 2019; Steffen et al., 2015). It is thus unlikely that the expansion of human economic activity in the closed earth system (ES) can continue long term at current rates due to the material limits of the planet. Because of the multidimensional nature of the ES, systemwide effects are difficult to predict, but certain dimensions are already surpassing their limits and disrupting others through interconnection (Steffen et al., 2015). Exceeding these limits would have severe human and economic costs that would seriously harm the ability of future generations to sustain themselves (Georgescu-Roegen, 1986).

Another critical element of the environment (E) are ecosystem services or functions of the planetary environment that are highly useful to humans but do occur naturally (Hickel & Kallis, 2019; Steffen et al., 2018). Prime examples would be a steady climate, breathable air, freshwater, and carbon sinks. Human activity has in the past, and with increasing intensity since the industrial revolution, altered these processes and reduced their efficacy by pushing planetary boundaries, which then created effects across the entire ES (Steffen et al., 2015). In addition to greenhouse gas emissions and resource extraction, pollution contributes significantly to these trends as it fills sink capacities beyond absorption capabilities and thus disrupts previous equilibria.

2.1.5 Green Growth

A related and more urgent question is whether GDP growth can be sufficiently decoupled from CO_2 emission as they are the primary driver of climate change (Steffen et al., 2018). This is the underlying assumption of green growth theories that recently gained support as the reality of climate change enters policy discourses (Hickel & Kallis, 2019; Victor, 2017). The goal is to maintain GDP growth while reducing emission to stay within the projected CO_2 budget to keep global temperatures within 1.5°-2° rise over preindustrial levels. This outcome would avoid the worst effects of climate change by preventing self-reinforcing feedback loops and thus limit the humanitarian and economic costs while keeping the possibility for ecosystems to recover (Steffen et al., 2018). Victor (2010) conceptualizes economic growth as the product of the scale of economic activity, measured in GDP, and intensity measured in tons of CO_2 per unit of GDP. Green growth then means that intensity decreases faster than scale increases, which produces GDP growth with declining emissions and environmental degradation. This process is assumed to happen through widespread and massive energy and material efficiency gains across all sectors, especially regarding production and transportation (Hickel & Kallis, 2019). When scale increases faster than intensity decreases, i.e., when GDP growth exceeds efficiency gains, brown growth occurs, which increases the net environmental impact (Victor, 2010). If both intensity and scale increase, black growth happens, which is currently the case. Green growth had never been achieved historically; however, between the 1970s and the mid-2000s, there was a period of brown growth or relative decoupling (Hickel, 2019; Victor, 2010). Since then, emissions rose faster than GDP, and with growing populations in developing countries, this trend is unlikely to reverse.

To achieve green growth, high energy and resource efficiency gains in all areas of society would need to be realized very soon (Hickel & Kallis, 2019). Victor (2010) found that these efficiency gains, or reductions in intensity, were correlated with slower GDP growth, making them unlikely to materialize through economic growth-focused policies (Kumi et al., 2015). Furthermore, current green growth frameworks assume high rates of decoupling that are not supported by empirical evidence, making them dangerously optimistic (Hickel & Kallis, 2019). Therefore, the green growth framework sounds attractive and presents a compromise solution for current challenges, but is not grounded in evidence (Hickel, 2019). Relatedly, the ecological phenomenon of Jevons' paradox states that gains in energy efficiency will always be offset by increases in the scale of consumption (Alcott, 2005). This contradiction was first

observed for coal in the 1900th century but holds for oil and gas, putting efficiency gains as a panacea to climate change in question. Overall, these findings cast doubt on the desirability of GDP growth in the context of climate change.

2.2 Theoretical Framework

To transform the literature review into a feasible research design, first presents indicators for each dimension and then reviews some qualitative policy mechanisms behind them.

2.2.1 Growth

The central indicator of this research is GDP per capita, whose validity and desirability of growth as a policy are being examined. GDP per capita is used to facilitate comparison irrespectively of population sizes and measured in a globally valid currency like current US$. Since this research centers efficiency, more GDP is not automatically considered better, but rather attention is paid to how this relates to the following indicators of development.

2.21 Development & Human Welfare

The first indicator of the development dimension is health, consisting of healthcare and nutrition, as arguably the principal need for human sustenance. Together, they form the basis for a thriving population, and their fulfillment is conditional for pursuing higher goals (FAO, WFP & IFAD, 2012). The quality of healthcare in a country is assessed using healthy life expectancy as this indicator is both simple and inclusive of health throughout a person's lifetime. The nutrition element is evaluated through the prevalence of undernourishment as a percentage of the population as this national indicator is narrowed down to insufficient nutrition. This is arguably the critical aspect here as nutrition above a certain threshold brings marginal gains to wellbeing while there are stark and direct detrimental effects below that basic level.

Education is the second important dimension of development, acting as a means to a productive workforce and an end itself in self-realization (Hanushek, 2013; Sen, 1988). It is a multi-faceted concept but thus difficult to measure quantitively, but for the purpose of this research, this limited approach shall suffice. This is done using the indicators of average school enrollment rate across primary, secondary, and tertiary education of nationally eligible children and average completion rates of primary and secondary schools. The first one captures how

many children of the respective ages have the opportunity to attend school throughout all levels. The second one serves as an output indicator of completion, measuring the completion of elements of the educational trajectory.

A third indicator is the income distribution or inequality within a country. It is relevant for GDP efficient sustainable development as it determines the distribution of wealth and access to resources (Szreter, 2003). A country can have a very high GDP and high levels of poverty if the wealth is unevenly distributed among its population, which effectively squanders most of it from a development perspective (Sen, 1988; Tuters, 2012). Growing GDP is often considered a means of reducing poverty, but the efficacy of this approach is questionable when the benefits do not reach the poorest (Kumi et al., 2013; Szirmai, 2015). Therefore, this research includes inequality measured through the national GINI coefficient in the GDP efficiency index, with less inequality being considered more efficient.

The last human welfare indicator is self-reported happiness as it makes an essential contribution to subjective wellbeing and perceived quality of life (QoL) (Costanza et al., 2007). Self-reported happiness complements objective quantitative indicators that measure opportunities and burdens by supplementing them with data on the individual experience of these circumstances (Sen, 1988; O'Neill, 2011). Furthermore, it is relevant to GDP efficient development as Easterlin et al. (2010) find that there is no long-term relationship between happiness and income growth, which would strengthen the case for growth prudence. Therefore, happiness is included as a fourth dimension to round off the other objective indicators using data from global surveys.

2.2.2 Sustainability

The measures of sustainability follow directly from the literature review and are limited to the three most pressing ones. While Steffen et al. (2015) identify nine dimensions in which human activity might exceed planetary boundaries, these vary in their impact and relation to economic activity. Among the two most consequential is climate change, which is measured as the CO_2 concentration in the atmosphere in parts per million (ppm). As this study takes a global perspective with states as units of analysis, the first indicator that follows from this is national CO_2 emissions per capita.

The second indicator is the material footprint per country as a measure of material throughput or extractive pressure exerted on the environment (Hickel, 2019). While the exact

consequences of each extractive process vary, grouping them into a general footprint serves as a valid quantitative proxy for the material needs of each countries' economy (Hickel & Kallis, 2019). Furthermore, much material is discarded after consumption, creating ample amounts of waste that will also be considered within this indicator, especially in the qualitative analysis. This should yield an accurate picture of which countries account for the most extraction in relation to their GDP and thus how GDP efficient their economies and citizens function.

The third indicator of sustainability is air pollution as it both affects local environments and people living within them and thus exists at the intersection of development and ecology. Polluted air contributes to disease and increased mortality in both humans and animals and plants and thus is very relevant to sustainable development.

Lastly, the fourth indicator for sustainability is the amount of protected areas, both terrestrial and marine, as a percentage of total territory. These include national parks, nature reserves, and similar areas under regulation in favor of conservation. While this regulation can vary in strictness and enforcement, the amount of protected areas is recognized as an important indicator of political commitment to sustainability and biodiversity (Chape et al., 2005). For these reasons, it is also part of the UN Sustainable Development Goals (SDGs) and Conference of the Parties agreements.

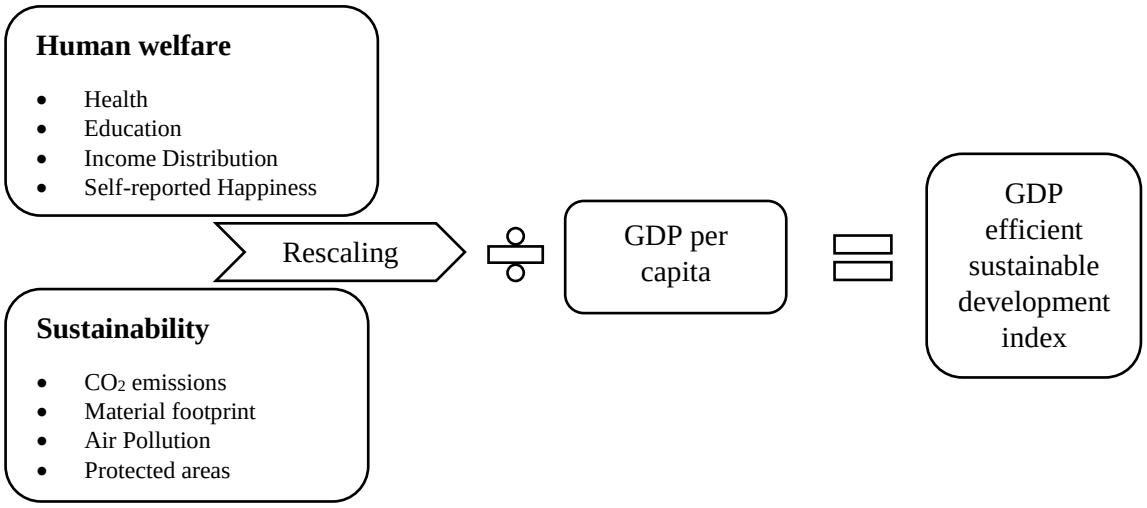
2.3 GDP Efficiency & Conceptual Model

Together, these indicators, also listed in Table 1, amount to two dimensions of dependent variables and GDP per capita as the independent variable. Figure 1 visualizes their relationship and treatment towards an index of GDP efficient sustainable development whose construction is further elaborated in the methodology section. The rationale for this concept is twofold and grounded in a sober appreciation of the current state of planet earth and scientific projections about its future (Steffen et al., 2018). The first factor is that developing countries are struggling to grow GDP at prescribed rates for significant development progress (Bird & Rowlands, 2017; Daly, 2008; Phillips, 2017). This leaves them missing development objectives and unable to raise revenues when international competitiveness for FDI is pursued. Therefore, identifying policies that make the most of limited available resources is critical to achieving any progress.

Secondly, the ecological tensions arising from globalized capitalism put the desirability of infinite GDP growth into question, a fact that applies to all countries alike (Daly, 2013;

Hickel & Kallis, 2019). This obligation challenges all actors to do more with less but in an environmentally conscious way that avoids Jevon's paradox where efficiency gains are always offset by scale increases (Alcott, 2005; Dauvergne, 2017). A more mindful use of resources and ecosystem services is imperative to sustain human habitation on earth at similar comfort levels as some enjoy today, which directs attention to the contemporary economic system (Boulding, 1966; Georgescu-Roegen, 1986; Steffen et al., 2015). GDP efficiency is then achieving greater development outcomes with existing resources and limited future expansion in order not to jeopardize the sustainability of the earth system and human life within it.

Figure 1: *Conceptual Model*



2.4 Policy Mechanisms

This section presents some insights on policy regimes that contribute to human welfare and sustainable development as explanatory mechanisms of outcomes and for use in the subsequent qualitative analysis.

