BILL & MELINDA GATES *foundation*

GOALKEEPERS

2022 REPORT

The Future of Progress

Halfway into the Sustainable Development Goals era, it's time to change our approach

Goalkeepers is dedicated to accelerating progress toward the Global Goals

In 2015, 193 world leaders agreed to 17 ambitious goals to end poverty, fight inequality, and stop climate change by 2030. Goalkeepers focuses on accelerating progress toward those goals, with a particular focus on Goals 1–6.

Seven years in, the world is on track to achieve almost none of the goals. But failure is not inevitable—if we collectively challenge our assumptions about how global progress is achieved.

Overleaf: A farmer checks corn from her latest harvest of hybrid climate-resistant corn seed in Machakos, Kenya.

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Introduction

By Melinda French Gates and Bill Gates
Co-Chairs, Bill & Melinda Gates Foundation

We are data people, and this is a data report. Sort of.

In 2015, leaders from 193 countries agreed to the Sustainable Development Goals—the SDGs. These were big, bold objectives we wanted to achieve by 2030, everything from ending poverty to achieving gender equality. And each year, this report attempts to answer the question, "How is the world doing?" We want people to grasp what the numbers say about the trajectory of human progress.

But this year, we think it's just as important that people understand what the numbers **cannot** say about progress.

Because there are two important things no data point in this report fully reflects: **crisis** and **innovation**.

When development experts around the world hammered out the SDGs seven years ago, they had no idea that in four years' time, a novel virus would jump into the human population, sparking a once-in-a-century pandemic. They didn't anticipate that wars would begin in Ukraine or Yemen—or that from Afghanistan to the United States, the rights of women would be hurled back decades.

As it stands now, we'd need to speed up the pace of our progress five times faster to meet most of our goals—and even that might be an underestimate, because some of the projections don't yet account for the impact of the pandemic, let alone the war in Ukraine or the food crisis it kicked off in Africa.

As bad as the data makes it seem, the real situation might be even worse.

Or it might be better.

Because what's also not reflected in the numbers is the potential for human ingenuity.

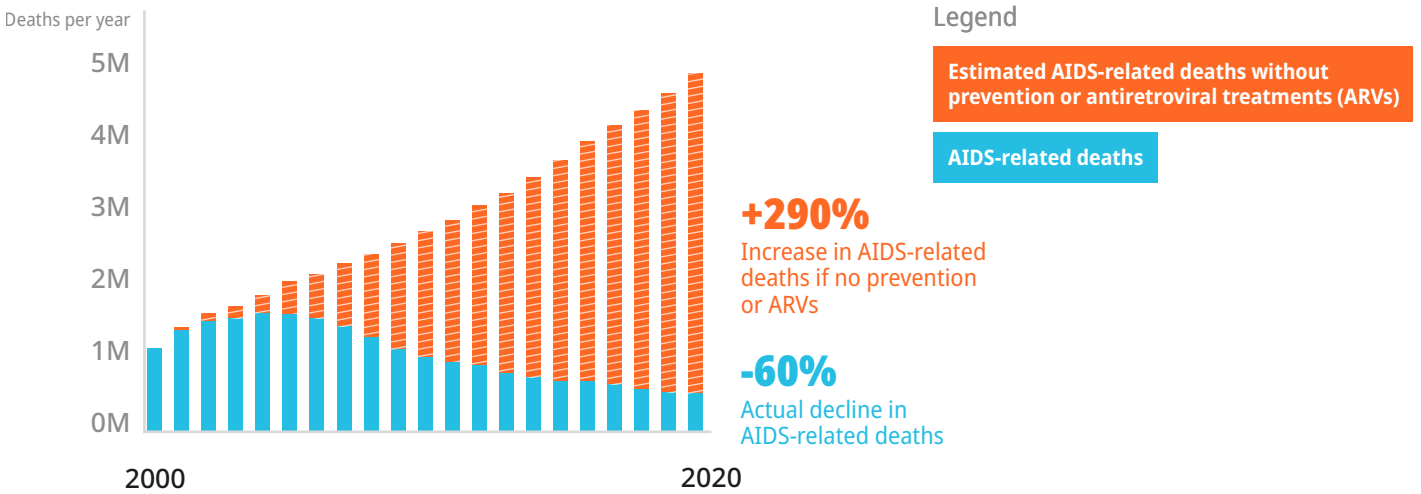
No projection can ever account for the possibility of game-changing innovation because when those breakthroughs happen, they change all the fundamental assumptions embedded in that equation. The math breaks down (in a good way).

