

March 2017

the P20 initiative

data to leave no one behind

methodology papers

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Annex 1: Income methodology

The P20 Initiative is an effort to draw attention to the status of a group we feel face particularly large chances of being left behind from international progress. Measuring poverty has become a major area of research within economics, with many new efforts to do so. The research and new datasets on poverty have greatly advanced our understanding. There remain many debates about the best way to measure poverty. The ongoing debates inform our methods but ultimately, we are methodologically agnostic. Regardless of how poverty is defined, we are interested in tracking the wellbeing of the people in the poorest 20% (P20) on an annual basis. We also have sought methods to understand as well as possible how disaggregating indicators on the wellbeing of the P20 by wealth quintile, gender, geography, age, and disability allows us to better understand the lives of these people. Hopefully new datasets and new methods will enable us to explore many different ways to assess the wellbeing of this group.

For the analysis in this baseline report we have sought methods that are straightforward and based on comparable international data. There are many more sophisticated methods for measuring poverty and we have explored some of them. Ultimately, we believe our results provide a good approximation of what much of the poorest 20% experience. This paper explores some of the basis for this.

We have adopted a dashboard-style approach to providing data on the P20. While many definitions of poverty are important, the measurement of income is one of the best methods to track progress among the P20. There are significant limitations to this measure, which is why we have included two other bellwether indicators: nutrition and civil registration. However, income and wealth is one of the strongest predictors of many outcomes related to wellbeing across many sectors.

The global P20: Why 20%?

The P20 Initiative has been created within the context of the ‘leave no one behind’ agenda inherent in the Sustainable Development Goals (SDGs). Many groups are particularly vulnerable to be left behind and many have proposed focusing on them within the context of the leave no one behind agenda. The World Bank’s new flagship report *Poverty and Shared Prosperity*¹ focuses on people below the international poverty line of \$1.90 per person per day.² Ensuring no one lives below the line is the first of the SDGs. (The World Bank has a more modest goal of reducing the share of the global population below the international poverty line to 3%).

The World Bank has also set the goal to boost income growth among the poorest 40% of each country. While efforts to eliminate extreme poverty focus on low income countries, this goal is meant to apply to all countries. This frame of analysis is important and the poorest 40% of the national populations of wealthier countries must be included in growth in order to achieve the goal of leaving no one behind.

We have chosen a different group for our analysis. We think that it is reasonable to say that one in five people in the world are vulnerable to being left behind over the next 15 years. The larger segments of the population would have wider ranging needs and addressing their challenges becomes more complex. There is some evidence that some people in the P20 live in high income countries.³

Income as a key bellwether

Income⁴ poverty is correlated with many of the kinds of challenges that many people face. Access to adequate money is closely related to meeting basic needs, having the opportunity to make decisions about how to live, and even accessing human rights. How people live, where they live, and what they do is heavily influenced by how much money they have. Money can also more easily be quantified and compared and tracked over time than can other theoretical concepts for which it serves as a proxy.

Chronic poverty

While the specific point estimates may not be completely accurate, we know that hundreds of millions of people struggle with many daily challenges. Many of these people experience extreme poverty for a period of their life or more than one period but also experience periods with greater wealth.⁵ There are, however, many groups that experience poverty for several generations or for several decades. The Chronic Poverty Research Centre found that between 20% and 60% of people who escaped poverty in six countries fell back within 10 years.⁶

Of course, there are many problems with poverty measurement. Income measurement can be distorted by sampling frames,⁷ inadequately trained staff,⁸ respondent recall,⁹ groups that are systematically excluded from surveys,¹⁰ the definition of urban and rural areas,¹¹ survey error and many other factors.

Even if we assume that income has been adequately measured and assessed at national level, international comparisons are very complicated and problematic. The world's largest statistical program, the International Comparison Project, generates estimates of the purchasing power parity (PPP\$) of currencies across the world. These PPP\$ adjustment factors are then used to convert income and consumption figures collected in household income surveys to make comparable poverty rates. There are many reasons why PPP\$ numbers may be biased and these biases may be very significant. Even when comparing the prices of thousands of goods across many countries in the world, it is very difficult to compare price changes over time and across places with very different consumption patterns. Deaton and Aten,¹² for instance, estimated that standard errors for price comparison between the US and India or China were 20–30%. This indicates the limits to this analysis and suggests that poverty lines should not be taken as completely accurate. Nevertheless, there are many valuable insights that can be drawn from analysis of people who tend to be at the bottom of the distributions. We note that most other efforts to measure challenges faced by poor people have severe limitations as well.

Alternative measures of poverty and wellbeing

There are a number of datasets on global wellbeing or poverty that could help shed light on the status of the P20.

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Table A1

Datasets on global wellbeing or poverty

Dataset	PovcalNet	Multidimensional Poverty Index	World Wealth and Income Database [Piketty and co-authors]	Global Wealth Report	International Wealth Index	GNI per capita	DHS/MICS wealth index	Household final consumption expenditure
Publisher	World Bank	Oxford Poverty & Human Development Initiative	Wid.world	Credit Suisse	Nijmegen Center for Economics (NICE)	World Bank	DHS/MICS	World Bank
Disaggregated	No	Yes	Some	No	Yes	No	Yes	No
Adjustable poverty line	Yes, with great precision	No	Yes	Yes, if data released	No	No	Yes	No
Frequency of updates	Yearly	Country data updated once every few years	Rarely	Yearly	Country data updated once every few years	Yearly/quarterly	Country data updated once every few years	Yearly/quarterly
Source data	Household Income and Expenditure Survey	DHS/MICS	Household surveys, income tax data, national accounts data	Some surveys but regression-based estimates for most low-income countries	DHS/MICS	National accounts	DHS/MICS	National accounts
Internationally comparable	Yes (but missing some high-income countries)	Yes (but only for countries with DHS/MICS surveys)	Partly	Yes	Yes (but only for countries with DHS/MICS surveys)	Yes	No ¹³	Yes

Notes: DHS: Demographic and Health Surveys; MICS: Multiple Indicator Cluster Surveys.

To best monitor progress of the P20, we need datasets that allow us to disaggregate data on a yearly basis with comparable data. As Table A1 indicates, there is not currently a dataset that allows us to do that. This highlights a critical gap in the need for data to leave no one behind.