2.5 Human Welfare

2.5.1 Healthcare

In the 1970s, findings on the effectiveness of comprehensive primary healthcare contributed to a consensus among experts and public health officials that it should be a model for health policy in Developing countries (Magnussen, Ehiri & Jolly, 2004). In contrast to the selective, disease-focused model that mainly responds to acute problems, comprehensive care emphasizes

universal provision and prevention to manage public health. This approach is similar to the model nearly all developed countries, and some developing countries use with great effectiveness, the main downside being that it is relatively more expensive for the single provider, which is often the state (Kruk et al., 2007). In contrast, mixed or private provision of healthcare can be more affordable due to market mechanisms and consumer choice of providers (Zwi, Brugha & Smith, 2001). These considerations became paramount with the neoliberal turn in the 1980s and spurred healthcare reforms across the world that shrunk governments' role in healthcare provision, encouraged by the WB and IMF for many LDCs (Sen & Koivusalo, 1998). The results have been mixed, but some issues associated with these reforms can be pointed out. Problems emerge from access equity as market allocation privileges wealthy individuals, and quality issues due to cost-saving concerns by healthcare providers (Zwi et al., 2001). Thus, the main questions for the context of this research are whether healthcare is publicly or privately provided, at which costs, and how effective it is at creating a healthy population.

2.5.2 Education

Secondly, education policy is less contentious as it is generally accepted to be an essential public good, and thus, that government provision is most efficient, attention is more focused on the micro-level of schooling (Szirmai, 2015). While 10-15 percent of students globally attend private schools, these are less relevant here as these are often financed by affluent parents or sponsors and thus face fewer resource constraints (Tikly & Barett, 2011). An extensive literature review on factors shaping educational outcomes in developing countries by Glewwe et al. (2013) finds that a well-functioning school with all material and a library, qualified and present teachers, a longer school day, and tutoring contribute most. Furthermore, while enrollment has increased immensely since the 1960s, the quality of schooling has received less attention while posing the more significant challenge for national education systems (Glewee & Kremer, 2006). Furthermore, in contrast with Sen (1988), the question of the purpose of education is receiving less attention, i.e., whether it should focus on labor market demands or facilitate personal opportunities and interests (Hanushek, 2013; Tikly & Barett, 2011). While the quantitative perspective still takes priority in many development discourses, educational quality is also increasingly receiving attention as countries improve their schooling systems. Teaching quality also affects the efficiency of education as it lowers dropout and repetition

rates, influencing the costs per student to complete the schooling trajectory (World Bank, 2010).

2.5.3 Income Distribution

Income distribution and corresponding wealth inequality are complex concepts with many contributing factors across economic and political institutions in a society (Wade, 2017). Possible policy interventions can thus take many forms from moderate to radical and transformative. They can either target assets like income and wealth or aim at correcting structural dynamics that produce these inequalities (Bourguignon, 2018). Taxation is a classical instrument that can do the former through levies on income, consumption, and assets or their transactions like inheritances. This intervention reduces outcome inequality, assuming the revenues fund government spending that is either universal or selectively favors the poor such as welfare systems. Progressive tax systems already passively do this as the upper percentiles generally contribute more to the state budget, but the spending priorities still matter greatly. The second approach aims at structural causes like market distortions and lacking opportunities that then perpetuate inequalities (Bourguignon, 2018; Sen, 1988). The former allows those with financial power to extract rents or manipulate economic processes to their ends. At the same time, those at the bottom have less access to credit, which might facilitate their social mobility. The latter concerns vital elements in personal development or human capital accumulation like nutrition, healthcare, education that significantly predict chances and earnings later in life (Bourguignon, 2018).

Both can be addressed at various levels and intensities by altering institutions or processes governing the respective dimensions. The employment of such redistributive policies depends on a country's political economy and culture, for example, the degrees to which it emphasizes meritocracy, individualism, or collectivism. Furthermore, globalization has somewhat limited the feasibility of some measures, especially taxation and regulation, as international agreements, capital mobility, and loan conditionality place significant sanctions on their enactment (Bourguignon, 2018). These external constraints create a distinct policy space for each country to make (macroeconomic) national policy, governments often making tradeoffs between sovereignty and other benefits when entering international institutions and agreements (Khor & Ocampo, 2010). This context will be considered when analyzing developing countries' domestic policies as they do not operate in a vacuum environment but

rather are subject to global power relations and external pressures, for example, through the World Bank and IMF (Phillips, 2017).

2.5.4 Happiness

Similar to asset distribution, happiness is a core societal outcome that continuously affects each citizen's life in multiple ways. As this is subjective, policy interventions are oriented towards averages and generally more facilitative than strictly targeted, arguably following Sen's (1988) notion of removing oppressive barriers and increasing opportunities for self-realization (Cooper, 2000). Two approaches to this are highlighted in this section that cover a range of possibilities to increase happiness in a population. The first is somewhat technocratic and consists of evidence-based interventions at the lower personal and local levels in line with discourses such as the World Happiness Report (Sutti, 2018). On the individual level, factors like sound mental health, human relationships, and time balance between work and leisure are essential contributors to happiness and should be policy targets. At the group level, the sense of belonging to a community makes a significant contribution, as does schooling due to its outsize role in shaping people while growing up. Creating communities, especially in urban settings that can be isolating, and making schools nurturing environments are key policy objectives here (Sutti, 2018). These are diverse policy areas that present many ways to increase happiness, but effectiveness is tied to a coordinated approach bringing these elements together, as visible in the following paragraph.

The second approach is the gross national happiness (GNH) philosophy that the government of Bhutan has implemented as its general state and development program. GNH is the synthesis of Bhutanese Buddhist values and traditions with the functions of a modern nation-state, which Bhutan became in 2008 after its king abdicated in favor of a constitutional monarchy (Givel, 2015). GNH consists of the four pillars sustainable equitable socioeconomic development, environmental conservation, preservation and promotion of culture, and good governance, which encompass the nine policy dimensions of psychological wellbeing, health, education, time use, cultural diversity, community vitality, ecological resilience, living standards, and also good governance. These are high-level objectives that are pursued by the GNH Commission, the government's 'apex strategic body' that emerged from previous planning and development agencies (Givel, 2015). The progress in GNH is monitored using the GNH Index, which uses 33 weighted indicators across the nine dimensions that are equally important to each other. Making happiness such an explicit objective was a global innovation

and has received much praise and some imitation, however, the practical implications are basic, for example, national free healthcare and schooling. Due to its spiritual and traditional roots, it can be considered a third way of sorts between capitalist and socialist models while still responding to the realities of modernity and globalization (Givel, 2015).

2.6 Sustainability

Lastly, some policy options are explored that governments can and are deploying to increase the sustainability of economic sectors and society at large. A rough dichotomy can be made between approaches attempting to increasing sustainability using carrot approaches of incentives and market creation, and more stick-like measures entailing regulation and sanctioning of polluters (Storm, 2009). The first broad category could be called improved business as usual, where policy aims to tweak and improve some aspects like the worst polluters or most disruptive practices. Standard tools here financial incentives like taxes or subsidies to direct actor behavior and promote more sustainable means over known, cheaper ones. Regarding the second group, regulation is the classical stick of the modern nation-state but is not universally popular and can have unintended consequences like less sustainable substitutes for targets of bans and market distortions. Furthermore, similarly to equality promoting measures, these policies might be constrained by international agreements and institutions that compel states not to intervene in particular domains or forbid trade-distorting subsidies (Dauvergne, 2017). This section now explores policies related to each indicator listed in Figure 1 or Table 1 for sustainability.

2.6.1 CO_2 Emissions

CO2 emissions are the main causal contributor to climate change and thus should be limited (Steffen at al., 2018). They emerge primarily from fossil fuel consumption for transportation and energy, as well as the cement used in construction and biomass used for energy. While reducing the scale of consumption would be effective in curbing emissions, it tends to reduce human welfare to some degree. Therefore, the more common approach is to alter the composition of energy sources and transportation modes towards more efficient and less polluting technologies (Storm, 2009). This can be achieved by focusing on different energy sources like nuclear or renewable, optimizing the use of existing fuels, for example, in transportation, and more sustainable construction with different materials and insulation.

2.6.2 Material Consumption & Waste

The material footprint is a key interface of people with the physical environment as it entails all materials used in any way. As it is very individual what each person consumes, the personal level is difficult to target with policy; rather, the input and output elements of production and waste are often addressed. Regarding input, material efficiency of production processes is of concern, with some goods requiring vastly more materials than others, making them targets for regulation or other measures (Victor, 2010). Ideally, market mechanisms automatically steer actors towards this efficiency, but when they are disrupted, policy interventions can address the market failure (Storm, 2009).

Furthermore, concerning output, waste increasingly becomes an issue since planetary boundaries confine its distribution and management, and eventually, landfills and oceans will be full. The ideal solution, comprehensive recycling, is effective in minimizing wasted materials and environmental degradation but also costly and challenging at scale, i.e., in major cities. Beneath that are systems were waste is systemically collected, but treatment capacities are lacking. Thus the material is often landfilled or burned, which reduces litter where people live but still creates negative environmental impacts. Lastly, when no waste management system is in place, negative impacts are strongest because they affect people in their dwellings but also the wider environment. Thus, the most comprehensive approach seems best and is usually funded by a local tax to match waste production, which enables cost-efficient waste treatment but also requires a corresponding legal framework.

2.6.3 Air Pollution & Water

In the index, this indicator is limited to air pollution because water data was not available. Still, water shall nonetheless be considered in the qualitative analysis because its quality contributes to the local environment and people's health (Szreter, 2003). Clean air and water are key ecosystem services and fundamental to human health and ecological vitality. Their pollution sources vary with air pollution being connected to similar sources as CO_2 emissions, while water pollution originates from insufficient sewage treatment and industrial wastewater. Thus, the policies for air pollution are similar to those for emissions, namely cleaner energy sources and efficient transportation, with the latter being especially urgent for urban areas. Technology such as filters also plays an important role in reducing emissions from existing systems and vehicles.

Regarding water, its monitoring, collection, and treatment, are important to avoid contamination of drinking water and other important natural bodies, e.g., lakes for fishing. This is largely an infrastructure issue with piping and treatment facilities being the requirements, but these are costly to establish. Beyond the initial investment, the maintenance and monitoring of water availability and quality also require attention, especially in scarce regions.

2.6.4 Conservation

Conservation is a broad area but generally refers to the preservation of some threatened entity, often species or unique natural areas. It is generally considered important but also in conflict with economic activities regarding the extraction of resources, spatial expansion of human settlements, and other interests such as game hunting. A key aspect of this is biodiversity, where a wide range of species contain varied genetic material, which serves as a 'database' of genetic information enabling evolutionary adaptation (Steffen et al., 2015). Preserving this natural asset as spawned different approaches, with the most common one being the designation of protected areas where nature is not disrupted (Chape et al., 2005). Furthermore, regulation on hunting, anti-poaching efforts, and species protection in sanctuaries and even zoos can contribute to conservation. This analysis focuses on protected areas as a proxy for conservation efforts as the data is available and comprehensible.

Chapter Three: Methodology

3.1 Research Design

This study employs a twofold sequential mixed method research design to answer the research question and generate further insights. The first element is the construction of a quantitative index ranking of GDP efficiency, followed by a second qualitative analysis of the highest-ranking countries' policies. The aim is to investigate the relationship between GDP growth as a policy objective and measure and sustainable human development outcomes. GDP efficiency emerges from this relationship and is shaped by the countries' policies in the two dimensions. This section elaborates on the methodology for each element regarding data sourcing and treatment, analytical procedures, validity, and findings.

3.2 Quantitative Section

3.2.1 Data

The index is constructed by aggregating country data on the indicators outlined in the theoretical framework and Figure 1 into composite values for the dimensions of human welfare and ecological sustainability. These are then divided by each country's respective GDP per capita to establish the relationship between each unit of sustainable development progress and GDP. This calculation is key to arriving at the GDP efficiency index (and isolating the role of GDP in the dimensions explicated in sub questions two and three). All data used are measured either per capita or as a percentage of the population and thus valid for global comparison without factoring population numbers into the analysis.

The datasets used are predominantly by the WB, with two being provided by other sources; therefore, the WB country listing was used (World Bank, 2020a). It consists of 217 countries or territories, of which 31 were removed from the analysis, listed in Appendix A. They are excluded due to not being sovereign countries or lacking data on more than five of ten indicators, leaving 186 countries. Three otherwise valid countries (Eritrea, North Korea, and Syria) were lacking GDP data, which was supplemented by cross-checking multiple other sources for the most accurate values.

Due to data availability limitations, the moment of analysis is not the current or last year but rather 2013 to include the most data across indicators from the same year. As visible

in Table 1, five indicators are available for 2013, four for 1-3 years from that, and two are averages from 2010 to 2018 to ensure sufficient data availability. This arrangement is a compromise between data accuracy and availability and maximizes viable countries while maintaining validity. The first indicator measured as a mean is the graduation rate for primary and secondary school, creating more of a generational cohort perspective of progression through education systems. The second is the GINI coefficient, which arguably does not change very quickly due to many contributing factors, and using the average yielded almost double the number of viable data points.