Look what happened with HIV.

Before the Sustainable Development Goals, there were the Millennium Development Goals—the MDGs—and one was reversing the spread of HIV/AIDS. This seemed impossible at the time, but thanks to the hard work and ingenuity of a coalition of advocates, governments, and others, we rapidly accelerated progress. From 2000 to 2020, we saw a nearly 60% reduction in yearly deaths.

A dramatic shift toward progress in the HIV/AIDS epidemic

AIDS-related deaths



We believe it's possible that one day we will look back at the data in this report the same way we look at the AIDS data from the turn of the millennium: in disbelief at how quickly and dramatically things turned around.

Human ingenuity can render our careful projections irrelevant and make our boldest aspirations seem timid. In the following essays, we write about how new ways of thinking about two old problems—food security and gender equality—can do just that. Of the 17 SDGs, these two might have the biggest delta between what we're on track to achieve and what we can achieve—because of the potential for breakthroughs.

“Human ingenuity can render our careful projections irrelevant and make our boldest aspirations seem timid.”

—Melinda French Gates and Bill Gates

There are times in history when the path of progress is predictable and linear; when you can predict what will happen tomorrow based on what occurred today. But we do not live in those times.

During the first half of the SDG era, we saw how unexpected crises could set back progress in unanticipated ways.

Will we see the opposite in the SDG era’s second half?

Will humanity show how it can accomplish what everyone previously thought impossible and innovate our way out of a deep hole?

That’s up to all of us.

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https://gates.ly/GK2022

Gender equality depends on women having power, not just "empowerment"

Economic progress for women is stalling worldwide —and COVID-19 is not the only reason why.

by Melinda French Gates
Co-Chair, Bill & Melinda Gates Foundation

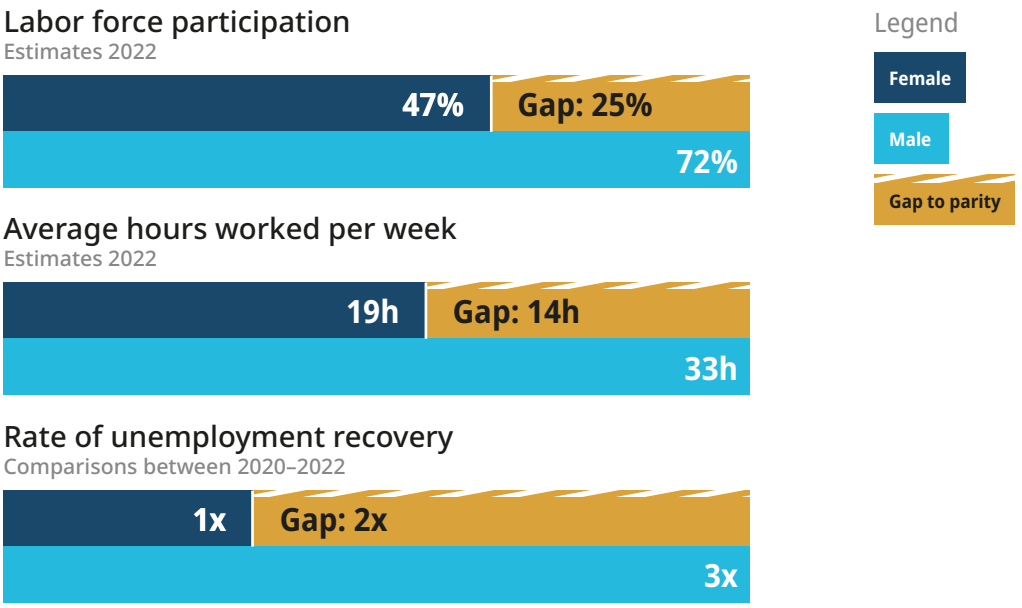
Ahmedabad, Gujarat, India.
© Gates Archive/Mansi Midha

The truth is, we were never on track to reach SDG 5—global gender equality—by 2030. Development experts knew this before they even finalized the goals. But today, halfway to our deadline, progress remains slow, even stalling. Our data partner Equal Measures 2030 now estimates the world won't reach gender equality until at least 2108—three generations later than we'd hoped.