Our analysis of income trends among the P20 draws from PovcalNet. We also use PovcalNet to know which countries the P20 live in. PovcalNet misses many of the wealthiest people in the world, particularly because it has no data on South Korea and several other high income countries. Consequently, we have estimated the wealth of the rest of the population using the household final consumption expenditure numbers published by the World Bank. These numbers are part of national accounts and may not be more accurate than PovcalNet in countries where both data sources are available; however, we believe that they are the best source of data for estimating the wealth of the rest of the population.

Besides their average wealth and which countries they live in, PovcalNet does not provide much information about the P20. The survey data powering PovcalNet belongs to the countries that carried out the surveys. Hopefully, more data is released. Until it is we are required to use a different method.

Demographic and Health Surveys (DHS) and Multiple Indicator Cluster Surveys (MICS) also have series of questions to find out the household's means of human waste disposal, source of drinking water, roofing materials, flooring materials and wall materials, and include questions about whether the household has certain assets (for instance, a car, chair, watch and telephone). The questions on household assets and household materials have been used to create a relative wealth index for each household. The wealth index was started by DHS and has been adopted by MICS. A 'principal components analysis' is applied to the assets and building materials recorded for each household to estimate the wealth of a country. This analysis creates an index for a set of variables that captures the largest amount of information about those variables.¹⁴ The wealth is estimated at a household level. Like PovcalNet, the wealth index does not attempt to measure the extent to which individual members of a household have access to the household wealth.

The DHS/MICS wealth index does not have a simple monetary equivalent and is not currently internationally comparable but has been shown to correlate well with the kinds of deprivations associated with poverty. It is a widely-used tool for estimating how wealth interacts with various indicators. For instance, UNICEF reports birth registration by wealth quintile using this index. DHS and MICS have provided microdata for nearly every survey including the wealth index number for each household.

To better understand the P20, we assume that the people with the lowest wealth index scores in a country compare with the people with the lowest incomes in PovcalNet in a country. If we had information on income levels and wealth index scores, we certainly would not find a perfect correlation but, in broad terms, we assume that these groups are roughly equivalent. This assumption, like the assumption that those in income poverty experience the same challenges as those in consumption poverty, has serious limitations.¹⁵ Nevertheless, it is the best that we can do with the data available currently.

We use the percentage of people in the P20 in each country in PovcalNet and find a wealth index score threshold that includes an equivalent proportion of people in each DHS or MICS survey. For instance, PovcalNet says that 47% of Ugandans would be in the P20. We therefore looked at the wealth index score in Uganda's latest survey and identified a wealth score cut off that would include 47% of Uganda's population. We then analysed the characteristics of the people below that wealth score in Uganda. Again, we stress that PovcalNet and the DHS wealth index are measuring different things. This method does not provide for analysis of the poorest 20% of the population ranked by income but it does provide information about many of the poorest people in the world in a global distribution that follows the general trends shown by PovcalNet.

We hope that better and more open data will provide alternatives to our methods but for now see them as a reasonable approximation for our purposes. We could wait for years for ideal datasets to emerge without being able to say anything on the status of the most vulnerable people but we feel that it is more important to make reasonable use of data that is available now for decision-making.

We have sought to replicate some of the research the World Bank has produced on the profile of poor people according to the data used for PovcalNet. Our preliminary results suggest that our methods produce a population that is slightly more rural and younger than that of the World Bank's Global Microdata Set.

Monitoring Global Poverty, the report of the World Bank's Commission on Global Poverty identifies four different possible types of poverty measurement: the international poverty line, a basic needs-based indicator, a capability approach and a minimum rights approach.¹⁶ The latter two types of poverty measurement are not fully developed yet and considerable work needs to be done to develop globally monitorable measures over time.

As previously mentioned, we are not only interested in monetary poverty. We are interested in other indicators as well. Our three bellwethers cover three major dimensions of poverty: income, nutrition and CRVS. One option would be to combine these indicators into a single indicator using an arbitrary index. The dashboard approach, by contrast, displays the indicators separately. The P20 analysis has opted for a dashboard approach. Income is particularly useful for defining who is in poverty because it is measurable with a fair degree of precision that can also be adjusted. It is far more difficult to think of ways to consistently find the 20th percentile of people according to CRVS status or stunting.

The Multidimensional Poverty Index and the P20

The Global Multidimensional Poverty Index [MPI] is an excellent tool for understanding the various dimensions of poverty. The index evaluates each household according to whether or not it has certain characteristics of health, education and living standards. This exercise avoids some of the challenges faced by international comparisons of monetary wealth. While there may be local variations, it is far easier to determine if a person in Haiti and a person in Viet Nam both have access to adequate toilets than if they are both living on PPP\$1.90. Once that is determined, the index gives equal weight to health, education and living standards (even though more indicators are available for living standards than the other two categories). If the household is determined to be poor in enough categories, it is considered multidimensionally poor. If it is poor in even more categories, it is considered deprived. The index then multiplies the number of people defined as poor in a country by the number of deprivations experienced and creates a single index score for each country. This method can be applied for subnational regions as well.

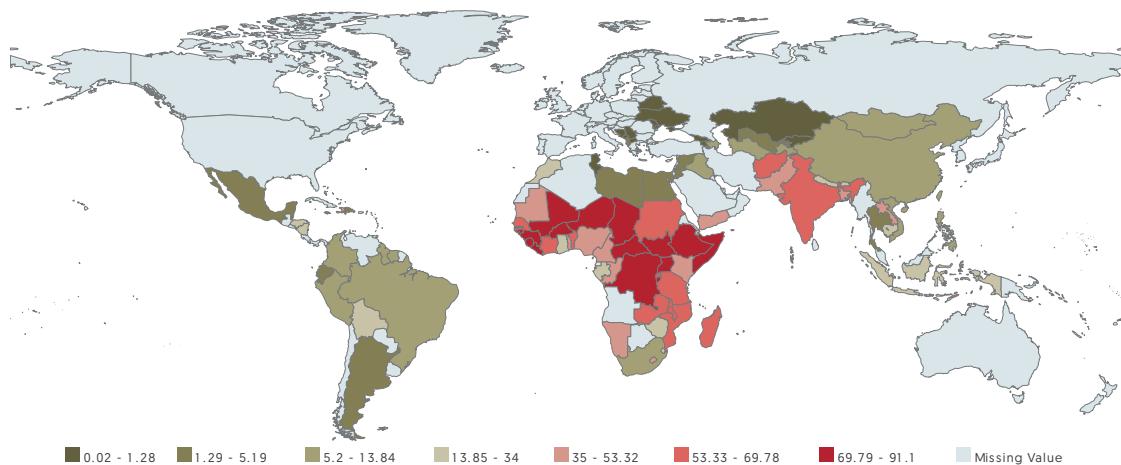
MPI is an index based on a series of thresholds. It is not possible to rank order individuals based on their MPI poverty. If you abandon the weighting scheme and rank order people according to how many MPI indicators assess them as being poor, you cannot reliably find the 20th percentile of those most deprived. This is because the MPI assesses people across 11 indicators. This is a lot of indicators but it is still too coarse to clearly distinguish between the 1.45 billionth poorest person and 1.46 billionth poorest person.

