Capstone Project

ASWell - Measuring accessible sustainable well-being

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ABSTRACT

Continuous economic growth is deemed incompatible with development and happiness as per the theory of uneven development and the Easterlin paradox. Thus, numerous alternative indexes to GDP have emerged in the past 30 years, aiming to measure progress, development, and well-being better. However, all these alternatives fall short of meeting all three of the following dimensions that lay the foundation for this paper's research: Transcending the growth paradigm, capturing well-being in a balanced, sustainable way and being accessible and replicable. To address these limitations, the ASWell index has been developed and compared against GDP in how it reflects long-term sustainable well-being. Based on the OECD's methodological approach for composite indexes, the ASWell relies solely on secondary data. Country rankings and comparisons between ASWell and GDP per capita over time were analysed using descriptive statistics. Norway achieved the highest ASWell score (0.798), while Qatar ranked lowest (0.465). Europe and Central Asia scored highest overall, whereas the Middle East and North Africa ranked lowest on the index. Globally and regionally, ASWell scores and GDP per capita exhibited parallel growth. While GDP per capita tended to increase consistently, ASWell scores fluctuated, particularly among the top five ASWell-ranked countries. A small negative trend in global ASWell scores can also be detected starting in 2017. These findings support the Easterlin paradox, indicating that GDP can only approximate well-being up to a certain threshold. On a country level, a link between GDP and well-being is even more difficult to identify, tying into the theory of uneven development. Overall, countries that excel in the ASWell index, rather than those with high GDP per capita, like Qatar, Kuwait, and the United Arab Emirates, should be considered models for achieving sustainable well-being worldwide. ASWell scores encompass economic, social, and carbon inequalities, offering a glimpse into the world's well-being if it were to mirror the conditions represented by a specific ASWell score.

Keywords: GDP, growth, post-growth, well-being, SDH, strong sustainability, uneven development, Easterlin paradox

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INTRODUCTION

Humanity lives in an era where constant economic growth through commodity production and consumption is the prevailing paradigm (Pilling, 2019). Gross domestic product (GDP) or GDP per capita (GDP/capita) is now widely acknowledged as the ultimate measure of the economy (Van den Bergh, 2009) and inadvertently became a proxy for well-being (Kalimeris et al., 2020). Many researchers have acknowledged that GDP misses capturing various aspects of societies contributing to well-being (Bleys, 2012; Hickel, 2020; Kubiszewski et al., 2013; Pilling, 2019; Van Den Bergh, 2009). In recognition of the limitations to growth and GDP, ideas of 'post-growth' and 'beyond GDP' momentum (Bleys, 2012; Van den Bergh, 2009), which led to the development of many alternative measures for well-being (Costanza et al., 2014; Kalimeris et al., 2020). Within these attempts to capture well-being beyond GDP, contradictions between GDP and other well-being indexes have already been detected and conceptualised by theories such as the Kuznets curve (Likaj et al., 2022), the theory of uneven development (Harvey, 2005) and the Easterlin paradox (Easterlin & O'Connor, 2021). This study will pick up this detected divergence and further investigate it.

A thorough scan of prominent existing alternatives to GDP has led to three key insights: 1) Most indexes still rely heavily on the growth paradigm. 2) Many fail to capture well-being following principles of strong sustainability. 3) All indexes are difficult to replicate and hard to access. Given these shortcomings, this paper will introduce a new index that moves beyond GDP while being rooted in strong sustainability and constructed using open-access secondary data. This new index, the accessible, sustainable well-being index (ASWell), shall serve as a minimum, rudimentary, holistic measure of sustainable well-being that can easily be replicated, used and built upon. This study is meant to contribute to the existing literature on alternatives to GDP, the post-growth movement, and sustainable development. By developing an easily replicable index and by that being the first of its kind, this research will help make the transition to a post-growth motivated well-being society easier and more achievable. This study sought to

answer the following research question: How does the ASWell index compare to GDP in reflecting long-term sustainable well-being?

This research is theoretical, explorative and quantitative, focussing on creating the composite index. First, an extensive literature review on concepts like growth, post-growth, GDP, strong sustainability and health and well-being will be demonstrated for an informed background to this study. Next, the conceptual framework will be presented, including a review of existing alternatives to GDP and a selection of and justification for key variables selected for the ASWell index. The development of the ASWell will be disclosed in detail and transparently to allow for easy replicability of the index. Lastly, the ASWell will be compared against GDP using descriptive statistics. The author hypothesises that the ASWell Index will prove a better yet rudimentary measure for long-term sustainable well-being compared to GDP, hoping that this insight will inspire researchers, policymakers, and economists to pursue further the idea of moving beyond GDP and the growth paradigm.

CONTEXTUALISATION AND THEORETICAL FRAMEWORK

Limits to Growth

In the 21st century it might seem that capitalism, the economic system in which most of the world's societies are living in, has been in place forever. Often, capitalism is taken for granted without questioning the system and underlying processes (Henderson, 2009). What makes capitalism such a distinct economic system in history is its organisation around the necessity of ongoing expansion, or 'growth', shaped by ever-increasing production, consumption and industrial extraction. Said growth is happening with a totalitarian logic to it, demanding constant growth in every sector, industry or nation's economy (Hickel, 2020). Growth is the lens through which most of the world's society looks at development and progress (Pilling, 2019).

That the pursuit of mere economic growth as it is currently happening cannot be sustained for much longer has already been recognised by the Club of Rome in their influential 1974 report on ‘The limits to growth’ (Meadows et al., 1974). Economic growth is a major driver of accelerating (carbon) emissions, air and water pollution and the depletion of non-renewable resources (Büchs & Koch, 2019; Daly & Cobb, 1994). Consequently, growth has direct and indirect consequences for human and planetary health through, for example, climate breakdown, heatwaves, increase in vector-borne diseases, and changes in ecosystems (Borowy & Aillon, 2017; Costello et al., 2009; Hagens, 2020; Kulkarni et al., 2022; Perkins, 2015). Moreover, growth is also seen as having failed to eradicate hunger, poverty and global inequalities (Büchs & Koch, 2019).

The theory of the (environmental) Kuznets curve proclaims that in the course of a country’s economic development (growth), income inequality and environmental pollution and deterioration first rise, then peak and afterwards substantially decrease, following a U-shaped curve (Acemoglu & Robinson, 2002; Piketty, 2006; Stern, 2017). However, both the conventional (income inequality) and the environmental Kuznets curve have been found not to be employable in all contexts, countries and times. Tipping points after which inequalities or pollution decrease appear very differently for countries or not at all (Hamaide, 2022; Piketty, 2006; Stern, 2017). Though rising income is frequently seen as a sign of societal progress, ecological economists argue that growth creates a variety of social and environmental costs that decouple well-being from material prosperity or income (Daly, 1977 and Victor, 2008, as cited in Howarth & Kennedy, 2016). This idea of decoupling gets reflected in the Easterlin paradox, which states that happiness converges together with income growth up until a certain threshold, after which their relationship becomes insignificant, with income continuing to grow while happiness stagnates or even decreases (Easterlin & O’Connor, 2022; Stevenson & Wolfers, 2008). Lastly, scholars have shown that economic growth is often falsely used interchangeably with development, ignoring geographical or imperialist dimensions that facilitated some countries' economic

development by exploiting others (Harvey, 2005). The theory of uneven development, or uneven growth, refers to the phenomenon that economic growth does not occur in similar patterns across geographical regions but that instead, profound differences in terms of wealth, inequalities or overall quality of life (well-being) prevail (Christophers, 2009; MacKinnon & Cumbers, 2007).

Given the inaptness of growth for a lasting global economic paradigm (Jackson, 2019), multiple concepts and movements to transcend the growth paradigm have been put forward in the last few decades, with the most prominent ones including the ideas of degrowth, a-growth and a steady state economy (SSE) (Buch-Hansen & Nesterova, 2023; D'Alisa et al., 2014; Heikinnen, 2018; Kallis et al., 2012; Kerschner, 2010; Martinez-Allier et al., 2010). Despite certain differences between these concepts, all "attempt to envision the social conditions (and economic implications) of a world in which, for the advanced economies at least, it is necessary to 'manage without growth'" (Victor, 2008/2018 as cited in Jackson, 2019, p. 244). Overall, such vision can be captured under the post-growth concept, which envisages a future that deprioritises economic growth to pursue social and ecological well-being (Likaj et al., 2022; Spash, 2015). To realise post-growth futures, structural changes like a redistribution of wealth, more localised and cooperative economies, stronger participatory democracy and a rethinking of labour and working hours are necessary (Oberholzer, 2023; Paulson & Büchs, 2022). When succeeding to realise such structural changes and decoupling well-being from economic growth, scholars argue that a post-growth strategy can lead to a well-being economy within planetary boundaries (Fioramonti et al., 2022; Jackson, 2019).

GDP - its limitations and alternatives

Just as the growth paradigm, its ultimate instrument, gross domestic product (GDP), is highly limited (Van den Bergh, 2009). Despite not having been originally intended that way (Likaj et al., 2022), GDP has become a proxy for well-being, development and progress (Kalimeris et al., 2020). Initially constructed in 1930 for evaluating a nation's capacity for financing upcoming

war activities, GDP has since fueled augmenting economic activities and consumerism while becoming an indicative contributor to ecological destabilisation through its reliance on fossil fuels and intensive land use practices (Gibson & Whyte, 2020). Critics highlight that GDP does not account for social losses through crime, warfare, armament, or loss of leisure time and fails to account for any activity that cannot be captured in monetary terms or terms of physical production, such as voluntary work or childcare (Costanza et al., 2014; Harris & Roach, 2013; Pilling, 2019). On top of that, GDP ignores environmental externalities, the ecological collapse the growth paradigm causes (Meadows et al., 1974), and inequalities (Howarth & Kennedy, 2016).

Given these limitations, many alternative indexes have been developed to measure well-being, development, or progress (Bleys, 2012). Three of the most prominent alternatives to GDP are the Human Development Index (HDI), the Index of Economic Welfare (ISEW) and the Genuine Progress Indicator (GPI), which are, to some extent, already being used by policymakers and governments (Kalimeris et al., 2020). Table 1 shows an investigation of these and further prominent alternatives to GDP. It examines three conditions that, building on the theoretical framework of this paper and a thorough scan of alternatives to GDP, established themselves as common themes and weaknesses among prominent GDP alternatives. Primarily, the selection and classification of assessed indexes are based on the classification scheme developed by Goossens et al. (2007), which sorts GDP alternatives into adjusting, supplementing and replacing GDP. All indexes in Table 1 that merely adjust or supplement GDP immediately fail to meet the first condition (post-growth) of moving beyond the economic growth paradigm or beyond GDP (Fioramonti et al., 2022). The second condition (sustainability) will only be considered met when the index follows strong sustainability principles, which will be further explained in the next section (Berr, 2017; Ott, 2003).[1]

[1] For simplicity of assessment the review for the second condition has been conducted based on the classical separation of sustainability into the three dimensions of social, ecological and economic sustainability (Berr, 2017) despite it being a rather limited and constraining conceptualisation of sustainability (Kuhlman & Farrington, 2010). Social sustainability (1) will be met in an index considering aspects like basic needs, social inequalities and political

The third condition (accessibility/replicability) will be met if the index can be replicated easily through, for example, providing access to all data needed and explanations of the codes and calculations while also covering a broad range of countries and territories.

Table 1

Review of prominent alternatives to GDP according to the three conditions of Post-Growth, Sustainability and Accessibility/Replicability

	Index	Link/Reference	Post-Growth	Sustainability	Accessibility/ Replicability
Adjusting	Green GDP/Green National Accounting	(Aguilar-Rivera, 2021)	no	1 yes 2 no 3 no	no
	Measure of Economic Welfare (MEW)	(Nordhaus & Tobin, 1973)	no	1 yes 2 yes 3 no	no
	Adjusted Net Savings	Link	no	1 yes 2 yes 3 no	no
	Index of Sustainable Economic Welfare	(Daly & Cobb, 1994)	no	1 yes 2 yes 3 no	no
	Genuine Progress Indicator	(Talberth et al., 2007)	no	1 yes 2 yes 3 yes	no
Supplementing	System of Economic Environmental Accounts (SEEA)	Link	no	1 yes 2 no 3 no	no
	National Accounting Matrix including Environmental Accounts (NAMEA)	Link (De Haan, & Keuning, 1996)	no	1 yes 2 no 3 no	no
	German Environmental-Economic Accounting (GEEA)	Link	no	1 yes 2 no 3 no	no
	System of Economic and Social Accounting Matrices and Extensions (SESAME)	(Keuning, 1997)	no	1 yes 2 no 3 no	no
	Sustainable Development Goals	Link	no	1 yes 2 yes 3 yes	no

participation opportunities (Grossmann et al., 2022; Vallance et al., 2011). Ecological sustainability (2) will be met in indexes that factor in environmental externalities (Harris & Roach, 2013). Economic sustainability (3) will be considered as met if the index accounts for economic inequalities (Berr, 2017; Van Niekerk, 2020).