Of course, metrics like "years to gender equality" are imprecise numbers, but they're based on hard, undeniable data about things like health outcomes and economic participation, political representation, and secondary education. And today, that data is screaming one thing: Gender equality is falling further and further out of reach.

Why? One explanation is that big, global shocks like the pandemic disproportionately destroyed women's livelihoods.

The economic side effects of COVID-19



But frankly, blaming COVID-19 alone would be a cop-out. We have to ask harder questions: Why do gender-neutral events like pandemics have gendered effects? And why, after decades of high-profile efforts to improve the lives of women and girls, is equality still generations out of reach?

Here's the honest answer: It's because the world still hasn't focused enough on gender equality—and when it does, it treats symptoms, not the cause.

If you dig beneath the "years to gender equality" metric, you'll see that economic inequality is one of those root causes. The World Bank reported that the difference in expected lifetime earnings between women and men amounted to $172.3 trillion globally even before the pandemic—twice the size of the world's annual gross domestic product.

A woman serves breakfast to her grandson in her home in Mexico City, Mexico.

© Gates Archive/Janet Jarman

Over the years, efforts (including our foundation's) to close this gap have centered around "women's economic empowerment," a shorthand for providing women with jobs or cash. These are proven ways to lift measures of economic equality—but even so, true economic power continues to elude millions of women.

So we've got to keep asking questions: *Once women have this money, can they actually spend it? Or do their husbands hold that power?*

When a woman secures a job, can she actually work and care for her children? Or is she set up to fail?

These questions illustrate the difference between theory and reality. Because when we create policies to change economic indicators, we might not be changing actual lives. We can't just talk about empowering women without making sure they are actually gaining power in their families and communities.

"We can't just talk about empowering women without making sure they are actually gaining power in their families and communities."

—Melinda French Gates

The difference between having money—and being able to spend it

One of the surest ways to build economic resilience is through cash transfers from governments to citizens. During the early days of the pandemic, 1.3 billion people worldwide received emergency cash from their governments.

These emergency transfers are often doled out without regard to gender—which means that men, who are more likely to have government ID or appear on tax rolls, are much more likely to receive the cash. But it's women who usually have the greatest financial need.

Many women in low-income countries earn a living through informal work, which means they have to weather economic crises without a regular paycheck, paid leave, or unemployment insurance. Many of them resort to survival strategies that entrap them in poverty: A 2021 study of women in the informal workforce found that 52% had drawn from savings, 46% borrowed money, and 17% sold or pawned assets to survive the pandemic.

Digital financial tools like mobile money accounts are an efficient way for governments to provide effective gender-intentional cash transfers. And those mobile payments give women more control over their money than a cash payment—because when money is deposited directly into her own online account, it's harder for her husband or anyone else to claim it for themselves.

A health care worker signs up for government digital payments by mobile phone in Mangobo, DRC.

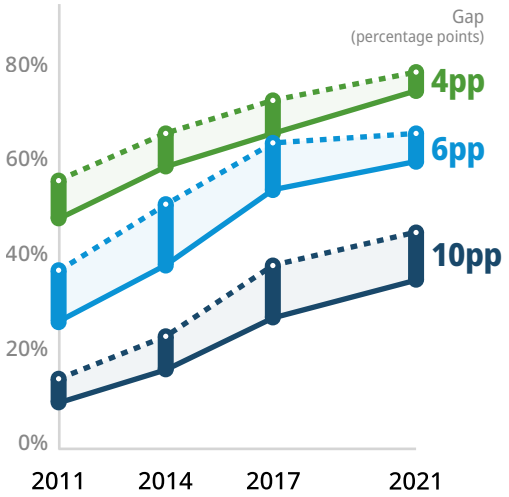
© Gates Archive/Junior Diatezua Kannah

We've seen what happens when women get the opportunity to spend microfinance loans with less spousal pressure: In Uganda, women who invested these disbursements in their businesses saw 15% higher profits compared to those who received their loans in cash. And in Niger, distributing cash transfer payments through mobile money instead of cash meant women were more likely to visit the market, sell grains, and participate in the economy in other ways.