An additional challenge to the MPI for our purposes is that the global numbers are adjusted biannually but country updates are only possible after a new survey is produced. This means that India's MPI score has not been updated since DHS 2006, the latest survey for which microdata are available. PovcalNet poverty thresholds can be more easily updated between surveys based on national accounts data. PovcalNet numbers for India have been updated five times since then.

Figure A1

Percentage of people MPI poor by country

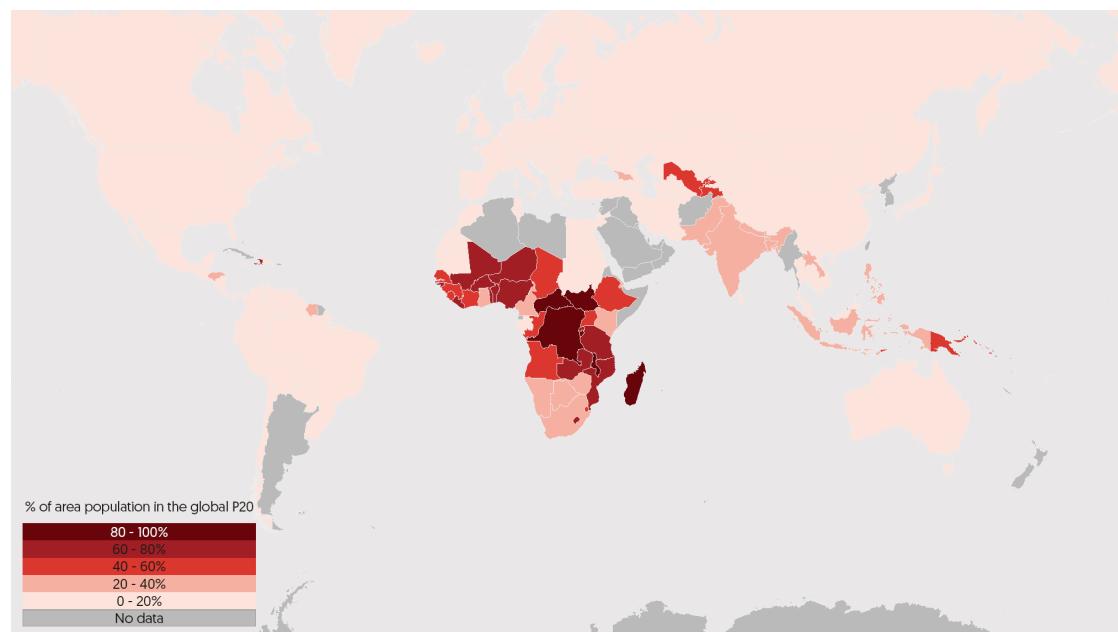
Population in multidimensional poverty (H) (%) - MPI Poor - All Countries



Source: Oxford Poverty & Human Development Initiative, downloaded 25 January 2017

Figure A2

Percentage of people in the P20 by country



A comparison between the MPI and the P20 maps provides some insight into the differences between the two approaches. For instance, both methods indicate that poverty is most severe in Sub-Saharan Africa. However, the P20 headcounts show Central Africa as having particularly acute poverty. The MPI Index shows acute poverty slightly north, with Niger, Chad, and Ethiopia standing out slightly more. Future analysis of the microdata will allow for more detailed understanding about the MPI status of those in the P20.

Comparative wealth index

As mentioned previously, the wealth index used in the DHS and MICS surveys is based on a principal component analysis of assets owned by those in each country. It is established at a country level and is not meant to be internationally comparable. A 2014 paper by Rutstein and Staveteig¹⁷ has generated a comparative wealth index. The aim of the paper is to adjust national income data to understand where it fits in the global spectrum. The basic intuition behind their procedure is to take a country with a median distribution and identify the frequency with which people in that population have a certain set of assets or a basic set of living standards. After identifying four assets to cover basic living standards and four assets to capture higher living standards, they suggest that comparisons can be made by regressing the 8 cut points onto a separate population. Rutstein and Staveteig only employed comparisons for a small number of countries. We sought to replicate this on a global scale. Our results produced some counter-intuitive results. For instance, the poorest family in our global analysis had a car and a refrigerator. Further research is necessary to better explore how to build on Rutstein and Staveteig's research.

One method we attempted was to replicate the principal component analysis conducted at a country level by Filmer and Pritchett to generate the country wealth score on a global level. Our preliminary analysis suggests that these results provide more intuitive results. However, further research is needed.

Conclusion

To best monitor the status of people in the poorest 20% more research is needed. We have selected procedures that face a number of challenges. We have sought to maximise our ability to measure the data as well as possible. There is strong disagreement about what exactly the population of the poorest people in the world look like. Our methods seem to identify a group that is largely consistent with other methods but differs in significant ways. We hope that more data, better research and more open data will allow us to conduct future analysis with greater certainty.

