Human Rights Measurement Initiative

Methodology Handbook: Economic and Social Rights Scores

June 2021

Document information

Key author contact details

Susan Randolph

University of Connecticut

susan.m.randolph@gmail.com

Thalia Kehoe Rowden

Human Rights Measurement Initiative

Thalia.KehoeRowden@motu.org.nz

Disclaimer

The findings and opinions expressed in this document are those of the authors.

Version: 2021.6.25

Contents

Table of Figures

Introduction

Human rights are those rights you have simply because you are human. Such rights are "inherent in our nature" and "allow us to fully develop and use our human qualities, our intelligence, our talents and our conscience and to satisfy our spiritual and other needs" (United Nations 1987, 4).

The Human Rights Measurement Initiative (HRMI) was formed to produce a comprehensive suite of scores that cover the rights embodied in international law, particularly the collection of international treaties known as the International Bill of Human Rights. These are internationally recognised human rights acknowledged by all United Nations member states.

Why? Because we believe that for human rights to improve, they need to be measured. High-quality data will create an opportunity for tremendous advances in our knowledge and understanding about how to encourage much greater respect for human rights around the world. We encourage you to contribute to building that knowledge.

The initial 13 rights we are measuring can be grouped into two broad categories: eight civil and political rights, and five economic and social rights. Each category has its own methodology, and this document details the methodology behind the economic and social rights measurement.

We also encourage you to use our data portal, which you can access from our website humanrightsmeasurement.org or from rightstracker.org. With the release of this interactive data tool, you can explore not only our civil and political rights scores for 39 countries, but also our economic and social rights scores for 194 countries. For each country you will be able to see its relative strengths and weaknesses, and you will also be able to explore performance on a particular right within different regions of the world. For the 39 countries we have survey data for, you will also see information on which population sub-groups are considered to be particularly at risk of abuses for each of the economic and social rights.

1 HRMI Economic and Social Rights Scores Methodology – Executive Summary

This is a brief explanation of how we constructed the Human Rights Measurement Initiative (HRMI)'s economic and social rights scores – shown in blue on the bar charts.

These scores are adopted and adapted from the Social and Economic Rights Fulfilment Index (SERF Index) developed by Susan Randolph, Sakiko Fukuda-Parr, and Terra Lawson-Remer.[1] The SERF Index gauges the extent to which countries meet their substantive economic and social right obligations of result. Specifically, HRMI's *income adjusted* "Quality of Life" score and underlying *income adjusted* economic and social right scores are the SERF Index and its underlying Right Indices. These *income-adjusted* scores set a benchmark consistent with each country's immediate obligation of results under the International Covenant for Economic, Social and Cultural Rights (ICESCR). HRMI's *global best* "Quality of Life" and its component *global best* economic and social right scores follow a similar methodology, but set a benchmark reflecting countries' common full obligation of results under the ICESCR. For more in-depth information on how they are constructed, please see Section 2.

1.1   What are economic and social rights?

The International Covenant on Economic, Social, and Cultural Rights (ICESCR) is a treaty adopted by the United Nations in 1966 and agreed to by 171 nations (as of June 2021) that sets out a list of economic, social, and cultural rights that we are all entitled to simply by virtue of being human. These include the rights to food, health, education, housing, work, and social security. HRMI's scores cover five out of six of these rights, with social security being the one that we have insufficient data on to measure independently. As relevant data covering more countries become available, we would like to incorporate cultural rights as well.

1.2   How does HRMI measure economic and social rights?

HRMI uses two benchmarks against which to assess country performance on each of the five economic and social rights as well as the summary Quality of Life score. These are the *income adjusted* benchmark and the *global best* benchmark. HRMI's scores using the *income*

---

[1] Randolph, Stewart, Fukuda-Parr, and Lawson-Remer, SERF Index Methodology 2021 Update Technical Note, Economic and Social Rights Empowerment Initiative, 2021, www.serfindex.org/overview/.

adjusted benchmark are measures of the extent to which countries are using their resources as effectively as possible to progressively fulfil their inhabitants' substantive economic and social rights. In other words, we look at the extent to which the people in a country enjoy the substantive rights they are entitled to, taking into account how rich or poor the country is and therefore how well it ought to be able to ensure that food, housing etc. are accessible for its people. HRMI's scores using the *global best* benchmark are measures of the extent to which countries are fulfilling their inhabitants' substantive economic and social rights relative to the best performing countries at any resource level. Thus, the two benchmarks assess countries' performance relative to their current and full obligations, respectively.

1.3   How is this different from the way HRMI measures civil and political rights?

HRMI measures these two groups of rights quite differently as is consistent with state obligations under international law. Under international law, the state must immediately and completely respect, protect, and fulfil all rights listed in the International Covenant for Civil and Political Rights, while the substantive rights listed in the International Covenant on Economic, Social, and Cultural Rights are to be *progressively realised using the maximum of available resources at all times*. Thus, HRMI's *income adjusted* economic and social rights scores measure economic and social rights relative to the extent to which each country ought to be able to fulfil those rights for its people, given its current resources. Because countries are obligated to progressively ensure the full realisation of the substantive rights enumerated in the ICESCR, we also track the extent to which countries have achieved full realisation of the substantive economic and social rights concerned. Because progressive realisation does not apply to civil and political rights, our civil and political rights scores are not adjusted to account for the resources available to a country.

A second important difference is that HRMI's economic and social rights scores are calculated from objective, internationally comparable, publicly accessible statistical data published by national and international bodies. Our civil and political rights scores, on the other hand, are calculated using surveys of human rights experts in each country. This is because objective statistical data that meets our standards, are not available for most civil and political rights. For more details on how we measure civil and political rights please see our forthcoming Civil and Political Rights section of the 2021 HRMI Methodology handbook.

The methodology used to identify those population subgroups more likely to have their rights violated are the same for civil and political rights as well as economic and social rights.

1.4   How does HRMI's economic and social rights methodology work?

Under international law, as noted above, countries are obligated to use "the maximum of [their] available resources" to progressively achieve "the full realization of the rights" specified in the Covenant (International Covenant of Economic, Social, and Cultural Rights, Article 2.1). This means that at any given time each country has a different level of obligation and a given country's obligation increases over time as its resource capacity expands. The methodology used to construct our *income adjusted* scores aims to assess the level of rights enjoyment achieved relative to the country's current level of obligation; that is, what the country could feasibly achieve in terms of fulfilling its people's rights given the level of resources it has. We do this by mapping an evidence-based achievement possibilities frontier to benchmark each country's obligation at any given time. The estimated achievement possibilities frontiers plateau at the resource level where it first becomes possible to ensure the highest level of rights enjoyment observed at any income level. This plateau value is the benchmark used to construct our *global best* scores.

This methodology is unique in:
- considering the perspective of both the rights-holder (i.e. the individual people) and the duty-bearer (i.e. the government) both currently and eventually;
- making possible objective assessment of whether the overall situation in a country is improving or deteriorating both vis-a-vis the country's immediate and eventual obligations;
- allowing cross-country comparisons of countries' fulfilment of their current and eventual economic and social rights obligations; and
- providing a methodology to examine disparity in rights fulfilment between regions, or between racial and ethnic or other population sub-groups within a given country.

1.5   What do HRMI's economic and social rights scores show, exactly?

HRMI's economic and social rights scores show the **percentage of the benchmark achievement obtained**. In the case of the *income adjusted* benchmark, this is the percentage of the currently feasible achievement obtainable, **given the country's per capita income level**. A low score means a country is not fulfilling the rights concerned nearly to the extent that should be possible at its per-capita income level. A score of 100% relative to the *income*

adjusted benchmark <u>does not mean</u> everyone in the country enjoys the right; it means the country is doing as well at ensuring that right as the best performing countries have at that per-capita income level. Thus, in the case of a very poor country, the economic and social rights scores can be quite high, even though a lot of people in that country do not have proper access to food, housing, education, etc. In contrast, in the case of the *global best* scores, HRMI's economic and social rights scores show the country's percentage achievement relative to the highest enjoyment level observed in any country at any per capita income level. A score of 100% relative to the *global best* benchmark means the country is doing as well at ensuring the right or right aspect as the best performing country has at any per-capita income level. In the case of a very poor country, its *global best* scores will be substantially lower than its *income adjusted* scores. In contrast, for wealthy countries there will be little, if any, difference between their *income adjusted* and *global best* scores.

1.6   What are HRMI's two different assessment standards?

HRMI's economic and social rights scores use two separate assessment standards: our "low-and middle-income" assessment standard and our "high-income" assessment standard. The low-and middle-income assessment standard holds countries to a basic standard that reflects the challenges that low-and middle-income countries face. The high-income standard holds countries to a higher standard more reflective of the economic and social rights challenges that high-income countries face.

We have these two different assessment standards because richer countries, having more resources, are typically further advanced in making sure that their people are well-fed, housed, educated, etc. So, we need to use indicators that can capture the different challenges these countries face. For example, richer countries have often already achieved high primary education participation and their focus is on raising the *quality* of education. Although education quality is also critically important for less developed countries, the indicator for education quality is not available for most low-and middle-income countries. Scores using both standards are calculated for all countries where the data are available, enabling researchers to evaluate countries with the available data on either standard.

1.7   How are HRMI's economic and social rights scores constructed?

We construct HRMI's economic and social rights scores by following the steps below:
- Step 1: Identify indicators that broadly summarise the extent to which people enjoy each economic and social right, and which are available on an internationally comparable basis for a large number of countries in the world.

- Step 2: Specify how much a country ought to be able to fulfil its people's rights given the country's per capita income in the case of the *income adjusted scores*, once resource constraints are no longer binding in the case of the *global best* scores; and compute indicator performance scores for each indicator reflecting the extent to which a country meets its obligations.
- Step 3: Combine indicator performance scores (using the benchmark concerned) into aggregate scores for each of the five economic and social rights, and average the result to obtain the Quality of Life score.

1.8   How does HRMI choose which indicators to use?

We use a number of criteria when selecting which data will be the best indicators of economic and social rights fulfilment, including:

- how well the indicator reflects enjoyment of the right (concept validity);
- reliability of the data;
- objectivity of measurement methods;
- comparability across countries and over time;
- public accessibility;
- data availability vis-a-vis country coverage and frequency of collection; and
- the extent of variation among countries.

Indicator sets are selected to:

- reflect the challenges most relevant to fulfilling a given right, rather than to encompass all aspects of a given right;
- prefer those specifying the percentage of the population enjoying the right over those indicating the average level of enjoyment of the right across the population. This is because high levels of enjoyment on the part of some people can hide the denial of the right to many;
- prefer indicators of flow variables to indicators of stock variables, since they give us a more up-to-date picture of the human rights situation; and
- prefer bellwether indicators sensitive to a variety of factors relating to rights fulfilment.

We attempt to keep the number of indicators of a given right to three, because our goal is to provide a summary measure of performance that is comparable across countries and can show trends over time. Our selection of indicators is practically constrained by:

- availability. The surveys providing many of the indicators on enjoyment of rights are not conducted annually, so the data used for each year are not always

unique. For example, in the case of the Right to Education score for Cameroon, the 2017, and 2018 series use data on the net primary school enrolment rate in 2017. Additionally, data on some right aspects we would like to include are only available for a handful of countries.

- relevance: Ensuring all students complete primary school is not an issue for OECD countries, so although this is an indicator we use in our low-and middle-income assessment standard, it is not an indicator used in our high-income assessment standard.