Furthermore, both education indicators are gross values and can thus exceed 100% when students outside the typical age range visit primary or secondary school. In the human welfare dimension, the education and health indicators have half the weight of inequality and happiness because there two indicators contribute to the same concept, whereas the other two are solitary. For sustainability, protected areas weigh five percentage points more and CO2 emissions per capita five percentage points less because the latter was moderately correlated with material footprint and air pollution, thus reducing overlap in the results.

Table 1 summarizes the indicators and data inputs, with most of them being derived from the World Bank World Development Indicators (WB WDI), one by the World Happiness Report, and one by United States SDG database (Helliwell, Layard & Sachs, 2015; United Nations Statistics Division, 2020; World Bank, 2020a).

Table 1

Indicators and Data Sources

Dimension	***Indicator, Weight***	***Measurement***	***Data Source, Year***
Development	GDP per capita	Annual GDP per person, current US$	WB WDI, 2013
Health	Average life expectancy, 0.125	Mean national life expectancy at birth in years	WB WDI, 2015
	Undernourishment, 0.125	Prevalence of undernourishment as % of a country's population	WB WDI, 2013
Education	Primary, secondary & tertiary school enrollment, 0.125	% of students enrolled in primary, secondary & tertiary school at national eligible ages	WB WDI, 2011

	Average completion rate primary & lower secondary school, 0.125	Gross intake ratio: students in the last year of respective schools as % of national eligibly aged population	WB WDI, 2010-2018
Inequality	Domestic income distribution, 0.25	GINI coefficient, deviation from perfect equality ranged 0-1	WB WDI, 2010-2018
Happiness	Subjective wellbeing, 0.25	Reported happiness in a global survey, range 0-10	World Happiness Report, 2015
Sustainability	CO_2 emissions per capita, 0.20	National CO_2 emissions in tons per capita, following production methodology	WB WDI, 2013
	Material footprint per capita, 0.25	National resource throughput in tons per capita, following consumption methodology	UN SDG database, 2013
	Air pollution ($PM_{2.5}$), 0.25	Concentration of fine or coarse particle matter ($PM_{2.5}$) in milligram per cubic meter of air volume	WB WDI, 2013
	Protected Areas, 0.30	Protected areas, terrestrial and marine (% of total territorial area)	WB WDI, 2016

3.2.2 Index Construction

To arrive at a comprehensive index that ranks countries by GDP efficiency, this study takes a simple comparative approach. Each indicator is rescaled to the 0-100 range to allow for calculating an average of the different outcome dimensions (Munda, 2011). Rescaling is done using a distance-to-target approach where the lowest and highest scores in a set serve as goalposts within which the rest is distributed (Yale Center for Environmental Law & Policy & CIESIN, 2018). The following equation (1) is used on the relevant datasets to arrive at comparable index scores.

$$\text{Index Score} = \left(\frac{indicator\ vale - minimum\ value}{maximum\ value - minimum\ value}\right)$$

After rescaling, the indicators representing negative phenomena were inverted by subtracting them from their maximum value as smaller values are more desirable here. These are namely undernourishment, GINI coefficient, and all sustainability indicators except for protected areas. Next, all indicators were divided by the respective countries' GDP per capita and multiplied

by 100,000 to receive index scores in the 100 to 390 range. Finally, the weighted average of the index scores for each dimension is taken using the weights outlined in Table 1, producing the final GDP efficiency scores for human welfare and sustainable development. To provide an answer to the first sub question, an average of the scores for both dimensions was taken to arrive at a unitary GDP efficiency index.

Furthermore, all index results were also calculated for the generally recognized groupings of countries by income and development status, as visible in Table 2. The income groupings are high income (Gross national income (GNI) >12,376$), upper middle income (GNI 3,996-12,375$), lower middle income (GNI 1,025-3,995$) and low-income countries (GNI <1,025$) (World Bank, 2020b). For development status, very high human development indicated by a Human Development Index (HDI) score above 0.8 is the criterion for developed countries, with the rest being considered developing. The group with a HDI score of 0.55 or less are also called the least developed countries (LDCs) (UNDP, 2019).

3.3 Qualitative Methodology

Once the index is completed, the four most efficient countries are selected for further analysis, two per dimension with one being developing and one developed. This is done due to the universal nature of the concept of GDP efficiency, which also stresses efficiency for all countries because of the quantitative limits to human activity on earth. The qualitative small-*n* analysis employs an embedded case study approach where the case selection is informed by previous quantitative analysis (Scholz & Tietje, 2002). The policy discussion in the theoretical framework and indicators in each dimension serve as guiding categories for the collection of qualitative evidence and analysis. Furthermore, water pollution was included as it initially was an independent indicator but was removed from the quantitative analysis due to insufficient data quality and now only features in the qualitative section. Each country's policies regarding the dimensions in Table 1 are investigated and classified, resulting in a matrix of cases and category findings. For example, following theoretical expectations, a country highly GDP efficient in human welfare might have universal public healthcare, free schooling, and extensive measures against inequality. There is further qualification if external influences have more explanatory power of outcomes than policy impact alone, for example, when geography or foreign relations significantly affect national results (Szirmai, 2015). Empirical country-

level data are gathered from country governments' primary sources and reports by international bodies and non-governmental organizations.

Finally, to synthesize both analyses, the index positions for each indicator and the variable matrix of selected cases are compared. This should produce a robust of set explanations and policy measures that emerged as contributing to GDP efficient development and thus provide an answer to the research question.

3.5 Validity & Reliability

This research aims for high validity and reliability to generate robust findings. As no experimental design or data gathering takes place, some ambiguity is also eliminated regarding the measurement devices. Internal validity concerns the measurement of effects attributable to changes in the independent variables, which only applies to some degree in this research design. The quantitative section mainly establishes correlation, which the qualitative analysis then investigates for causal relationships through compiling data on each indicators' relation to GDP per capita. External validity stems from the mixed methods approach, which deductively uses global data and then explains the findings inductively in the qualitative analysis. This way, both theory and evidence inform the findings and increase generalizability. By limiting the case selection to developing countries, it is further improved as there is greater homogeneity among them, decreasing the odds for factors that are unaccounted for to intervene.

Reliability is high due to this being a study that does not gather data using its own measurements. The data sources are public and fully disclosed, and the index calculation equation is shared and thus, replicable. All results can be independently validated and comprehended. Furthermore, intermediate steps will be reported throughout the study. For the qualitative analysis, the criteria for arriving at certain judgments are clarified, so they are comprehensible. Lastly, since only one researcher conducts it, critical reflection is done to avoid biased or narrow interpretations for the empirical evidence. Together, these efforts should produce valid and replicable findings and robust policy insights.

Chapter Four: Analysis

4.1 Quantitative Results & Discussion

4.1.1 Pre-GDP Results

Before considering the final GDP efficiency indices, a brief discussion of the data before they were divided by GDP per capita and multiplied is warranted. This highlights the contribution of the indicators and the validity of their composition in measuring human welfare and sustainability. As visible in Table 2, both high income and developed country groups score highest on human welfare, reflecting the comfortable lives these countries' wealth affords their citizens. The range is .55 with high income having the largest distance of .26 to the adjacent group and a similar distribution for developed and developing countries. Sustainability scores are reversed with low-income and developing countries scoring highest, but the ranges of .21 and .15 respectively are noticeably smaller. These suggest stronger influence of wealth and development status in generating human welfare than achieving sustainability. Possible reasons are a combination of greater means and more effective policies in addition to resource extraction, generating wealth at the cost of sustainability. It is in line with the literature arguing a negative relationship between a country's affluence and its ecological footprint, captured here in CO_2 emissions and material consumption.

Table 2

Grouped Pre-GDP Results

Income groups	*Number of countries*	*Human welfare scores*	*Sustainability scores*	*Average scores*
High income	51	0.116	0.143	0.130
Upper middle income	53	0.090	0.153	0.122
Lower middle income	46	0.081	0.158	0.120
Low income	36	0.061	0.164	0.112
Development status				
Developed countries	58	0.119	0.146	0.132
Developing countries (incl. LDCs)	128	0.076	0.154	0.115
Least developed countries (LDCs)	44	0.063	0.161	0.112

The average of both dimensions has the smallest range in both groupings, and the ranking features primarily European countries at the top, which combine high human welfare with some sustainability efforts. Exceptions are Venezuela and Bhutan, which combine strong sustainability with moderate human welfare development and thus score well in comparison with much richer states. The pre-GDP results are as expected in the human welfare dimension, with sustainability showing a smaller difference between developed and developing countries than anticipated. This is possibly due to sustainability featuring fewer per capita indicators, namely air pollution and the percentage of protected areas, which favor countries that can deploy technology, for example, to reduce air pollution in urban areas.

4.1.2 GDP Efficiency Results

The results after dividing by GDP visible in Table 3 show a clear tendency of countries with the lowest GDP per capita, achieving the highest efficiency scores across all dimensions. There is little variation in the top ten countries across the rankings, as visible in Appendix B.

Table 3

Grouped GDP Efficiency Index Results

Income groups	*Number of countries*	*Human welfare Index*	*Sustainability Index*	*GDP efficiency index*
High income	51	0.388	0.509	0.448
Upper middle income	53	1.371	2.450	1.910
Lower middle income	46	3.485	6.897	5.191
Low income	36	9.024	25.532	17.278
Development status				
Developed countries	58	0.514	0.667	0.590
Developing countries (incl. LDCs)	128	4.021	9.866	6.943
Least developed countries	44	7.306	20.034	13.670

Human welfare has somewhat steady distances between the groups, with the largest being between lower middle income and low-income countries, which reflect the GDP classifications of income groups. Low-income includes the most impoverished nations, while lower middle income goes up to four times the amount of the threshold value (1,025$). The index range in Appendix B for human welfare is 19.71, but only eight countries score above 10, suggesting a highly skewed distribution towards the lowest GDP per capita countries. Sustainability shows

a similar pattern but across significantly larger ranges of 61.884 for the country index and 25.523 for the income groupings in Table 3. Furthermore, the distances of the low-income and developing countries from the others are disproportionately larger, with 21.635 and 10.168 respectively, and only six countries exceeding a score of 30. This suggests an even more uneven distribution and a weaker negative influence of GDP on sustainability than its relationship to human welfare.

Put differently, the sustainability dimension of sustainable development is more affordable since more is being achieved per dollar of GDP than in human welfare. This is congruent with the literature, which argues that while wealthier countries might be more efficient regarding emissions and material use, their disproportionately greater scale of consumption offsets these benefits. Human welfare has a different dynamic where GDP per capita is more closely related to the index scores; i.e., it has a stronger effect on development outcomes. Nevertheless, the GDP per capita of LDCs and low-income countries is disproportionately much smaller than their human welfare indicator values. This suggests that there is a bottom plateau of sorts for this dimension where welfare does not significantly decrease anymore, but GDP per capita does. One possible factor contributing to this phenomenon is technology received by trade or aid, which supports this minimum level of welfare development, for example, knowledge on medical treatment, technology, drugs, and nutrition. Furthermore, inequality and happiness are less related to GDP per capita and more to other factors, decoupling their contribution to the index from GDP values.

4.2 Qualitative Analysis

4.2.1 Cases

The cases for qualitative analysis were selected according to their scores in the two dimensions and belonging to the developed or developing country categories. For each dimension, one country of each group was selected, with the final four being presented in Table 4. Following a brief overview, these will be analyzed case wise in the main dimension the scored highest in, i.e., human welfare or sustainability.