Replacing	Gallup-Healthways Well-Being Index	Link	no	1 2 3 no yes no	no
	Happy Planet Index	Link	yes	1 2 3 yes no no	no
	Ecological Footprint	Link	yes	1 2 3 yes no no	no
	Human Development Index (HDI)	Link	no	1 2 3 no no no	no
	Environmental Sustainability Index (ESI)	Link	yes	1 2 3 yes, no, no	no
	Personal Well-being Index	Link (Cummins et al., 1994)	yes	1 2 3 no no no	yes
	International Well-being Index	(Cummins, 2014)	yes	1 2 3 no no no	no

Conceptualising Sustainability

Sustainability, in its literal meaning, derives from the Latin word sustinēre, which translates to endure, support, maintain and sustain (Caradonna, 2022). For a long time up until today, sustainability, especially in the context of financial and economic sustainability, focused on enhancing the long-term viability of economic growth and prosperity through measures such as austerity politics, fiscal consolidation and debt reduction (Monastiriotis, 2014; Reinhart & Rogoff, 2015). Monetarist and neoclassical conceptualisations of sustainability are driven by concepts like the Solow model (Brock & Taylor, 2010), the Kuznets curve and the so-called ‘sustainability rule’ (Harris, 2003) that justify economic development or the maintenance of per capita wealth through substitutability of natural capital with physical, human or other forms of capital (Kuhlman & Farrington, 2010; Van Niekerk, 2020). These approaches are coined as ‘weak sustainability’ by ecological economists, as opposed to the concept of strong sustainability (Harris & Roach, 2013). Strong sustainability views the human sphere as a subset

of the biophysical sphere and rejects the idea of substitutability of different forms of capital and the monetary valuation of natural items (Ott, 2003). Instead, strong sustainability postulates preserving ecological systems for the ecology's and future generations' interest and aims to construct a new well-being economy "based on non-utilitarian 'ethical' values and the search for new measurements of wealth" within planetary boundaries (Berr, 2017, p. 71). In that respect, strong sustainability can be seen as preserving the planet's and people's well-being in the long run (Van Niekerk, 2020).

Conceptualising Health and Well-Being

Health is defined as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (WHO, 1946, p. 1). In 1991, Dahlgren and Whitehead (1991) developed the model on the main determinants of health (Appendix A: Figure 1), which has been influential in public health policy (Dahlgren & Whitehead, 2021). Introduced by the World Health Organization (WHO) in 2003, the Social Determinants of Health (SDH) gained attention as prominent factors shaping human health (Braveman & Gottlieb, 2014), considering social factors such as living conditions, fair employment opportunities, social protection or individual attributes (WHO, 2013; Appendix A: Figure 2).

This research will focus on the concept of well-being, which is one dimension of the definition of health by the WHO (1946). It can be defined as "a positive state experienced by individuals and societies […] determined by social, economic and environmental conditions. Well-being encompasses quality of life and the ability of people and societies to contribute to the world with a sense of meaning and purpose" (WHO, 2021, p. 10). Beyond this definition, scholars have conceptualised well-being in many different ways (Brulé & Suter, 2019; Busseri, 2018; De Cates et al., 2015; Dolan et al., 2008; Luhman et al., 2021) considering factors contributing to well-being such as work-life balance, social connections (Paulson & Büchs, 2022), general human needs (Gough, 2015) such as access to clean water, nutrition, sufficient

housing (Büchs & Koch, 2019; Dolan et al., 2008; Doyal & Gough, 1991; Koch et al., 2017; Lamb & Steinberger, 2017), social safety and opportunity for political participation (Babajanian, 2013; Voukelatou et al., 2021). Just like the SDH, these factors will be considered in constructing the ASWell index.

Fundamentally, this research will look at a broader notion of well-being that focuses on societal well-being or general human and planetary flourishing (Kosoy et al., 2012; VanderWeele, 2017) rather than individual subjective well-being (De Cates et al., 2015). Achieving long-term well-being and planetary flourishing that lasts for generations to come necessitates transcending the growth paradigm, staying within planetary boundaries (Kosoy et al., 2012) and following principles of strong sustainability (Van Niekerk, 2020), social justice (Grossmann et al., 2022), intergenerational equity (Summers & Smith, 2014) and ecological justice (Ferdowsian, 2021).

METHODOLOGY

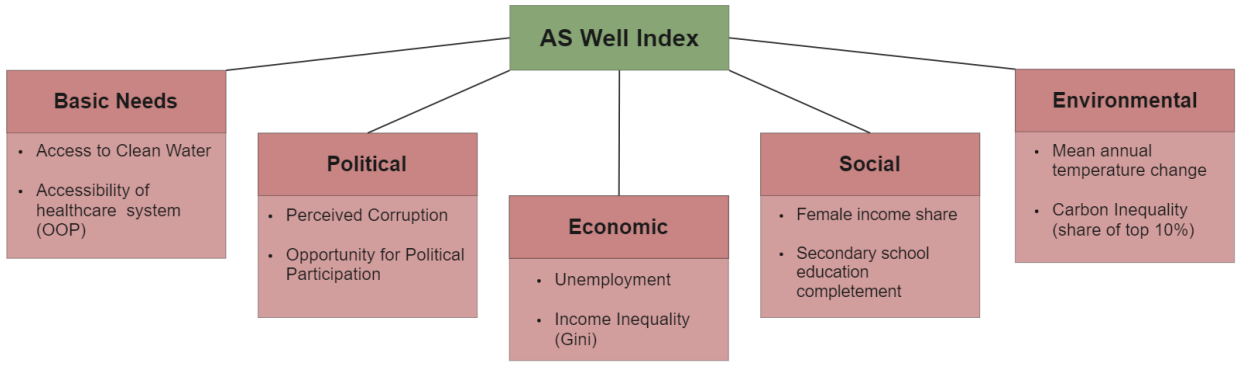
Methodological approach

This research is theoretical, quantitative and methodological in nature. In analysing the research question, the study follows the principle of a cross-sectional study using panel data. The construction of the ASWell index is oriented strongly by the guidelines of the *Handbook on Constructing Composite Indicators* developed by the Organisation for Economic Co-operation and Development (OECD, 2008). The handbook identifies seven key steps for composite index creation: 1) Development of theoretical framework; 2) Selection of variables; 3) Imputation of missing data; 4) Multivariate analysis; 5) Normalisation of data; 6) Weighting and aggregation; 7) Robustness and sensitivity test. Next that, Greco et al. (2019) and Mazziotta and Pareto (2013) have also proven as very helpful sources in creating the ASWell index. The first of these steps was created by means of a literature review which input can be reviewed in the preceding section. In the following, the realisation of the remaining steps will be explained.

Conceptual framework

Figure 1

Conceptual Framework showing the dimensions and variables included in the ASWell index



The ASWell Index follows five dimensions identified to be critical for societal well-being: Economic, Social, and Environmental (WHO, 2021), Basic Needs (Lamb & Steinberger, 2017), and Political (Voukelatou et al., 2021). Each dimension has been restricted to two variables due to limited data availability worldwide and to ensure an equal division between the five overarching categories while still making it feasible to replicate the index. Since variables were selected based on whether there was a quantitative way to assess certain well-being determinants and whether secondary open-access data was available for a large selection of countries and territories for the years 2000-2021, the ASWell might miss some variables that influence well-being, such as time poverty (Bardasi & Wodon, 2006; Giurge et al., 2020), social safety (Babajanian, 2013), biodiversity habitat or forest cover loss (Passmore et al., 2022), air pollution (Liu et al., 2021), sufficient nutrition (Koch et al., 2017), or the global peace index (GPI). An explanation for the choice for each specific variable making up the ASWell index and its influence on well-being will be elaborated on in the following abstracts. Technical notes on each of these variables, the sources they derive from, how they were initially measured, and their units and scales can be found in Appendix C2.

Basic Needs

For the basic needs dimension of the ASWell, access to clean water and the accessibility of healthcare systems proxied by out-of-pocket payments (OOP) have been selected. Poverty can be a barrier to accessing needed healthcare and “adequate” nutrition, housing and hygiene, thereby negatively impacting health. However, having to spend high percentages of OOP on healthcare as an individual can exacerbate poverty leading to a vicious cycle where poor health exacerbates poverty, and poverty exacerbates poor health (Sapkota et al., 2021).

Political

Studies have shown that (perceived) corruption negatively impacts (subjective) well-being and happiness (Li & An, 2020; Rothstein, 2021; Yan & Wen, 2020). Given this, perceived corruption has been chosen as one of the parameters of the political dimension of the ASWell index. Moreover, having the opportunity to participate in free and fair elections directly impacts well-being (Voukelatou et al., 2021). Hence, the degree to which a country allows for participatory democracy will be included in the ASWell index.

Economic

Except for a few exemptions (Graham & Felton, 2009), income inequality is almost consistently negatively correlated with well-being - in Eastern and Western countries (Du et al., 2019; Hickel, 2020). Moreover, Unemployment has been shown to be linked to lower well-being over almost ten decades consistently (Wood & Burchell, 2018; Zuzanek & Hilbrecht, 2016), manifesting itself in “significantly lower levels of mental health, life satisfaction, family satisfaction, and physical health than their employed counterparts” (ibid, p. 661). Therefore, this index will consider unemployment and the Gini as variables for the economic dimension.

Social

Achieving gender equality is fundamental to improving future generations' health and well-being (Braveman & Gottlieb, 2014; Roseboom, 2020; Tesch-Römer et al., 2007). Based on

the availability of data, female labour income share ('female_is') has been chosen as a proxy variable for gender inequality. Furthermore, an accessible education system has been shown to be relevant for well-being (Dolan et al., 2008). Education in terms of people that completed at least upper secondary education, next to 'female_is', will therefore be included in the ASWell index on the social dimension.

Environmental

Due to strongly limited open-access data availability on environmental issues, the two environmental variables chosen for the ASWell are mean annual temperature change and carbon inequality. Human and planetary well-being will be greatly negatively impacted by rising temperatures and carbon emissions (IPCC, 2023; Appendix A: Figure 3). Moreover, it has been detected that global inequalities in terms of who emits the most carbon dioxide are higher within countries than between countries (Alvaredo et al., 2021; Chancel et al., 2023; Appendix A: Figure 4). By including carbon inequality in the ASWell index, the disproportional division of people contributing to and suffering from the climate crisis is recognised (Chancel et al., 2023).

Data collection

The ASWell relies solely on open-access secondary data to achieve its goal of replicability and accessibility. Data has been collected from open-access data sources of the WHO, the World Bank (WB), the World Inequality Database (WID), Transparency International, and the United Nations' Food and Agricultural Organisation's statistical website (FAOSTAT). Choices about which data to use for the ASWell have been made based on whether data for a desired factor was accessible and openly available for a minimum of 180 countries from 2000 until 2022. The ten variables selected for the ASWell have been selected based on the theoretical framework, highlighting their contributions to well-being and rich open-access data being accessible for these variables.

Data processing and development of the composite index

Generally, most data processing steps have been done using the programming language 'R'. Initially, before composing the ASWell, in the unified dataset containing all variables for all countries corresponding to the UN's country designations (UN, n.d.), all countries and territories with data for less than five variables were deleted[2], leaving 190 countries and territories with data from 2000 to 2022 for at least five of the ten variables. The cleaned dataset still contained values missing completely at random (MCAR) (Yadav & Roychoudhury, 2018), which was imputed using a random forest imputation method in 'R'. For this, the *MissRanger()* function of the MissForest package (Stekhoven, 2022) has been used. 'MissForest' uses a non-parametric imputation method, which is developed from the information of other variables using a regression tree of resampling-based classification to predict the missing values (Yadav & Roychoudhury, 2018).

Multivariate analysis

To get better insights into the dataset, a multivariate analysis in the form of a principal component analysis (PCA) has been performed after data imputation using the *prcomp()* function, which is part of the base package in R. PCA, in theory, can be used to construct a composite index by choosing the principle component (PC) that explains the most variation in the data (OECD, 2008). PCA can thereby be used as a technique for weight elicitation by using the factor loadings of the PC to explain most variance (Greco et al., 2019). However, this approach was not feasible for the ASWell since the weights assigned to the strongest PC to certain variables (see Appendix C1, Figure 3) did not match the theoretical framework. This is a common issue for PCAs (Greco et al., 2019). The ASWell can only properly account for how some variables will affect well-being positively and others negatively through manual weighting - a normative and theoretical judgement that the PCA cannot make.

[2] For an overview of deleted countries and territories please consult Appendix B

On top of that, a correlation analysis and tests for normality have been conducted in R. The correlation analysis (Appendix C1, Figure 6) indicates that only ‘Water’ and ‘education’ variables are strongly positively correlated. Other variables are only slightly or moderately negatively or positively correlated (e.g., ‘PCI’ with ‘partidem’, ‘education’, and ‘water’). No variables are strongly negatively correlated. Furthermore, none of the ten variables is normally distributed, as the histograms and qq-plots (Appendix C1, Figures 4 and 5) show which has been dealt with through data normalisation, as explained in the next paragraph.