Notes

- 1 World Bank Group, 2016. *Poverty and Shared Prosperity 2016: Taking on Inequality*, World Bank. Available at <https://openknowledge.worldbank.org/handle/10986/25078>
- 2 The Bank determined that \$1.90 [PPP 2011] should be the IPL by averaging the national poverty lines of 15 low income countries. Countries establish poverty lines using a variety of methods but generally they are meant to capture the minimum amount of money required to subsist in that country. The 15 countries included in the World Bank average show a fair amount of variance. Tanzania's national poverty line was the lowest among the group at PPP\$0.88 2011.
- 3 Edin, K and Shaefer, L, 2015. *\$2.00 a Day: Living on Almost Nothing in America*, Houghton Mifflin Harcourt.
- 4 In this case, we refer to income when, in fact, many official poverty numbers are measuring consumption. There is vibrant debate about what best captures poverty. Those who are poor as measured by income may be different from those as measured by consumption. Ultimately, we determine to rely on the World Bank methodology to make use of the best poverty survey available for each country, regardless of whether it is measuring income or consumption.
- 5 Krishna, A, 2010, *One Illness Away: Why People Become Poor and How They Escape Poverty*, Oxford University Press.
- 6 Chronic Poverty Advisory Network. The Chronic Poverty Report 2014–2015: The road to zero extreme poverty. ODI 2014, page 2, Figure 1.
- 7 Datt, G. and Ravallion, M., 1992. Growth and redistribution components of changes in poverty measures: A decomposition with applications to Brazil and India in the 1980s. *Journal of development economics*, 38(2), pp.275-295
- 8 Jerven, M., 2013. *Poor numbers: how we are misled by African development statistics and what to do about it*. Cornell University Press
- 9 Deaton, A. and Kozel, V., 2005. Data and dogma: the great Indian poverty debate. *The World Bank Research Observer*, 20(2), pp.177-199.
- 10 Carr-Hill, R., 2013. Missing millions and measuring development progress. *World Development*, 46, pp.30-44.
- 11 Deaton, A. and Kozel, V., 2005. Data and dogma: the great Indian poverty debate. *The World Bank Research Observer*, 20(2), pp.177-199
- 12 Deaton, A. and Aten, B, 2015, *Trying to Understand the PPPs in ICP 2011: Why Are the Results So Different?* NBER Working Paper No. 20244.
- 13 Rutstein and Staveteig (2014) have proposed a methodology for making international comparisons with national wealth index numbers. They have only demonstrated its techniques across a small set of countries. There are a number of potential challenges when making the comparison broader.
- 14 Filmer, D and Pritchett L, 2001. 'Estimating Wealth Effects without Expenditure Data – Or Tears: An Application to Educational Enrollments in States of India', *Demography*, 38(1): 115–132.
- 15 We have conducted some preliminary analysis of the correlation between these measures. On the individual level, there seems to be little agreement about who are the poorest in an upper middle income country as calculated using income, consumption and wealth indexes.
- 16 World Bank, 2017. *Monitoring Global Poverty: Report of the Global Commission on Global Poverty*, World Bank, page 112. Available at: <https://openknowledge.worldbank.org/handle/10986/25141>
- 17 Rutstein, S.O. and Staveteig, S, 2014. *Making the Demographic and Health Surveys Wealth Index Comparable*. DHS Methodological Reports No. 9. Rockville, Maryland, USA: ICF International. Available at: <http://dhsprogram.com/publications/publication-MR9-Methodological-Reports.cfm#sthash.iO4wAmOG.dpuf>

Annex 2: Nutrition and wellbeing methodology

Measuring whether people are getting better nourished

Better nutrition underpins health and the ability to learn and earn. Stunting – a lifelong consequence of malnutrition – is both a symptom of past deprivation and a predictor of future poverty. The second SDG is to end hunger and ensure access to safe and nutritious food for all, especially people who are poor and in vulnerable situations, and to end malnutrition in all its forms, including achieving the targets for reducing stunting. That is why nutrition, and specifically stunting, have been chosen as bellwether indicators, able to reveal whether people in the P20 are getting better nourished.

There is a long history of food consumption and nutrition being identified as a key measure of wellbeing. One of the first major antipoverty programmes was the Speenhamland system in England (begun in 1795), which sought to ensure that low income families would have enough money to purchase bread.¹ Estimates of the money required to purchase food adequate to survive continue to play a major role in the development of national poverty lines, which in turn influence the international poverty line.² The latest estimates suggest that the minimum amount of money required to provide adequate calories and a balanced diet would be 2011 PPP\$1.59 per person per day.³ However, trends in nutrition can diverge with trends in income.⁴ Nutrition can be closely linked to political circumstances, cultural preferences, weather, water and sanitation, disease incidence, plans for the future, gender norms, activity levels and many other factors that may be quite independent of income levels.

The SDGs give a much higher priority to nutrition than the Millennium Development Goals did. The goal of SDG2 is to end malnutrition in all its forms everywhere, including ending hunger, achieving food security and improving nutrition and promoting sustainable agriculture. It includes nine indicators. The first indicator, the prevalence of undernourishment, is calculated based on ‘food balance sheets’. Calories available at the national level are estimated and then a model is used to calculate what food might be available based on inequality estimates in the country. These inequality measures are not based on observed nutritional inequality but on income or consumption inequalities, whereas the evidence shows that nutritional patterns differ significantly from income patterns. The method is also based on national-level data that are highly modelled making it impossible to disaggregate by different parts of the population with much accuracy. As a result the data does not reveal whether people in the poorest 20%, or women or older people, are consuming fewer calories than the rest of the population.

SDG indicator 2.1.2 measures food insecurity using the Food Insecurity Experience Scale (FIES). This scale, developed by the Food and Agriculture Organization (FAO), includes eight questions that can be implemented during a survey. The FIES module has been part of government surveys in several countries and has been included in the Gallup World Poll in conjunction with the FAO. Unfortunately, the data for this measure is not easily available and it is not clear to what options are available to link household wealth to FIES data. It is also not clear what disaggregations are possible with the data.

Wasting

One of the longest-standing and most widely-measured indicators of nutrition is wasting – low weight for age. Wasting is technically defined as being two standard deviations⁵ below the median weight for age (WAZ) for children under 5. Children are not compared against the median weight for their country or for the world but the median height compared with a standard developed by the World Health Organization (WHO). The current standards were set based on a WHO study carried out from 1997 to 2003. The WHO Multicentre Growth Reference Study drew on data from 8,500 children from Brazil, Ghana, India, Norway, Oman and the US to update the standards first set in the 1950s.⁶ The group in the study excluded children at high risk of malnutrition. Consequently, the WHO reference group median is likely to be well above the actual global median for height and weight.

Wasting is an indicator of acute (as opposed to chronic) under-nutrition. While people may experience wasting for long periods of time, wasting may also be a temporary condition. When children are underweight, they are more likely to experience illness, suffer from other forms of malnutrition and face a higher risk of death. Wasting is generally measured using WAZ; however, it can also be assessed using mid upper arm circumference. Data on wasting is collected as part of DHS and MICS surveys with some frequency but is generally not measured as frequently as stunting.

Stunting

Stunting – low height for age – is probably the most widely analysed indicator of nutritional wellbeing and is included as SDG indicator 2.2.1. Stunting is defined as being two standard deviations below the median in the WHO guidelines. Unlike wasting, stunting is generally regarded as a chronic condition. Those who experience stunting before the age of two are likely to be shorter for the rest of their life⁷ and to have reduced cognitive development, school achievement and labour productivity.⁸ Stunting is also known to be related to poor neural development, though it is not clear exactly how.⁹ A woman experiencing stunting is more likely to have complications with childbirth because she is more likely to have a smaller pelvis. She is also more likely to have children with smaller birth weights, creating intergenerational risks.