- **Table 1: Rights enjoyment indicator sets used in HRMI economic and social rights scores**

Economic and social right	Indicator
• Assessment standard	
Food	
• Low-and middle-income	% children (under 5) not stunted
• High-income	% population food secure (based on the food insecurity experience scale, FIES)
Education	
• Low-and middle-income	Net primary school enrolment rate
• Both	Net secondary school enrolment rate
• High-income	% students scoring level 3 or better on the PISA test (by topic – Mathematics, Science & Reading)
Health	
• Low-and middle-income	Modern Contraceptive use rate
• Both	Child (under 5) survival rate
• Both	Adult (15-60) survival rate
• High-income	% live births not low birth weight
Housing/Water/Sanitation	
• Low-and middle-income	% population with "basic" access to water on premises
• Low-and middle-income	% population with access to at least "basic" sanitation
• High-income	% population with "safely managed" sanitation
• High-income	% poorest quintile of population with access to affordable housing (post subsidy housing costs less than 40% of disposable income.)
Decent Work/Social Security	
• Low-and middle-income	% with income >$3.20 (2011 PPP$**) per day
• High-income	% with income > 50% median income
• High-income	% unemployed not long-term unemployed

*PISA is the Program for International Student Assessment that implements the surveys of student learning outcomes that we use.
**PPP$ means purchasing power parity dollars. This means that currency conversions between countries have been made using conversion factors that equate to the actual purchasing power of the currencies rather than using official exchange rates. The prices used are those prevailing in 2011.

1.9   What is HRMI's achievement possibilities frontier?

This is a tool HRMI uses to assess what is feasible for countries to achieve in terms of their ability to deliver on economic and social rights for their people. This is done by seeing what

has been achieved by other countries over history and at different levels of available resources.

The achievement possibilities frontier (APF) for a given indicator is constructed by plotting the observed value of the indicator against per capita GDP (2017 PPP$) for all countries over roughly a twenty-year period. The frontier is defined as the outer envelope of the scatter plot, and the equation specifying the frontier is estimated by fitting a curve to the observations that define the outer boundary of the scatter plot. See Section 2 for detailed interpretation.

Figure 1: Achievement Possibilities Frontier for "Percentage of Children Not Stunted"
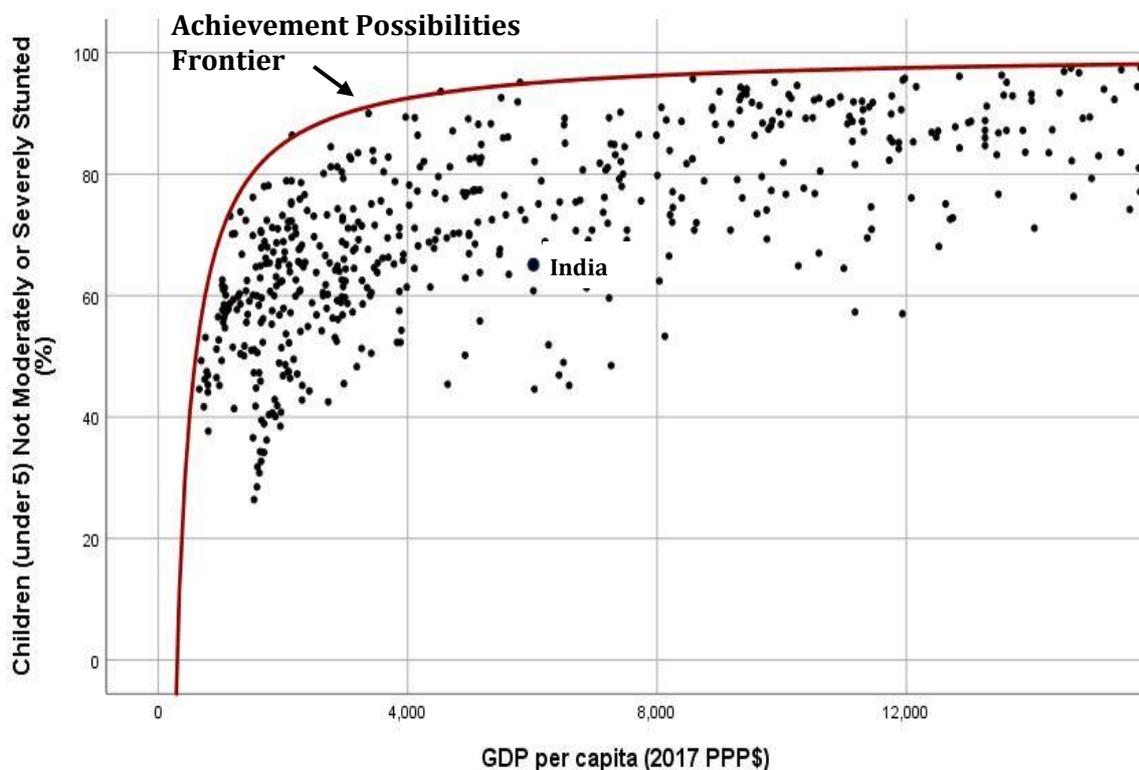
The approach to assessing a country's performance using the *income adjusted* benchmark is to compare the country's actual performance to the feasible performance as benchmarked by the achievement possibilities frontier. For example, India's child stunting rate in 2017 (the most recent observation available) was 34.7%, implying the percentage of children not stunted was 65.3% and is shown in the above plot as the largest dot with India's name next to it. India's per capita income level in 2017 was $6186 (2017 PPP$). At the per-capita GDP of $6,186 (2017 PPP$), it should be possible to ensure that 95.2% of Indian children under 5 are not stunted as shown by the height of the red frontier line directly above India's observation. Our first cut at assessing India's performance on the right to food using the *income-adjusted* benchmark takes the ratio of the observed percentage of children that

are not stunted (65.3%) to the benchmark percentage of children not stunted (95.2%), and then multiplies by 100 to yield the percentage of the feasible level achieved.

After that, some final steps in our calculations are still needed. Since the plausible range of indicators varies, we also need to standardise scores by taking into account how close the lowest observed value is to zero. In the case of our right to food indicator, the lowest value observed is 26% (the percentage of children not stunted in Bangladesh in 2000). We therefore standardise the scores by computing the percentage of the feasible level achieved with reference to the minimum observed score. So, looking again at India, its achievement relative to this minimum observed score is 65.3% - 26% = 39.3% of children not stunted. Relative to the minimum, it is feasible for India to achieve 95.2% - 26% = 69.2% of children not stunted. Thus, India's income adjusted score on the Right to Food is calculated as (39.3%/69.2%) x 100 = 56.8%.

The *global best* benchmark sets the benchmark for all countries at the maximum height of the estimated APF or at the income level at which all people enjoy the right. Since 2.3 percent of children that are growing normally are expected to be more than two standard deviations below the mean height for their age, the *global best* benchmark is set at 97.7% of children are not stunted.   India's *global best* right to food score is calculated as before, only substituting the *global best* benchmark for the *income adjusted* benchmark. So now we have (65.3% - 26%)/ (97.7% - 26%) = 54.8%. So long as resources are binding, country scores using the *global best* benchmark will be lower than those using the *income adjusted* benchmark.

In the case of some richer countries, HRMI's economic and social rights scores also take into account the fact that some countries have many times the resources needed to ensure that all people enjoy a given right, yet still fail to make sure that everyone enjoys the rights to which they are entitled. For example, Oman and Mexico have nearly an identical percentage of children that are not stunted (90% for Mexico and 88.6% for Oman), yet Oman's per-capita income is nearly 1.5 times higher than Mexico's. For countries like Oman with per-capita income levels multiple times what is needed to reach the frontier, but who still fail to do so, we impose a penalty on their *income adjusted* and *global best* scores.

2 HRMI Economic and Social Rights Scores 2020 Technical Note[2]

Susan Randolph, John Stewart, Sakiko Fukuda-Parr, and Terra Lawson-Remer

This technical note provides a detailed explanation of the methodology used to construct the Human Rights Measurement Initiative's (HRMI's) 2021 economic and social rights scores. HRMI's economic and social right scores are adopted from the International Social and Economic Rights Fulfilment Index (SERF Index) and were developed by Susan Randolph, Sakiko Fukuda-Parr, and Terra Lawson-Remer. As with most measurement initiatives, the SERF Index methodology has evolved to take account of emerging conceptual and data issues. The International SERF Index has been refined six times since it was initially published in 2009. HRMI's 2021 economic and social rights scores are the underlying Right Indices that comprise the 2021 Update of the International SERF Index scores and cover the years 2007 to 2018.

The book, *Fulfilling Social and Economic Rights* by Sakiko Fukuda-Parr, Terra Lawson-Remer and Susan Randolph (Oxford: Oxford University Press, 2015) provides a detailed account of the basic SERF Index methodology and insights gained from its application that is accessible to practitioners.[3] (https://global.oup.com/academic/product/fulfilling-social-and-economic-rights-9780199735518?cc=us&lang=en&#) The conceptual and methodological underpinnings of the SERF Index are also fully elaborated in two peer reviewed publications:

- Fukuda-Parr, Sakiko, Terra Lawson-Remer and Susan Randolph (2009) 'An Index of Economic and Social Rights Fulfillment: Concept and Methodology.' *Journal of Human Rights*. 8: 195-221.
  https://www.tandfonline.com/doi/abs/10.1080/14754830903110194

- Randolph, Susan, Sakiko Fukuda-Parr, Terra Lawson-Remer (2010) 'Economic and Social Rights Fulfillment Index: Country Scores and Rankings.' *Journal of Human Rights*, 9.3, 230-261. https://www.tandfonline.com/doi/abs/10.1080/14754835.2010.501257

---

[3] *Fulfilling Social and Economic Rights* was the winner of the 2019 Grawemeyer Award for Ideas Improving World Order.

2.1 Overview

HRMI's economic and social rights (ESR) scores measure the performance of countries on the fulfilment of key economic and social rights obligations. HRMI's scores use objective, internationally comparable, publicly accessible statistical data published by national and international bodies. HRMI's ESR scores provide summary indicators of performance for human rights that are grounded in international law. The International Covenant for Economic, Social, and Cultural Rights (ICESCR) articulates a list of essential substantive economic and social rights that the 171 nations (as of June 2021), representing a wide range of cultural traditions who have ratified it and concur that they are essential. These are the rights to food, health, education, housing, work, and social security. HRMI's ESR scores cover five out of six of these rights. We do not yet have sufficient internationally comparable data to independently include social security. However, the indicators used to measure the right to work also capture key elements of the right to social security; available data just do not enable a full separation between the right to work and the right to social security.

A fundamental principal of international law is that countries have a duty to progressively realise economic and social rights to the maximum of their available resources. Statistics like school enrolment and infant mortality tell us only the extent to which individuals enjoy economic and social rights, but not whether a state is complying with its obligations to use the maximum of its available resources to progressively respect, protect, and fulfil human rights. Measuring economic and social rights fulfilment requires considering the perspectives of both the rights-holding individual and the duty-bearing government. While many widely available socio-economic indicators and other metrics, such as the Human Development Index (HDI) assess the level of rights enjoyment, they ignore the obligation level of the duty bearing state. HRMI's ESR methodology estimates obligations for progressive realisation by using an innovative approach that maps an evidence based 'achievement possibilities frontier' (APF) to benchmark each country's obligation at any given time. This methodology is the only ESR methodology that:

- considers the perspective of both the rights-holder and the duty-bearer measuring state compliance with obligations of progressive realisation;
- makes possible objective assessment of whether the overall situation in a country is improving or deteriorating;
- allows cross-country comparisons of rights fulfilment; and
- provides a methodology to examine disparity in rights fulfilment between regions, or between racial and ethnic or other population sub-groups.

The HRMI *income-adjusted* scores measure a country's achievement relative to what it is feasible to achieve at the country's per capita income level. That is, they look at the enjoyment level of a right in a country and compare it to the best observed achievement in countries with approximately the same per capita income. This best-practice achievement level is the *income-adjusted* benchmark level of rights enjoyment. More specifically, the HRMI *income-adjusted* scores show the percentage of the feasible achievement obtained at the country's per capita income level. A low score means a country is not fulfilling the right concerned to the extent possible at its per capita income level; it is failing to effectively use the maximum of its available resources to achieve the right. An *income-adjusted* score of 100% on a right or right aspect **does not mean** everyone in the country enjoys the right; it means the country is doing as well at ensuring the right as the best performing countries at that per capita income level. Thus, in the case of a very poor country, the score on the right can be quite high even though the enjoyment level of the right is quite limited. A country achieving an *income-adjusted* score of 100% cannot rest on its laurels.