Normalisation of data

Since all variables of the ASWell come from different data sources with different ranges, scales and units, the data had to be normalised to compare and aggregate them. Standardisation using z-scores is one of the most commonly used approaches to data normalisation (OECD, 2008), where each variable is given a mean of 0 and a standard deviation of 1. In R, this step has been done using the *scale()* function in R. Normalisation with z-scores allows for relative comparison between alternatives or over time but no absolute comparison (Mazziotta & Pareto, 2013), which is not required for the ASWell Index. Since standardisation with z-scores leads to some values turning negative, the data has additionally been normalised through minimum-maximum scaling to range between 0 and 1 so that directional weighting can be applied in the next step of composite index creation.

Weighting and aggregation

Composite indicators can be aggregated in various ways, like through additive or geometric mean methods (OECD, 2008). The choice of aggregation method depends on whether variables are considered compensatory or non-compensatory. In the case of compensatory methods, a low score in one variable can be compensated for by high scores in another variable (Mazziotta & Pareto, 2013). However, the ASWell variables are non-compensatory based on the theoretical framework. Low performance in, for example, unemployment cannot be made up for by high accessibility of clean water. Because of this, a

multi-criteria approach, the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS), has been selected for the ASWell index.

TOPSIS aggregates normalised and weighted variables based on their values' distances to the best and worst possible outcomes for each variable. These were defined by assigning directional weights to the variables (-1 or 1) depending on whether a variable is considered to factor in positively or negatively into the ASWell index, hence, if the variable should be maximised or minimised (Fu et al., 2020). In line with the theoretical and conceptual framework, ‘OOP’, ‘unemployment’, ‘Gini’, ‘Carbon_T10’ and ‘Temp_change’ were assigned a directional weighting of -1 since they will supposedly affect well-being negatively, while all remaining variables were maximised. Apart from the directional weighting, all variables of the ASWell were assigned equal weight, which is the most common approach in composite indicator development (Fu et al., 2020; OECD, 2008) and because of increased simplicity in composing the index (Greco et al., 2019). Overall, this improves the accessibility and replicability of the methods used. Moreover, the cultural and circumstantial dependence on well-being (Dolan et al., 2008), the researcher refrained from proclaiming specific different weights. When replicating the ASWell, anyone can adjust the weights of the variables to their specific cultural contexts and preferences.

Robustness and sensitivity

Commonly, after aggregation, a robustness and sensitivity analysis is conducted to find out whether any of the multiple decisions made along the process of weighting, normalisation or aggregation method have impacted the results of the index and whether with alternative choices better index values could have been obtained (OECD, 2008). However, already during the process of creating the ASWell and in line with scientific guidelines on the topic (Greco et al., 2019; Mazziotta & Pareto, 2013; and OECD, 2008), many different approaches to weighting, normalisation and aggregation have been tried and ruled out to find the best methods for the

composition of the ASWell. The ASWell has been normalised using z-scores, and the conscious decision to not assign different weights to the variables, as well as a theoretically grounded decision on directional weighting, have been made very carefully, it constructing a robustness and sensitivity analysis of the ASWell has been deemed redundant. Instead, the results and discussion sections will show how, through comparison to GDP/capita and its general results, the ASWell index can serve as a sound measure for long-term sustainable well-being.

Data analysis

The data analysis for the ASWell index has been done solely descriptively. First, some descriptive statistics (mean, median, standard deviation, percentiles and a histogram) have been computed using Excel. After that, ASWell index results were grouped and ranked by multiple conditions, such as region and country. Additionally, maps have been developed to show the distribution of average ASWell scores worldwide and in specific regions using QGIS. Finally, the ASWell has been plotted together with GDP/capita following a line graph format to compare the development of the ASWell and GDP/capita over time for the five highest and lowest scoring countries and per geographical region on both indicators on average across time (2000-2022).

RESULTS

General results of the ASWell

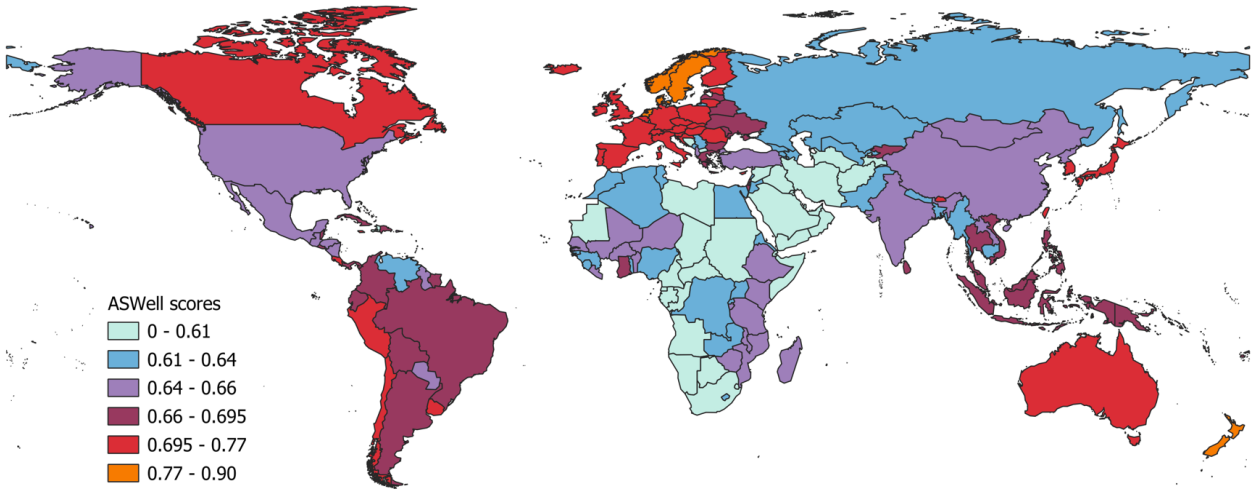
ASWell scores range from zero to one, with one marking the highest obtainable ASWell score. The histogram showing the distribution of all ASWell scores for each country and year (Appendix A: Figure 5) suggests a relatively normal distribution for the ASWell with some outliers to the lower end of the distribution[3]. Similar can be observed for the histogram showing the distribution of the averaged ASWell scores per country across the timeframe (Appendix A: Figure 6). The mean of all ASWell scores amounts to 0.656, and the median to 0.652. The

[3] A table containing average ASWell index scores for each country can be found in Appendix C3 to identify which countries mark the outliers.

standard deviation of the ASWell index lies at 0.057. Fifty percent of all countries and years fall within a range of index scores between 0.62 and 0.69, marked as the 25th and 75th percentile, respectively. The maximum ASWell score was achieved by Sweden in 2001, with a score of 0.83. The United Arab Emirates (UAE) attained the lowest ASWell score of 0.43 in 2004. Overall, across the timeframe, Norway however has scored highest on the ASWell index with a score of 0.7979, closely followed by Denmark with a score of 0.7977. The next three places in the top five scorers of the ASWell are occupied by Sweden (0.7966), the Netherlands (0.79), and New Zealand (0.788). Qatar achieved the lowest ASWell score (0.465) among the 189 assessed countries. United Arab Emirates (UAE) (0.5), Kuwait (0.548), Somalia (0.548) and Djibouti (0.555). Figure 2 visualises the 198 countries' performances on the ASWell index on average from 2000 to 2022.

Figure 2

World map showing average ASWell scores across the timeframe from 2000 to 2022 ranging from 0 to 1.



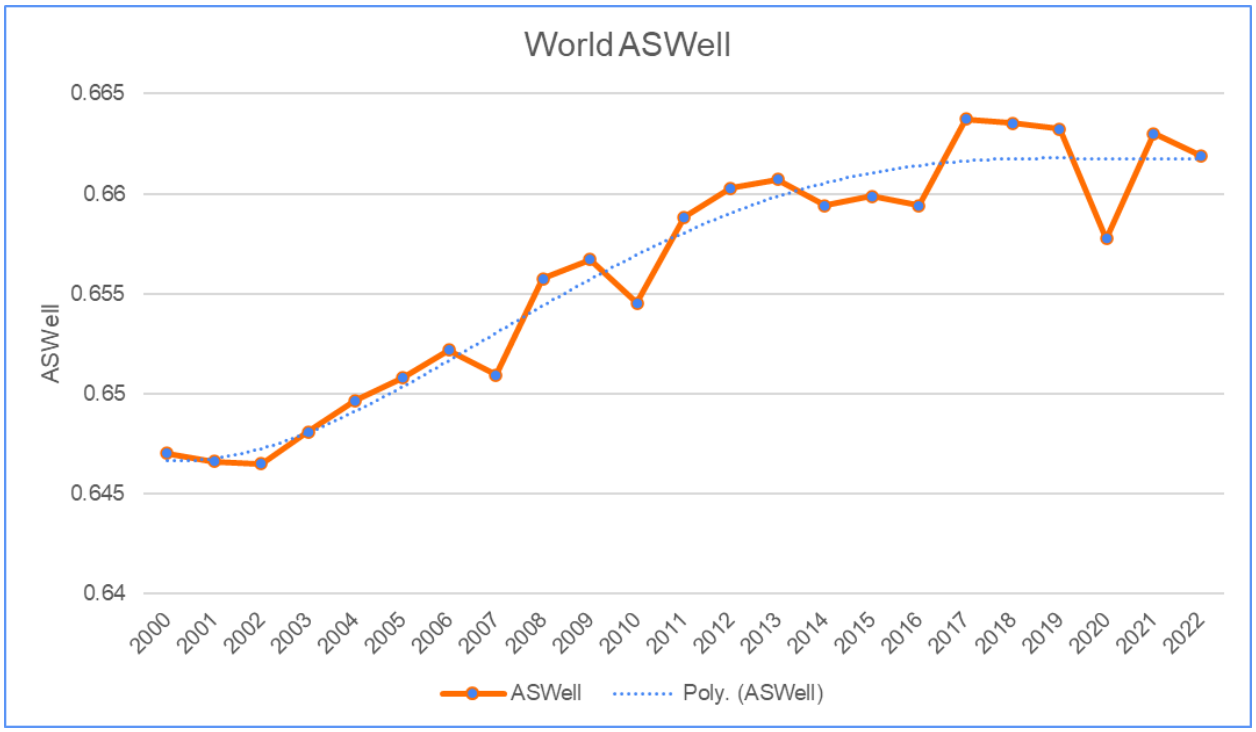
As the map suggests, the geographical region of Europe and Central Asia has the highest overarching ASWell score across all years (0.69), while countries in the Middle East and North Africa score lowest on average on the ASWell (0.6)[4]. North America (0.674), East Asia (0.673), Latin America and the Caribbean (0.666), South Asia (0.646) and Sub-Saharan Africa (0.628) score in between. On a worldwide scale, average well-being according to the ASWell in

[4] Consult Figures 9 and 10 in Appendix A for close-up maps on these specific regions.

the time from 2000 to 2022 has been at a score of 0.656. As Figure 3 visualises, well-being on the world level has been rising overall until reaching a maximum in 2017 (0.664), with several smaller low points in the years 2007 (0.651), 2010 (0.655), and 2014 to 2016 (0.659). When looking at the individual data points, it seems that after 2017 a slight negative trend in well-being is taking off, with a remarkable minimum in 2020 (0.658), after which well-being rises again but seems to continue the negative trend that started in 2017. More mildly put, the polynomial trendline in Figure 3 suggests a stagnation of well-being from 2017.

Figure 3

Line graph showing the actual data and polynomial trend of ASWell scores over time (2000-2022) on the world level (taken from the average across all countries).



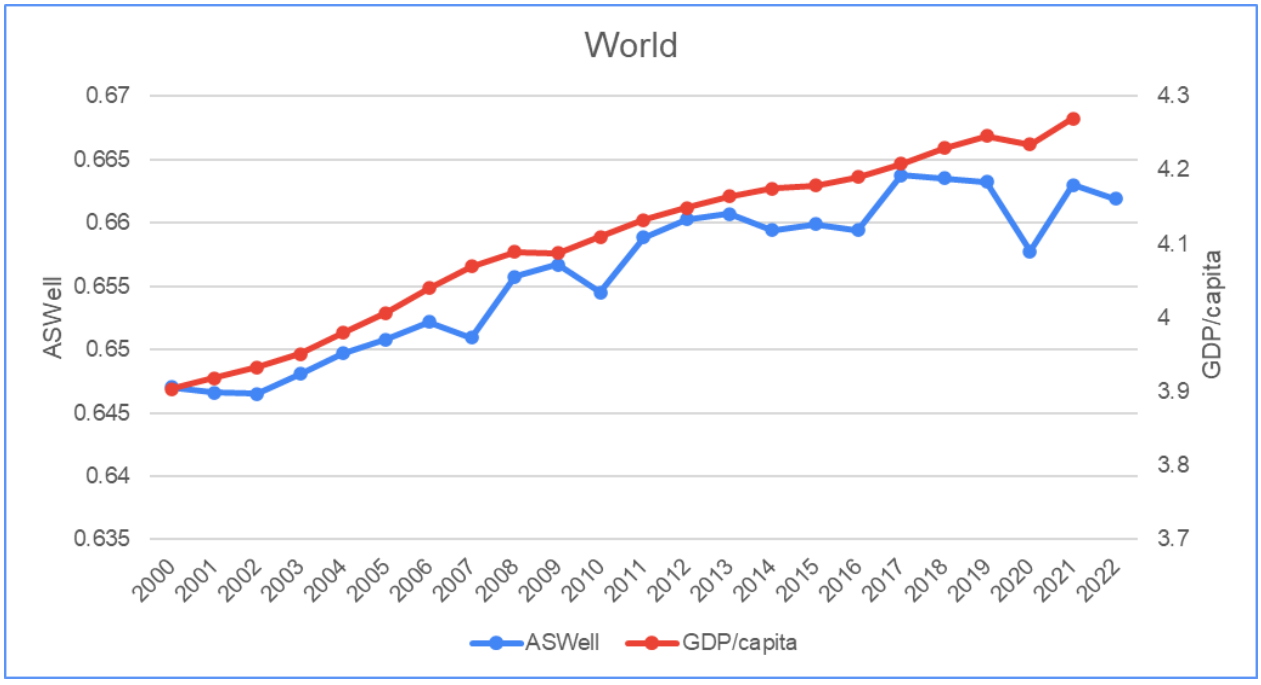
Some other country results worth highlighting are Uruguay, Malta, Bhutan, Canada, and Mauritius, as these countries are the highest-scoring countries in their specific world region, ranking 13th, 22nd, 31st, 41st, and 42nd, respectively.