Malnutrition is not only about being underweight. In many countries there is a double burden of malnutrition including both people who are underweight and who are overweight. There is also data that suggests that people who are living with stunting are more likely to suffer obesity later in life.¹⁰

The relationship between income and nutrition is complicated. The economist Angus Deaton explains that height is determined by a combination of genetics and net nutrition. Income can contribute to the gross nutrition consumed but nutrition can be lost through high activity levels, diarrhoeal diseases or other diseases that consume nutrients.¹¹ In fact, there is some evidence that among developing countries higher average incomes are associated with lower average heights, suggesting that a range of factors are likely at play in determining stunting.¹² Since the P20 measure can readily be applied to different measures of wealth, income and consumption, a natural question is whether it can as easily be applied to height-for-age measurements – in other words whether it is possible to identify the poorest 20% of people ranked by height for age. The main measures used in DHS and MICS surveys do not actually show where a child falls within any real population. Rather, each child is compared against the WHO growth recommendations for healthy children based on a subset of healthy children in a few countries.

It would be fairly straightforward to adjust the z-scores to reflect the actual distributions observed in a country, but it would be a much bigger challenge to create a global distribution of heights-for-age. The surveys used in our analysis were conducted anytime between 1996 and 2014 and not all of them have measured heights. Additional data from countries not surveyed would also be required to create a global distribution of heights for age.

The P20 Initiative is about focusing political attention on people who are missing out on progress. To do that, it is useful to have data that is regularly updated, so that policymakers and others can have early warning where things are not going in the right direction. PovcalNet allows for adjustments to P20 headcounts each year in most countries so we can trace what is happening to the incomes of people in the poorest 20%. DHS and MICS surveys only produce new stunting estimates every few years when new survey data has been released. The methods used for this analysis do enable stunting comparisons between the P20 and the rest of the population to be produced every year.

As a specific example, the China Family Panel Studies (CFPS) 2012 survey reports a national stunting rate of 15.9%. The survey has not produced data for 2013. However, the 2013 consumption data in PovcalNet suggests that 6.2% of China's population is in the P20. Therefore, an analysis of the bottom 6.2% of people in the CFPS compared with the rest of the population can produce a reasonable approximation of the difference in stunting between the P20 and the rest of the population in 2013. For China, this method indicates that 37.5% of the children under 5 in households in the P20 experience stunting, compared with 15.3% for the rest of the population in 2013. Of course, between 2012 when the CFPS was conducted and 2013, stunting rates likely changed both within the P20 and elsewhere. However, data limitations do not allow for clear methods for filling these gaps.

The P20 bellwethers are not comprehensive or conclusive findings – but signals that sound a warning bell if things are not moving in the right direction. There is a large gap in stunting incidence rates between the P20 and the rest of the global population. Some 44% of children under 5 in the P20 experience stunting. The latest estimates from the joint UNICEF, WHO and World Bank dataset indicate that 23% of children globally experience stunting. This suggests that the P20 represents 35% of the share of stunting despite being only 20% of the population. Furthermore, in almost every country, better educated mothers are less likely to have stunted children and the P20 show higher stunting rates than the rest of the population.

Based on the trends seen between 1990 and 2015 and the WHO projections, dramatic change would be required to eliminate stunting by 2030. Extending WHO projections forward, stunting is not on track to be eliminated until 2078.

As an additional assessment of the health status of those in the P20, the body mass index can be calculated for surveys where adults were measured. This data was collected for some surveys, providing estimates for 45 countries with a combined female population aged 15–49 of 1.15 billion. Based on WHO weight categories, women have been identified as being in a normal range, thin, pre-obese or obese.

The results indicate that, at least among this subset of women in the P20 and women the rest of the population, those in the P20 experience higher rates of mild, moderate and severe thinness. Our preliminary analysis of an even smaller subset of 13 countries that weighed men in their DHS modules, representing about 685 million men, suggests that men in the P20 are much more likely to be thin or severely thin than those in the rest of the population.

Table A2

WHO weight category among adults for the P20 and the rest of the population

	Women		Men	
	P20	Rest of population	P20	Rest of population
Severe thinness	5.7%	3.3%	6.8%	4.6%
Moderate thinness	7.8%	4.6%	10.7%	6.3%
Mild thinness	18.9%	11.2%	26.8%	16.0%
Normal range	59.0%	51.9%	53.6%	58.7%
Pre-obese	6.9%	19.4%	1.9%	12.2%
Obese class I	1.3%	7.0%	0.1%	1.8%
Obese class II	0.3%	1.9%	0.0%	0.2%
Obese class III	0.2%	0.7%	0.0%	0.1%

DHS and MICS also collect some data on other nutrition-related indicators. For instance, in some surveys, they test salt used in the household for iodine. They also take blood samples for anaemia, vitamin A supplementation, breastfeeding, and the introduction of solid foods among infants. In future analyses, we will explore these measures in further depth.

Notes

- 1 For an extensive discussion of this programme, see Ravallion, M, 2016. *The Economics of Poverty: History, Measurement, and Policy*.
- 2 For an extended discussion of nutrition requirements and poverty measurement see World Bank, 2017. *Monitoring Global Poverty*, pages 124–34.
- 3 Kakwani, N. and Hwa Son, H, 2016. *Measuring Food Insecurity: Global Estimates, Social Welfare Functions and Development*, pages 253–94.
- 4 Coffey, D, Deaton, A, Dreze, J, Spears, D and Tarozzi, A, 2013. 'Stunting Among Children: Facts and Implications.' *Economic and Political Weekly*, 48[34]: 68–70.
- 5 A standard deviation is defined as the square root of the variance (a measure of the distance from the mean). In a normal distribution, two standard deviations above and below the mean provides the 95% confidence interval. The Z score indicates how many standard deviations a point is from the mean. For example, in a normal population, someone with a z-score of -2.0 would be at the 2.5 percentile.
- 6 The WHO Multicentre Growth Reference Study [MGRS], Available at: <http://www.who.int/childgrowth/mgrs/en/>
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Annex 3: Civil registration and vital statistics methodology

Income and nutrition focus to a large extent on meeting basic needs and enabling people to take up opportunity. However, the third P20 bellwether, civil registration and vital statistics (CRVS), represents a basic political right and an essential building block for data to leave no one behind. Birth registration by a civil authority is an SDG indicator under Goal 16 for building peaceful and inclusive societies, while achieving 100% birth registration and 80% death registration is the final indicator of the SDGs under Goal 17 to strengthen the means of implementation.