All countries are obligated to achieve progressively the full realisation of the rights enumerated in the ICESCR. As a result, HRMI also assesses country performance relative to what evidence shows is feasible once income is no longer a constraint, what we call the *global best* benchmark. A country with a high *income-adjusted* score may simultaneously have a low *global-best* score on the same right or right aspect indicating that although it is meeting its immediate obligation under Article 2.1 of the ICESCR to fulfil that right to the "*maximum of its available resources"*, it still has a long way to go to fully meet its obligation to realise the right. Some countries have more than enough income to reach the *global best* benchmark but fail to do so. For these countries, a penalty is imposed on the countries' scores. The penalty is larger the lower the enjoyment level of the right. The penalty is also larger the more the country's income exceeds the income necessary to fully realise the right. As a result, in the case of a country with a high per capita income, the country's score on a right or right aspect could well be lower than the raw indicator value reflecting the enjoyment level of the right or right aspect.

Data constraints, coupled with the different rights challenges in high income countries versus other countries, have led to our creation of two separate assessment standards:

- The "low-and middle-income" assessment standard holds countries to a basic level of rights fulfilment, and
- The "high-income" assessment standard holds countries to a higher standard more relevant to the right challenges facing high-income countries.

Scores using both standards are calculated for all countries with necessary data, enabling researchers to evaluate countries with the necessary data on either standard. HRMI's ESR scores are comparable across time for each country, as well as between countries. When computing a country's score on a right, the most recently available data on a given right enjoyment indicator (and the per capita income data for the corresponding year) is used. However, because the surveys providing many of the indicators on enjoyment of rights are not conducted annually, the data used for each year are not always unique. For example, in the case of the Right to Education score for Cameroon, the 2017 and 2018 series use data on the adjusted net primary school enrolment rate in 2017. If the most recently available data on an indicator is more than 10 years prior, the score for that right is recorded as "missing".[4]

The construction of HRMI's ESR scores is further elaborated below. In addition to the ESR scores described below, HRMI collects information on which population subgroups are most likely to be unable to claim the different economic and social rights for the 39 countries that were part of our Civil and Political Rights (CPR) survey. The methodology used to identify these "groups at risk" is described in the Civil and Political Rights section of the 2021 HRMI Methodology Handbook.

2.2   Sources and definitions of rights and obligations

The International Covenant of Economic, Social, and Cultural Rights (ICESCR)[5] commits governments to fully realise the economic, social, and cultural rights enumerated therein *progressively*. As stated in Article 2.1:

> "Each State Party to the present Covenant undertakes to take steps, individually and through international assistance and co-operation, especially economic and technical, to the maximum of its available resources, with a view to achieving progressively the full realization of the rights recognized in the present Covenant, by all appropriate means including particularly the adoption of legislative measures."

The '*progressive realisation*' provision recognises that states have very different starting points in their ability to achieve full enjoyment of economic and social rights, as noted by Fukuda-Parr, et al. (2015)

---

4 Downloadable excel files with information on the "most recent data year" for each indicator used in the construction of each right index for each year are available at https://humanrightsmeasurement.org/download-the-dataset/ Researchers who prefer a less generous look back period can use the files from the 2021 Update of the SERF Index (HRMI's economic and social rights metrics) to recode observations they consider too old as missing.

5 United Nations (1966). International Covenant on Economic, Social and Cultural Rights (ICESCR). Adopted 16 December 1966, General Assembly Resolution 2200 (XXI), U.N. GAOR, 21st Session, Supp. No. 16, U.N. Document A/6316 (1966), 993 U.N.T.S. 3 (*entered into force* 3 January 1976).

"Countries around the world face hugely different levels of deprivation and capacity. Inherent in the idea of progressive realization is that a government's ability to fulfil rights commitments depends on the level of resources (financial and other) available in the country."[6]

The enjoyment of the right to the highest attainable standard of health, for example, cannot be achieved overnight, as facilities need to be built, personnel trained, and policy incentives for businesses and households put in place and so on, for people to have access to healthcare. These arrangements require financial resources which may be beyond what governments and households can currently mobilise. Consequently, the performance of states with regard to progressively realising economic and social rights cannot be judged on the basis of outcomes – enjoyment of rights by people – alone. For example, the performance of the United States and Malawi cannot be compared on the basis of their respective levels of child survival rates considering the hugely different levels of capacity in these two countries.

Thus, a country's performance in fulfilling obligations for economic and social rights depends on:

- the actual economic and social rights (ESR) outcomes people enjoy, as indicated by socio-economic statistics that proxy for particular rights; and
- a society's capacity for fulfilment, as determined by the amount of economic resources available overall to the duty-bearing state.

The provision of progressive realisation has complicated and frustrated efforts to monitor countries' fulfilment of their economic and social rights obligations, since, as Human Rights measurement scholar Chapman notes:

"it necessitates the development of a multiplicity of performance standards for each right in relationship to the varied… contexts of specific countries".[7]

That is, measures of ESR outcomes must reflect variable local specificities. The monitoring procedure adopted by the Committee on Economic, Social and Cultural Rights assesses performance relative to 'benchmarks'. But this leaves the problem of setting the benchmark. In the absence of a conceptual and evidence-based model for setting benchmarks, States enjoy considerable discretion over where their benchmark is set, thus effectively leaving open an 'escape hatch' for States to avoid meeting their ESR obligations.

---

[6] Fukuda-Parr, Sakiko, Terra Lawson-Remer, and Susan Randolph, *Fulfilling Social and Economic Rights* (Oxford: Oxford University Press, 2015, p. 11).

[7] Chapman, Audrey. 'The Status of Efforts to Monitor Economic, Social, and Cultural Rights,' in *Economic Rights: Conceptual, Measurement and Policy Issues, eds.* Shareen Hertel and Lanse Minkler (Cambridge: Cambridge University Press, 2007). Chapter 7, p 150.

HRMI's ESR scores overcome this problem. The innovation of the methodology lies in the construction of Achievement Possibilities Frontiers (APFs) that use an evidence-based approach to specify each country's level of obligation *for progressive realisation* with regard to various aspects of each economic and social right. The basic construction of HRMI's Right scores involves the following steps:

- Identify indicators that broadly summarise: 1) the enjoyment level of the substantive rights articulated in international law and 2) country resource capacity.
- Specify country obligations with regard to each of the selected indicators and compute indicator scores reflecting the extent to which a country meets its obligations on each aspect of the right.
- For each substantive right, aggregate the indicator scores for the different right aspects or the right into a right score by averaging the indicator scores.
- Average the right scores to get the Quality of Life score.

For most ESRs, resource constraints do not bind throughout the income range observed globally. Once resources no longer impose a constraint, countries are obliged to fully realise the substantive rights guaranteed under the ICESCR.[8] For this reason, HRMI uses two different benchmarks against which to assess country performance; the *income-adjusted* benchmark and the *global best* benchmark. HRMI's scores using the *income adjusted* benchmark are measures of the extent to which countries are using their resources as effectively as possible to progressively fulfil their inhabitants' substantive economic and social rights. In other words, we look at the extent to which the people in a country enjoy the substantive rights they are entitled to, taking into account how rich or poor the country is and therefore how well it ought to be able to ensure that food, housing etc. are accessible for its people. HRMI's scores using the *global best* benchmark are measures of the extent to which countries are fulfilling their inhabitants' substantive economic and social rights relative to the best performing countries at any resource level. Thus, the two benchmarks assess country performance relative to their current and full obligations, respectively.

---

[8] United Nations (1966).

2.3 Measuring economic and social rights enjoyment and state resources

2.3.1 Sources and definitions of rights and obligations

HRMI ESR scores draw on international law – the Universal Declaration of Human Rights[9] (UDHR), ICESCR[10] and numerous other international human rights legal instruments[11] – to define the substantive rights of individuals and the obligations of states. The substance of these rights is detailed in General Comments of the Committee on Economic, Social, and Cultural Rights (CESCR).[12]

The General Comments identify seven substantive economic and social rights; the right to:

- adequate food,
- education,
- highest attainable standards of physical and mental health,
- adequate housing,
- water and sanitation,
- decent work, and
- social security.

Following the Office of the High Commissioner for Human Rights 2012 guidelines on using indicators to monitor human rights, we collapse these into six rights, in view of the fact that access to water and sanitation are key components of the right to housing.[13]

---

[9] United Nations (1948). *Universal Declaration of Human Rights (UDHR.,* Adopted 10 Dec. 1948, United Nations General Assembly Res. 217 A (III), (1948).

[10] United Nations (1966).

[11] These international legal instruments include the General Comments of the relevant treaty body committees, reports of Special Rapporteurs, and other documents such as reports of seminars, task forces and working groups.

[12] Committee on Economic Social and Cultural Rights.(1991)'General Comment 4:The Right to Adequate Housing',6thSession, 13 December;(1997) 'General Comment 7: The Right to Adequate Housing—Forced Evictions', 16thSession, 20 May; (1999a) 'General Comment 11:Plans of Action for Primary Education', 20thSession, Geneva, 26 April – 14 May 1999, Document E/C.12/1999/4; (1999b) 'General Comment 12: The Right to Adequate Food', 20thSession, Geneva, 26 Apr – 14 May, Doc. E/C.12/1999/5; (1999c) 'General Comment 13: The Right to Education',21stSess. 15 November – 3 December 1999, Document E/C.12/1999/10; (2000) 'General Comment 14: The Right to the Highest Attainable Standard of Health', 22nd Session, 25 April – 12 May 2000, Document E/C.12/2000/4 ; (2005) 'General Comment18:The Right to Work', 35th Session, 7-25 November 2005, Document E/C.12/GC/18, 6 February 2006;(2008) 'General Comment 19:The Right to Social Security', 39th Session, 5-23 November. Document E/C.12/GC/19, 4 February 2008; 'General Comment No. 23 (2016) on the right to just and favourable conditions of work', E/C.12/GC/23, 27 April 2016; 'General Comment No. 22 (2016) on the right to sexual and reproductive Health' E/C.12/GC/22, 2 May 2016.

[13] United Nations Office of the High Commissioner for Human Rights (2012). *Human Rights Indicators: A Guide to measurement and implementation.* HR/PUB/12/5. New York: Office of the High Commissioner for Human Rights, United Nations.

States bear the primary responsibility for the realisation of the rights of citizens and individuals residing within their borders. Their obligations are threefold: *to respect, to protect, and to fulfil* rights. These obligations also include the cross-cutting *procedural rights of non-discrimination, participation, and accountability*. General Comments 3[14] , 9[15], and 20[16] along with the *Limburg Principles[17]* and *Maastricht Guidelines[18]* elaborate the nature and extent of the obligations accepted by State parties to the Covenant.

HRMI's ESR scores measure State parties' compliance with their obligations for progressive realisation of economic and social rights, focusing on outcomes reflected in enjoyment of the substantive rights by people and in the case of HRMI's *income*-adjusted scores, adjusted for state capacity. They do not attempt to assess the extent to which States ensure the *procedural rights* of non-discrimination, participation, and accountability. HRMI's ESR scores complement other measurement tools such as those suggested by the Office of the High Commissioner for Human Rights.[19] These and other recent initiatives, such as the Right to Education Index,[20] focus on different aspects of obligations, such as process (or policy efforts made by government), structure (institutionalised provisions), and outcomes (level of rights enjoyment in the population), while assessing performance on 50 to 100 aspects of each right. However, none of these other measurement tools attempts to provide as broad a summary of performance and benchmark outcomes according to the obligation of progressive realisation as do HRMI's ESR scores.

2.3.2   Selecting the indicators of rights enjoyment and resource capacity

A number of criteria govern the selection of the indicators. Beyond making sure selected indicators appropriately reflect enjoyment of the right concerned and resource capacity, selected indicators must be:

---

[14] Committee on Economic, Social and Cultural Rights (1990) 'General Comment 3: The Nature of States Parties' Obligations', 5th Sess., December 14.

[15] Committee on Economic, Social and Cultural Rights (1998) 'General Comment 9: The Domestic Application of the Covenant' 19th Session, 16 November – 4 December, Document E/C.12/1998/24, 3 December 1998.