Comparison to GDP

To compare their trends of GDP, ASWell scores have been plotted together with GDP/capita over time (2000-2022) for the five countries scoring highest and lowest on the ASWell and GDP per capita on average, the seven world regions, and the world in total. As Figure 4 indicates, GDP/capita is continuously increasing globally. Well-being, according to the ASWell, follows a generally increasing trend. However, looking closely, the graph reached a local maximum in 2017 with an average score of 0.66 in well-being, after which the trend seems to have shifted to slightly decrease until the most recent value in 2022.

Figure 4

Line graph showing the trend of ASWell scores over time (2000-2022) against the trend of GDP/capita on the world level.



On a regional level, the ASWell index and GDP/capita do not show a great divergence (Figure 5). Even though the ASWell slopes demonstrate more fluctuations than GDP/capita, which follows an almost linear trend in most regions, well-being generally increases in all world regions. This regional trend, however, looks very different when zooming in on individual countries. Looking at Table 2, it becomes apparent that there are strong differences between the

ASWell and GDP/capita since two of the top five scoring countries in GDP/capita (Qatar and UAE) rank among the bottom five countries on the ASWell index. Moreover, Luxembourg and Singapore score sixth and seventh lowest on the ASWell while scoring second and fifth highest on GDP/capita, respectively. Regarding the five lowest-scoring countries on GDP/capita, except for Somalia, which is also among the five lowest-scoring countries on the ASWell, the other four countries score higher on the ASWell index. CAR still scores relatively low with a rank of 170, while DRC, Mozambique and Burundi score more towards the middle on the ASWell with ranks 141, 111 and 104. Simultaneously, the Top five of the ASWell all score very high (top 40) in GDP/per capita, too.

Figure 5

Line graph showing the trend of ASWell scores over time (2000-2022) against the trend of GDP/capita per world region.

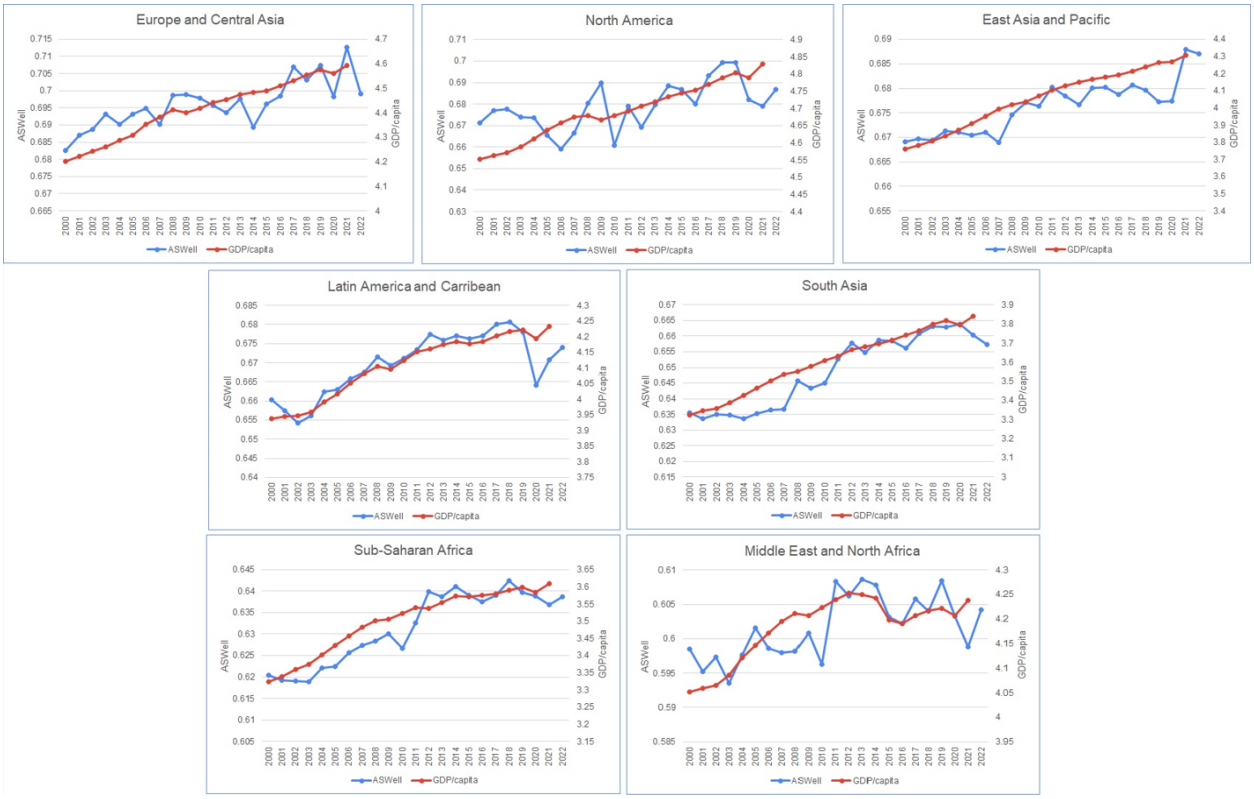


Table 2

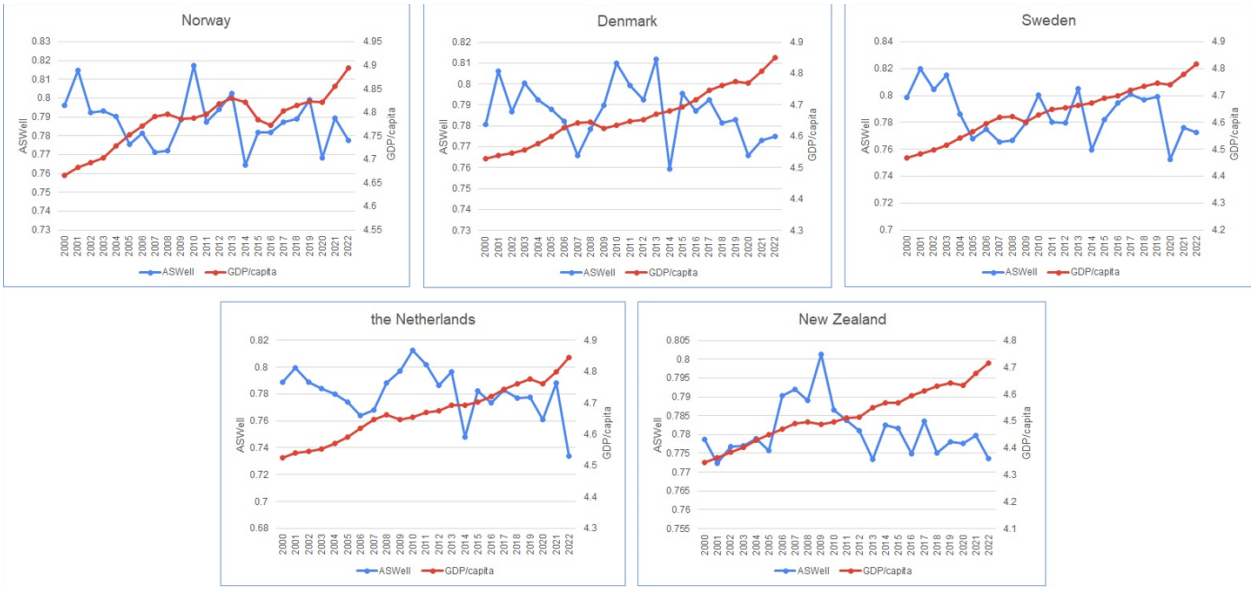
Table showing the top 5 highest and lowest scoring countries for the ASWell and GDP/capita on average across the years 2000-2022.

Top 5 ASWell	Bottom 5 ASWell
1. Norway (0.798) 2. Denmark (0.798) 3. Sweden (0.797) 4. The Netherlands (0.790) 5. New Zealand (0.788)	1. Djibouti (0.555) 2. Somalia (0.548) 3. Kuwait (0.548) 4. United Arab Emirates (0.503) 5. Qatar (0.465)
Top 5 GDP/capita (in thousands)	**Bottom 5 GDP/capita (in thousands)**
1. Qatar (1118,2) 2. Luxembourg (989,6) 3. Macao (861,1) 4. United Arab Emirates (826,8) 5. Singapore (777,1)	1. Somalia (1,067) 2. Mozambique (0,995) 3. Central African Republic (0,884) 4. Dem. Rep. of the Congo (0,769) 5. Burundi (0,671)

Zooming in on these specific countries listed in the table above, comparing trends of the ASWell and GDP/capita over time, it becomes evident that for most of these countries, the trajectories for GDP/capita and the ASWell differ strongly. Figure 6 shows how the two different indicators diverge over time for the top 5 scoring countries of the ASWell. While GDP/capita continuously grows, the ASWell index follows a less steady slope with differing rising and falling trajectories with a decreasing overall trend of the ASWell for all five countries.

Figure 6

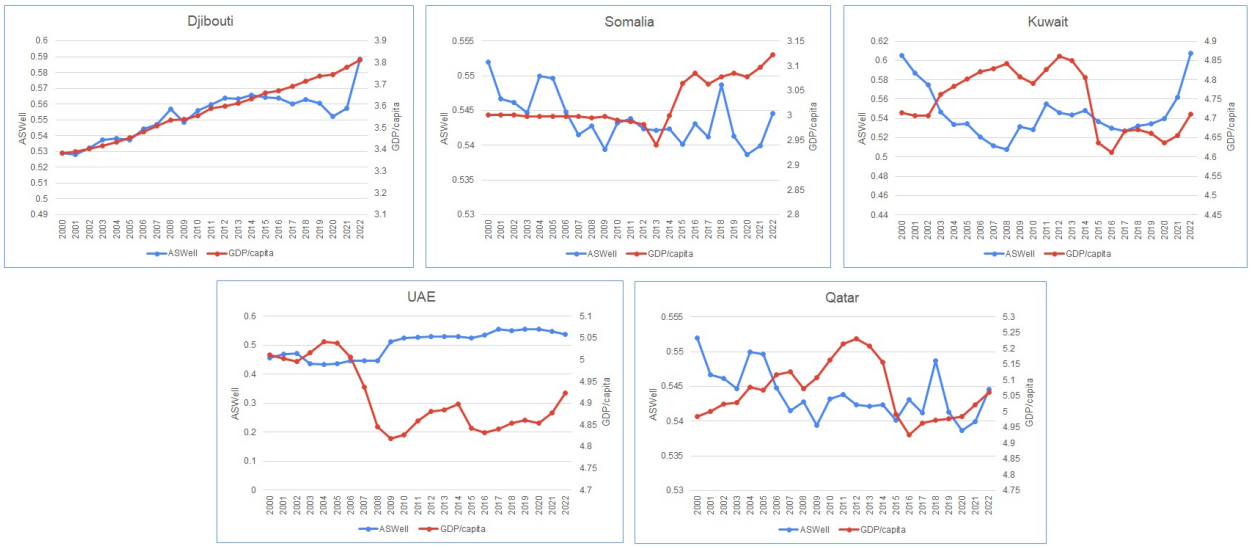
Line graphs showing the trend of ASWell scores over time (2000-2022) against the trend of GDP/capita for the 5 highest scoring countries on the ASWell index overall.



While the divergence between both indicators is most distinct for the top five ASWell countries, strong differences between the slopes can also be established from the remaining country comparisons. As Figure 7 shows, with the exception of Djibouti, the trajectories of both indicators differ strongly for the bottom 5 scoring countries on the ASWell. In Qatar, the two indicators seem to run most counter to each other. When plotting polynomial trendlines over the two indicators' trajectories (Appendix A: Figure 6), well-being decreased while GDP/capita rose from 2000-2012. After 2012, the general trend for the ASWell seemed rather positive, with GDP/capita decreasing strongly until 2016, after which it rose again. Similar contrary trends can be observed for Kuwait (Appendix A, Figure 7), though, in the last three years of the timeframe, both GDP/capita and ASWell are rising in tandem. In Somalia, GDP/capita has been rising on average while the trend of the ASWell has been decreasing throughout the timeframe. However, with steeper increases in GDP/capita, well-being, while still decreasing, decreases less drastically on average. In Djibouti, GDP/capita and well-being both follow an increasing overarching trend which can be attributed to a large boost in well-being in 2022, which broke a downward trend in well-being that started in 2014. The graph for the UAE also presents an interesting case. There, well-being has been following a slow but steady upward trend, notwithstanding relatively strong fluctuations in GDP/capita.