Table 4

Selected Cases

Dimension	**Human Welfare**		**Sustainability**	
Development Status	Developed	Developing	Developed	Developing
Country	*Belarus*	*Malawi*	*Bulgaria*	*Burundi*
Country Score	1.675	19.728	2.267	61.891
Group Mean Score	0.514	4.021	0.667	9.866

Table 5

Pre-GDP Scores for selected Cases (rescaled & if applicable inverted, higher is better)

Indicator/Country	*Belarus*	*Malawi*	*Bulgaria*	*Burundi*
GDP per capita	7978.87	348.43	7646.84	256.98
Health life expectancy	0.66	0.35	0.69	0.24
Prevalence of undernourishment	1.00	0.72	0.96	0.00
School enrollment	0.69	0.39	0.59	0.38
School completion rate	0.89	0.28	0.57	0.26
GINI index	0.96	0.47	0.67	0.64
Happiness score	0.63	0.31	0.29	0.01
CO_2 emissions	0.82	1.00	0.85	1.00
Material footprint	0.65	0.93	0.64	0.96
Air pollution	0.84	0.79	0.83	0.62
Protected areas	0.17	0.31	0.51	0.14

Human Welfare

4.2.2 Belarus

Belarus is an upper middle income developed country in Eastern Europe landlocked between Poland, Ukraine, Russia, and the Baltic states (CIA, 2020; UNDP, 2019). A former Soviet republic, the country never fully transitioned to democracy and is considered a factual dictatorship, the last in Europe. With a population of 9.4 million people, 79% of whom live in cities, and a GDP of 7978 US$ per capita in 2013, it is at the lower end of the wealth distribution in Europe but maintains high development (CIA, 2020). Being positioned between the major actors of the European Union (EU) and Russia, it has often sided with Russia, for example, by

entering multiple international organizations aiming to create an eastern alternative to the EU. While it also tries to maintain independence from Russia, it is ultimately reliant on energy imports, and 45% of Belarusian exports go to its big neighbor (CIA, 2020). Unlike in Russia, the state has maintained a major role in the economy, and privatization and liberalization are incremental, resulting in low FDI and growth. This strong state involvement generates low unemployment, poverty, and inequality, but also leaves an undynamic economy vulnerable to external shocks (Richardson et al., 2013). Nevertheless, it achieves high development outcomes and ranks 90th in the human welfare index with a score of 1.675, almost matching Paraguay and .015 above Peru. This score is low overall, but the most efficient for developed countries and thus will now be examined in the respective indicator dimensions.

Healthcare

Belarus has an extensive public national healthcare system based on the Soviet Semashko system (Richardson et al., 2013). While it has changed since the early 1990s, these adjustments have been very incremental, especially in comparison to other former Soviet countries. The Belarusian healthcare system is organized hierarchically under the Ministry of Health, which regulates procedures and takes care of most financing (Richardson et al., 2013). There are few private providers who only offer additional diagnostic services as branches of public hospitals. Until 2005 senior officials and some companies accessed a parallel elite health system, but this has since then been integrated into the national system. The Ministry of Health plans and manages the system through its subordinates at the regional and local levels who supervise policy implementation and the adherence to procedures (Richardson et al., 2013).

In 2011 Belarus spent 5.3% of its GDP on healthcare, 70.7% of which was public spending, corresponding to 13% of total government expenditure (Richardson et al., 2013). This spending is funded by taxes on enterprises, both public and private, which are pooled at the local level and then partly sent to the national ministry to fund specialized tertiary care. Another 26.7% of spending is out-of-pocket (OOP) payments by citizens for co-payments on certain drugs and treatments that exceed that universal access model. This funding model creates some inequities resulting from regional and urban-rural differences in economic performance that affect tax revenues and incomes (Richardson et al., 2013). People living in rural areas will have fewer healthcare facilities in their vicinity, and OOP payments might cost them more financially due to lower incomes. Belarus leads Europe in beds and doctors per capita, which contributes to good outcomes but also leads to overcapacity due to uneven

distribution across the country. The system offers widespread primary care, either through urban centers offering many services or rural outpatient clinics. Secondary and tertiary care is done in regional and national hospitals where more advanced treatments are possible. In conclusion, Belarus has a robust public healthcare system that achieves good outcomes, with its main weakness being that it reflects general inequities in the country between regions and urban-rural citizens (Richardson et al., 2013).

Education

Belarus has a free public education system administered by the Ministry of Education (EuroEducation, 2006). Students attend compulsory primary education from age six to ten, after which they graduate to basic secondary school until grade 10 at age 15. Following this, they can either attend gymnasium or college to prepare for university entrance, follow a technical secondary school, or a vocational school (EuroEducation, 2006). In higher education, students can attend free public universities or tuition-based private ones, which are about 20% of tertiary educational institutions. Since 2015 Belarus has become a member of the Bologna process and is thus more integrated into European higher education.

Education is predominantly state-funded by the Ministry of Education, distributing means that amount to 5% of GDP and 12.8% of government expenditure (World Bank, 2020a). This model generates universal access to education and high enrollment rates across educational levels. One criticism of the education system, especially in higher education, is that due to Belarus not being a democracy, academic freedom is lacking (Shraibman, 2013). The president selects university deans, degrees above graduate level are awarded by a state commission, and students face limits to political expression. This is an important caveat, which, while impossible to quantify, impedes higher education in Belarus.

Inequality

Belarus had a GINI index value of 26.6 in 2013 and 25.2 in 2018 and thus a trend of declining income inequality (World Bank, 2020a). It is among the lowest in Europe, although many former Soviet countries have low GINI scores, except for Russia. The low inequality partly stems from Belarus' hesitant approach to privatization and liberalization after the fall of the Soviet Union in the 1990s (Champion & Kudrytski, 2019). It opted instead to maintain its industrial base and the state's large role in managing it, generating stability at the cost of market dynamism promised by liberalization reforms. The high expenditure on subsidizing secured

wages and benefits was enabled by accruing debt and discounted oil imports from Russia, which are now decreasing in volume, forcing Minsk to consider serious economic adjustment (Champion & Kudrytski, 2019). And while national inequality has remained low due to these policies, there are still considerable differences between regions regarding economic opportunities and the aforementioned healthcare inequities (Bussolo et al., 2018). These disparities between regions are results of high urbanization and economic dynamism, exemplified by Minsk, the capital, moving ahead with advanced IT services while other areas remain in Soviet-era industrial production (Champion & Kudrytski, 2019). So, while inequality among the people is low, wealth distribution across the regions is unequal and should be addressed to maintain the overall ambition of stability.

Happiness

Regarding happiness, Belarus is in the upper half of countries, ranking 59th out of 159 in 2015 with a score of 5.81 out of 10, the global average being 5.37. This moderate score is perhaps surprising for the leader of the developed countries, but Eastern Europe is not generally known for its cheerfulness. As the government does not have explicit policies or programs aimed at promoting happiness, this section instead focuses on the explanatory factors provided by regression analyses in the World Happiness Report (Helliwell, Layard & Sachs, 2015). Belarusians happiness is best explained by their economic positions, family life, and health, where they score above the global averages. Especially the first two show high differences of about .2, with health being .1 above the global average. In contrast, freedom, trust in government, and generosity of fellow citizens are close to or below the rest of the world, suggesting they are a lesser source of happiness for Belarusians. These are unsurprising for a former Soviet de facto dictatorship; however, people seem content with the stability and relative prosperity it affords them. In conclusion, Belarus' commitment to stability in many dimensions has so far worked, with its people being taken care of satisfactorily and content with their material circumstances.

4.2.3 Malawi

Malawi is a landlocked low-income country and LDC located in southeastern Africa bordered by Zambia, Tanzania, and Mozambique (CIA, 2020). With a GDP per capita of 348 US$ in 2013 and a population of 19.1 million people growing at a yearly rate of 3.3%, it is among the

poorest countries on earth with demographic trends contributing to this (World Bank, 2020a). Furthermore, Malawi is noticeably rural, with only 16% of people living in urban areas amounting to merely four major cities, missing out on some of the potential economic dynamism of urbanization (World Bank, 2020c). The former British colony gained independence in 1964 but remained a one-party authoritarian state until 1994 when President Hastings Banda resigned, and free elections took place (CIA, 2020). Since then, it became a democracy party to many international organizations and transitioned to a market economy but is still struggling to achieve consistent economic development (World Bank, 2020c). Because of this, Malawi has been a major recipient of economic aid and development support from the World Bank, IMF, and donor countries, although this has decreased considerably since 2000 due to various corruption concerns. Malawi's economy is primarily agrarian, with agriculture accounting for about a third of GDP and 80% of exports, which is strongly related to most people living in rural areas (World Bank, 2020a). This is considered to impede economic development in combination with the high prevalence of HIV/AIDS, which harms human capital development (World Bank, 2020c).

In the pre-GDP index ranking for human welfare, Malawi ranks 135th with a rounded score of 0.69 that it shares with Cameroon and Djibouti and above Cuba, which scored 0.67. This puts it in the lower third of countries, which is to be expected for an LDC facing various challenges. But, after dividing by GDP, Malawi ranks first overall, scoring 19.73 and almost two points higher than second-ranked Burundi with 17.81. This is primarily due to its very low GDP per capita as one of the poorest countries on earth. However, other low-income countries scored lower, suggesting that Malawi is still considerably more efficient in its class. The following sections seek to identify reasons for this outcome in Malawi's policies.

Healthcare

Malawi has a primarily public healthcare system that constitutionally guarantees adequate healthcare to every citizen (Malawi Ministry of Health & Population, 2016). The healthy life expectancy is 55.5 years, and 19% of the population experiences malnutrition, which together amount to very low healthcare scores in the index. The government is the primary provider of healthcare funding and access, which is free at the point of service and aspired to be available within 8 kilometers of each person's home. However, as public coverage is severely lacking, religious, NGO, and private providers organize a significant amount of healthcare services (Makwero, 2018). The largest here is the Christian Health Association of Malawi (CHAM),

which operates about 29% of all health services with funding support by the government, especially in rural areas (Malawi Ministry of Health & Population, 2016). Other NGOs, especially international, and growing numbers of private for-profit providers that charge fees, also aim to fill in the gaps of Malawi's healthcare system. The country spent 11.6% of GDP on healthcare in 2013 or 7% of government expenditure, with another 6.7% being out of pocket payments (World Bank, 2020a). This is below global averages and explains the resource shortages that contribute to the problems of the Malawian healthcare system. Furthermore, external donors provide a considerable proportion of Malawi's healthcare budget to ameliorate its shortcomings, but the exact amounts fluctuate and are hard to quantify.

The system is organized at four levels: community, primary, secondary, and tertiary (Malawi Ministry of Health & Population, 2016). The community-level aims at rural areas where health surveillance assistants and small facilities provide basic services and promote preventative interventions such as lifestyle changes. The primary level offers comprehensive primary-care at health centers and small hospitals. The secondary level covers entire districts and provides referral services for more advanced procedures in addition to primary services for the surrounding populations. Lastly, the tertiary level entails central hospitals with specialists for complex interventions. However, in practice, people also approach them for primary and secondary services due to proximity and lacking rationing of access (Malawi Ministry of Health & Population, 2016). This hints at a central issue in the system, lack of staff, and uneven distribution across the country, exemplified by the fact that half of doctors and nurses are positioned in four central hospitals (Makwero, 2018). Also, Malawi faces a general shortage of medical staff except for nurses and midwives, as medical school is expensive and inaccessible (Seed Global Health, 2015). Lastly, abortion is illegal in Malawi except when the mother's life is in danger, leading to many unsafe, illegal abortions that increase maternal mortality rates. Overall, the system has the potential to achieve its goal of universal quality healthcare coverage, but the drastic underfunding and issues of staff and resource allocation lead to inadequate outcomes at considerable human capital costs.

Education

Malawi has a primarily public education that consists of primary, secondary, and tertiary schooling (Seed Global Health, 2015). Primary schooling was made free in 1994 and covers grades one to eight, with the teaching language changing to English in grade five. The government funds 92% of education, with the rest being private or religious schools that are

especially numerous at the secondary level (World Bank, 2010). After the extensive primary phase, secondary education is geared towards university and some vocational training, but the latter is lacking for entering the workforce upon graduation. Furthermore, secondary education is not free, and there are various types of schools since the level is generally underdeveloped compared to the other two (Seed Global Health, 2015). Malawi has four universities that offer higher education programs and additional colleges that train white-collar staff like teachers. Entrance to university is competitive and costly due to limited, underfunded spaces, which often means elite children having privileged access (World Bank, 2010).

Such inequities are present throughout the education system due to the dire economic situation, but they are most notable in primary education. Here enrollment has increased drastically since 1994 at the expense of quality as funding is limited and teachers are in demand, leading to a high student to teacher ratios and staff misallocation (Seed Global Health, 2015). Furthermore, the system is inefficient due to high dropout and repetition rates, as evidenced by a 35% primary school completion rate (World Bank, 2010). There are also gender inequities as child marriages and pregnancies are not uncommon in Malawi and cut short the educational trajectories of girls. Thus, the education system is ineffective and notably inefficient and cannot be considered a GDP efficient policy regime.