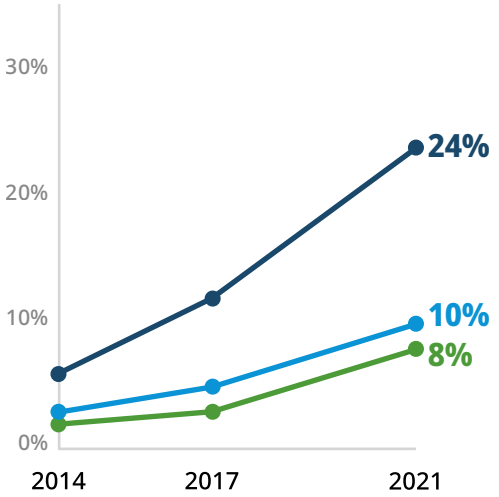
Digital payments pay dividends in surprising ways, too: The World Bank found that a person who receives a digital payment from their government is more likely to take advantage of other financial services, such as saving or borrowing money. And women can use digital tools like smartphones and mobile money accounts to open up avenues to new economic opportunities: getting credit to start or grow a business, accessing knowledge about new products, and connecting to local and global marketplaces.

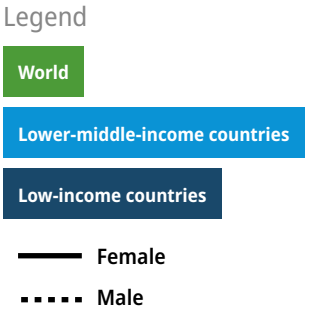
A bright spot of progress—and opportunity

Financial account ownership, female and male



Mobile money account ownership, female





For example, our foundation is working with India's Ministry of Rural Development to digitize the country's Self Help Group program for women. Across India, there are thousands of self-help groups—they're often called "women's empowerment collectives"—where women come together in pursuit of their personal or economic goals. Sometimes, they pool their money to purchase assets and equipment that support their

livelihoods and economic growth. The new digitization process will bring this experience online, allowing women to do bookkeeping, access credit, and even reach new customers via their smartphones.

Digital tools will have the most impact if they're provided along with support, such as digital financial literacy training. A 2019 Abdul Latif Jameel Poverty Action Lab study in India found that when women were trained to use financial accounts they controlled, they were 7% more likely to earn income, had 30% higher earnings, and were more likely to make purchases.

The difference between a job being available—and being able to take it.

But even with the opportunities that digital tools unlock, there remains a systemic barrier for many women who want to earn money of their own.

In June, I visited the Institut Pasteur de Dakar in Senegal, where I met Dr. Billo Tall, the Institut's director of clinical research and data science. She told me that she wouldn't be where she is today if not for the university where she studied making special accommodations to help her care for her infant son.

Dr. Billo Tall (center) shares information with colleagues at Institut Pasteur de Dakar, in Dakar, Senegal.

© Gates Archive/Carmen Yasmine Abd Ali

Dr. Tall's story illustrates a fundamental truth: Women will never have full economic power without real caregiving infrastructure in place. In virtually every society, women are expected to care for children, family members, and homes without getting paid to do it. It's an essential yet undervalued

responsibility that has stopped countless women from entering and thriving in the workforce. In low- and middle-income countries, unpaid caregiving makes up more than half of women's total working hours, meaning they have less time available to earn an income.

Now imagine a world in which a generation of unpaid caregivers became paid entrepreneurs running child care businesses of their own.