Figure 7

Line graphs showing the trend of ASWell scores over time (2000-2022) against the trend of GDP/capita for the 5 lowest scoring countries on the ASWell index overall.



Similarly, the graphs of the top five scoring countries in GDP/capita, except Singapore (Figure 8), also show diverging trends in well-being and GDP/capita. With respect to the bottom five scoring countries on GDP/capita (Figure 9), all five exhibit diverging trajectories for GDP per capita. In the Central African Republic (CAR) and Somalia, both GDP/capita and well-being show fluctuating trends. However, CAR has seen a strong decrease in GDP/capita in 2013 and an overarching increasing trend in well-being, while Somalia has seen an increase in GDP/capita in 2013 while following an overall downward trend in well-being. In Burundi, both indicators developed with an upward trend until 2013, after which well-being started to decrease while GDP/capita continued to increase, however more slowly than before 2013. DRC and Mozambique both had a steady, almost linear increase in GDP/capita. Simultaneously, well-being increased in both countries until 2015 and 2013, respectively, after which it started to decrease again.

Figure 8

Line graphs showing the trend of ASWell scores over time (2000-2022) against the trend of GDP/capita for the 5 countries with the highest GDP/capita overall.

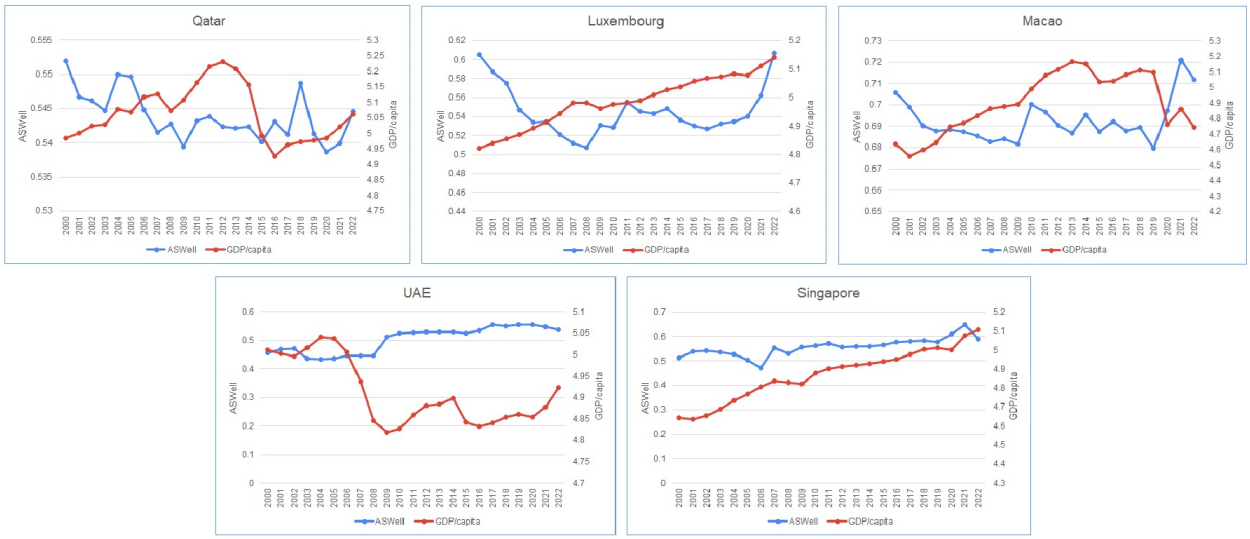
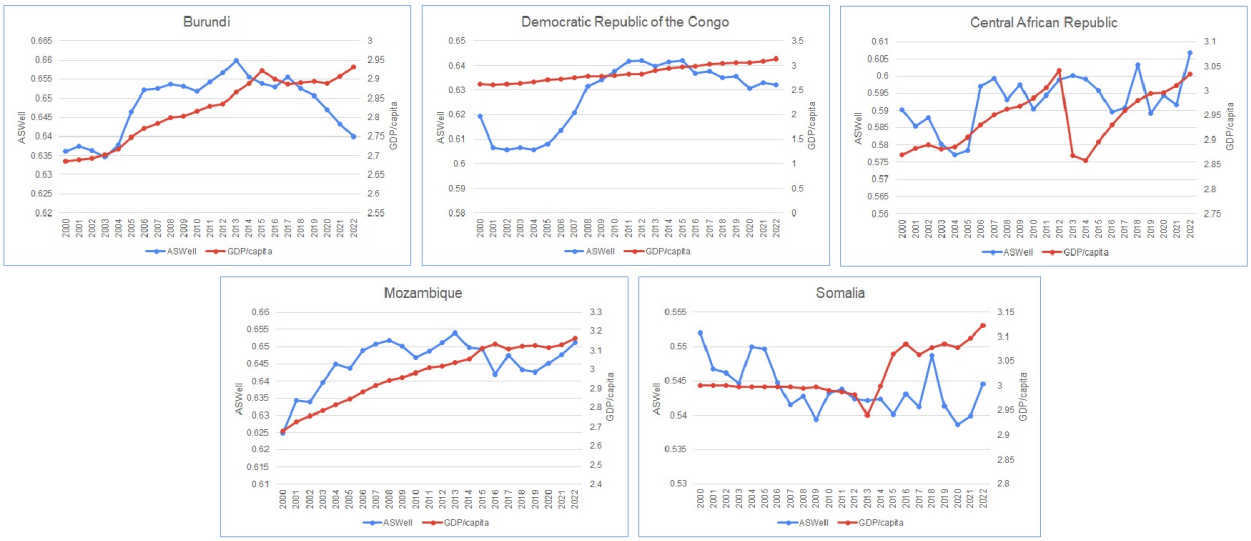


Figure 9

Line graphs showing the trend of ASWell scores over time (2000-2022) against the trend of GDP/capita for the 5 countries with the lowest GDP/capita overall.



DISCUSSION

How to read the ASWell and its general results

Many alternatives to GDP that aim to measure well-being, progress, or development reflect either personal (subjective) well-being (e.g., Gallup-Healthways Well-Being Index, Personal Well-being Index) or a single nation's well-being at different points in time (e.g., GPI, OECD better life index). Thereby, current alternatives to GDP prescribe or normatively inform only to a limited extent what should be done regarding progress and development to achieve long-lasting, sustainable well-being, next to many of them not transcending the growth paradigm. The ASWell, however, can be read as giving normative suggestions to achieve worldwide long-term sustainable well-being. A well-being score on the ASWell can reflect the well-being of a society of one country at a specific time. For example, high OOP payments, limited access to clean water, high unemployment and a malfunctioning education system can impact the well-being of a country momentarily (Dolan et al., 2008). The ASWell, however, also includes aspects to capture long-term societal well-being, such as environmental deterioration, socio-economic inequalities and the abilities of future generations to meet their needs ('Temp_change', 'Gini', 'female_is', 'partidem', 'Carbon_T10') and thereby goes beyond merely capturing the current state of well-being within a country. Essentially, the ASWell suggests which country provides the best conditions (in terms of the ten variables composing the ASWell) for global well-being to thrive without compromising the well-being of future generations and the planet.

According to the results of the ASWell index, the best time and place for everyone in the world to have lived in would have been Sweden in 2001. Overall, high scores on the ASWell index, as for Norway, Denmark, Sweden, the Netherlands and New Zealand, can be regarded as setting an example for the development the world's countries should be moving towards to generate long-lasting, sustainable well-being. While showing higher standards of living ('OOP', 'Water', 'education', 'partidem', 'unemployment') compared to lower scoring countries on the

ASWell, the top five scoring countries also exhibit lower levels of inequalities and behaviours that could compromise the well-being of future generations and the environment (‘Gini’, ‘female_is’, ‘Temp_Change’, ‘Carbon_T10’).

It becomes evident that many countries scoring particularly low on the ASWell are rich (in terms of GDP) oil countries in the Middle East and North Africa, with Qatar, UAE, Kuwait and Djibouti scoring in the bottom five countries on the ASWell index. For Djibouti, a low ASWell score might not be surprising since the country is known for struggling with high levels of inequality, poverty, an accelerating water crisis and climate change (Dumitrescu, 2019; Kanda et al., 2023). The Gulf Arab monarchies of Qatar, UAE and Kuwait have gained substantial wealth through oil and gas exports but have experienced vigorous socioeconomic inequalities, poverty, youth unemployment (Koch & Stivachtis, 2019), racially segregated labour markets (Holthaus, 2019), and low democracy levels (EIU, 2022). Their low well-being scores given by the ASWell are mainly driven by an almost non-existent participatory democratic approach (‘partidem’ <1) due to their authoritarian status (EIU, 2022), relatively high economic inequality (‘Gini’ >0.4), very low female income share (‘female_is’ <20%), and excessive carbon emissions among the top richest ten percent (‘Carbon_T10’ >90). At the same time, these three countries do relatively well on access to clean water (>90%), ‘unemployment’ (<3%), and ‘education’ (>90%), three categories that might rather reflect the current state of the countries’ well-being. Likely, a survey asking for perceived well-being within these countries at this point would not necessarily indicate low well-being. However, access to clean water, education and employment alone does not guarantee long-term well-being that lasts over future generations without being at the expense of the environment. The ASWell, with its strong focus on considering different kinds of inequalities (‘Gini’, ‘female_is’, ‘Carbon_T10’) (Syrovátka & Schlossarek, 2019), suggests that if all countries were to take the performances of UAE, Qatar and Kuwait as models for development and well-being, the long-term outlook for global well-being would be grim as a high

GDP is no guarantor for high well-being that can be sustained for all people and the planet in the long-term.

Luxembourg and Singapore are the next lowest-scoring countries on the ASWell index. Luxembourg's current generation experiences relatively high well-being regarding access to clean water, 'OOP', perception of corruption, the opportunity for political participation, 'unemployment' and 'education'. Still, Luxembourg only achieves an average ASWell score of 0.557 due to, on average, a high Gini (0.48), a great change in surface temperature (1.6 degrees), and, weighing in most strongly, extremely high carbon emissions among the top richest ten percent of society (142.5). Singapore's low ASWell score (0.559) is mostly driven by, on average, high percentages in OOP payments (40%), no opportunity for political participation ('partidem' <0.15), a high Gini (0.52), high surface temperature change (1.12 degrees) and high carbon emissions ('Carbon_T10' > 100). Hence, if all national governments would follow the example of Singapore or Luxembourg, worldwide well-being would be low, marked by high socioeconomic inequalities benefiting only a very privileged demographic that, through their lifestyle, cause high CO2 emissions leading to increased warming of the planet which in turn will reverberate in lower global well-being.

Somalia, scoring third lowest on the ASWell, scores relatively poorly, on average, on population with access to clean water (22.5%), participatory democracy ('partidem' < 1), Gini (0.56), unemployment (19%), female labour income share (10%), 'education' (17%), and perceived corruption ('CPI' < 20). In this case, current well-being can be interpreted as low as compared to the other four countries in the bottom five on the ASWell. With relatively strong surface temperature changes(1 degree on average) but low carbon emissions among the richest 10 percent ('Carbon_T10' < 10) and its high vulnerability to climate change, the case of Somalia perfectly ties into the loss and damage debate and theories of distributive and compensatory justice (Vanhala & Hestbaek, 2016; Warsame et al., 2022). Loss and damage approaches and distributive justice set to highlight and tackle the fact that many low-income

countries, especially small island states and countries in Sub-Saharan Africa, are disproportionately affected by climate change while historically having contributed the least to it (Dorkenoo et al., 2022; Mechler et al., 2020). Distributive justice is forward-looking into how countries which are most vulnerable to climate change can develop without exacerbating climate change-related or socio-economic problems (Schinko et al., 2019). Compensatory justice, from a backwards-looking perspective, suggests that countries partially responsible for socioeconomic or climate-change-related disadvantages in other countries should make up for these disadvantages through loss and damage payments as reparations (Wallimann-Helmer et al., 2019).

Overall, looking at all countries that score low on the ASWell index, one can identify two major types. On the one hand, countries from the Middle East and North Africa, such as Qatar, Djibouti, Yemen, Iran and Saudi Arabia, score in the bottom ten percent of the ASWell while many of them exhibit very high GDP/capita levels. Their low ASWell scores indicate undesirable circumstances for global well-being in the long term. On the other hand, countries mostly in Sub-Saharan Africa, such as Somalia, Eswatini, Sudan, and the Republic of the Congo, also score in the bottom ten percent of the ASWell, while also exhibiting rather low levels in GDP/capita. There, as shown by the example of Somalia, the living standards and well-being of current generations are already much lower as compared to countries like Qatar or Kuwait, where current living standards are relatively high (when looking at variables like ‘OOP’, ‘Water’, or ‘education’). Nevertheless, rather low levels of carbon emissions among the richest ten percent countries from Sub-Saharan Africa scoring low on the ASWell might not contribute as strongly to exacerbating global (carbon) inequalities and the ecological crisis endangering long-term well-being as compared to the first type of country scoring low on the ASWell. Ultimately, low ASWell scores can therefore point either towards conditions that might jeopardise long-term human and planetary flourishing or towards conditions that are already jeopardising the current generation’s flourishing.