[16] Committee on Economic, Social and Cultural Rights (2009) 'General Comment No. 20: Non-discrimination in economic, social and cultural rights', 42nd session, May 4-22, Document E/C.12/GC/20, 2 July 2009.

[17] United Nations (1987). The Limburg Principles on the Implementation of the International Covenant on Economic, Social and Cultural Rights. Guidelines adopted at a workshop sponsored by the International Commission of Jurists, the Faculty of Law of the University of Limburg, and the Urban Morgan Institute for Human Rights, University of Cincinnati, Maastricht, Netherlands, 22-26 January 1997, Document E/CN.4/1987/17.

[18] United Nations (2000). The Maastricht Guidelines on Violations of Economic, Social and Cultural Rights. Guidelines adopted at a workshop sponsored by the International Commission of Jurists, the Urban Morgan Institute for Human Rights and the Center for Human Rights of the Faculty of Law of Maastricht University, Maastricht, Netherlands, 22-26 January 1997. Document E/C.12/2000/13.

[19] United Nations Office of the High Commissioner for Human Rights (2012). For comparison of SERF (HRMI's ESR metrics) with other proposals, see Randolph et al, *Journal of Human Rights* 2010, and Fukuda-Parr, Sakiko, 'The Metrics of Human Rights: Complementarities of Human Rights and Capabilities Approach', *Journal of Human Development and Capabilities,* Vol. 12:1 pp73-89.

[20] See https://www.rtei.org/en/.

- based on reliable data;
- measured with objective methods;
- legitimately comparable across countries and over time; and
- publicly accessible.

To satisfy these criteria, all data sets used to construct HRMI's ESR scores are international series that are maintained by international organisations. Further considerations for indicator selection include:

- data availability and country coverage;
- frequency of data collection;
- the extent of variation among countries;
- ability to reflect the challenges most relevant to fulfilling a given right;
- indicators specifying the percentage of the population enjoying the right are preferred to those indicating the average level of enjoyment of the right across the population;
- indicators of flow variables are preferred to indicators of stock variables; and
- preference is given to bellwether indicators sensitive to a variety of factors related to rights fulfilment.

In general, we have sought to keep the number of indicators reflecting different key aspects of a given right down to three.

Our selection of indicators is also practically constrained by current data availability. This, plus different rights challenges in high income OECD countries versus most other countries, led to our creation of two separate sets of scores using two different assessment standards: one standard relevant to the majority of countries, our "low-and middle-income" assessment standard, and the other most relevant to high income countries, our "high-income" assessment standard. For example, the high-income assessment standard includes a measure of the quality of schooling, performance on the Program for International Student Assessment (PISA) Mathematics, Science and Reading, among the education indicators. The quality of education is no less a concern for all other countries, it is just that there is no measure with broad coverage available at this time for low-and middle-income countries. Regarding relevance, ensuring all students complete primary school is not an issue for high-income OECD countries, so although this is an indicator we use in our low-and middle-income assessment standard, it is not included in our high-income assessment standard.

Data limitations currently preclude defining separate scores for all six rights. HRMI's ESR scores include separate scores for five rights—the rights to food, health, education,

housing, and work—with key elements of the right to social security captured by the right to work and cover the years 2007 through 2018. Available data do not enable us to fully separate the right to work from the right to social security at this time. In the case of HRMI's ESR scores for the right to food using the high-income assessment standard, data are only available for 2015, 2016, 2017 and 2018. We have found it necessary to use two different assessment standards given the differences in data availability and current rights challenges between the two groups of countries. However, rights scores using both standards are calculated for all countries (low- and middle-income as well as high-income countries) with available data, enabling researchers to evaluate countries with the available data on either standard. Table 2 below shows the indicators currently used to measure enjoyment of key aspects of each right for each of the two assessment standards.[21] The 2021 Update incorporates several changes. First, for the low- and middle-income assessment standard we use the *modern* contraceptive use rate rather than the simple contraceptive use rate to measure access to reproductive health care. This is because the simple contraceptive use rate includes traditional methods that do not entail access to reproductive health care. Second, for the high-income assessment standard, we have switched our indicator of affordable housing to one that better captures the full cost of housing. Specifically, the indicator is the percentage of the poorest quintile of the population living in households where the total housing cost ('net' of housing allowances) represents less than 40% of disposable income ('net' of housing allowances). As was the case for our last update, we provide scores disaggregated by sex in the case of all aspects of the right to education as well as the overall right to education itself, in the case of the child and adult aspects of the right to health, and in the case of the right to food for the low- and middle-income assessment standard.

Appendix Table A gives details of sources and definitions for each indicator. A detailed discussion of why particular indicators were selected is provided in *Fukuda-Parr, Lawson-Remer, and Randolph (2015).* As noted at the outset, States are required to fulfil economic and social rights *progressively,* and to commit the *maximum of available resources* to meet this obligation. HRMI ESR scores use per capita GDP as the indicator of State resource capacity measured in 2017 purchasing power parity (PPP) dollars. While it might be argued that States with larger budgets or better institutions have a greater capacity to fulfil economic and social rights than those with the same per capita income but smaller budgets

---

[21] In response to feedback from a wide range of scholars and practitioners, some of the indicators used to construct the SERF Index—and accordingly HRMI's ESR metrics—have been refined in the current version of the SERF Index and differ from those reported in Randolph, Fukuda-Parr and Lawson-Remer (2010) and Fukuda-Parr, Lawson-Remer, and Randolph (2015) and HRMI's 2019 data set.

or poorer institutions, a State's capacity depends on the choices it makes with regard to its taxing policies and institutional structure. Since the obligation to progressively realise economic and social rights requires States to collect and expend resources at the level necessary to meet their rights obligations, it is appropriate to measure resource capacity as reflected by the total resources available to the State, not the portion of those resources the State chooses to tap. We measure GDP per capita data in 2017 international purchasing power parity dollars (2017 PPP$) to standardise for inflation and purchasing power across countries and thus enable comparison over time and across countries.[22]

Table 2: Rights enjoyment indicators used to construct HRMI's ESR scores

Human Right/Indicator	Assessment Standard	
	Low- and Middle income	**High-income**
Right to food		
% Children (under 5) not stunted	√	
% People food secure (based on the food insecurity experience scale, FIES)		√
Right to education		
Net secondary school enrolment rate	√	√
Net primary school enrolment rate	√	
% Students achieving level 3 or better on PISA test (by topic, Mathematics, Science & Reading)		√
Right to health		
% Children (under 5) surviving to age 5	√	√
% Adult (15-60) survival rate	√	√
% Couples (15-49) using modern contraceptives	√	
% New-borns not low birth weight (<2500 grams)		√
Right to housing		
% Population with at least "basic" sanitation	√	
% Population with "basic" water on premises	√	
% Population with "safely managed" sanitation		√
% Poorest quintile of population with access to affordable housing (total housing costs net of housing allowances is < 40% of disposable income net of housing allowances)		√
Right to work		
% Population with income>$3.20 (2011 PPP$) per day	√	
% Population with income > 50% median income		√
% Unemployed not long-term (>12 months) unemployed		√

---

[22] Purchasing power parities (PPPs) are the rates of currency conversion that equalise the purchasing power of different currencies by eliminating the differences in price levels between countries. The year 2017 is the most recent survey year of the International Comparison Project that estimates PPP$ and accordingly the PPP$ prices are the prices prevailing in 2017. See for example https://datacatalog.worldbank.org/dataset/international-comparison-program-2017 for more information.

2.4 Calculating indicator scores by benchmarking a country's obligations of progressive realisation

Achievement Possibility Frontiers (APFs) use an evidence-based approach to benchmark each country's obligation with regard to each indicator reflecting the different aspects of each right. The APFs reflect what is feasible to achieve when a country allocates the maximum of available resources to fulfilling economic and social rights and uses those resources effectively as is evidenced by the experience of the best performing countries at different per capita GDP levels. The frontiers are constructed so as to be stable over the medium term, thus enabling inter-temporal comparison.[23] Specifically, the APF for a given indicator is constructed by plotting the observed value of the indicator against per capita GDP (2017 PPP\$) for each country over roughly the past two decades.[24] The frontier itself is defined as the outer envelope of the scatter plot, and the equation specifying the frontier is estimated by fitting a curve to the observations that define the outer envelope of the scatter. While earlier versions of the SERF Index measured GDP per capita in 2005 PPP\$,[25] or 2011 PPP\$ HRMI's 2021 ESR scores utilise the frontiers re-estimated using the 2017 PPP\$ exchange rates. The 2017 PPP\$ exchange rate series is based on a broader survey coverage than the 2005 or 2011 PPP\$ series and has an improved methodology. Appendix Table B shows the equations specifying the frontier for each indicator.[26]

To better understand the process, consider the construction of HRMI's Right to Food Score using the low-and middle-income assessment standard. The first step, as discussed above, is to figure out the best statistical indicators to monitor. Some of HRMI's scores use multiple indicators, but only a single right enjoyment indicator is used in constructing HRMI's right to food score for the low-and middle-income assessment standard—a measure of child malnutrition prevalence. Specifically, as shown in Table 2, we use the percentage of children under 5-years of age who are not stunted, that is, whose height for age is not unusually low

---

[23] Although knowledge of how to transform resources into rights enjoyment will change over time, rapid and abrupt changes in best practice technology are unlikely.

[24] The APFs for HRMI's 2021 ESR metrics were constructed in 2021 using all data available at that time since 1995 For several of the indicators, specifically, the PISA indicators, the food security indicator and the affordable housing indicator, data are not available as far back as 1995. In those cases, we use all available data when constructing the APFs.

[25] The book, Fukuda-Parr, Lawson-Remer, and Randolph (2015) and two papers, Fukuda-Parr, Lawson-Remer, and Randolph (2009), and Randolph, Fukuda-Parr and Lawson-Remer (2010) further detail the basic methodology, although the 2021 version of the International SERF Index, the version upon which HRMI's 2021 Update of its ESR metrics are based, incorporates some additional refinements as indicated in this technical note.

[26] To guard against measurement error and ensure that the frontiers reflect what is reasonably achievable, observations from countries engaged in civil war at the time of the observation were eliminated, and for purposes of estimating the frontier, the per capita income corresponding to observations occurring in the wake of the Post USSR transition when per capita income levels in many of the former Soviet Republics and Eastern European countries briefly and temporarily plummeted were reset to the per capita income level just prior to the start of the transition until per capita income levels recovered. See Fukuda-Parr, Lawson-Remer, and Randolph (2015, 2009), and Randolph, Fukuda-Parr and Lawson-Remer (2010) for further details.

relative to the median (precisely, not more than 2 standard deviations below the median).These data come from the World Health Organization's *Global Database on Child Growth and Malnutrition.* The stunting rate is a bellwether indicator of family malnutrition. It has been found to be more sensitive to both chronic caloric insufficiency and a diet chronically lacking in adequate protein and micronutrients and is less likely to be influenced by temporary illness than other measures of child under-nutrition. Also, because parents tend to protect the nutritional wellbeing of their children over their own, the child stunting rate also reflects the inability of parents to adequately ensure their own nutritional wellbeing. Because our focus is on rights enjoyment, we subtract the child stunting percentage from 100%. We then construct a scatter plot of the percentage of children under 5 who are not stunted against GDP per capita (2017 PPP$) using all available country observations from 1995 to 2018.

These data are shown in **Error! Reference source not found.** 1, where each black dot is a single country observation for a particular year. The most recent observations available for India is highlighted. As can be seen, there is a substantial spread between the best and worst performing countries at each per capita GDP level. We use econometric techniques to fit a curve to the outer boundary of the scatter plot (the solid red curve in **Error! Reference source not found.** 1). This fitted curve is the Achievement Possibilities Frontier (APF). Based on country experience, it benchmarks for each per capita income level the percentage of children it is feasible to ensure are not stunted. The APF defines the level of a State's immediate obligation to use the maximum of its available resources to ensure the right for any given per capita GDP level (2017 PPP$).