Inequality

Malawi has comparatively bad scores for inequality. Its GINI index score is 45.1, which has been fairly steady since 2010 but climbed to that level from 39.9 in 2004 (World Bank, 2020a). This is above the global country average of 38 and suggests serious equity issues in asset and income distribution in Malawi. These are primarily rooted in its history and economic structures and will likely continue to reproduce themselves until Malawi's socio-economic development increases (Cornia & Martorano, 2017). Two of the contributing factors are demographic and human capital, namely that the high population growth rate and prevalence of HIV/AIDS maintain a high burden on the poorest peoples. They have a harder time saving up to invest in health and education, which would grow human capital and enable social mobility (Mussa & Masanjala, 2015). Economically, the dominance of agriculture in Malawi's economy has the potential to reduce inequality, but economic policy decisions and global market dynamics have largely prevented this. Most Malawians farm for subsistence and only larger estates can compete and produce crops or livestock for export markets.

Moreover, agricultural productivity differs too due to inequities in access to farming inputs like fertilizers and machinery, which were subsidized in the mid-2010s, but this stopped in accordance with structural adjustment programs (Cornia & Martorano, 2017). Furthermore, the slow sectoral economic transition towards services has missed manufacturing growth opportunities, and too few people have the necessary advanced skills to participate in these sectors (Mussa & Masanjala, 2015). Finally, declines in terms of trade affect inequality too, as Malawi's economy is highly reliant on primary exports of agricultural output, which has wider effects on many people's incomes. While the government is cognizant of these factors, general development challenges and international pressures on markets and policy programs have hindered effective action to reduce inequality persistently.

Happiness

Malawian's have limited material reason for happiness, and it reflects directly in its scores in the Global Happiness Report survey, where Malawi scored 4.29 and ranked 131st in 2015, which has since decreased to 150th with 3.41 in 2019 (Helliwell, Layard & Sachs, 2015). As there are no policies or documents directly addressing happiness, the factors from the Global Happiness Report are considered together with other socio-economic indicators. Malawi scores below the global average of 5.37 out of 10, which is especially stark in certain dimensions. The economic dimension explains .01 of Malawi's score, and it is .8 less than the global average of 1, which is unsurprising given the widespread material destitution among the population. What is surprising that the family situation explains .22, and it is .4 less than the global average of 1.23 of happiness despite the rapid population growth rate, which would suggest some affinity for one's kin. Family planning and contraception are relatively known and actively promoted in Malawi; thus, procreation does not generally happen by mere accident. Relatedly, health also scores below the global average, but the difference is smaller with .4 and in line with the country's inadequate healthcare situation.

Interestingly, freedom and generosity are slightly above global averages, with freedom being the strongest explanatory factor overall. This suggests some satisfaction with the sociopolitical setting of the country and is congruent with the peoples reported kindness, Malawi is also known as the 'warm heart of Africa' (Misachi, 2019). These factors are limited by below-average trust in government, but in a country notorious for corruption, this is unsurprising. Furthermore, Malawi's high economic inequality might contribute to the low overall score as relative deprivation has been found to decrease people's happiness (Costanza

et al., 2007). It is then uncertain whether Malawi's happiness score is entirely because of, or partly despite, its development status and material issues.

Sustainability

4.2.3 Bulgaria

Bulgaria is a developed upper-middle-income country in Southeastern Europe. An EU member state since 2007, Bulgaria is part of Europe's southern frontier through its border with Turkey. With a slowly declining population of 6.95 million people and a GDP per capita of 7,649 US$ in 2013, it is among the lowest income EU members but does quite well for the region of Southeastern Europe (CIA, 2020). A former communist republic, the country became a parliamentary democracy in 1990 and reformed into a market economy, achieving high development status in 2003 and joining the EU shortly after (UNDP, 2020). It has benefited considerably from EU membership but generally ranks low in comparison with other member states, perhaps most notably in corruption, which continues to be perceived as a significant problem (CIA, 2020). While the Bulgarian economy has shifted to services, it retains some of its communist roots in large industrial and agricultural sectors that enlarge its environmental footprint. This section explores how it achieved its sustainability efficiency score of 2.267, which amounts to rank 103 among all countries and first of the developed nations. It is similarly efficient to Peru with a score of 2.274 and Dominica with 2.227. In the pre-GDP index, Bulgaria scores 33rd for sustainability, which places it in the upper fifth of countries, with ten EU members scoring higher. Still, these all have higher GDP per capita, which is why Bulgaria surpasses them in efficiency.

Sustainability

Bulgaria has made considerable progress in becoming more sustainable, which was arguably accelerated when joining the EU and implementing its environmental regulation into national legislation (UNECE, 2017). It spends 0.7% of its GDP on environmental protection, which is equal to 1.9% of total government expenditure and very close to the EU average (Eurostat, 2020). To analyze Bulgaria's environmental policy that led to its sustainability score, this section is structured according to the primary focal areas of emissions, material consumption and waste, pollution and water, and conservation. These cover the main themes that emerged

from the literature regarding climate change, human consumption and ecological role, and the preservation of ecosystem services.

Emissions

Bulgaria has moderately low CO_2 emissions per capita by European standards, but in global comparison, it still emits high amounts, ranking 52nd in the dataset (World Bank, 2020a). This is primarily due to its reliance on dirty fuels for most energy, namely solid fuels like coal and an old inefficient vehicle fleet that cannot utilize biofuels or electricity (UNECE, 2017). While Bulgaria has reached its EU goal for transitioning to a cleaner fuel composition early, the target of 16% leaves room for improvement (EC DG-ENV, 2019). However, from a global comparative perspective, Bulgaria still does well regarding emissions, possibly due to its moderate population density and EU support for greater sustainability.

Material Consumption & Waste

Material throughput can be considered a product of consumption and recycling as these are the input and output processes for modern capitalist economies. Bulgaria's material consumption per capita is moderately high for developed countries, but its comparatively low GDP per capita amplifies this in the final index. Determining the policy causes of the material consumption per capita values is beyond the scope of this research, so this section will now focus on the second element of the equation, waste.

Waste management in Bulgaria is closely connected to emissions since the country lacks integrated recycling systems, and much garbage is incinerated or placed in landfills. Bulgaria's waste generation is below the EU average, but so are the treatment levels, although recycling and composting have increased since 2017 (EC DG-ENV, 2017). While there is legislation that obliges municipalities to collect separate streams, the implementation and enforcement are lacking. The current goals are to reduce landfilling of biodegradable waste and reduce air pollution from incineration. Furthermore, Bulgaria imports waste from Italian cities and burns it, partly as refuse-derived fuel for cement kilns, producing emissions that are also threatening the health of nearby residents (Nicastro, 2018). This practice creates a difference between Bulgaria's consumption levels, which are moderate for the region, and its waste and corresponding emission levels.

Air & Water Pollution

This section covers both air and water pollution as they each constitute important policy areas of sustainability and affect a country's peoples considerably, making them relevant for sustainable development. For air pollution, Bulgaria does poorly in the European comparison, having among the highest numbers of premature deaths caused by air pollutants, and places in the lower half globally (Nicastro, 2018). This result is connected to its energy and transportation systems, which, in addition to some older industrial facilities, do not use the most advanced technologies to filter their exhaust air. Furthermore, Bulgaria's waste incineration facilities contribute to its low air quality, especially when built in proximity to homes (Nicastro, 2018). There is no national policy to address this, and the European Commission has opened a legal case attempting to improve Bulgaria's compliance with EU regulation on this matter (Nicastro, 2018).

Bulgaria has an extensive water piping network that gives 99% of the population access to piped water, 95% of which meets safe drinking water standards (UNECE, 2017). This water is primarily sourced from surface water, which is slowly improving in quality, but demand is growing, exacerbating an existing monitoring problem. Bulgaria lacks an integrated national water monitoring system, and thus the number of water bodies and sources of extraction of unknown quality is increasing (EC DG-ENV, 2019). Available information on surface waters shows that the most significant pressures are from agriculture, industry, and urban wastewater that goes untreated. Only 26% of urban wastewater is collected, with 20.4% undergoing secondary treatment and 6.7% undergoing subsequent stringent treatment (EC DG-ENV, 2019). So, while access and quality are good, treatment is lacking, and this exerts pressures on ecosystems.

Conservation

This is arguably Bulgaria's strong suit as it is highly biodiverse and has designated considerable amounts of territory as protected. The country hosts 26% of European distinct species in its territory, 38.55% of which is covered by forests, also containing the oldest trees in Europe, placing it among the most biodiverse countries in Europe (EC DG-ENV, 2019). In recognition of this, Bulgaria has designated about a third of its territory as protected areas as part of the European Natura 2000 network. These entail three natural parks, 11 nature parks, 55 reserves, 33 managed reserves, 564 protected sites, and 344 nature monuments (UNECE, 2017).

However, the latter two categories are usually very small and thus insignificant in a national-territorial context. The larger protected areas are well managed and maintained, also contributing to tourism, but the more numerous smaller ones mostly enjoy legal status and derive no tangible benefits beyond this (EC DG-ENV, 2019). The challenge here is balancing the ambitious commitment to conservation with the need for economic growth. This, for example, manifests in the increased need for space for agriculture, and there are demands to permit certain kinds of farming in protected areas.

Overall, Bulgaria's leading sustainability score for developed countries is best explained by its location and EU membership. Having diverse geography and rich ecosystems is a beneficial starting point, which, in combination with strong EU environmental regulation, leads to a sustainability efficient, highly developed country. However, its leadership position is also due to its low GDP per capita as an upper-middle-income country and poorest EU member state. The data suggest that since the transition to democracy, Bulgaria has relied on environmental rents to some degree through industrial pollution and extraction, which the ecosystems had to cope with. But it has managed to reduce this, especially since joining the EU and aiming to become a modern service economy (UNECE, 2017).

4.2.4 Burundi

Burundi is a low-income LDC in south-eastern Africa landlocked between its neighbors Rwanda, Tanzania, and the Democratic Republic of the Congo (CIA, 2020). It has a population of 11.8 million and a GDP per capita of 257 US$ in 2013, which has since grown to 310US$ (World Bank, 2020a). Burundi's population is rapidly growing at a rate of 2.5% per year, which is the 11th fastest in the world, and this is considered a source of development problems (CIA, 2020). Since gaining independence in 1962, the county has experienced two civil wars and genocides, and its transition to a democratic republic has not been assured when its president attempted to bypass a limit on his third term in 2015 (CIA, 2020). It has hardly recovered from these struggles as it is one of the least developed and poorest countries on earth. Poverty is widespread, more than half of the population experiences undernourishment, and Burundi has the lowest GDP per capita of all countries in the dataset for this research (World Bank, 2020). This is related to its economy being dominated by inefficient subsistence agriculture, accounting for 50% of GDP and over 90% of employment, while farms, on average, have less

than one hectare of land (CIA, 2020). Furthermore, most farming lacks irrigation, fertilizers, and other inputs, and is done on degraded land (UNstats, 2017). Burundi's commercial exports are mostly primary goods like coffee, tea, gold, and basic manufactured goods (World Bank, 2020a). This composition amounts to an economy that is undynamic, subject to external influences on agricultural outputs, and barely integrated into global markets.

Burundi scored 81st in the pre-GDP index ranking for sustainability, most likely due to its very low consumption levels and CO_2 emissions per capita that are among the lowest in the dataset. However, as 95% of Burundians use charcoal firewood for energy, its CO2 emissions are likely higher than indicated as the available data only included fossil fuel and cement emissions (UNstats, 2017). This is consistent with its air pollution value being disproportionally higher. In the GDP efficiency calculation for sustainability, Burundi leads with a score of 61.891, which is 9.57 points above second-ranking Somalia. As mentioned in the preceding analysis, this is mostly due to its extremely low GDP, which determines the top positions. This is exemplified by Burundi's score being more than double that of eighth-ranked Madagascar and thrice the average of all LDCs visible in Appendix C. Nonetheless, this section will explore Burundi's environmental situation and policies that contributed to this outcome.