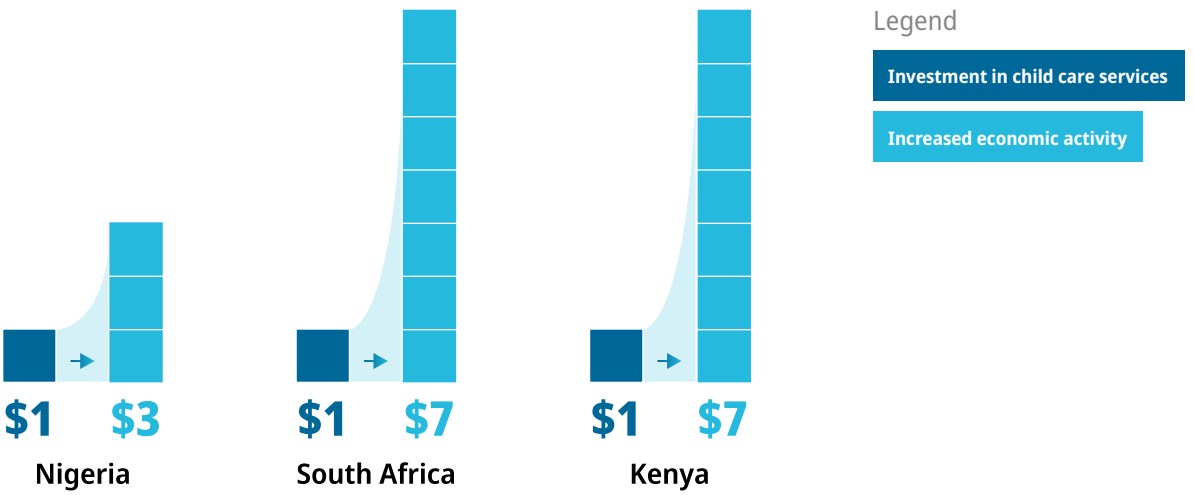
During the pandemic, I spoke with Sabrina Habib, the co-founder of Kidogo, a Kenyan social enterprise organization that partners with Kenyan women running informal daycares. It offers a triple dividend: child care for Nairobi's low-income families, better livelihoods for the "mamapreneurs" providing the care, and more efficient and profitable child care businesses throughout the community. Everyone wins.

What might be possible if similar child care models spread not just throughout the country, but throughout the world?

For starters, it would reap huge economic rewards. Investing in child care infrastructure at scale isn't just essential for a woman's sense of autonomy or even her family's bottom line—it's the smart thing to do for our economies. When our data partner Fraym conducted large, nationally representative surveys in Kenya, Nigeria, and South Africa, they found that if better government child care policies and funding were in place, nearly 15 million women would enter or re-enter the labor force.

A smart investment in women, families, and societies

Return on investment for child care services



Business owner Thia Camara Sy (right) with her staff at WIC Capital, in Dakar, Senegal.

© Gates Archive/Carmen Yasmine Abd Ali

The key to the future of progress

True equality depends not only on a woman's ability to access a livelihood, but also on her ability to control it fully. It means not just putting food on a kitchen table, but also being able to make decisions for her family around that table. It means not just benefiting from a government policy, but designing those policies. It means not just empowerment, but real, lived power.

Because when women have power—over their money, over their own bodies, and in society—we all benefit. Women are force multipliers: An extensive body of research shows that when women can control their own money, their sense of self changes. So do the expectations of those around them. Their children are more likely to attend school. Their families are healthier. Their household income grows—and so does the global economy.

So when it comes to the future of progress—not just on the global goals related to gender equality but on those on good health, quality education, ending poverty, and more—there is one engine that can drive them all: women's power.

We need to change how we think about world hunger

The war in Ukraine shows that hunger can't be solved just with humanitarian assistance alone. Investments in agriculture R&D are required.

by Bill Gates
Co-Chair, Bill & Melinda Gates Foundation

Njoro, Kenya
© *AATF/Dream Catcher*

In February, Russia's invasion of Ukraine interrupted the flow of grain from Europe to Africa, creating another humanitarian crisis on a second continent.