2.4.1   Assessing state performance: the *income-adjusted* indicator score

Ignoring, for the moment, some critical refinements, the approach to assessing State performance with regard to its immediate obligation is to compare the State's actual performance to the feasible performance as benchmarked by the APF at the country's current GDP per capita. So again, looking at **Error! Reference source not found.** 1 on page 1 2, India's child stunting rate in 2017 (the most recent year data were available for India when the frontier was estimated) was34.7%, implying the percentage of children not stunted was 65.3%. However, at its then per capita GDP of $6,186 (2017 PPP$), it should be possible as shown by the APF to ensure 95.2% of children under 5 are not stunted. Thus, our first cut at assessing India's performance using the *income*-adjusted benchmark is to take the ratio of the observed percentage of children that are not stunted (65.3%) to the benchmark

percentage of children not stunted (95.2%) and then multiply by 100 to yield the percentage of the feasible level achieved.

Two things should be noted about **Error! Reference source not found.** 1. First, the observed percentage of children that are not stunted never reaches a value approaching zero. In fact, the lowest value observed is 26%, the percentage of children not stunted in Bangladesh in 2000. The observed minimum score differs widely across indicators. For example, the minimum observed score for the child survival rate (100% - % child mortality rate) is 66.9% (Niger in 1990) and that for the percentage of the population with access to water on their premises is 0% (Tanzania in 2000). Given that we are aggregating across multiple indicators in the construction of HRMI's ESR scores, we need to standardise these indicators for two reasons. First, if we fail to do so our scores will not be comparable across rights and indicators with a larger actual range will drive right scores comprised of more than one aspect. Second, we need to take into account the fact that even in the absence of any government efforts to ensure rights, certain indicators, such as the child survival rate, would have positive values while positive scores on other indicators, such as access to an improved water source, or primary school completion rates, substantially depend on public provision of goods and services and could be zero or close to zero.

We standardise the scores by computing the percentage of the feasible level achieved with reference to the minimum observed score on the indicator in the case of those indicators that do not substantially depend on public provision of goods and services. In Figure 2, the red horizontal line shows the minimum observed value of 26% on the percentage of children not stunted. So, for India, its achievement relative to this minimum observed score is 65.3% − 26%= 39.3% of children not stunted—the height of the blue arrow. Relative to the minimum, it is feasible for India to achieve 95.2%-26%=69.2% of children not stunted—the height of the red arrow. Thus, India's *income-adjusted* score on the Right to Food is calculated as (39.3%/69.2%) x 100 = 56.8%.

More generally, the rescaling formula is:

$$S = 100 \left[(\text{actual value} - \text{minimum value}) / (\text{frontier value} - \text{minimum value}) \right]$$

Here, formally we refer to *S* as the **rescaled indicator score**. The numerator of the ratio in brackets reflects the extent to which the State has ensured the given right aspect is enjoyed, while the denominator of the ratio reflects the level of the State's immediate obligation to ensure that right aspect. After multiplying by 100, the rescaled indicator scores can be interpreted as the percentage of the immediate obligation met. The minimum values are set to approximate the indicator value one would expect to observe in a country with a subsistence per capita income level that places no priority on ensuring economic and social rights. This is approximated as zero for those indicators for which the score significantly

depends on state provision of goods and services (e.g., the net primary school enrolment rate); otherwise, as discussed, above it is approximated as the minimum value observed in any country in any year since 1990.[27] The minimum scores for each indicator are shown in Appendix Table B.

Figure 2: Rescaling the indicator scores
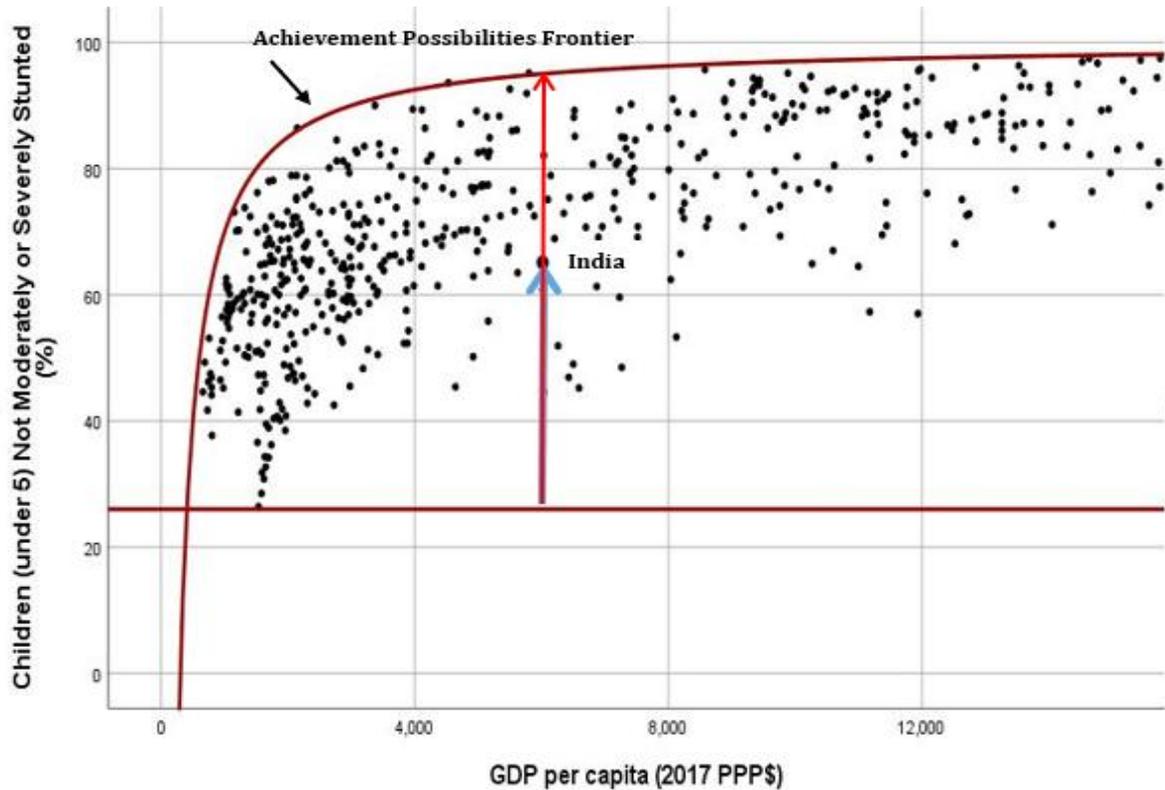
There is one more issue that needs to be taken into account: some countries have many times the resources needed to ensure all people enjoy a given right but fail to ensure that all people, in fact, enjoy that right. Figure 3 fills out the scatter plot and APF for the percentage of children that are not stunted to include higher per capita income levels. Notice that the APF peaks and then becomes horizontal. The indicator value where the APF peaks (that we call Xp), is the highest value of the indicator observed at any income level. It is the current global best performance and in most cases implies the right aspect concerned is enjoyed by everyone in the country. In the case of the % of children that are not stunted, this occurs at 97.7%, since the height of 2.3% of children is expected to be more than 2 standard deviations below the median height for a well-nourished population. Appendix Table B

[27] With regard to the minimum values used to rescale indicators, the distinction between those indicator scores that substantially depend on public provision of goods and services (with a consequent 0 minimum) and those that do not is a refinement incorporated into the 2011 and later updates of the SERF Index as well as HRMI's ESR metrics.

specifies the global best (Xp) values for all the indicators. It should also be noted that in many cases, the frontier reaches a peak and then plateaus at a per capita GDP level well below the highest observed per capita income level.

We call the per capita income level where the frontier first reaches its peak Yp. It can be interpreted as the minimum per capita GDP required to ensure enjoyment of the right aspect concerned by everyone in the population given current knowledge of the structures and measures (legislation, policies, programs, etc.) that promote that goal. In the case of the percentage of children that are not stunted, this occurs at $13,043 (2017 PPP$) as seen in **Error! Reference source not found.** 3.

In general, countries with income levels exceeding Yp have more than sufficient income to ensure everyone enjoys the aspect of the right concerned. The Yp values differ substantially across indicators and are also shown in Appendix Table B. The rate at which resources can be transformed into enjoyment of the right aspect concerned is shown by the shape of the frontier as it rises to its peak value and is implicit in the estimated frontier equations. Those rising more steeply imply greater ease in transforming income into enjoyment of the right aspect concerned.

Figure 3: Oman's resources exceed the level needed to eliminate child stunting.
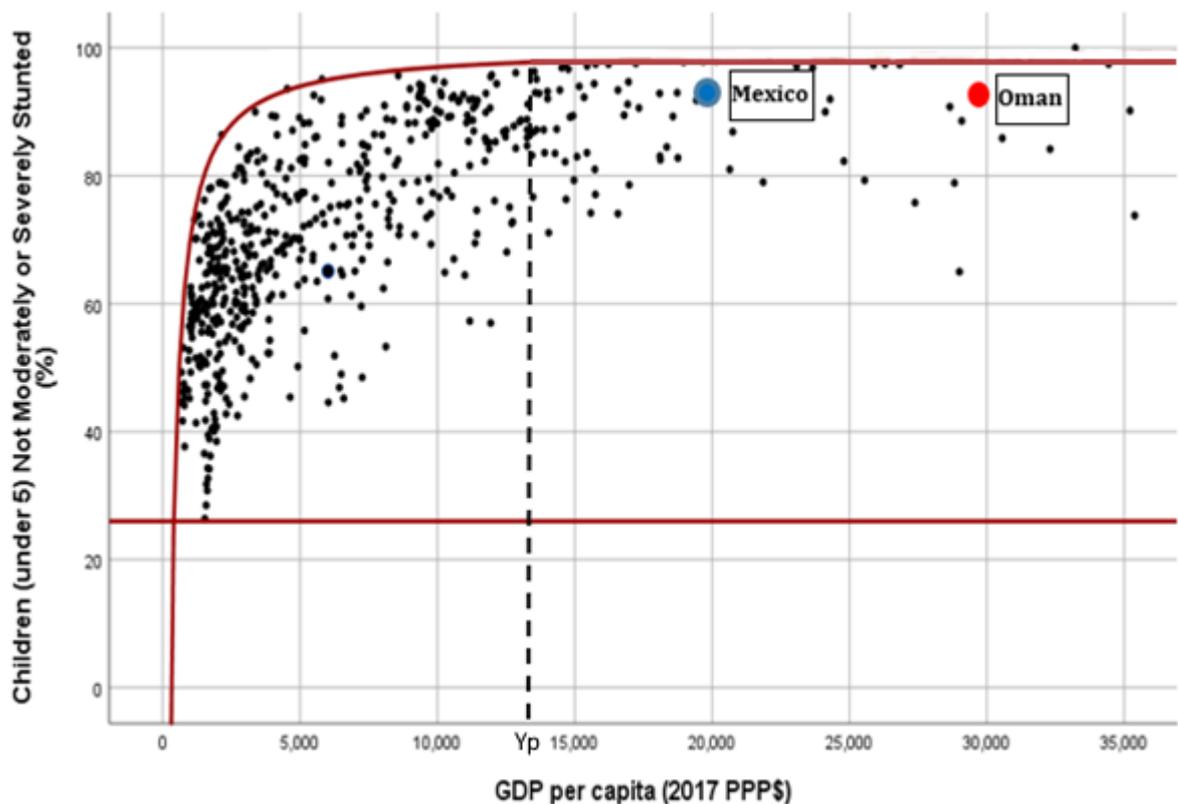
The frontier value of the indicator will be the same for countries with per capita income levels above Yp whether their per capita income level is exactly Yp or two times Yp, or even

10 times Yp, and thus their rescaled performance indicator score will be the same. However, it makes little sense to evaluate two countries with the same indicator score as performing equally well if one has twice as much income as another. Looking again at **Error! Reference s ource not found.** 3, notice that Oman and Mexico have nearly the identical percentage of children that are not stunted (90% for Mexico and 88.6% for Oman), yet Oman's per capita income is nearly 1.5 times higher than Mexico's ($29,082 vs. $19,633 measured in 2017 PPP$). Also notice that for per capita income levels higher than $13,043 (2017 PPP$), the value of Yp for the percentage of children not stunted, which is somewhat less than Mexico's per capita income, the frontier reaches its peak value (97.7%), so resources no longer constrain countries' ability to eliminate child stunting. For countries like Oman with per capita income levels multiple times what is needed to reach the frontier, but who still fail to do so, we impose a penalty on their rescaled indicator score. In Oman's case, based on the formula discussed below, this is about 6 percentage points. A penalty is also imposed on Mexico's rescaled indicator score, but the penalty is much smaller, about 2, since its per capita income is only somewhat higher than Yp.