Emissions

Burundi is among countries with the lowest CO_2 emissions per capita on earth, as most citizen's primary energy consumption is from firewood and charcoal (UNstats, 2020). This is a considerable limitation in the data, but these fuels are nonetheless renewable, and the plants capture CO_2 while growing, making the indicator sufficient for these purposes. Since its economy is hardly industrialized and infrastructure is sparsely developed, major emission sources are only present in a limited capacity (CIA, 2020). Furthermore, less than 10% of the population has access to electricity, but the existing demand is largely met using hydropower, which makes up for 85-95% of the national energy mix (World Bank, 2020a). These factors are primarily related to low GDP per capita and limited socioeconomic development and might increase with economic growth, but for now, sustainability is a minor concern of Burundi's government. While its development vision for 2025 mentions the environment as a priority and commits to its protection, there were no details available regarding its progress or implementation (Ministry of Planning and Communal Development/Forecasting Unit, 2011). The government is cognizant of its peoples' and economy's reliance on and interconnection with the environment and the threats of climate change on key national ecosystems like forests

and water sources. Nevertheless, as a contributor of less than 1% of global CO_2 emissions, its scope for action is limited in preventing climate change, and it focuses on adaptation to the effects instead (Republic of Burundi Ministry for Land Management, Tourism, and Environment, 2007).

Material Consumption & Waste

Burundi's material consumption per capita of 20,0615 tons is the 14 lowest in the dataset, and together with its CO_2 emissions contributed most strongly to its high sustainability score. This data includes crops, biomass, and wood, of which Burundians indeed use considerable amounts for subsistence through farming and solid fuel energy generation (UNstats, 2017). But these are direct use cases where all material is directly utilized and does not entail much processing or improving of material where efficiency might decrease and throughput increases like, for example, industrial meat production. Furthermore, as Burundi is among the countries with the least integration into global markets and flows its impact through product chains and extraction elsewhere is limited (CIA, 2020). However, as an exporter of primary goods, the country contributes to extractive pressures on the environment, for example, through its second-largest export being gold mined in Burundi (World Bank, 2020a).

Regarding waste, while Burundi does not produce large amounts, it also does not manage its garbage with much concerted effort (Republic of Burundi Ministry for Land Management, Tourism and Environment, 2007). No city in Burundi has an integrated municipal approach to waste management due to the low priority of the issue compared to other services (Mbuligwe, 2012). When waste is collected, it is door to door by small enterprises that then dump it in open, often wet, areas close to the city where it may be burnt sporadically. This leads to random accumulations of waste in the cities and exposure of the water supply, which has contributed to the spread of infectious diseases (Mbuligwe, 2012). Waste management receives little consideration as a public service and possible business as development priorities lay elsewhere. Overall, Burundi's material consumption and waste management are less subjects of deliberate policy interventions and more products of its LDC status. However, with development progress and international cooperation with organizations like UN habitat and among African nations, it is likely to emerge on the agenda for government at various levels.

Air & Water Pollution

Despite having comparatively low measured emissions per capita, Burundi still experiences considerable air pollution that exceeds the safe levels almost fourfold (World Bank, 2020a; World Health Organization, 2018). This is due to the widespread use of solid biomass fuels for household energy and waste burning in dwelling and agriculture in addition to industrial pollution (UNstats, 2017). While the government is cognizant of this, the economic situation does not permit significant intervention in the short- and medium-term regarding energy provision as the country's waterpower resources are already exploited (Republic of Burundi Ministry for Land Management, Tourism and Environment, 2007). Additional power sources are thus unlikely to be as clean as hydropower.

The state of water pollution is less grave but far from ideal and interconnected with the country's lacking waste management. Wastewater, when it is being collected, is barely treated and generally disposed into water bodies that accumulate pollution while also serving as water sources, for example, its biggest Lake Tanganyika (Liliane, 2012; Republic of Burundi Ministry for Land Management, Tourism and Environment, 2007). This exerts considerable stress on ecosystem services and is not sustainable, especially considering that the rapid population growth in Burundi will exacerbate these processes. Overall, both forms of pollution are unsurprising for a densely populated LDC, and a lack of policy frameworks or management systems that address them means that they will persist in the near future.

Conservation

Conservation efforts in Burundi are limited following the indictor data according to which it has designated 7.6% of its territory as protected areas (World Bank, 2020a). This relatively low number is congruent with qualitative data, which suggests considerable environmental damage across the country as a result of overexploitation. Especially deforestation and soil degradation are rampant as they provide means to food and energy for a majoritarian indigent population (UNstats, 2017). As the population grows, more land is being cultivated while the overexploitation reduces fertility, spurring this demand for more space even more. Only Burundi's water resources are abundant in quantity but also threatened by pollution, and possible drought in the future as climate change alters rain seasons (Republic of Burundi Ministry for Land Management, Tourism and Environment, 2007). The government is aware of such risks and considering adaptations, but their implementation remains difficult amongst

other urgent policy priorities. However, due to the strong reliance of the people and economy on these ecosystem services, sustainability is increasingly becoming a concern that could spur a more assertive conservation policy.

In conclusion, Burundi's leading sustainability position is best explained by its GDP and measured CO_2 emissions, which are among the lowest in the world. Despite having quite unsustainable economic and habitation practices that rely heavily on decreasingly abundant ecosystem services, their low volume still places Burundi above larger and richer countries. The government is cognizant of these issues, but the low development status commands more attention to meeting the basic needs of its citizens, while these more medium-term issues are not immediate priorities.

Chapter Five: Discussion & Conclusion

5.1 Qualitative Discussion

This section covers the discussion of the qualitative analysis and subsequent synthesis with quantitative findings. Table 6 presents a summary of the findings for each case, which will now be elaborated by indicator.

5.1.1 Healthcare

Regarding healthcare, the Belarusian system showed to be quite effective in generating good health outcomes with ample resources regarding capacity and staff, as also visible in Table 5. Belarus' incremental policy approach avoids excessive rationalization, but this also maintained some overcapacity, which reduces efficiency. In contrast, Malawi's healthcare system, while also mostly public, is younger and was not designed following a general model. This is visible in the shared provision between the government and the NGO sector, which delivers one third in addition to a few private providers. While out of pocket spending it almost four times higher in Belarus, this only concerns non-essential items, while in Malawi, it also covers key treatments. The general lack of state funding for healthcare in Malawi is a limitation on this comparison as the system and outcomes might look vastly different with more resources. Nevertheless, a publicly funded system with various levels of specialization, referral between them, and copayments for non-essential treatment emerges as the most effective from this analysis. Regarding GDP-efficient human welfare generation, a universal healthcare system is a highly efficient means to this end.

5.1.2 Education

The analysis of education showed a limited effect of the structure of the system on efficiency, as sufficient funding seems to be the primary determinant of outcomes. The main difference between the approach is that in Belarus, secondary school does not represent the last stage for most students as it does in Malawi. Belarus, having six years of primary school, follows a model of lower and upper secondary schooling where the former is still general in content while the latter is geared towards future opportunities. In contrast, Malawi has eight years of primary schooling and one secondary stage, which generally aims at university but includes the entire cohort regardless of prospects. This is arguably inefficient as it will be less useful to students entering the workforce afterward, which is the majority given then scarcity and costliness of university spots in Malawi. While university is free in Belarus, students in upper secondary

school can also opt for vocational training, which better prepares them for subsequent occupations. This is a critical distinction and affects efficiency, in addition to the issues Malawi's system experiences due to insufficient funding. When primary school was made free in 1994, the system experienced a shock it is yet to recover from, with high student to teacher ratios, frequent dropouts and repetitions, and inefficient staff allocation across the country. With more resources, it might look different, yet with existing means, this analysis supports a publicly funded system with specialization at secondary level as the most efficient. As human capital is a key economic input and an end, public education is a GDP efficient way to grow it.

5.1.3 Inequality & Happiness

As neither country had a very proactive policy targeting inequality or happiness, these sections are less meaningful for prescriptions regarding GDP efficiency. Belarus has low inequality, but this is arguably shaped by its Soviet past, which made equality an explicit political goal at the cost of other factors. And despite its more diverse economy, which requires greater capital accumulation, the government has maintained some income equality using funding it received through Russian energy subsidies, which only few countries can replicate. In contrast, Malawi is more unequal when it theoretically should not be as its agrarian economy is less concentrated and has opportunities to produce primary exports. However, as subsistence farming fails to produce enough food to nourish the population, it does not live up to its potential due to lacking output. In the mid-2010s, Malawi had a fertilizer subsidy program, which boosted farming output considerably, but it has since been abandoned because it, among other factors, violated structural adjustment and trade rules. Before Malawi can seriously address inequality, it must alleviate the widespread poverty among its population so the citizens can participate in the economy. From these cases, not much can be derived beyond the observation that some state intervention can potentially reduce inequality but comes at some cost, either financial or legal, in the context of extensive international law. This suggests that there are further barriers to some measures beyond sufficient knowledge or political will for implementation that hold back potentially effective policies.

Regarding happiness, it can be observed that there is some relationship between GDP and self-reported wellbeing, but not whether it is linear or eventually saturated as some argue (Easterlin et al., 2010). The effect of material wellbeing is strong in both instances; it supersedes immaterial factors in Belarus where the economy, family, and health all explain considerably more than freedom, trust in government, and generosity. In contrast, in Malawi,

only family stands out positively as an explanatory factor, while the immaterial values of freedom and generosity surpass the others, and economy is actually the lowest of all. These cases are arguably extremes with Belarus being a quasi-dictatorship and Malawi very poor, which possibly skews people's experiences away from these omnipresent negative factors and towards individual positive aspects. In Belarus, these are relative material comfort and stability, while in Malawi, they are the trust and kindness of their fellow citizens. The prescription is then perhaps for each country to identify and focus on its weaknesses here, but this is considerably easier said than done.

5.1.4 Emissions

On this key sustainability indicator, neither country does particularly well, and their scores are best explained by the relatively low scale of emitting activities. Bulgaria emits accordingly for developed countries due to its reliance on fuels like coal and an aging, inefficient petrol vehicle fleet. Its policy is directed by external impulses from the EU to phase in more renewable energy sources into the energy composition, which is taking place but at a moderately slow rate. Bulgaria is arguably in the sweet spot combination of having low GDP per capita for a developed country and being an EU member, which entails certain policy obligations, among them, towards sustainability. Burundi benefits from the latter too in that its citizens consume little energy but less by choice than availability, with less than 10% having access to electricity. This removes the onus of mass power generation and allows it to largely rely on hydropower for its current demand, which should be expanded at every opportunity. Burundian's reliance on biomass fuels for energy is not sustainable per se as it creates high emissions and scales poorly, especially considering deforestation. If the majority were to switch to electric energy for their needs, it would be more efficient in many dimensions and improve people's health but not necessarily sustainable if hydropower could no longer meet the demand. The analysis then supports the policy of shifting a country's energy mix away from dirty fuels towards renewable and sustainable energy sources as fast as possible to meet existing demand to ensure future viability.

5.1.5 Material Consumption & Waste

Regarding material throughput, both countries benefit from the relatively low scale of consumption in their respective development group. This means lower GNI and thus purchasing power, which lowers the overall expenditure on goods, especially manufactured

and improved ones that are less material-efficient, for example, meat products. Neither country has a specific policy aimed at this, such as promoting circular economic processes, hence the expanded focus on waste management as the other side of material throughput. Here both countries perform poorly, and the policy area cannot be considered to be contributing to their high ranking. Bulgaria has a functioning waste management system where garbage is collected extensively but not generally recycled; instead, it is landfilled or incinerated, which contributes to emissions and air pollution. Burundi has an even more rudimentary waste management policy that is connected to its development status, and there being more urgent priorities to address. Waste is not systematically collected, and what accumulates is dumped and sporadically burned outside of settlements, contributing to water and air pollution and the squandering of materials. The government is aware of this, but its resources are tied up in other policy areas; thus, progress in waste management is unlikely in the short-term. There are no clear policy recommendations to be derived from this analysis other than less consumption. Lowering material throughput and recycling are effective but expensive ambitions for more affluent countries.