For everyone to be included in progress, everyone needs to be counted – and to count in the eyes of their government. CRVS systems are the bedrock of population data and the basis for legal identity and for citizens to be recognised by their government.

A functioning civil registration system provides continuous data on the population and allows services to be planned and delivered. It tracks key events in the lives of a country's citizens and typically includes birth registration, death registration, marriage and divorce. The P20 bellwether, used to see if progress is going in the right direction, is birth registration. It is the most basic element of CRVS systems and the most widely-available indicator. The P20 bellwether can only feasibly be carried out as a comparison of CRVS status for those in the P20 and the rest of the population. Conceptually, it would not be possible to identify the 20% of people most deprived of CRVS status.

Birth certificates and government records of a birth are frequently required as proof of citizenship and children should receive a certificate soon after their birth. The right to nationality is part of the Universal Declaration of Human Rights¹ yet many children never receive a birth certificate. In some cases this is part of government policy for political reasons² but more often the consequence of inadequate resourcing and the absence of a functioning CRVS system.

UNICEF collects data on birth registration based on reports from national systems. This will typically include the data from the national statistical offices or administrative data systems. Countries may collect this data using household surveys, administrative data systems or censuses. For about 100 countries, the data is taken from household surveys, indicating that the administrative data systems are not adequate to report the rates. The DHS and MICS surveys include the most widely used way of measuring this data: they ask if the birth has been registered. Secondarily, the surveys ask if the family has a birth certificate and the interviewer then asks to see the birth certificate.

Only 34% of children under 5 in the P20 have a birth certificate compared with 65% of the global population based on the most recent estimates from UNICEF. The P20 account for 55% of the unregistered births of children under 5 worldwide.

Studies of CRVS systems have pointed out that women and girls who are not registered can face particular disadvantages. When marriages are not registered, women may not be able to register their children's births³ or inherit property. Disaggregated data reveals that while gender gaps in birth registration are minimal in most countries, in some contexts, boys are more likely to have identity cards than girls.⁴ Similarly, gender inequality can be particularly pronounced in death registration.⁵

Another important dimension of CRVS is the registry of deaths. Many deaths are never reported and the causes of death are rarely discovered. As a result of the poor state of CRVS systems, deaths are usually estimated using approximations, including surveys, combined with national-level data such as GDP.

An area of optimism in the domain of CRVS system improvement is the development of identification cards. India's biometric ID system has increased the official registration of millions of new people.⁶ The World Bank has committed significant energy to promoting identity for development,⁷ and identification programmes can be a powerful tool for ensuring that births, deaths, marriages and divorces are registered.

Improved performance in functioning CRVS system is often best facilitated by improved administrative systems. A well-functioning ministry of health, for instance, is more likely to monitor births and deaths and to identify causes of deaths. Developing these administrative data systems is a sustainable investment in improved population data and statistical capacity.

Although civil registration confers legal identity, being counted through a government system does not always lead to more responsive government and greater access to government services. Governments have used identity cards and registration systems to exclude and oppress certain ethnic or religious groups⁸ as well as to target and plan services. As with most other indicators, we will track progress on this indicator within the broader context. The risks of certain groups being excluded despite being tracked through CRVS should be apparent through the disaggregation of the other bellwether indicators.

Notes

- 1 Universal Declaration of Human Rights, Article 15 states 'Everyone has the right to a nationality.'
- 2 For instance, children of Haitian descent born in the Dominican Republic or the Rohingya in Myanmar may be particularly likely to be excluded from CRVS systems for political reasons.
- 3 Plan International, 2012. *Mother to Child. How Discrimination Prevents Women Registering the Birth of their Child.* Available at: <https://plan-international.org/publications/mother-child-discrimination-and-child-registration>
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Annex 4: Disaggregated data

Disaggregated data is a critical component of the goal to leave no one behind. People can be excluded from progress as a result of many dimensions of poverty. But they can also be excluded because of their identity. Leaving no one behind requires data that goes beyond the level of the household, to identify individual people and groups likely to be excluded as a result of identity.

SDG target 17.18 requires significant increase in the availability of high quality, timely and reliable data disaggregated by income, gender, age, race, ethnicity, migratory status, disability, geographic location and other characteristics relevant in national contexts. The P20 Initiative is focused on a minimum set of standard disaggregations that would enable data to be joined up to reveal who is being included in progress. This minimum set is quintile, gender, geography, age and disability – QGGAD for short. These five elements are widely recognised as important and although there are real data challenges, they are less politically sensitive and easier to define than some other dimensions. They therefore represent a good starting point for measuring progress.

Disaggregated data reveals the differences between people – between women and men for instance, or between older and younger people. But there are also significant data gaps. If data is not collected in the first place, it cannot be disaggregated and there are issues of significance to some groups that require different data to be collected.

Disaggregated data also needs to be joined up. People do not just have one identity – we have many and they intersect with each other. People are advantaged or disadvantaged as a result of their sex or gender identity, their age, their income, where they live, their ethnicity or religion so the data needs to be capable of being used in a way that reveals a more holistic picture of the forces shaping people's choices and opportunities.

There are two dimensions of inequality that are relevant to measuring progress: vertical and horizontal. Vertical inequality is a measure of differences between households. Horizontal inequality measures differences between groups of people. Vertical inequality is measured by comparing the status of households but horizontal inequality is primarily measured through disaggregated data that reveals the status of individual and groups based on their identity. Horizontal inequalities are frequently masked by national or household averages. They can be uncovered by disaggregating the data and seeking to fill the data gaps.

The P20 Initiative will be monitoring the extent to which QGGAD disaggregations are included in the major datasets. The baseline starting point is set out in Table A2.

Table A3

Do the major datasets include QGGAD disaggregations?

Data source	Income	Sex and gender	Geography	Age	Disability
PovcalNet	Yes, with great precision, although income and consumption are treated as the same	No	China, India and Indonesia show urban/rural split but no countries have subnational data	No	No
DHS	Wealth but not income	Yes, but wealth defined at household level. Most questions focus on women and children. Most questions focus on sex, not gender identity	Yes, almost all countries provide GPS coordinates	Yes, for education. Few questions on people aged 5–14 and over 49	11 of the 56 DHS surveys in our sample have some questions about disability
MICS	Wealth but not income	Yes, but wealth defined at household level. Most questions focus on women and children. Most questions focus on sex, not gender identity	Yes, but GPS coordinate data is not provided	Yes, for education. Few questions on people aged 5–14 and over 49	5 of the 41 MICS surveys in our sample have some questions about disabilities

These data sources were set up with different objectives and the extent of disaggregated data partly reflects the purposes for which they were established. However, they are all major sources for measuring progress under the SDGs and need to be able to reveal who is included and who is left behind.