More generally, the final step in calculating the indicator score is to deduct a penalty from the rescaled indicator score when a country has income that is more than sufficient to ensure everyone in the country enjoys the right aspect concerned, but fails to ensure that everyone does so. Thus, the final indicator score, what we formally call the **adjusted indicator score, A** is:

$$A = S \text{ if } Y <= Yp$$

$$A = S - \text{penalty if } Y > Yp$$

A related problem occurs when the estimated APFs asymptotically reach their peak. Consider Figure 4, that is they become nearly flat as they approach, but never fully reach a fixed peak. The enlarged red (on the left) and blue (one the right) dots are the observations for two different countries. The relevant portion of the APF above them is nearly flat but still very gently rising Both the indicator and frontier values for both countries are nearly identical, and both are failing to meet their obligations. However, the country represented by the blue dot has two and a half times more resources than the country represented by the red dot. As such, its score should be lower; a penalty should be imposed on its rescaled indicator score.

Figure 4: Example Achievement possibilities frontier (APF) with asymptotic peak
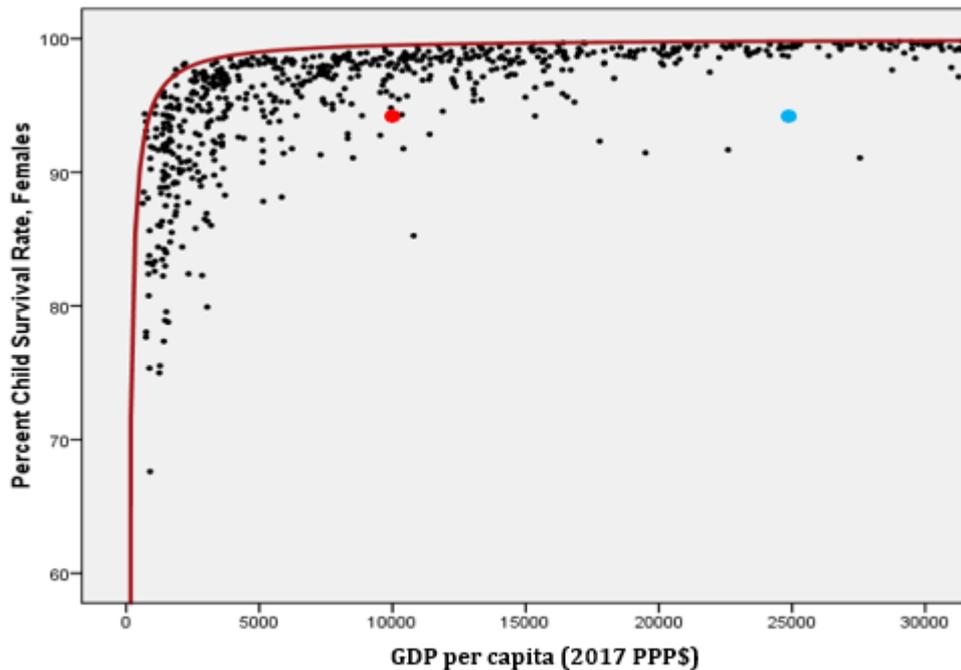
The question arises as to how flat the frontier needs to be before a penalty is imposed on the rescaled indicator scores of countries that fail to reach the frontier. We specify that level, call it the income at nearly flat, Ynf, as the point where the instantaneous slope of the frontier is .0001, that is when it has flattened to the point that it only increases by 1 percent per $10,000 increase in GDP per capita (2017 PPP$). In the case of asymptotic APFs, the adjusted indicator performance score, A is:

$$A = S \text{ if } Y <= Ynf$$

$$A = S - \text{penalty if } Y > Ynf$$

A number of alternative penalty formulas were considered in Fukuda-Parr, Lawson-Remer, and Randolph (2009) along with a set of axioms defining the characteristics one would like such a penalty formula to have. On the basis of the axioms, penalty formula F was identified as meeting all but the flexibility criterion. A refinement of penalty formula F offered in Randolph, Fukuda-Parr, Lawson-Remer (2010), ensures it meets the flexibility criterion as well. The resultant **adjusted indicator score, A when Y>Yp is**:

$$A = 100\left[\left(\frac{S}{100}\right)^{\left(\frac{Y}{Yp}\right)^{\beta}}\right]$$

In the case of APFs with asymptotic peaks we substitute the per capita income level when the slope of the frontier flattens to .0001, Ynf, for Yp in the formula above.

The value of β determines the severity of the penalty and for purposes of calculating HRMI's indicator scores, β is set equal to 0.5. **Error! Reference source not found.**5 plots the adjusted indicator score against the ratio of a country's per capita GDP to the Yp value for rescaled indicator scores, S scores, of 95%, 90%, 80%, 60%, and 40%. For example, the figure indicates that if a country has an S score of 95%, the penalty reduces the adjusted indicator score to 85% as its income rises to ten times the minimum amount necessary to fulfil the right aspect concerned.

Figure 5: Penalty for different Y/Yp values
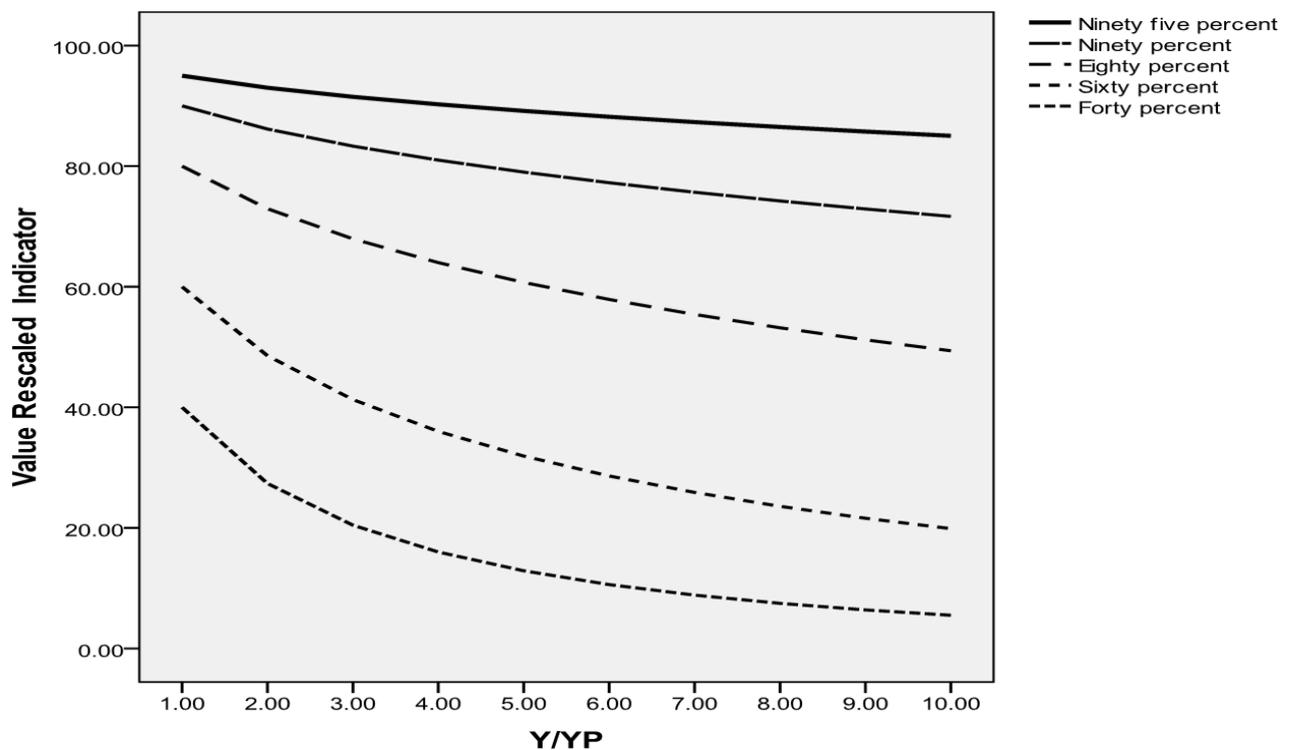
2.4.2   Assessing state performance: the *global best* indicator score

The procedure used to calculate HRMI's *global best* indicator scores are identical to those used to calculate HRMI's *income-adjusted* indicator scores except that the benchmark against which country indicator values are compared is the peak value of the APF, our *global best* benchmark. That is, our *global best* benchmark is Yp in the case where the APF reaches a flat plateau or in the case of APFs that have an asymptotic peak, the value of the asymptotic peak. More specifically, the rescaling formula is:

S_{gb} = 100 [(actual value − minimum value) / (global best value − minimum value)]

The *global best* benchmark is the same for all countries and reflects a country's progress towards meeting its full obligations of result. Looking again at the example of India in Figure 2, the numerator is India's achievement relative to the minimum observed score, 65.3%-26%=39.3% of children not stunted—the height of the blue arrow, the same as before. However, the denominator changes and is calculated relative to the constant global best score, or 97.7% - 26% = 71.7%. Thus, India's *global best* score on the Right to Food is calculated as (39.3%/71.7%) x 100 = 54.8%.

As is the case for the *income-adjusted* scores, countries with income in excess of the minimum required to achieve the *global best* benchmark, but that fail to do so, have a penalty applied to their indicator score. Accordingly, the *global best* adjusted indicator score, A_{gb}, is calculated as:

$$A_{gb} = S_{gb} \text{ if } Y <= Yp$$

$$A_{gb} = S_{gb} - \text{penalty if } Y > Yp$$

The penalty formula for the *global best* adjusted indicator score is the same as for the *income-adjusted* adjusted indicator score. As before, in the case of APFs with asymptotic peaks, Ynf is substituted in the above equations for Yp. In the case of countries with incomes less than Yp or Ynf, their adjusted indicator scores will be lower using the *global best* benchmark than the *income adjusted* benchmark reflecting the fact that, given the principle of progressive realisation, their immediate obligation is less than their full obligation. In the case of countries with incomes greater than Yp, the adjusted indicator scores will be identical regardless of the benchmark used. In the case of countries with incomes greater than Ynf, the adjusted indicator scores will be identical regardless of the benchmark used except in the case that the indicator value is greater than its value at Ynf. In that case, the adjusted indicator score will be marginally higher using the global best benchmark.

2.5   Right scores & Quality of Life score

Each substantive right score is computed as the simple average of the underlying adjusted indicator scores for the different aspects of the right assessed. For simplicity sake, we will refer to the adjusted indicator scores simply as the indicator scores from here on out. So, for example, using the low-and middle-income assessment standard, the right to education score is the average of the indicator scores for the net primary school enrolment rate and the net secondary school enrolment rate. In the event a single bellwether indicator is used to assess the enjoyment of a right, the substantive right score is simply the relevant indicator

score. So, for example, using the low-middle income assessment standard, the right to food score (*income-adjusted* or *global best* depending on the benchmark concerned) is the indicator score for the percentage of children that are not stunted. Thus, differentiating between the different indicator scores with i, and denoting n as the number of indicator scores relevant to right k, the formula for a given **substantive right score, R_k,** is:

$$R_k = \Sigma A_i/n$$

The exception is for the high-income right to education score. Here the three education quality indicator scores (percent of students achieving Level 3 or better on the PISA Mathematics, PISA Science and PISA Reading scores) are first averaged and then that result is averaged with the education access score (the net secondary school enrolment rate).

Finally, the substantive right scores are averaged to yield HRMI's *"Quality of Life"* score[28]. That is, given that we have 5 substantive rights:

$$\text{Quality of Life} = \Sigma R_k /5$$

Table 3 below shows the indicator scores that are averaged for each right for both assessment standards.