5.1.6 Air & Water Pollution

The air pollution indicator and the associated concept of water pollution showed somewhat predictable results for both countries, with the Bulgarian air quality being the most notable finding. Despite possible expectations to the leader of the developed country group for having little pollution, Bulgaria exceeds the threshold for safely breathable air by a factor of two. Meanwhile, Burundi does the same fourfold, but this is less surprising considering its development status. The causes for both countries are its energy sources, which rely too much on burning dirty fuels for electricity or heat, in addition to waste incineration, which creates additional pollutants in the air. Bulgaria is cognizant of this but has no national policy as the EU target for a greener energy composition was already met, and waste processing is subject to local government policy. Burundi has similar problems but fewer capacities to address it, leaving citizens exposed to an invisible hazard.

Water pollution is similar but less immediately dangerous to humans unless they consume unfiltered polluted water, which might occur in rural areas. Bulgaria has a national policy to maintain the purity of water bodies, which currently lacks reliable data gathering to be truly effective, but this is being developed with EU support. In contrast, Burundi largely lacks wastewater collection, treatment, and awareness about the state of its water bodies. This

is again a product of low development but is likely to become a bigger issue with the growing population as more pressure on and demand for ecosystems providing clean water will emerge. The analysis then suggests that low emissions do not necessarily mean clean air and water as these can be polluted by the quality of the quantitatively limited discharges. The recommendation is to measure these levels continuously to create and maintain awareness of their potential effects on human health. These impacts also make this an important indicator regarding GDP efficient development, as, while limiting pollution is key to maintaining ecosystems, it also has strong connections to human welfare.

5.1.7 Conservation

This area showed a stark contrast between the cases regarding their commitment and policy towards conservation, i.e., the protection of biodiversity and ecosystem services. Bulgaria has a very proactive conservation approach where almost one-third of the country's territory has protected status, and its high biodiversity is being recognized as an asset to maintain. This is facilitated by EU support through a network of protected areas and continuous emphasis on environmental protection. In contrast, Burundi has few protected areas, and while the country has abundant natural resources regarding forests and water, these are being overexploited and degraded, harming the species within them. There is no active conservation policy as the government focuses on more urgent development priorities, and these long-term concerns take a back seat. Conservation is then a critical policy area for sustainability but less so for economic development as the exploitation of natural resources can give short-term benefits. However, for more developed countries, it gains importance as the case of Bulgaria shows whose extensive protected areas are tourist destinations and habitats for many species.

Table 6

Summarized Findings of the Analysis Cases (DR = dimension rank)

Dimension	Human Welfare		Sustainability		
Development	Developed	Developing	Developed		Developing
Indicator Country	*Belarus*	*Malawi*	*Bulgaria*		*Burundi*
Healthcare (funding).	Public, national tax-funded, three organizational levels. DR: 96th.	Public & NGO (29%), high external funding, staff & means shortages. DR: 1st.	*Emissions*	High, reliance on dirty fuels, slow transition in energy mix towards renewables. DR: 115th	Very low, solid fuels for household energy, hydropower for electricity, clean but not sustainable at scale. DR: 1st
Education	Public, 6 yrs primary, free at all levels (5% of GDP spending), three graduation tracks. DR: 95th	Public (92%), 8 yrs primary free, increasing fees after, low quality & efficiency, unequal. DR: 3rd	*Material consumption & waste*	Moderate use, waste is managed but rarely recycled, often incinerated, or landfilled. DR: 115th	Very low, limited use of processed material, high biomass instead. No real waste policy. DR: 1st
Inequality	Low (GINI 26.6) declining, regional inequalities, strong state intervention. DR: 76th	High (GINI 45.1) steady, human capital & asset inequities, varying state intervention. DR: 4th	*Pollution (Air & Water)*	Moderate, dirty fuels & waste incineration pollute the air. Limited wastewater treatment. DR: 105th	High air pollution from solid fuels, trending upward. Barely any wastewater collection & treatment. DR: 2nd
Happiness Belarus DR: 79th	Upper medium (5.81), no policy, material explains more than societal	Low (4.29), no policy, material explains more than societal. DR: 2nd	*Conservation* Bulgaria DR: 48th	High (28.29% protected area), active policy with EU support.	Limited (7.6% protected area), no policy, forest & soil degradation. DR: 9th

5.2 Synthesis

In the human welfare dimensions, the findings were arguably more coherent than for sustainability, as the discussion showed. Despite the stark development differences and their

implications, there were observable commonalities across the cases. In contrast, for sustainability, the picture that emerged was less clear and offered fewer insights into the policies or factors that generate GDP-efficiency. Overall, the amount of GDP per capita still appears to be the major determinant of efficiency ranking outcomes, which is congruent with the quantitative analysis. However, in the developed country group Bulgaria and Belarus were not the lowest GDP counties, which suggests the outsized influence of GDP per capita eventually moderates at higher levels. This is congruent with the argument that GDP produces diminishing returns for development as beyond certain thresholds, increases in GDP per capita do not generate significant welfare increases (Easterlin et al., 2010). However, the level of this threshold did not emerge from this research as determining it would require a large-*N* study of all countries, which exceeds the scope here.

Chapter Six: Conclusion & Further Research

6.3 Conclusion

This study set out to answer the research question '*Which policies contribute to GDP efficient sustainable development*?' using a mixed-method approach. The results are summarized here according to the sub questions. The first is '*What is GDP efficient sustainable development and how can it be measured?'* which was explored through the literature review covering GDP as a concept and its relationship to sustainable development. This inquiry yielded an approximate definition of 'achieving greater development outcomes with existing resources and limited future expansion not to jeopardize the sustainability of the earth system and human life within it.' It combines the ambition of development to create more human welfare with the projections regarding planetary boundaries and climate change, which are both served by doing more with less, hence the efficiency focus. As the latter concerns all countries, not just developing ones, the analysis included developed countries to highlight their possible potential for greater efficiency. It was measured using an index that centered GDP per capita and matched sustainable development outcomes against it, arriving at a ranking of all countries according to these criteria.

The second and third sub questions focused on the substantive elements of the research question, the policies which produce and explain the quantitative results in each dimension of sustainable development. The second one asks, '*What explains human welfare development in the most GDP efficient countries?*'. This question was investigated through a qualitative analysis of the two highest-scoring countries in the GDP efficiency ranking of the development groups, Malawi and Belarus, one being a developing and one a developed country. Public healthcare provision and education with various levels and sufficient specialization were found to be most efficient in generating human welfare. The additional indicators of inequality and self-reported happiness did not yield significant policy prescriptions other than that policymakers should be cognizant of them and try to promote them qualitatively. As the most efficient countries were chosen, these policies are not the absolute most effective ones but rather the best in relation to a country's GDP per capita. For some countries, the indicator score is low, but since GDP is disproportionately lower, they emerged as most efficient without objectively superior development outcomes.

The third sub question is '*What explains the low negative environmental impact of the most GDP efficient countries?*', focusing on the ecology aspect of sustainable development.

Low negative environmental impact was assessed via good scores for sustainability on quantitative indicators. The highest-ranking countries in each development group, Bulgaria and Burundi, were analyzed qualitatively. The findings are somewhat paradoxical because neither country is the most sustainable in the group. Instead, their comparatively low GDP per capita reduces the scale of negative environmental impact and elevates their positive scores like low CO_2 emissions and, in Bulgaria's case, a high degree of protected areas. Both countries have somewhat diversified their energy mix away from fossil fuels but not through deliberate action but rather exogenous circumstances. Bulgaria is following EU policy prescriptions for sustainability, and Burundi has abundant hydropower resources that meet the demand of the small percentage of its population that has access to electricity. The recommendations are then to aim for low CO_2 emissions and material consumption while pursuing some conservation efforts to achieve GDP efficient sustainability. These, together with the findings from sub question two, form the answer to the research question based on the examples of the four most GDP efficient countries in their group regarding sustainable development.

6.4 Limitations & Further Research

The limitations of this research concern the methodology, data, and scope. A more sophisticated formula for calculating the index might be able to reduce the outsized influence of GDP per capita. In this iteration, GDP was the determining factor in the ranking and overshadowed the contribution of the other indicators, hiding potentially more efficient countries. Furthermore, controlling for external influences like aid and other financial factors like household and voluntary work that are not accounted for in GDP per capita would increase the validity of the results. The cases in the qualitative analysis shared the presence of significant exogenous funding sources, which might have increased their efficiency scores by circumventing GDP per capita accounting. For Belarus, they are energy subsidies it receives from Russia, for Bulgaria, it is EU support from several funds, and for Malawi and Burundi, it is development aid and support. Furthermore, this research did not control for debt, which could enable a country to spend and improve the indicator scores without generating the wealth behind it.

The second limitation of scope ties into the suggestions for further research. The number of cases in the qualitative analysis permits only limited inferences and prescriptions.

They did not yield sufficient insights for grounded recommendations, which more cases would enable. Replicating this research with an improved methodology and larger n in the qualitative analysis might reveal patterns in the policies of the most efficient countries that have hitherto been missed. Furthermore, one could focus more intensively on either human welfare or sustainability, as both will continue to grow in relevance in the future.

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Appendices

Appendix A

Countries and territories excluded from the analysis

American Samoa, Andorra, Aruba, Bermuda, British Virgin Island, Channel Islands, Cayman Island, Curaçao, Faroe Islands, French Polynesia, Gibraltar, Greenland, Guam, Hong Kong SAR (China), Kosovo, Isle of Man, Macao SAR (China), Monaco, Nauru, New Caledonia, Northern Mariana Islands, Palau, Puerto Rico, San Marino, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Sint Maarten (Dutch part), St. Martin (French part), Turks and Caicos Islands, Virgin Islands (U.S.)

Appendix B

Ranked country scores for all dimensions (countries selected for further analysis bold)

Rank	Country	Human Welfare Efficiency Index	Country	Sustain-ability Efficiency Index	Country	GDP efficiency index
1	**Malawi**	19.728	**Burundi**	61.891	Burundi	39.849
2	Burundi	17.807	Somalia	52.316	Malawi	35.788
3	Niger	16.984	Malawi	51.848	Somalia	30.534
3	Ethiopia	15.489	Central African Republic	44.156	Niger	26.771
4	Nepal	14.635	Niger	36.558	Ethiopia	25.306
5	Congo, Dem. Rep.	12.565	Congo, Dem. Rep.	35.415	Central African Republic	24.533
6	Madagascar	11.696	Ethiopia	35.122	Congo, Dem. Rep.	23.990
7	Sierra Leone	11.092	Madagascar	29.944	Madagascar	20.820
8	Liberia	10.891	Togo	29.390	Togo	19.487
9	Togo	9.584	Guinea-Bissau	26.964	Mozambique	17.590
10	Bangladesh	9.495	Mozambique	26.898	Nepal	17.073
11	Burkina Faso	9.472	Guinea	24.397	Sierra Leone	17.007
12	Kyrgyz Republic	9.327	Burkina Faso	24.389	Burkina Faso	16.931
13	Guinea	9.320	Uganda	23.738	Liberia	16.862
14	Gambia, The	9.226	Sierra Leone	22.922	Guinea	16.858
15	Uganda	9.008	Liberia	22.833	Guinea-Bissau	16.471
16	Somalia	8.751	Gambia, The	22.358	Uganda	16.373
17	Tajikistan	8.451	Rwanda	22.230	Gambia, The	15.792
18	Rwanda	8.295	Korea, Dem. People's Rep.	21.525	Rwanda	15.262
19	Mozambique	8.281	Afghanistan	20.943	Tanzania	13.935
20	Tanzania	7.636	Benin	20.664	Benin	13.862
21	Pakistan	7.526	Haiti	20.364	Afghanistan	13.818
22	Myanmar	7.165	Tanzania	20.233	Korea, Dem. People's Rep.	13.816
23	Benin	7.060	Mali	19.949	Haiti	13.245
24	Afghanistan	6.693	Nepal	19.510	Mali	12.713
25	India	6.414	Cambodia	17.751	Tajikistan	12.343
26	Lesotho	6.354	Chad	16.977	Bangladesh	11.679