- PovcalNet is not based on a standard dataset. The microdata underlying PovcalNet is taken from household income and expenditure surveys carried out by national statistical offices or other government agencies. These surveys are reviewed by a committee at the World Bank that determines whether the methods are sufficiently sound and comparable to be included in PovcalNet. Living Standards Measurement Study [LSMS] survey microdata allow for disaggregation by age, sex, geography and potentially disability. However, the World Bank does not own the microdata, it is owned by the countries in which these surveys were conducted and the World Bank is restricted from making it publicly available.¹ The World Bank disseminates some of the microdata from a few surveys used for PovcalNet through its LSMS² but the presentation of the data in PovcalNet does not allow disaggregation by gender, geography (except rural/urban distinctions for three countries), age or disability.
- Household income and expenditure surveys measure income or consumption or wealth at the household level, rather than the individual level. Consequently, when household wealth, consumption or incomes are calculated they show equal wealth levels between men and women. But household averages can miss inequalities across groups; among families in Senegal, for instance, household averages are reported to misidentify about a quarter of people who are poor.³ Similar issues, though likely to a lesser extent, apply to age and disability. It is clearly difficult to determine how evenly household wealth is shared among members of the household and significant changes will be required to gather this data.⁴ The World Bank Commission on Global Poverty encourages the World Bank to support additional research on this topic.

- The DHS and MICS surveys were not set up with the main objective of providing data to compare progress of groups. Both are primarily focused on young children and women of reproductive age. Consequently, the surveys ask few questions about men, children older than 5 and women older than 49. In order to disaggregate data to leave no one behind, new methods and new tools are required – including standards for disaggregation that will allow different sources of data to be joined up.

Income quintile

The basic premise of the P20 requires disaggregation by quintile because it is about identifying the poorest 20% of the world's population. The SDGs are universal; they are not achieved unless achieved for everyone, so identifying those who are and are not included in economic progress is essential. As the methodological note on income describes, this is not readily done with most existing datasets, particularly when comparing across countries and time (see Annex 1: Income methodology).

Gender

Understanding the differences that arise from sex and gender identities is fundamental to policies and investments that reach everyone. Sex disaggregation reveals the differences between men and women; gender identity covers a wider range of issues.

The three main data sources do not disaggregate household wealth and income by gender or sex. DHS and MICS surveys are focused on sex not gender, and primarily on women, rather than on data that disaggregates progress and shows the difference between men and women. There are questions about gender relations, but not gender identity, in these surveys. It is rare for surveys or censuses to record gender identity.⁵

The current data does not show a clear gap between men and women in the three bellwethers of income, nutrition and birth registration – but this in itself reflects the limits of the data that is currently collected and available. Data2X has produced a list of 28 gender data gaps across a range of sectors.⁶

Examples of differences revealed by sex and income disaggregation include the following:

- Among men and women over 25, women are less likely to have completed primary education. The gap between men and women is wider among the P20 than the rest of the population.
- Preliminary research shows that women in the P20 are more likely to have had a sister who died as a result of pregnancy or childbirth.
- In some countries, women in the P20 are more likely to have experienced female genital mutilation/cutting; in other countries, the opposite trend is observed.
- Among countries with DHS surveys, men in the P20 and men in the rest of the population were equally likely to report that they were working but there was a significant difference among women – 48% of women in the P20 reported that they were working compared with 39% of women in the rest of the population.
- 65% of the women in the P20 report that they worked in agriculture compared with 58% of the men and with 29% of women in the rest of the population.

Other dimensions including time use surveys and measures of political rights and economic empowerment can expose gaps that may not be apparent across other indicators.

Geography

National averages can mask significant inequalities within geographical divisions. For instance, people in rural areas are much more likely to be in the P20 than those in urban areas. The DHS wealth index is calculated separately for urban areas and rural areas and then adjusted to make the two more comparable. Even so, the wealth index estimates larger differences between urban and rural areas than PovcalNet. PovcalNet has substantial difficulty distinguishing between the cost of living in urban areas and rural areas. This is a particular challenge in areas with large suburban populations. There is also some evidence that urban areas are significantly miscounted in many household surveys.⁷

There are also important geographical differences between subnational geographic regions.

- PovcalNet does not publish any data on poverty disaggregated by subnational units.
- Some LSMS surveys include GPS coordinates for where surveys were conducted.
- Most LSMS surveys include some data on the subnational location.
- Sampling procedures for DHS and MICS surveys are such that they are designed to be representative of populations in subnational survey regions. Survey regions are defined differently in different countries. Uganda has more than 100 districts (1st administrative level) but 11 survey regions. In India every state or territory (1st administrative level) has its own survey region with a couple of exceptions. The number of survey regions is determined by the country.

Many DHS surveys also provide GPS coordinates for each survey cluster. To protect the privacy of respondents, the GPS coordinates are randomised within a 3km radius for urban cluster and within a 5km radius for rural clusters. It is not possible to know where a cluster falls within a city; however, the GPS points provide a much more detailed image of what variation exists within an area. Mapping the P20 headcounts for each cluster on a world map shows the high degree of variation that exists. This method also highlights some of the shortcomings with the methods used for this analysis. For instance, the subnational data calculated shows that Kampala, Uganda does not have anyone in the P20. In truth, Kampala has people below the national poverty line and international poverty line.⁸

Geographic estimates of poverty have significantly expanded in recent years through the use of satellite and call data records. Satellite data is promising because it is globally available without the logistical problems of fielding a survey and satellite images are not subject to the kind of biases faced by survey enumerators.

Although satellite data adds value,⁹ it will not be able to provide as nuanced an image of household consumption patterns as sitting down with a family for two or three hours and it cannot provide any disaggregation by income, gender, age or disability. What it can do is provide some valuable information on countries that do not currently have data, particularly those with few national surveys. In Somalia¹⁰ satellite data was used to increase the speed with which a household survey could be done.

Data from cell phone use has been applied to try to estimate poverty headcounts in some countries.¹¹ This tool can also provide precise geographic estimates of where some people live but cannot yet provide very precise estimates of their welfare.