Comparison to GDP

Comparing the trajectories of the ASWell index for individual countries and world regions over time against GDP/capita, one can easily identify that, on average, the ASWell demonstrates more fluctuations than GDP/capita. Fluctuations in well-being are generally not surprising since well-being is highly dependent on and sensitive to cultural, political, natural and individual circumstances, which, however, has mostly been found looking at individual well-being (Dorn et al., 2007; Sonnentag, 2015). The ASWell variables can also be influenced by social policies, which can be subject to external shocks such as institutional or governmental change, technological advancements, social movements or natural disasters (Cerna, 2013), which might explain some of the observed fluctuations.

Looking more closely into the original variables that compose the ASWell, it seems that, in many cases, fluctuations in the ASWell over time can be explained by fluctuations in one specific variable. For most countries in Europe and Central Asia scoring highest on the ASWell, changes in annual mean surface temperature are factoring in strongly into changes in well-being. New Zealand, for example, saw a decrease in ASWell from 0.80 to 0.78 from 2009 to 2010, mostly driven by annual mean surface temperature change, increasing from 0.06 to 0.6. Similar could be observed in Denmark (2013-2014) and the Netherlands (2021-2022), where decreases in well-being according to the ASWell can also be attributed to strong differences in annual mean temperature change from 0.04 to 2.68 degrees in Denmark and 1.32 to 2.6 degrees in the Netherlands. Also, in Somalia, which scores low on the ASWell and GDP/capita, a decrease in well-being on the ASWell can be attributed to a greater change in mean annual temperature. Despite these observations, it should be noted that the changes in well-being according to the ASWell appear on a relatively small scale. While strong visual fluctuations in the ASWell graphs might hint at strong fluctuations in well-being, ASWell scores within countries mostly do not exceed a range of 0.1 index points.

Regarding GDP/capita-specific dips that can commonly be identified in many countries' trajectories of the graphs in the years 2007 to 2008 and 2019 to 2020 can be attributed to the global financial crisis and the Covid-19 pandemic (Bhattacharya & Dasgupta, 2012; Maliszewska et al., 2020). However, these events cannot be clearly identified when looking at general trends in the country-level graphs for the ASWell index scores. Only on the world and regional level can a decrease in well-being in 2020, presumably due to the Covid19 pandemic, be detected (Appendix C2, Figure 12).

As already elaborated, GDP or GDP/capita is commonly misused as proxies for well-being, development and progress (Bleys, 2012; Likaj et al., 2022). Literature provides evidence on why GDP/capita and growth should not be mistaken to reflect an individual's or a country's well-being (Costanza et al., 2014; Hoekstra, 2019; Kalimeris et al., 2020). The country-level results of the ASWell compared to GDP/capita over time feed into this growing literature. As the results showed, on average, slopes of the ASWell and GDP/capita diverge strongly on the country level (Figure 6, 7, 8, 9), suggesting that GDP/capita growth does not reflect progress or positive development in well-being according to the ASWell. On a regional level (Figure 5), however, ASWell and GDP/capita are almost converging, implying that counter to the country-level results, an increase in GDP/capita can at least to some extent reflect increases in well-being from 2000 to 2022. On the world level (Figure 4), GDP/capita and the ASWell also seem to follow a rather converging trend. Nevertheless, starting in 2017, global ASWell scores are slowly decreasing. Albeit only future observations will show whether this downward trend of well-being in terms of the ASWell will continue, the decreasing trend of the last five years suggests that global sustainable well-being with long-term well-being potential peaked in 2017 and from then on started to diverge from the continuous increasing trend in GDP/capita. These deductions fit into ongoing scholarly debates on three particular theories/concepts: the Kuznets curve, uneven development theory, and the Easterlin paradox.

Kuznets curve, uneven development theory, and Easterlin paradox

Observations on the limited applicability of the income and environmental Kuznets curves (Piketty, 2006; Stern, 2017) can be confirmed on inspection of the comparisons made between the ASWell and GDP/capita. While some countries exhibit high ASWell scores driven by low socio-economic inequalities and high living standards, next to also ranking high in GDP/capita levels, like the top five scoring countries on the ASWell, others like the top five scoring counties in GDP/capita, exhibit high socio-economic and carbon emission inequalities despite generally high living standards and economic development suggesting that there might not be such thing as a general tipping point in economic development that leads to fewer environmental degradation and inequalities. This feeds into findings from the literature that continuous economic growth increases environmental pollution and deterioration (Stern, 2017) and inequalities (Howarth & Kennedy, 2016).

The results of the ASWell compared to GDP/capita also connect to the uneven development theory, especially when looking at the two types of countries that score in the bottom ten percent in the ASWell country ranking. Somalia is one example of how this theory manifests itself in this study's results. Looking at Somalia's country graph comparing GDP/capita and the ASWell (Appendix C2, Figure 8), one can see that up until 2013, GDP/capita has been rather stagnant with a slight negative trend, but that from 2014 onwards, continuous economic development in terms of rising GDP/capita can be observed. In accordance with the theory of uneven development, Somalia was "lagging behind" until 2013 and is now starting its development following the example of countries already considered as developed. At the same time, however, despite a "kick off" in economic development in 2013, ASWell scores continued to fluctuate strongly while following an overall negative trend. This leads to assume that apart from the fact that well-being and GDP cannot be used interchangeably, uneven development impacts well-being even more long-lastingly than GDP

per capita, with disadvantages from the (colonial) past still reverberating in lowered present well-being and living standards.

The bottom ten percent of the ASWell country ranking, as already acknowledged, presents a mix of two dominant types of countries: 1) Countries in the Middle East and North Africa that exhibit relatively high living standards but high socioeconomic and carbon inequalities and 2) countries in Sub-Saharan Africa that cannot serve as a model for long-term sustainable well-being but also do not exhibit high living standards presently. Arguably this second type of country has experienced a form of uneven development, not only in terms of GDP per capita but, more importantly, in terms of societal well-being, given their colonial and exploited past (Heldring & Robinson, 2012; Mentan, 2017).

Lastly, the results presented in this study underscore the Easterlin paradox. Scholars argue that high-income countries have already passed the threshold of planetary boundaries, after which the relationship between GDP and well-being breaks down completely (Borowy & Aillon, 2017; Hickel, 2020; Koch et al., 2017). Even the world has supposedly reached a “welfare plateau” (van den Bergh, 2022, p. 1), where additional growth will not add more well-being but will only increase wealth inequalities. These trends can also be observed in the ASWell data compared to GDP/capita. The fact that many high-income countries also score high on the ASWell index (Figure 6) GDP/capita and ASWell trends diverge strongly suggests that these countries have already passed the threshold theorised by the Easterlin paradox. While not a high-income country, Burundi (Figure 9), at least in the time frame of 2000 to 2022, seems to present an excellent example of this showing the disconnectedness of economic growth and well-being on a country level. Up until 2013, ASWell scores and GDP/capita have been growing. After that, GDP/capita continued to grow while well-being flipped into a decreasing trend. Also, on a worldwide scale, as already suggested, a potential Easterlin paradox can be observed as up from 2017 ASWell scores seem to stagnate and even slowly

decrease. Why the ASWell score started to decrease precisely up from 2017 and whether this trend will continue would be interesting for future research to look at.

Given these three examples and the general outcomes of the comparisons of ASWell scores against GDP/capita, this study hence provides strong evidence suggesting that GDP (per capita) is indeed an entirely insufficient indicator of a country's well-being and especially fails to factor into the potential for long-term sustainable well-being that lasts across generations without harming the environment. Even though regional findings might still show some converging trends between GDP and well-being, with the Easterlin paradox already being global, policymakers should be discouraged from solely looking at economic growth when making suggestions for development, progress and enhancement of well-being.

Limitations

The objective of creating a new index that is accessible and replicable naturally comes along with some limitations. The largest one is the mentioned exclusive reliance on secondary open-access data sources which strongly limits the options of data and variables for the construction of the ASWell index. Many variables, motivated by theoretical reasoning on their importance to well-being, could not be included due to a lack of publicly available data for a sufficient amount of countries covering the period of 2000 to 2022. Especially the exclusion of the Global Peace Index due to data only being available from 2008 onwards might significantly weaken the results. After all, conditions of conflict and general peacefulness of a country can strongly influence well-being but also general living conditions (Pedersen, 2002) reflected by variables in the ASWell like 'Water', 'OOP', 'CPI', 'education', 'partidem' and 'unemployment'. In the future, or when looking at more recent time frames up from 2008, it should therefore be considered to include the GPI or a similar variable. It has also been detected in a closer examination of the methodology behind the CPI index (Transparency International, 2022) that it is calculated based on perceptions of business people and experts of corruption, which

represents a very limited and elite part of society and might not reflect the general population's perception of corruption. Another shortcoming related to data availability is missing data throughout the original dataset of the ten variables.

It has also been observed that the variable of Temp_change strongly impacts ASWell scores, particularly for countries in Europe and Central Asia scoring high on the ASWell. This is due to missing data on environmental factors influencing well-being and the weighting scheme of the index. By defining increasing values in Temp_change to factor in negatively in the ASWell, the simple directional weighting is not sensitive to annual temperature change being a highly fluctuating variable that does not follow straightforward positive or negative trends. Hence, a sudden change from 0.04 to 2.68 degrees (67-fold increase) in annual temperature change can strongly influence the ASWell score and cause a sudden dip in the ASWell from one year to the next. With more data becoming available for environmental variables in the future, the Temp_change variable should be exchanged or its weighting method adjusted to account for ASWell's sensitivity to fluctuations in Temp_change. Similarly, though higher scores in the 'education' variable improve the ASWell index score, 'education' scores above 100 do not need to reflect a better school system. As 'education' reflects secondary school enrollment in percentages relative to the number of students in the age group expected for secondary school enrollment, a percentage higher than 100 reflects that more students are enrolled in secondary school education than the age population suggests, which could be due to late school enrollment, repetition or overage students.

Lastly, the author, coming from a country located in the global north with high ASWell scores and GDP, acknowledges that perceptions of well-being might differ strongly between cultural and socio-economic contexts, and the variables chosen for the ASWell might not have been chosen by a researcher from a different cultural background. Furthermore, the author, coming from such a privileged background, acknowledges that debates on the disconnect

between GDP and well-being may be less important for countries that have been underdeveloped.

Future outlook

Despite these limitations and potential for improvement, the initial worldwide analysis of the ASWell against GDP/capita, albeit only descriptive, has led to insightful findings that support the Easterlin paradox and feed in the emerging beyond growth movement calling to find new measures to well-being apart from GDP and redefine progress and development. The ASWell presents a sound toolbox to be reused, amended and expanded upon. It is the first well-being index that has been created in a perfectly replicable manner and is therefore accessible to a wide public that can adjust and interpret the ASWell to their specific social and cultural contexts. As this study has only examined the five top and bottom-scoring countries for the ASWell and GDP/capita so far, there is much potential for future research to investigate the index results further. The researcher, too, aims to further develop the index following up on new developments in the field of well-being and post-growth research and progress in public data available for variables influencing well-being. Just as the initial ASWell index will be made and remain available, including the R codebook for easy replication, any changes to the ASWell will be made transparent and accessible. Through this, the ASWell will keep on serving its main purpose of being a holistic, sustainable well-being index that is accessible and replicable for anyone with a computer, internet access and some basic understanding of statistics. Moreover, the ASWell index and this research shall inspire other research institutions and policymakers to improve the accessibility of already existing alternatives to GDP, move beyond the growth paradigm, and investigate and measure well-being as holistically and sustainable as possible to not only target improved well-being for current generations but to also consider how present conditions might impact the well-being of future generations and the planet as a whole.

CONCLUSION

In this paper, a new index, the accessible, sustainable well-being index (ASWell), has been introduced and descriptively compared to GDP/capita. The results of this comparison and general findings of the ASWell conform with findings of previous research on already existing alternatives to GDP that suggest that GDP can only proxy well-being until a certain threshold and is generally unsuitable as a measure of well-being. Showing how specifically country-level trends of GDP/capita and the ASWell diverge strongly over the timeframe from 2000 to 2022 next to showing the beginning of a slight negative trend in well-being in 2017 on a global scale, this research ties into ongoing debates on the Kuznet's curve, the theory of uneven development and the Easterlin paradox. Unlike existing indexes alternative to GDP, the ASWell has been constructed relying solely on secondary open-access data to allow for easy accessibility and replicability of the results. Simultaneously the ASWell transcends GDP and captures well-being as holistically as possible by including a balanced amount of variables that factor in sustainability in terms of social, ecological and intergenerational justice and equity. Essentially, the ASWell can be read as reflecting how the entire world's well-being would look if it were to mirror the conditions making up a certain ASWell score of a country at a certain point in time. In that regard, low levels of socioeconomic inequalities and care for the environment are just as important as decent living conditions when desiring worldwide thriving in the long run.