27	Kenya	6.333	Tajikistan	16.235	Cambodia	11.593
28	Haiti	6.126	Eritrea	15.570	Kyrgyz Republic	10.779
29	Korea, Dem. People's Rep.	6.106	Kenya	13.937	Chad	10.768
30	Guinea-Bissau	5.977	Bangladesh	13.862	Kenya	10.135
31	Vietnam	5.897	Zimbabwe	13.597	Myanmar	10.049
32	Mauritania	5.858	Myanmar	12.933	Eritrea	10.043
33	Mali	5.477	Cote d'Ivoire	12.728	Pakistan	9.684
34	Cambodia	5.435	Senegal	12.364	Zimbabwe	9.016
35	Senegal	5.274	Kyrgyz Republic	12.231	Senegal	8.819
36	Solomon Islands	5.106	Pakistan	11.841	Lesotho	8.776
37	Lao PDR	5.059	Lesotho	11.198	Cote d'Ivoire	8.427
38	Central African Republic	4.910	Comoros	10.663	Mauritania	7.735
39	Nicaragua	4.814	Zambia	10.599	Cameroon	7.368
40	Cameroon	4.703	Kiribati	10.423	Sao Tome and Principe	7.262
41	Sao Tome and Principe	4.678	Cameroon	10.034	Comoros	7.135
42	Yemen, Rep.	4.569	Syrian Arab Republic	9.894	Lao PDR	7.125
43	Chad	4.560	Sao Tome and Principe	9.847	India	7.023
44	Eritrea	4.517	Mauritania	9.612	Zambia	6.856
45	Zimbabwe	4.434	South Sudan	9.490	Vietnam	6.742
46	Sudan	4.151	Lao PDR	9.190	Yemen, Rep.	6.686
47	Cote d'Ivoire	4.126	Yemen, Rep.	8.802	Kiribati	6.610
48	Honduras	3.865	Bhutan	8.588	Solomon Islands	6.609
49	Moldova	3.863	Nicaragua	8.331	Nicaragua	6.573
50	Uzbekistan	3.769	Solomon Islands	8.113	Syrian Arab Republic	6.140
51	Ghana	3.642	Honduras	8.085	Honduras	5.975
52	Comoros	3.608	India	7.632	Bhutan	5.956
53	Bolivia	3.491	Vietnam	7.587	Sudan	5.758
54	Bhutan	3.323	Sudan	7.366	Ghana	5.206
55	Morocco	3.239	Ghana	6.769	Uzbekistan	5.081
56	Egypt, Arab Rep.	3.181	Bolivia	6.441	South Sudan	5.039
57	Philippines	3.167	Djibouti	6.419	Moldova	4.973
58	El Salvador	3.131	Uzbekistan	6.392	Bolivia	4.966
59	Zambia	3.114	Congo, Rep.	6.287	Djibouti	4.711
60	Ukraine	3.055	Moldova	6.083	Philippines	4.622
61	Djibouti	3.004	Philippines	6.076	Morocco	4.373
62	Indonesia	2.881	Papua New Guinea	5.616	Congo, Rep.	4.096
63	Armenia	2.874	Micronesia, Fed. Sts.	5.555	Guatemala	3.900
64	Guatemala	2.812	Morocco	5.508	Armenia	3.815
65	Kiribati	2.797	Vanuatu	5.186	El Salvador	3.758
67	Sri Lanka	2.730	Nigeria	5.166	Vanuatu	3.722
68	Jordan	2.644	Marshall Islands	5.053	Indonesia	3.656
69	Albania	2.614	Guatemala	4.988	Egypt, Arab Rep.	3.560
70	Tunisia	2.572	Armenia	4.757	Nigeria	3.555
71	Mongolia	2.502	Indonesia	4.431	Sri Lanka	3.532
72	West Bank and Gaza (Palestinian Territories)	2.420	El Salvador	4.384	Micronesia, Fed. Sts.	3.379
73	Syrian Arab Republic	2.387	Sri Lanka	4.335	Ukraine	3.326
74	Samoa	2.371	Cabo Verde	4.168	Albania	3.231

75	Algeria	2.276	Guyana	4.134	Samoa	3.196
76	Vanuatu	2.257	Samoa	4.020	Papua New Guinea	3.164
77	Georgia	2.202	Egypt, Arab Rep.	3.939	Cabo Verde	3.158
78	Cabo Verde	2.149	Albania	3.848	Jordan	3.125
79	Nigeria	1.944	Belize	3.811	Tunisia	3.012
80	Thailand	1.937	Eswatini	3.704	Marshall Islands	2.990
81	Fiji	1.933	Jordan	3.606	Mongolia	2.984
82	Congo, Rep.	1.905	Ukraine	3.597	Georgia	2.841
83	North Macedonia	1.890	Georgia	3.479	Guyana	2.736
84	Ecuador	1.882	Mongolia	3.465	West Bank and Gaza (Palestinian Territories)	2.723
85	Timor-Leste	1.794	Tunisia	3.453	Fiji	2.644
86	Tonga	1.746	Tonga	3.359	Eswatini	2.624
87	Bosnia and Herzegovina	1.698	Fiji	3.355	Tonga	2.552
88	Iran, Islamic Rep.	1.696	Timor-Leste	3.244	Timor-Leste	2.519
89	Paraguay	1.675	Jamaica	3.173	Belize	2.512
90	**Belarus**	1.675	Tuvalu	3.166	Algeria	2.492
91	Peru	1.660	Namibia	3.064	Jamaica	2.406
92	Jamaica	1.639	West Bank and Gaza (Palestinian Territories)	3.026	Ecuador	2.363
93	Serbia	1.633	Angola	2.915	North Macedonia	2.346
94	Montenegro	1.573	Ecuador	2.844	Paraguay	2.256
95	Dominican Republic	1.552	Paraguay	2.836	Thailand	2.203
96	Eswatini	1.544	North Macedonia	2.803	Bosnia and Herzegovina	2.199
97	China	1.497	Dominican Republic	2.792	Dominican Republic	2.172
98	Guyana	1.338	Algeria	2.708	Tuvalu	2.166
99	Colombia	1.297	Bosnia and Herzegovina	2.699	Peru	1.967
100	Bulgaria	1.291	Thailand	2.468	Iran, Islamic Rep.	1.943
101	Belize	1.212	Cuba	2.325	Angola	1.936
102	Micronesia, Fed. Sts.	1.202	Peru	2.274	Serbia	1.890
103	Romania	1.194	**Bulgaria**	2.267	Namibia	1.840
104	Tuvalu	1.166	Dominica	2.227	Montenegro	1.834
105	Mauritius	1.160	South Africa	2.201	Bulgaria	1.779
106	Costa Rica	1.121	Iran, Islamic Rep.	2.189	Belarus	1.759
107	Mexico	1.111	Botswana	2.164	Colombia	1.676
108	Maldives	1.106	Serbia	2.147	Cuba	1.653
109	Lebanon	1.062	Montenegro	2.095	South Africa	1.628
110	South Africa	1.055	Colombia	2.056	Maldives	1.568
111	Iraq	1.051	Maldives	2.031	China	1.561
112	Azerbaijan	1.009	Grenada	2.025	Romania	1.536
113	Malaysia	1.007	Azerbaijan	1.959	Botswana	1.528
114	Cuba	0.980	Romania	1.877	Azerbaijan	1.484
115	Angola	0.957	Belarus	1.842	Dominica	1.467
116	Venezuela, RB	0.946	Turkmenistan	1.779	Lebanon	1.413
117	Argentina	0.943	Lebanon	1.763	Iraq	1.387
118	Kazakhstan	0.943	Iraq	1.722	Mauritius	1.350
119	Marshall Islands	0.927	China	1.624	Costa Rica	1.317
120	Croatia	0.924	Gabon	1.599	Mexico	1.273
121	Poland	0.918	Venezuela, RB	1.588	Venezuela, RB	1.267

122	Suriname	0.896	Suriname	1.578	Turkmenistan	1.264
123	Turkey	0.893	Mauritius	1.541	Gabon	1.240
124	Botswana	0.893	Costa Rica	1.513	Suriname	1.237
125	Gabon	0.881	Brazil	1.444	Grenada	1.232
126	Brazil	0.870	Mexico	1.435	Malaysia	1.173
127	Hungary	0.862	Panama	1.384	Brazil	1.157
128	Panama	0.839	Croatia	1.339	Croatia	1.131
129	Lithuania	0.786	Malaysia	1.339	Poland	1.115
130	Latvia	0.777	Poland	1.312	Panama	1.111
131	Chile	0.760	Hungary	1.295	Hungary	1.078
132	Turkmenistan	0.749	Latvia	1.239	Argentina	1.076
133	Uruguay	0.737	Argentina	1.208	Latvia	1.008
134	Slovak Republic	0.720	Antigua and Barbuda	1.188	Lithuania	0.935
135	Russian Federation	0.718	Libya	1.156	Turkey	0.928
136	Papua New Guinea	0.711	Lithuania	1.084	Slovak Republic	0.897
137	Dominica	0.707	Slovak Republic	1.073	Kazakhstan	0.879
138	Czech Republic	0.702	Seychelles	1.050	Russian Federation	0.795
139	Estonia	0.648	Turkey	0.964	Antigua and Barbuda	0.765
140	Namibia	0.617	Slovenia	0.917	Libya	0.758
141	South Sudan	0.589	Barbados	0.915	Czech Republic	0.756
142	Slovenia	0.584	Russian Federation	0.872	Chile	0.753
143	Malta	0.571	Kazakhstan	0.815	Slovenia	0.751
144	Greece	0.545	Czech Republic	0.810	Uruguay	0.749
145	Portugal	0.533	Portugal	0.770	Seychelles	0.730
146	Korea, Rep.	0.519	Uruguay	0.762	Estonia	0.673
147	Oman	0.469	Chile	0.747	Barbados	0.654
148	Spain	0.456	Greece	0.699	Portugal	0.652
149	Cyprus	0.451	Estonia	0.697	Greece	0.622
150	Grenada	0.438	Malta	0.617	Malta	0.594
151	Seychelles	0.410	Spain	0.594	Spain	0.525
152	Barbados	0.393	Equatorial Guinea	0.584	Korea, Rep.	0.515
153	Saudi Arabia	0.382	Bahamas, The	0.529	Cyprus	0.490
154	Trinidad and Tobago	0.378	Cyprus	0.529	Oman	0.449
155	Israel	0.372	Korea, Rep.	0.511	Italy	0.416
156	Italy	0.363	Italy	0.469	Trinidad and Tobago	0.411
157	Libya	0.360	Trinidad and Tobago	0.445	Saudi Arabia	0.389
158	Antigua and Barbuda	0.343	Oman	0.429	Israel	0.386
159	United Kingdom	0.316	France	0.426	France	0.370
160	France	0.314	United Kingdom	0.414	United Kingdom	0.365
161	Belgium	0.312	Germany	0.410	Germany	0.356
162	Iceland	0.308	Israel	0.401	Bahamas, The	0.339
163	Finland	0.303	Saudi Arabia	0.397	Equatorial Guinea	0.337
164	Germany	0.301	Japan	0.362	Belgium	0.336
165	Japan	0.295	Belgium	0.360	Japan	0.329
166	Bahrain	0.286	New Zealand	0.334	Iceland	0.308
167	Netherlands	0.285	Netherlands	0.310	Finland	0.299
168	Austria	0.284	Iceland	0.308	Netherlands	0.298
169	United Arab Emirates	0.282	United States	0.300	New Zealand	0.297
170	Ireland	0.272	Finland	0.295	Bahrain	0.282

171	Canada	0.268	Brunei Darussalam	0.293	Ireland	0.279
172	New Zealand	0.260	Ireland	0.287	Austria	0.276
173	United States	0.247	Bahrain	0.278	United Arab Emirates	0.274
174	Denmark	0.246	Austria	0.268	United States	0.273
175	Sweden	0.243	United Arab Emirates	0.267	Denmark	0.256
176	Australia	0.204	Sweden	0.266	Sweden	0.255
177	Kuwait	0.197	Denmark	0.266	Canada	0.249
178	Switzerland	0.170	Canada	0.229	Brunei Darussalam	0.221
179	Bahamas, The	0.149	Singapore	0.195	Australia	0.195
180	Norway	0.148	Switzerland	0.188	Switzerland	0.179
181	Brunei Darussalam	0.148	Australia	0.186	Kuwait	0.171
182	Singapore	0.130	Kuwait	0.145	Singapore	0.163
183	Luxembourg	0.123	Luxembourg	0.134	Norway	0.140
184	Equatorial Guinea	0.090	Norway	0.132	Luxembourg	0.128
185	Qatar	0.086	Liechtenstein	0.062	Qatar	0.046
186	Liechtenstein	0.018	Qatar	0.007	Liechtenstein	0.040