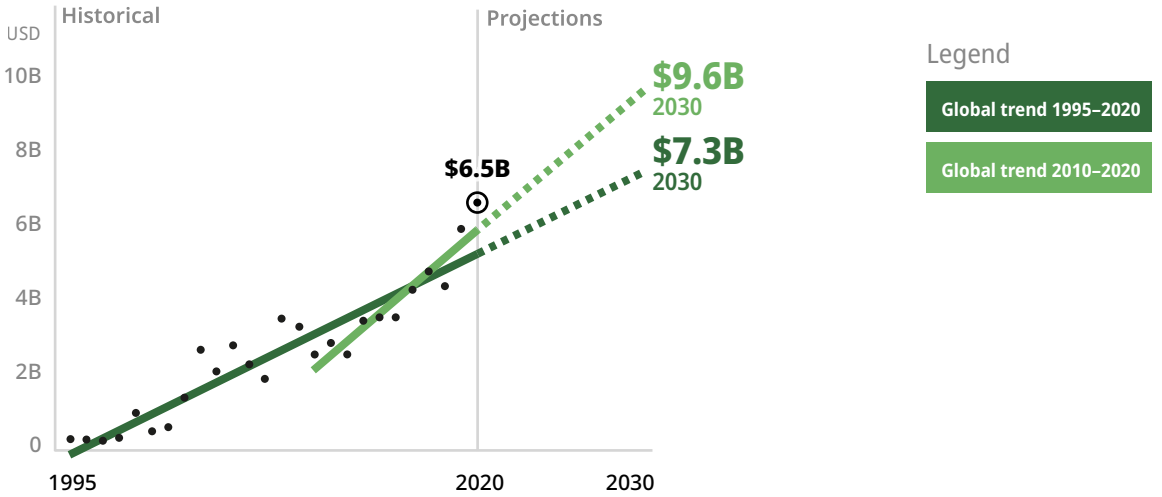
Fourteen African nations relied on Ukraine and Russia for half their wheat. Now, those shipments were canceled, and the supply shock spiked the price of replacement wheat to its

highest level in 40 years. Prices eventually started falling in May, but in the interim, there were the makings of a modern famine, with world leaders sounding the alarm bell, calling for an influx of aid—money and pallets of food to be shipped to sub-Saharan ports immediately.

Even before the war in Ukraine, food aid had been skyrocketing, and it's projected to keep rising through the end of the decade.

Food aid to low-income countries is at record levels—and rising

Past and projected spending on food aid



In one sense, this is a very good and necessary thing. The world should be generous and prevent people from going hungry. But in another sense, it doesn't solve the larger problem.

The goal should **not simply be giving *more* food aid**.

It should be to ensure ***no* aid is needed in the first place**.

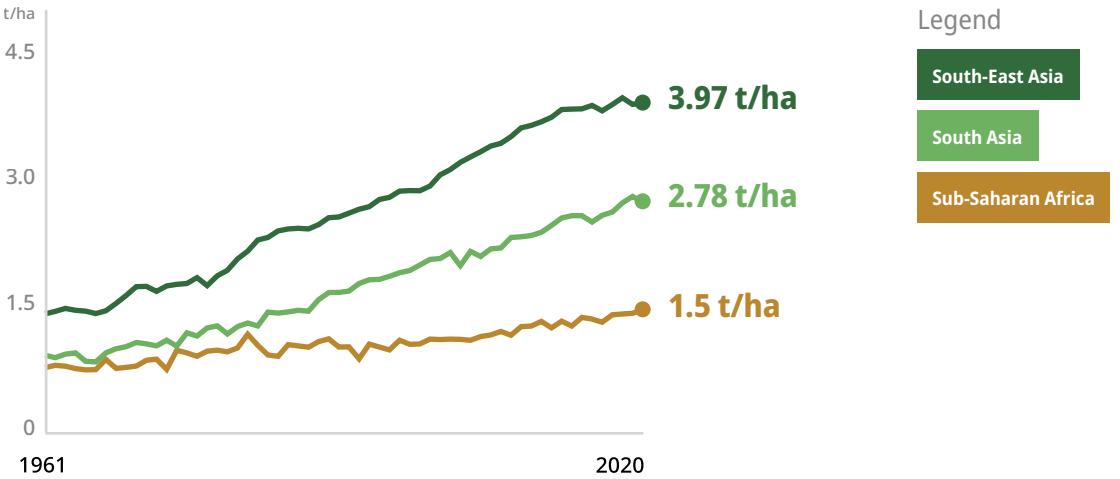
It's worth stepping back and asking a basic question: *Why did a crisis in Eastern Europe threaten to starve millions of people six thousand miles away?*

It's a complex issue. But mostly, it's a story about where it's easy to produce food—and where it isn't.