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APPENDIX

Appendix A: Tables and Figures

Figure 1

Main determinants of Health according to Dahlgreen & Whitehead (1991)

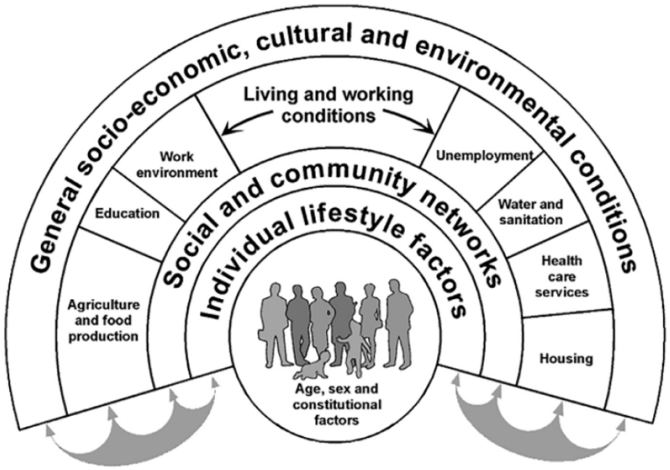

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Figure 2

Conceptual model on the Social Determinants of Health (SDH)

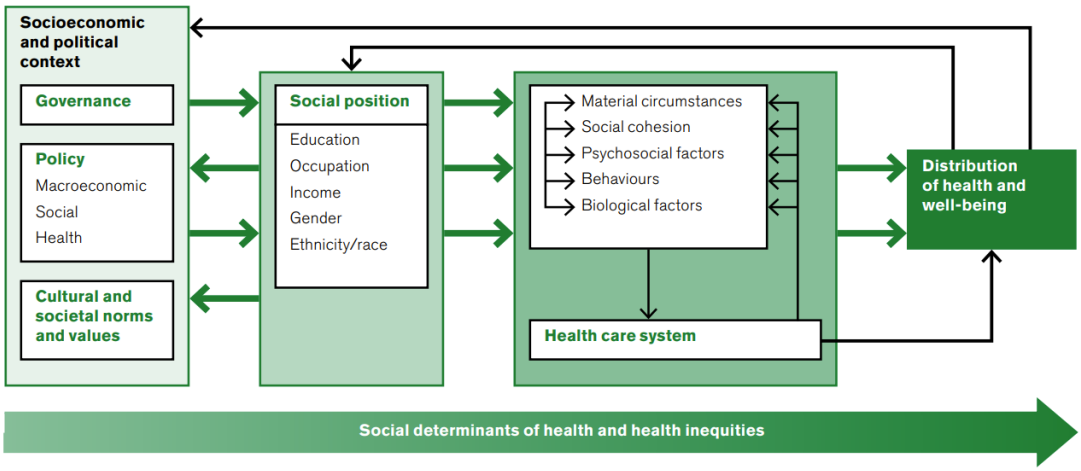

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Figure 3

The extent to which current and future generations will experience a hotter and different world depends on choices now and in the near-term.

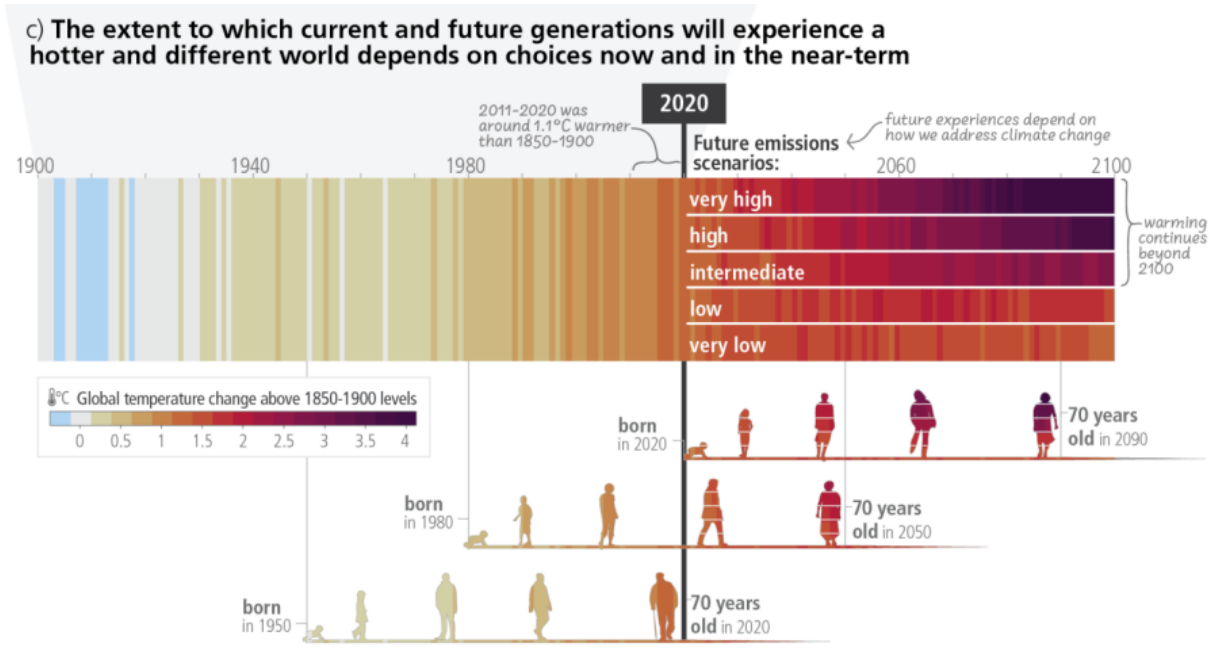

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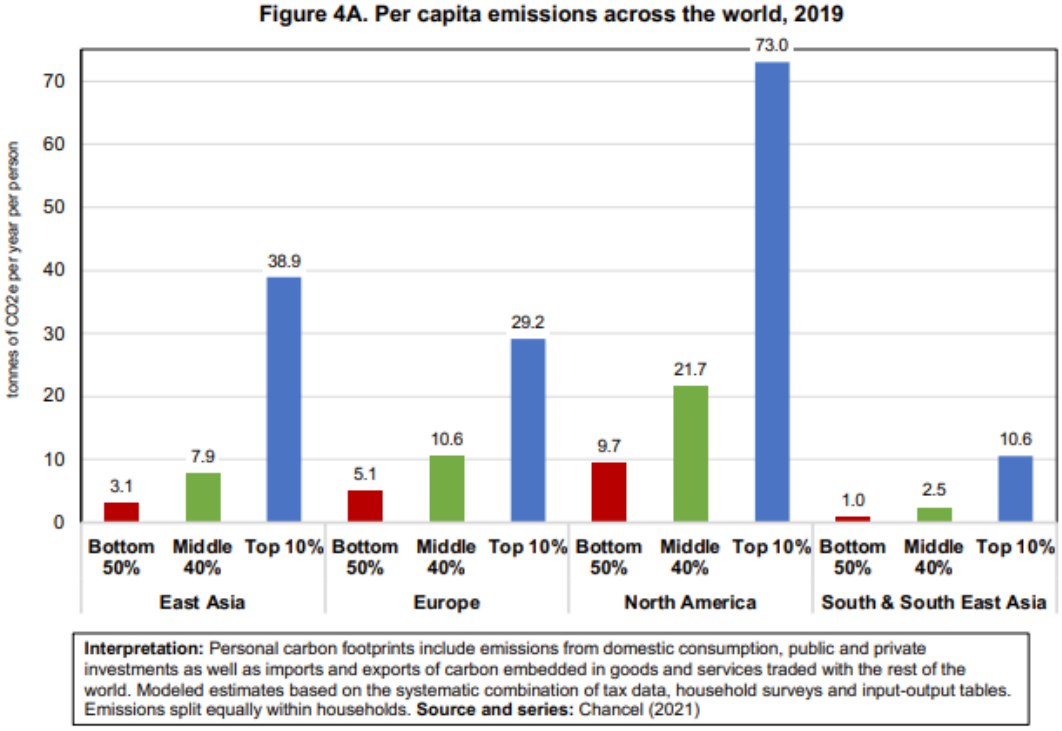
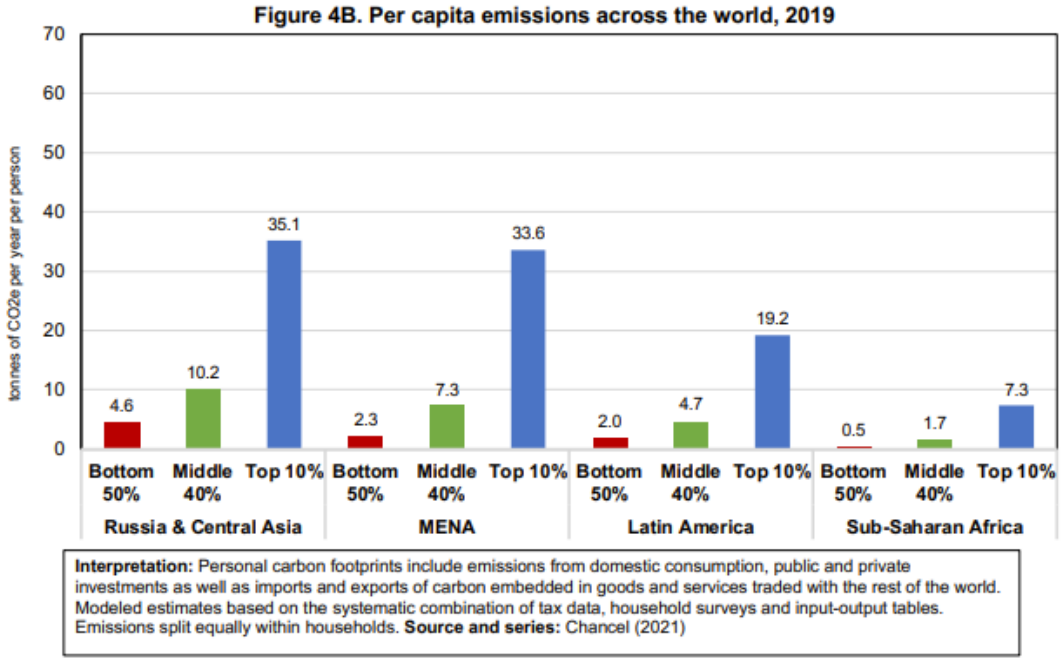
Figure 4

Graphs visualising carbon emissions per capita by income percentiles across the world in 2019





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https://wid.world/document/climate-change-the-global-inequality-of-carbon-emissions-19

Figure 5

Histogram showing the distribution of ASWell scores for all countries and years of the sample population

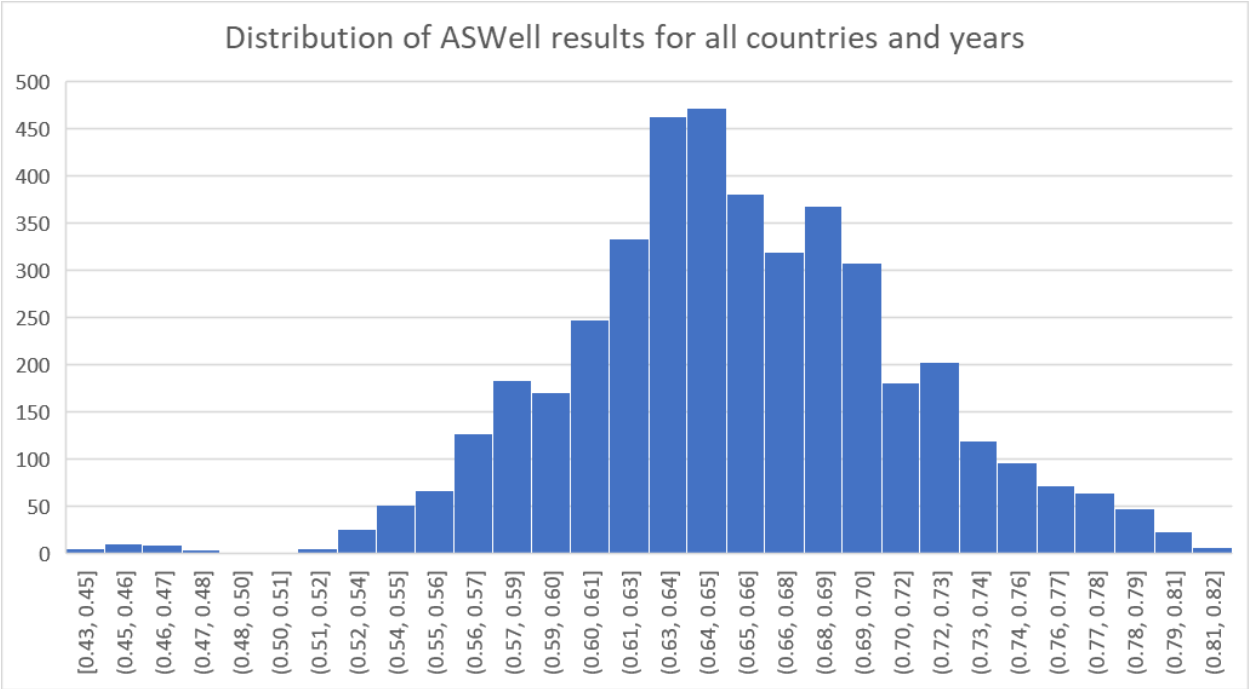


Figure 6

Histogram showing the distribution of average ASWell scores for all countries of the sample population acros the time frame from 2000 to 2022