Table 3. Sub-scores Comprising HRMI Right Scores by Assessment Standard

Right and Sub-Rights	Assessment Standard	
	Low-and Middle-Income	**High-income**
Right to food score		
Children non-stunted score	√	
Food security score		√
Right to education score		
Secondary school enrolment score	√	√
Primary school enrolment score	√	
Education quality score (average Mathematics, Science & Reading scores)		√
Right to health score		
Children surviving to age 5 score	√	√
Adult survival score	√	√
Contraceptive use score	√	
Birthweight score		√
Right to housing score		
Basic sanitation score	√	
Water on premises score	√	
Safely managed sanitation score		√
Affordable housing score		√
Right to work score		
Absolute poverty score	√	
Relative poverty score		√
Long term unemployment score		√

---

[28] The Quality of Life score is HRMI's name for the SERF Index.

2.6   References

Chapman, Audrey. (2007) The Status of Efforts to Monitor Economic, Social, and Cultural Rights. Chapter 7, pp. 143-164 in Shareen Hertel and Lanse Minkler (eds.), *Economic Rights: Conceptual, Measurement and Policy Issues*. Cambridge: Cambridge University Press.

Chapman, Audrey. (1996) "A Violations Approach for Monitoring the International Covenant on Economic, Social, and Cultural Rights," *Human Rights Quarterly*, 18(1), 23-66.

(Economic and Social Council), Committee on Economic Social and Cultural Rights. (1990) "General Comment 3: The Nature of States Parties' Obligations", Fifth Session, December 14.

(Economic and Social Council), Committee on Economic Social and Cultural Rights. (1991) "General Comment 4: The Right to Adequate Housing", Sixth Session, 13 December.

(Economic and Social Council), Committee on Economic Social and Cultural Rights. (1997) "General Comment 7: The Right to Adequate Housing—Forced Evictions", Sixteenth session, 20 May.

(Economic and Social Council), Committee on Economic Social and Cultural Rights. (1998) "General Comment 9: The Domestic Application of the Covenant" Nineteenth session, 16 November – 4 December, Doc. E/C.12/1998/24, 3 December 1998.

(Economic and Social Council), Committee on Economic Social and Cultural Rights. (1999a) "General Comment 11: Plans of Action for Primary Education", Twentieth session, Geneva, 26 April – 14 May 1999, Document E/C.12/1999/4.

(Economic and Social Council), Committee on Economic Social and Cultural Rights. (1999b) "General Comment 12: The right to adequate food", Twentieth Session of the Economic and Social Council, Geneva, 26 April – 14 May. Document E/C.12/1999/5.

(Economic and Social Council), Committee on Economic Social and Cultural Rights. (1999c) "General Comment 13: The Right to Education" Twenty-first session 15 November – 3 December 1999. Document E/C.12/1999/10.

(Economic and Social Council), Committee on Economic, Social and Cultural Rights. (2000) "General Comment 14: The Right to the Highest Attainable Standard of Health", 22nd Session, 25 April – 12 May 2000. Document E/C.12/2000/4.

(Economic and Social Council), Committee on Economic, Social and Cultural Rights. (2005b) "General Comment No. 18: The Right to Work", 35th Session, 7-25 November 2005. Document E/C.12/GC/18, 6 February 2006.

(Economic and Social Council), Committee on Economic, Social and Cultural Rights. (2007) "General Comment No. 19: The Right to Social Security" 39th session, 5-23 November. Document E/C.12/GC/19, 4 February 2008.

(Economic and Social Council), Committee on Economic, Social and Cultural Rights (2009) 'General comment No. 20: Non-discrimination in economic, social and cultural rights', 42nd session, May 4-22, Document E/C.12/GC/20, 2 July 2009.

(Economic and Social Council), 'General Comment No. 23 (2016) on the right to just and favorable conditions of work', E/C.12/GC/23, 27 April 2016; 'General Comment No. 22 (2016) on the right to sexual and reproductive Health' E/C.12/GC/22, 2 May 2016.

Fukuda-Parr, Sakiko, Terra Lawson-Remer and Susan Randolph. (2009) "An Index of Economic and Social Rights Fulfillment: Concept and Methodology", *Journal of Human Rights*, 8: 195-221.

Sakiko Fukuda-Parr, Terra Lawson-Remer and Susan Randolph, *Fulfilling Social and Economic Rights* (Oxford: Oxford University Press, 2015)

Randolph, Susan, Sakiko Fukuda-Parr, and Terra Lawson-Remer. (2010). "Economic and Social Rights Fulfillment Index: Country Scores and Rankings", *Journal of Human Rights*. 9: 230-261, 2010.

United Nations. (1945) Charter of the United Nations (San Francisco, 26 June 1945) (*entered into force* 24 Oct. 1945).

United Nations. (1948) Universal Declaration of Human Rights (UDHR), *adopted* 10 Dec. 1948, United Nations General Assembly Res. 217 A (III) (1948) New York.

United Nations. (1966a) International Covenant on Economic, Social and Cultural Rights (ICESCR), 1966. *Adopted* 16 Dec. 1966, General Assembly Res. 2200 (XXI), U.N. GAOR, 21st Sess., Supp. No. 16, U.N. Doc. A/6316 (1966), 993 U.N.T.S. 3 (*entered into force* 3 Jan. 1976).

United Nations. (1987) The Limburg Principles on the Implementation of the International Covenant on Economic, Social and Cultural Rights. Guidelines adopted at a workshop sponsored by the International Commission of Jurists, the Faculty of Law of the University of Limburg, and the Urban Morgan Institute for Human Rights, University of Cincinnati, Maastricht, Netherlands, 22-26 January 1997, UN doc. E/CN.4/1987/17.

United Nations (2000) The Maastricht Guidelines on Violations of Economic, Social and Cultural Rights. Guidelines adopted at a workshop sponsored by the International Commission of Jurists, the Urban Morgan Institute for Human Rights and the Center for Human Rights of the Faculty of Law of Maastricht University, Maastricht, Netherlands, 22-26 January 1997. UN doc. E/C.12/2000/13.

United Nations Office of the High Commissioner for Human Rights (2012). *Human Rights Indicators: A Guide to Measurement and Implementation.* HR/PUB/12/5. New York: Office of the High Commissioner for Human Rights, United Nations.

2.7   Appendix

Appendix Table A: Indicator Definitions

Indicator	Assessment Standard	Primary Source	Date Accessed	Definition
Resources				
GDP per capita (2017 PPP$)	Both	World Bank International Comparison Project.	December 27, 2020 from WB WDI at https://databank.worldbank.org/data/source/world-development-indicators#	GDP per capita based on purchasing power parity (PPP), PPP GDP is gross domestic product converted to international dollars using purchasing power parity rates. An international dollar has the same purchasing power over GDP as the U.S. dollar has in the United States. GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in constant 2017 international dollars.
Education				
Net Secondary School Enrolment (UIS_UNESCO)	Both & By Sex	United Nations Educational, Scientific, and Cultural Organization (UNESCO) Institute for Statistics (UIS).	January 5, 2021 from WB WDI at https://databank.worldbank.org/data/source/world-development-indicators#	Total number of students in the theoretical secondary school age group enrolled in secondary school, expressed as a percentage of the total of secondary school age. Divide the number of students enrolled who are of the official age group for secondary education by the population for the same age group and multiply the result by 100. NER at each level of education should be based on enrolment of the relevant age group in all types of schools and education institutions, including public, private and all other institutions that provide organised educational programmes.

Indicator	Assessment Standard	Primary Source	Date Accessed	Definition
Net Primary Enrolment	Low-and Middle Income & by Sex	United Nations Educational, Scientific, and Cultural Organization (UNESCO) Institute for Statistics (UIS).	January 5, 2021 from WB WDI at https://databank.worldbank.org/data/source/world-development-indicators#	Total number of students in the theoretical age group for primary education enrolled in that level, expressed as a percentage of the total population in that age group. Divide the number of students enrolled who are of the official age group for primary education by the population for the same age group and multiply the result by 100. NER at each level of education should be based on enrolment of the relevant age group in all types of schools and education institutions, including public, private and all other institutions that provide organised educational programmes. A high NER denotes a high degree of coverage for the official school-age population. The theoretical maximum value is 100%. Increasing trends can be considered as reflecting improving coverage at the specified level of education. When the NER is compared with the GER, the difference between the two highlights the incidence of under-aged and over-aged enrolment. If the NER is below 100%, then the complement, i.e. the difference with 100%, provides a measure of the proportion of children not enrolled at the specified level of education. However, since some of these children/youth could be enrolled at other levels of education, this difference should in no way be considered as indicating the percentage of students not enrolled. To measure universal primary education, for example, adjusted primary NER is calculated on the basis of the percentage of children in the official primary school age range who are enrolled in either primary or secondary education. A more precise complementary indicator is the Age-specific enrolment ratio (ASER), which shows the participation in education of the population of each particular age, regardless of the level of education.

Indicator	Assessment Standard	Primary Source	Date Accessed	Definition
% Scoring Level 3 or greater on the PISA Science test	High-Income & by Sex	Program for International Student Assessment (PISA)	January 2, 2021 from WB WDI^ https://databank.worldbank.org/data/source/world-development-indicators#	Achievement levels run from 1 to 6. At Level 3, students can draw upon moderately complex content knowledge to identify or construct explanations of familiar phenomena. In less familiar or more complex situations, they can construct explanations with relevant cueing or support. They can draw on elements of procedural or epistemic knowledge to carry out a simple experiment in a constrained context. Level 3 students are able to distinguish between scientific and non-scientific issues and identify the evidence supporting a scientific claim. Level definition from figure 4.10 in OECD (2018), "PISA for Development Reading Framework", in *PISA for Development Assessment and Analytical Framework: Reading, Mathematics, and Science*, OECD publishing, Paris, https://doi.org/10.1787/9789264305274-4-en
% Scoring Level 3 or greater on the PISA Mathematics test	High-Income & By Sex	Program for International Student Assessment (PISA)	January 1, 2021 from WB WDI^ https://databank.worldbank.org/data/source/world-development-indicators#	Achievement levels run from 1 to 6. At Level 3, students can execute clearly described procedures, including those that require sequential decisions. Their interpretations are sufficiently sound to be a base for building a simple model or for selecting and applying simple problem-solving strategies. Students at this level can interpret and use representations based on different information sources and reason directly from them. They typically show some ability to handle percentages, fractions and decimal numbers, and to work with proportional relationships. Their solutions reflect that they have engaged in basic interpretation and reasoning. Level definition from figure 3.3 in OECD (2018), "PISA for Development Reading Framework", in *PISA for Development Assessment and Analytical Framework: Reading, Mathematics, and Science*, OECD publishing, Paris, https://doi.org/10.1787/9789264305274-4-en

Indicator	Assessment Standard	Primary Source	Date Accessed	Definition
% Scoring Level 3 or greater on the PISA Reading Test	High-Income & By Sex	Program for International Student Assessment	January 1, 2021 from WB WDI^ https://databank.worldbank.org/data/source/world-development-indicators#	Achievement levels run from 1 to 6. Tasks at this level (Level 3) require the reader to locate, and in some cases recognise the relationship between several pieces of information that must meet multiple conditions. Interpretative tasks at this level require the reader to integrate several parts of a text in order to identify a main idea, understand a relationship, or construe the meaning of a word or phrase. They need to take into account many features in comparing, contrasting, or categorising. Often the required information is not prominent or there is much competing information; or there are other text obstacles, such as ideas that are contrary to expectation or are negatively worded. Reflective tasks at this level may require connections, comparisons, and explanations, or they may require the reader to evaluate a feature of the text. Some reflective tasks require readers to demonstrate a fine understanding of the text in relation to familiar, everyday knowledge. Other tasks do not require detailed text comprehension but require the reader to draw on less common knowledge. Level definition from figure 2.2 in OECD (2018), "PISA for Development Reading Framework", in *PISA for Development Assessment and Analytical Framework: Reading, Mathematics, and Science*, OECD publishing, Paris, https://doi.org/10.1787/9789264305274-4-en
Food				
100% - Malnutrition Prevalence - height for Age (% children under 5)	Low-and Middle-Income & By Sex	UNICEF, WHO, World Bank: Joint child malnutrition estimates (JME)	January 3, 2021 from WB WDI from https://databank.worldbank.org/data/source/world-development-indicators#	100 – prevalence of stunting. Prevalence of stunting is the percentage of children under age 5 whose height for age is more than two standard deviations below the median for the international reference population ages 0-59 months. For children up to two-years-old height is measured by recumbent length. For older children height is measured by stature while standing. The data are based on the WHO's new child growth standards released in 2006. UNICEF, WHO, World Bank: Joint child malnutrition estimates (JME). Aggregation is based on UNICEF, WHO, and the World Bank harmonised dataset (adjusted, comparable data) and methodology.