The size of your crop often depends on where you live

Crop yield, tonnes per hectare (t/ha)

Tonnes of food produced per hectare cultivated, including cereals and legumes



Since the 1960s, agricultural productivity has increased all over the world. Farmers saw their harvests get bigger, but they didn't get bigger everywhere at the same rates. In places like China and Brazil, harvests boomed, while productivity in many South-East Asian countries—Laos and Cambodia, for instance—lagged behind the global average. In sub-Saharan Africa, harvests grew much more slowly than those anywhere else in the world—and not nearly fast enough to feed the domestic population.

When a region can't grow enough to feed its people, there's only one solution—to import food—which Africa does on the order of US$23 billion a year.

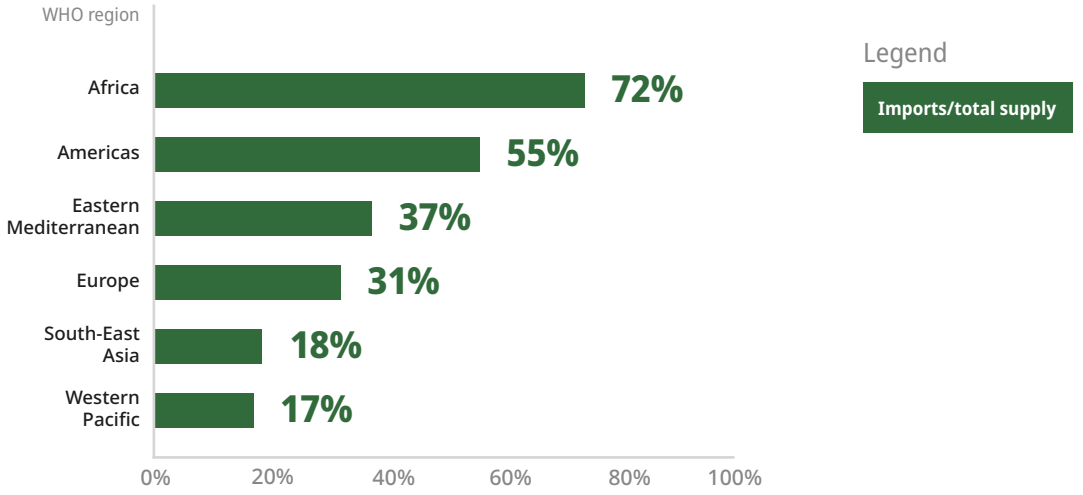
Each African nation is different, but none is likely buying grain from Eastern Europe because it wants to. It's importing because it has to.

The goal should not simply be giving *more* food aid. It should be to ensure *no* aid is needed in the first place.

—Bill Gates

Current domestic production isn't enough to feed Africa

Percentage of wheat supply from imports



The low agricultural productivity has everything to do with the conditions in which African farmers labor. Most eke out a living by farming very small plots of land, often less than a hectare (2.4 acres), without enough irrigation or fertilizer, so whenever there's a shock to the wider food system—and the total global supply of food is reduced—they cannot grow enough to make up the deficit. People go hungry. This time, the shock was a war that created a disconnect between Eastern European farms and the global supply chain, but next time it could be a different type of shock, like a drought or heat wave that wipes out entire farms across Africa. In fact, that's the more likely scenario.

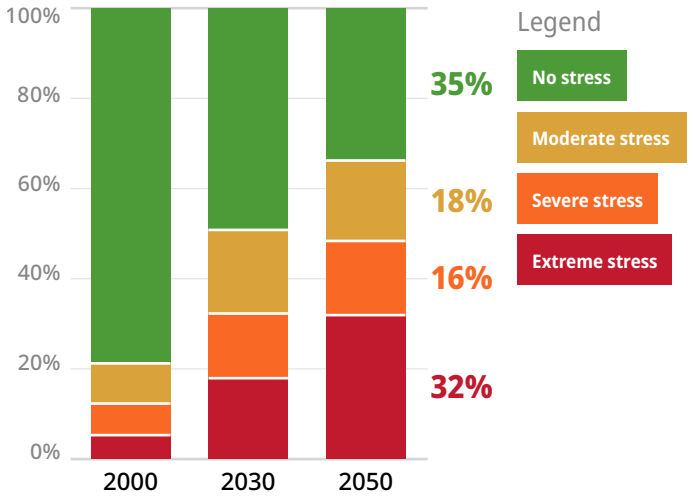
This is where climate change enters the story. The war in Ukraine was a major disruption to the global food supply, but climate change presents a much, much bigger problem. It's the largest threat to food production since the invention of agriculture, especially in Africa where the environment is deteriorating faster than anywhere on Earth.