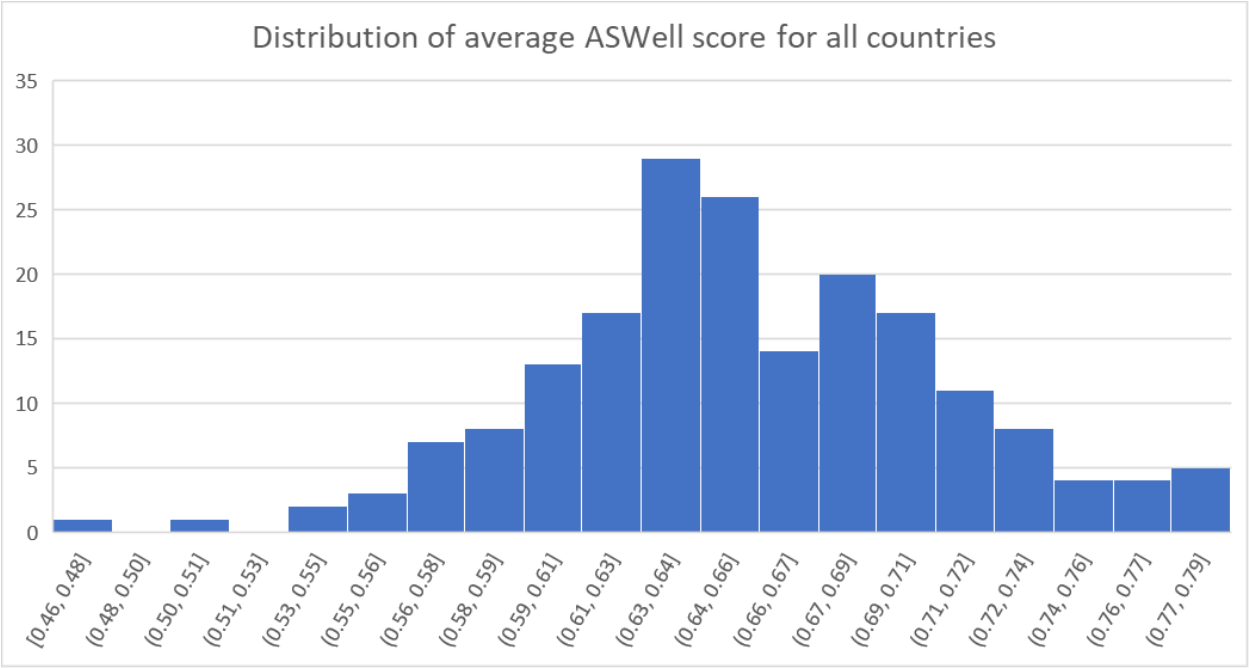


Figure 7

Line graph showing Qatar plotted for the ASWell and GDP/capita across time (2000-2022) with polynomial trendlines added for each indicator.

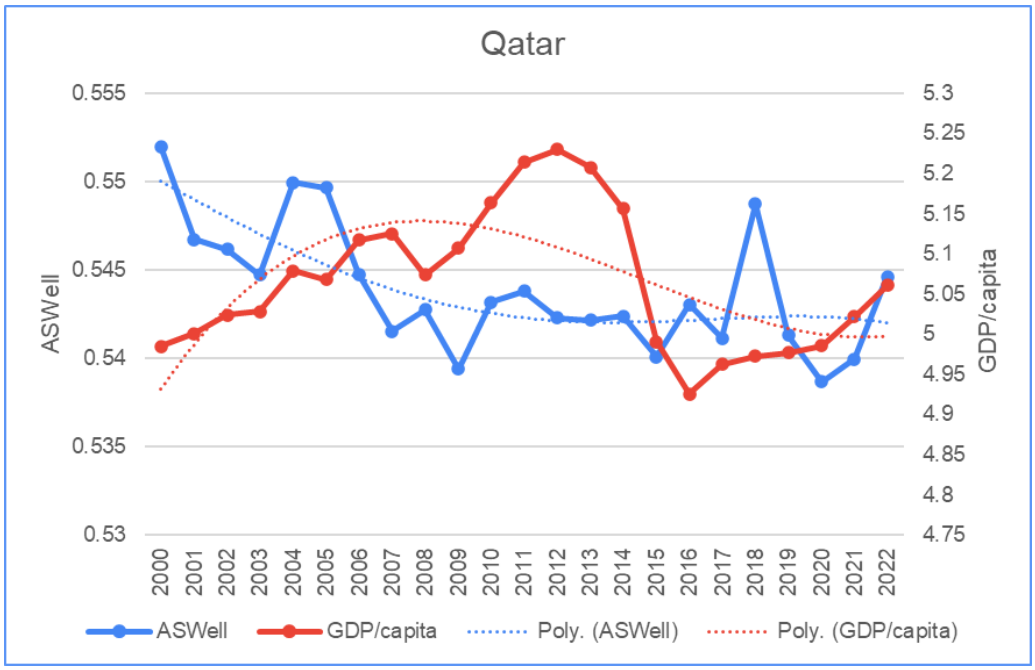


Figure 8

Line graph showing Kuwait plotted for the ASWell and GDP/capita across time (2000-2022) with polynomial trendlines added for each indicator.

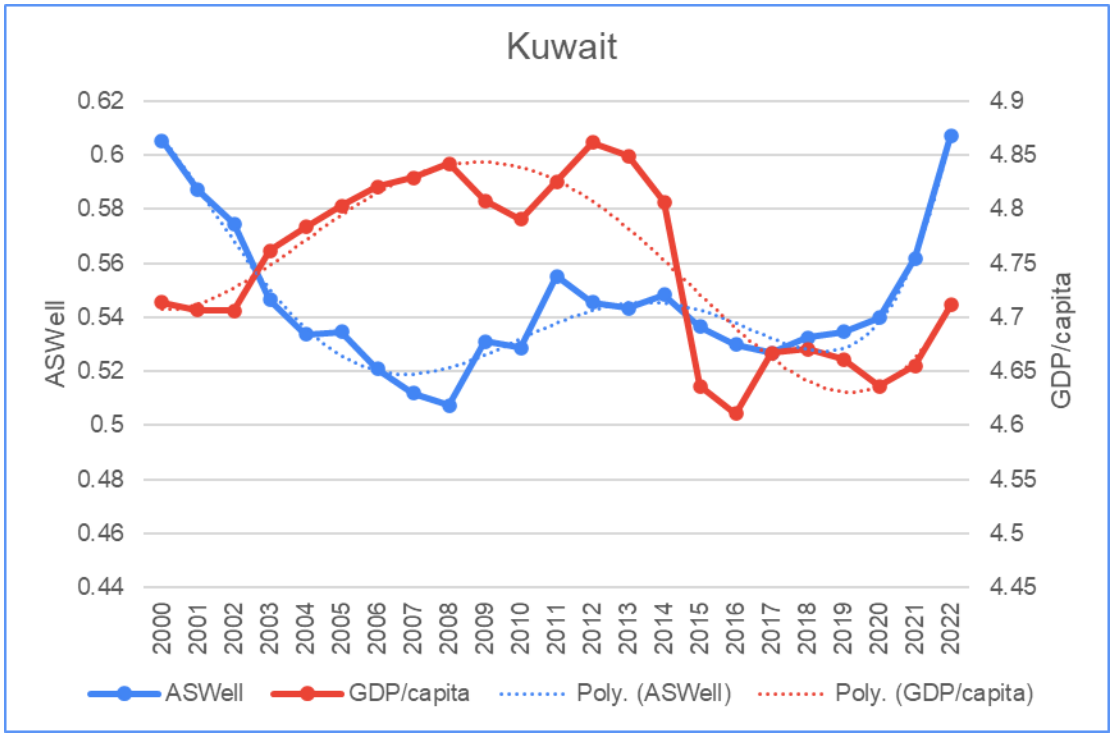


Figure 9

Map of Europe and parts of Central Asia indicating average ASWell Index scores for these countries from 2000 to 2022.

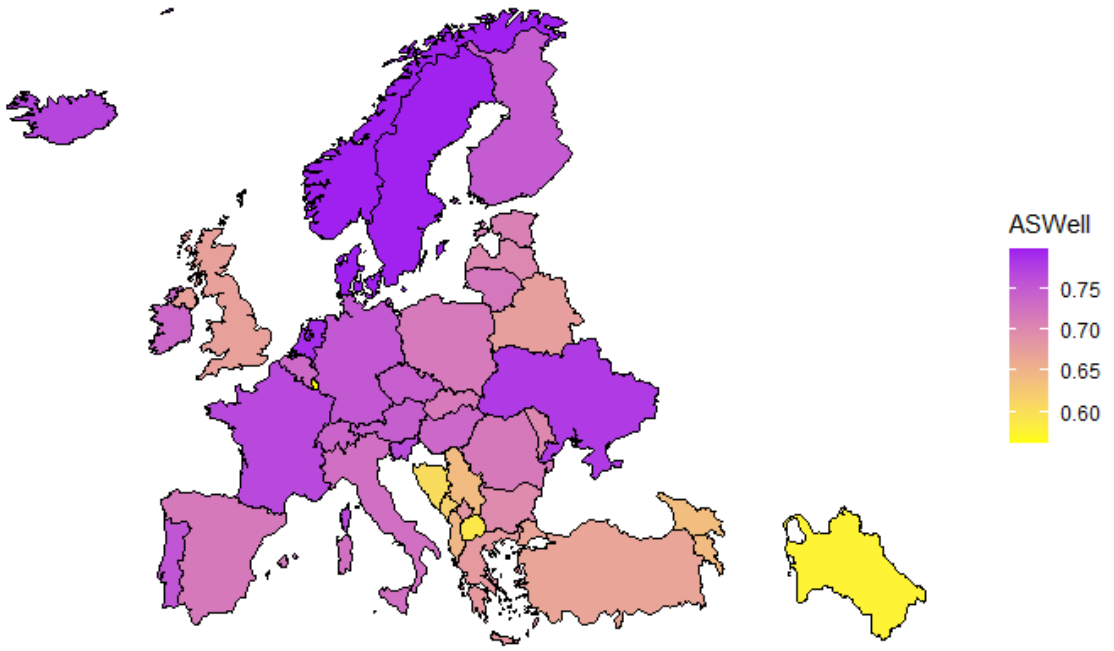
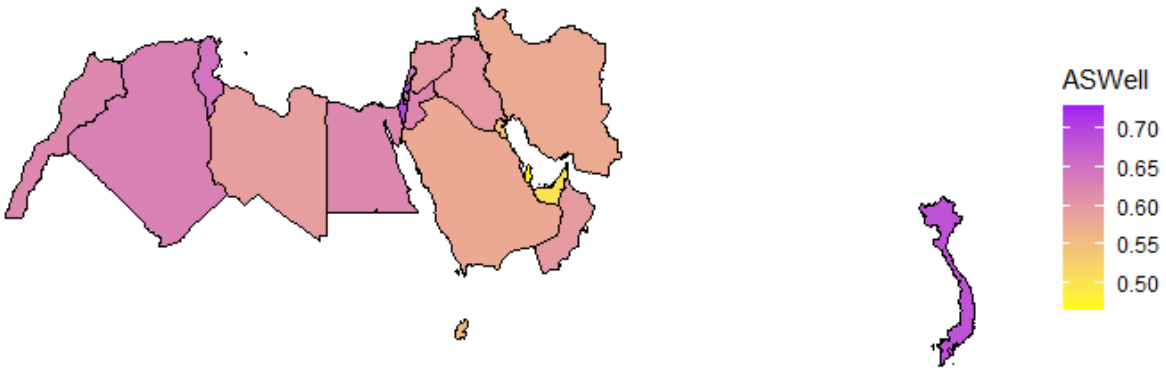


Figure 10

Map of Middle East and North Africa indicating average ASWell Index scores for these countries from 2000 to 2022.



Appendix B: List of deleted countries from the initial dataset

- American Samoa
- Andorra
- Antigua
- Aruba
- Bermuda
- British Virgin Islands
- Cayman Islands
- Channel Islands
- Faroe Islands
- French Polynesia
- Gibraltar
- Greenland
- Guadeloupe
- Guam
- Isle of Man
- Liechtenstein
- the Marshall Islands
- Micronesia
- Monaco
- Nauru
- New Caledonia
- Niue
- Palau
- San Marino
- St. Helena
- Turks and Caicos
- Tuvalu
- United States Virgin Islands
- Wallis and Futuna

Appendix C

Please consult this folder to access Appendix C which contains the following:

- Appendix C1: graphs created to describe the results of the PCA
- Appendix C2: technical notes, such as links to all secondary-data variables used, and an overview of variable, data frame and document names and meanings
- Appendix C3: datasets used and created, R code used to create the index