Indicator	Assessment Standard	Primary Source	Date Accessed	Definition
100% - % Moderately or Severely Food Insecure	High-Income	Food and Agricultural Organization (FAO)	January 20, 2021 from FAO http://www.fao.org/faostat/en/#data/FS	100 – proportion of population living in moderately or severely food insecure households. The indicator measures the percentage of individuals in the population who live in households experiencing food insecurity at moderate or severe levels during the reference period. The severity of food insecurity, defined as a latent trait, is measured on the Food Insecurity Experience Scale global reference scale, a measurement standard established by FAO through the application of the Food Insecurity Experience Scale
Health				
Adult (15-60) survival rate (% cohort)	Both & by Sex	United Nations Population Division (UNPD) World Population Prospects or University of California, Berkeley, and Max Planck Institute for Demographic Research. The Human Mortality Database.	December 31, 2020 for both sexes and by sex from WB WDI https://datacatalog.worldbank.org/dataset/world-development-indicators	(1000 – Adult Mortality Rate)/ 10 where Adult mortality rate, is the probability of dying between the ages of 15 and 60--that is, the probability of a 15-year-old dying before reaching age 60, if subject to age-specific mortality rates of the specified year between those ages.
100% - child (under 5) mortality rate/10	Both & by Sex	UN Inter-agency Group for Child Mortality Estimation (UNICEF, WHO, World Bank, UN DESA Population Division).	December 31, 2020 for both sexes and by sex from WB WDI https://databank.worldbank.org/data/source/world-development-indicators#	(1000 – under-five mortality rate)/10 Under-five mortality rate is the probability per 1,000 that a newborn baby will die before reaching age five, if subject to age-specific mortality rates of the specified year.
# Modern contraceptive Use rate (% couples 15-49)	Low- and Middle-Income	Compiled by United Nations Population Division from household surveys, including Demographic and Health Surveys, and Multiple Indicator Cluster Surveys.	December 31, 2020 from WB WDI https://databank.worldbank.org/data/source/world-development-indicators#	Modern contraceptive prevalence rate is the percentage of women who are practising, or whose sexual partners are practising, at least one modern method of contraception. It is usually measured for women ages 15-49 who are married or in union. Modern methods of contraception include female and male sterilisation, oral hormonal pills, the intra-uterine device (IUD), the male condom, injectables, the implant (including Norplant), vaginal barrier methods, the female condom and emergency contraception.

Indicator	Assessment Standard	Primary Source	Date Accessed	Definition
100% - % Low Birth Weight Babies	Hi-Income	Primary source OECD statistics, secondary source WB WDI.	Primary: December 31, 2020 from OECD https://stats.oecd.org/ then click on HEALTH, then HEALTH STATUS, then INFANT HEALTH Secondary: December 31, 2020 from WB WDI https://databank.worldbank.org/data/source/world-development-indicators#	100 - % low birth weight newborns. Number of live births weighing less than 2500 grams as a percentage of total number of live births. (Data values restricted to upper middle- and high-income countries.)
Housing				
% population with basic access to water on premises	Low-and Middle-Income	WHO UNICEF Joint Monitoring Project (JMP)	January 3, 2021 from JMP data https://washdata.org/data/household	Improved drinking water sources are those which, by nature of their design and construction, have the potential to deliver safe water. The JMP subdivides the population using improved sources into three groups according to the level of service provided. In order to meet the criteria for a safely managed drinking water service, people must use an improved source meeting three criteria: a) it should be accessible on premises, b) water should be available when needed, and c) the water supplied should be free from contamination. If the improved source does not meet any one of these criteria but a round trip to collect water takes 30 minutes or less, then it will be classified as a **basic** drinking water service.
% population with at least basic sanitation.	Low- and Middle-Income	WHO UNICEF Joint Monitoring Project (JMP)	January 3, 2021 from WB WDI https://databank.worldbank.org/data/source/world-development-indicators#	Basic sanitation is defined as use of improved facilities that are not shared with other households. Improved sanitation facilities are those designed to hygienically separate excreta from human contact.
% households with safely managed sanitation	High-Income	WHO UNICEF Joint Monitoring Project (JMP)	January 3, 2021 from WB WDI https://databank.worldbank.org/data/source/world-development-indicators#	Safely managed sanitation is defined as use of improved facilities that are not shared with other households and where excreta are safely disposed in situ or transported and treated off-site. **Improved sanitation facilities** are those designed to hygienically separate excreta from human contact.

Indicator	Assessment Standard	Primary Source	Date Accessed	Definition
#% poorest population quintile with affordable housing	High-Income	OECD Affordable housing database	January 20, 2021 from Eurostats at https://ec.europa.eu/eurostat/databrowser/view/ILC_LVHO)7B_custom_477428/default/table?lang=en	100 – the housing cost overburden rate among the poorest population quintile. The housing cost overburden rate is the percentage of the population living in households where the total housing cost ('net' of housing allowances) represent more than 40% of disposable income ('net' of housing allowances). Costs include rent or mortgage (principal and interest) costs as well as the costs of mandatory services and charges, regular maintenance and repair, taxes and utilities.
Right to Work				
100% - % Relative Poverty Rate	High-Income	Primary Luxembourg Income Study Secondary OECD	January 4, 2021 from Luxembourg Income Study Key Figures https://www.lisdatacenter.org/data-access/key-figures/ and January 4, 2021 from OECD https://data.oecd.org/inequality/poverty-rate.htm	Relative poverty rate defined with reference to 50% of median income. Primary source Luxembourg Income Study (LIS), Secondary source OECD. LIS definition: Indicator of poverty status of the household to which the individual belongs to, based on the equivalised disposable household income concept and with respect to the 50% of the median. OECD definition: The poverty rate is the ratio of the number of people whose income falls below the poverty line; taken as half the median household income of the total population.
100% - Poverty Headcount ratio (at $3.20 2011 PPP$ per day)	Low-and Middle-Income	World Bank PovcalNet http://iresearch.worldbank.org/PovcalNet/index.htm	January 24, 2021 from https://databank.worldbank.org/data/source/world-development-indicators#	100 – the poverty headcount ratio at $3.20 (2011 PPP). Poverty headcount ratio at $3.20 a day is the percentage of the population living on less than $3.20 a day at 2011 international prices. As a result of revisions in PPP exchange rates, poverty rates for individual countries cannot be compared with poverty rates reported in earlier editions. Data from World Bank, Development Research Group are based on primary household survey data obtained from government statistical agencies and World Bank country departments. Data for high-income economies are from the Luxembourg Income Study database.
100% - % Long-term Unemployed (%unemployed)	High-Income	OECD	January 4, 2021 from https://data.oecd.org/unemp/long-term-unemployment-rate.htm	Long-term unemployment refers to the number of people with continuous periods of unemployment extending for 12 months or longer, expressed as a percentage of the total unemployed.

# Indicates new indicator and frontier estimate for 2020 update.

^The data by sex were corrected to ensure the percentage achieving each score was the percentage of that sex not the percentage of all students taking the test.

Appendix Table B: Frontier Equations, Peak Indicator Values, Income level at Peak Indicator Value, Minimum Value

Indicator	Equation	Yp Global Best Max	X at Yp GDP at indicator max	Ynf Indicator Value at nearly flat	X at Ynf GDP at indicator nearly flat	X at Ymin GDP at indicator Minimum	Indicator Minimum Value
Resources GDP per capita (2017 PPP$)							
Health							
Adult Survival both sexes	Y = 96 – 24000/x	96	asymptotic	94.45	15492	333	Zimbabwe 2002 males 24.6%→24
Male Adult Survival	Y = 94 – 26000/x	94	asymptotic	92.39	16125	371	Zimbabwe 2002 males 24.6%→ 24
Female Adult Survival	Y = 97 – 22000/x	97	asymptotic	95.52	14832	301	Zimbabwe 2002 males 24.6%→24
Child Survival both sexes	Y = 100 – 7000/(x – 200)	100	asymptotic	99.16	8567	411	Niger 1990 males 66.9%→66.9
Male child survival	Y = 100 – 7500/(x-200)	100	asymptotic	99.13	8860	427	Niger 1990 males 66.9%→66.9
Female child survival	Y = 100 – 6000/(x-200)	100	asymptotic	99.23	7946	381	Niger 1990 males 66.9% → 66.9
Modern Contraceptive Use	Y = 85 – 60000/(x+150)	85	asymptotic	82.55	24345	556	Guinea 1993 & Somalia 1999 1.00%→0
Not Low Birth weight	Y = 97 – 10000/x	97	asymptotic	96	10000	301	Bangladesh 2000 63.8%→63.8

Indicator	Equation	Yp Global Best Max	X at Yp GDP at indicator max	Ynf Indicator Value at nearly flat	X at Ynf GDP at indicator nearly flat	X at Ymin GDP at indicator Minimum	Indicator Minimum Value
Food							
Not Stunted	$Y = 100 - 30000/x$ for x<13043, else = 97.7	97.7	13043			405	Bangladesh 1991, 26.4%→26
Not Food Insecure	$Y = 100 - 72000/x$	100	asymptotic	97.32	26833	809	Liberia 2017 11% → 11
Education							
Net Primary both sexes	$Y = 109 - 15000/(x-325)$ for x<1992, else=100	100	1992			463	Afghanistan, females 1993, 13.7%→0
Net Secondary both sexes	$Y = 103 - 70000/x$ for x<23333, else=100	100	23333			680	Mozambique females, 1999, 2.27%→0
PISA Math both sexes	$Y = 86 - 375000/x$	86	asymptotic	79.88	61237	4360	Dominican Republic 2015 Females, 1.6% →0
PISA Reading both sexes	$Y = 94 - 500000/x$ for x < 38461, else=81	81	38461			5319	Algeria 2015, males 1.0% → 0
PISA Science both sexes	$Y = 83 - 280000/(x-4000)$	83	asymptotic	77.71	56915	7373	Dominican Republic, females 2.46% → 0

Indicator	Equation	Yp Global Best Max	X at Yp GDP at indicator max	Ynf Indicator Value at nearly flat	X at Ynf GDP at indicator nearly flat	X at Ymin GDP at indicator Minimum	Indicator Minimum Value
Right Work							
Not Absolutely Poor	$Y = 111 - 111000/(x+300)$ for x <9791, else=100	100	9791			700	Dem. Rep. Congo, 2004, Guinea 1991, 1.5% →0
Not relatively poor	$98 - 55000/(x-4000)$	98	asymptotic	95.65	27452	6007	Peru 2004, 70.6%→70.6
Not long-term unemployed	$Y = 100 - 40000/(x-2000)$	100	asymptotic	98.00	22000	2471	North Macedonia 2008, 15.11% →15
Right to Housing							
Water on Premises	$108 - 80000/x$ for x < 10000, else=100	100	10000			741	Tanzania 2000, 0.83% → 0
At least Basic Sanitation	$120 - 95000/x$ for x<4750, else=100	100	4750			792	Ethiopia 2000, 3.4% → 0
Safely managed sanitation	$107 - 300000/(x + 2000)$ for x < 40857, else = 100	100	40857			804	Niger 2000, 3.15% → 0
Affordable housing—bottom quintile total costs housing<40% (Eurostats)	$100 - 150000/(x-10500)$	100	asymptotic	96.13	49230	12079	Greece 2018 →5

* In the equations above, Y refers to the indicator concerned while x refers to GDP per capita measured in 2011 PPP$.# Indicators that are new this year.