A census can provide information on poverty disaggregated to the smallest geographic unit: the household. This provides a powerful tool for policymakers but there are limitations to this source of data. As a matter of policy or practice, censuses can miss many groups of people who are likely to be left behind. Censuses generally use proxy means testing which asks a few questions that are taken as being good predictors of whether or not someone is in poverty. These proxies are valuable for targeting, even if they are not as accurate at measuring poverty as income or consumption measures.

Making this wide range of subnational data accessible and interoperable is already offering much better information for designing policies and prioritising investments than has previously been available.

Age

Data on the age of the population and on the status of different age groups is necessary to include everyone in progress. Different data is also needed for different age groups and there are currently significant gaps in the data required to ensure that everyone of every age is included.

Poverty is sometimes seen as applying differently to younger and older people. For instance, older people and children may not require as many calories as middle-aged adults. Therefore, some measures of poverty will have a lower poverty line for children than for adults. PovcalNet does not make such adjustments and as a result, poverty measurements in the P20 Initiative are currently reported in simple per capita numbers.

Because wealth, income and consumption are defined at the household level, it is difficult to disaggregate by age and show income for different age groups. However, there is some evidence that households in the P20 are more likely to include children and older people than households in the rest of the population.

Many of the measures in the DHS and MICS focus on women between the ages of 15 and 49 but some specific questions target all members of the household.

- For each member of a household, DHS and MICS will record their age, relationship to head of household, marital status, whether they regularly stay in the household and highest level of schooling completed.
- For children under 5, additional questions are asked in many surveys about immunisations, breastfeeding, height, weight, birth registration status, birth certificate and a number of other indicators.
- Women and men aged between 15 and 49 are asked many questions about reproductive health and domestic violence. But there is data on these issues for children younger than 15 and people older than 49.

In almost all countries, the data on older people is limited. Older people tend to be a small proportion of the total population, particularly in sub-Saharan Africa. To collect better data on them, larger sample sizes would likely be required. Furthermore, older survey interviewers are needed to improve survey responses, particularly around sensitive questions. All of this requires more resources. However, in some countries, this work has been done. In Namibia, the Maldives, Haiti, Cameroon and South Africa, DHS surveys have or will have expanded their sampling frames to include people over the age of 49 in their women's or men's questionnaires.

There are other issues of concern for older people and children that are not covered by these surveys. Issues related to neglect, abuse, disability, non-communicable diseases and social pensions are all data gaps that are important for older people.¹² UNICEF has produced a clear outline¹³ of the data availability and data challenges related to the progress of children under Agenda 2030.

An alternative to adding these questions to DHS and MICS surveys is to create new survey tools. For instance, WHO's Study on Global Ageing and Adult Health [SAGE] focuses primarily on people over 50. This programme has led to nationally representative surveys in China, Ghana, India, Mexico, Russia and South Africa. In future work, the connection between P20 data and SAGE data will be explored in further depth.

One particularly common tool for analysing age data is Whipple's Index. The index is a test of the quality of age data in a dataset. Data with inaccurate ages is more likely to see ages that end in a 0 or a 5. For instance, if a person's age is incorrectly recorded, it is more likely to be reported as 40 rather than 39 or 41 or it will be reported as 35 rather than 34 or 36. The Whipple Index finds the share of ages that end in a 0 or a 5 and multiplies them to get an index.

A Whipple Index between 100 and 105 would generally be considered clean data. A Whipple Index of 175 would be very messy. Among the DHS and MICS surveys in our dataset the total Whipple Index is 141. For the P20, the Whipple Index is 153 while for the rest of the population in our survey data, it is 124. This suggests that the data is notably less accurate for those in the P20 than among the rest of the population. This could be related to the relatively smaller number of people in the P20 who have had their births registered and their actual age not being known for certain.

Disability

Data on disability measurement has been greatly enhanced by the Washington Group 'short set of questions' on disability measurement. These questions are focused on the level of difficulty people report in carrying out a number of activities. The questions cover seeing, hearing, communicating, remembering, taking care of oneself and mobility. This set of questions does not cover all disabilities but provides a basic framework to understand the impact of disability.

To date these questions have generally not been included in DHS or MICS surveys but in Uganda they were included in a DHS survey. This data reveals the differences between people in the P20 and the rest of the population [see figures 27 and 28]. Sampling error and chance mean that there are large confidence intervals for the disabilities in the sample.

There is a complex relationship between disability and other aspects of identity such as age as well as with the environment and poverty so it is important to be able to disaggregate by a range of different, intersecting issues. Disability can be strongly linked with old age and if poverty results in significant gaps between the life expectancy of the P20 compared with the rest of the population, the correlation between poverty and disabilities could be weakened or flipped. Researcher Daniel Mont has found that in Viet Nam, disability is more closely linked with poverty when limiting the scope to a smaller age group. He has also found that geography has a lot to do with how disability is experienced.¹⁴

The DHS Program has officially adopted a disability module. The module will be part of the DHS surveys for Angola, Haiti, South Africa, Timor Leste and Uganda.¹⁵ Similarly, the MICS program has developed a module with the Washington Group on child disability. Future analysis of the P20 by disability status will benefit significantly from these new data sources.

Notes

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the P20 initiative – data to leave no one behind

The P20 Initiative is focused on how the Sustainable Development Goals [SDGs] set out in the 2030 Agenda for Sustainable Development [Agenda 2030] can work with the data revolution to deliver progress for the poorest 20% of the world's population – the P20.

Agenda 2030 includes specific commitments to end extreme poverty and ensure that no one is left behind. The logic is clear: for these goals to be met, it is essential to know who the people in the poorest 20% are and whether they are included in global progress.

Existing statistics help to track national averages but they do not focus enough on who is included and who is left behind. In any country, if the status of the P20 fails to improve, success on Agenda 2030 will be out of reach – regardless of overall progress at national level.

The P20 Initiative promotes data that puts people first. It focuses on simple measures, drawn from the SDG framework, that assess the progress of the people in the poorest 20% of the world's population to ensure that those furthest behind are benefitting from efforts to tackle poverty and improve growth.

The P20 Initiative puts forward three 'bellwether' indicators to maintain a focus on one big question – are the poorest 20% of people getting their share of global progress? To answer this question, the P20 Initiative will track over time if the people in the poorest 20% of the world's population are better off, better nourished and counted by their governments.

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We work to ensure that decisions about the allocation of finance and resources result in an end to poverty, increase the resilience of the world's most vulnerable people, and ensure no one is left behind.

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