To more clearly see the potential impact of climate change on farming in Africa, our foundation recently supported development of a data visualization tool called an "Agriculture Adaptation Atlas." When experts saw the visual results, they were alarmed. The easiest way to understand is by focusing on a single crop: corn (or as most of the world refers to it, "maize").

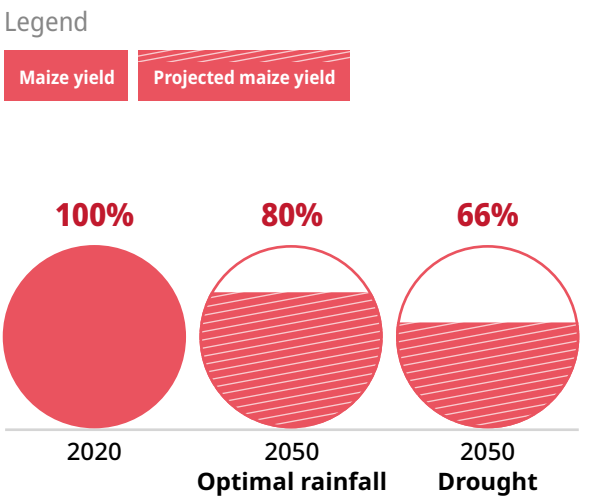
Maize accounts for about 30% of all the calories people in sub-Saharan Africa eat. It's an incredibly important crop, but also a sensitive one. When temperatures exceed 30 degrees Celsius (86 degrees Fahrenheit), the growing process starts breaking down; pollination and photosynthesis slow. Every additional degree above 30 Celsius per day cuts crop yield by at least 1%. For example, if there are five days of 35 degrees Celsius (95 Fahrenheit) temperatures, that's five multiplied by five—25% of the harvest is lost.

Sub-Saharan Africa's most important crops are at risk

Heat stress maize distribution in sub-Saharan Africa (%)



Predicted change in maize yield in Nigeria, 2050



That's what the Agriculture Adaptation Atlas predicts: By the end of the decade, 30% of Africa's maize crop will exist in these conditions—as will every other food source, from crops to livestock. And that severe climate stress is the principal reason 32 million more people in Africa are projected to be hungry in 2030.

For farmers on small plots of land, there aren't many obvious solutions. A recent survey by the World Bank and the Nigerian government asked farmers, "How are you responding to lower crop yields," and the second and third most common responses were "eating less" and "selling livestock," while the top answer was just "do nothing."

Fortunately, there are other, better options.

How can farmers fight climate change? Magic seeds

Fourteen years ago, our foundation began supporting a group of African crop researchers. Their goal was to develop a new type of maize—what I started calling "magic seeds."

Of course, the seeds weren't actually magic, but by breeding select varieties of the crop, the researchers believed they could produce a hybrid maize that would be more resistant to hotter, drier climates. They succeeded wildly.

When researchers in Kenya compared plots of this new maize, which they called *"DroughtTEGO®,"* with the old one, they saw the *DroughtTEGO* farms were producing an average of 66% more grain per acre. That harvest is enough to feed a family of six for an entire year, and the family would still have so much surplus maize that they could sell it for about $880, equivalent to five months of income for the average Kenyan. In fact, many farmers could finally afford to send their kids to school or build new homes once they switched to *DroughtTEGO*.

This kind of agricultural innovation is happening around the world, including in Punjab. The region's farmers grow India's two main staple crops—rice in the wet season and wheat in the dry northern Indian winter—but climate change is upending their livelihood. In 2010, and then again in 2015, early heat waves turned the wet season into a dry one, overcooking the rice. In response, local farmers worked with the Punjab Agricultural University to find a new solution: a short-duration rice variety that required three fewer weeks in the field. It could be harvested before the climate change-induced heat waves cooked the crop. And it allowed farmers to plant their wheat earlier, too. With one seed, Punjab was supercharging two crops.

A farmer compares her recycled maize with her larger hybrid climate-resistant maize in Machakos, Kenya.

© Gates Archive/Alissa Everett

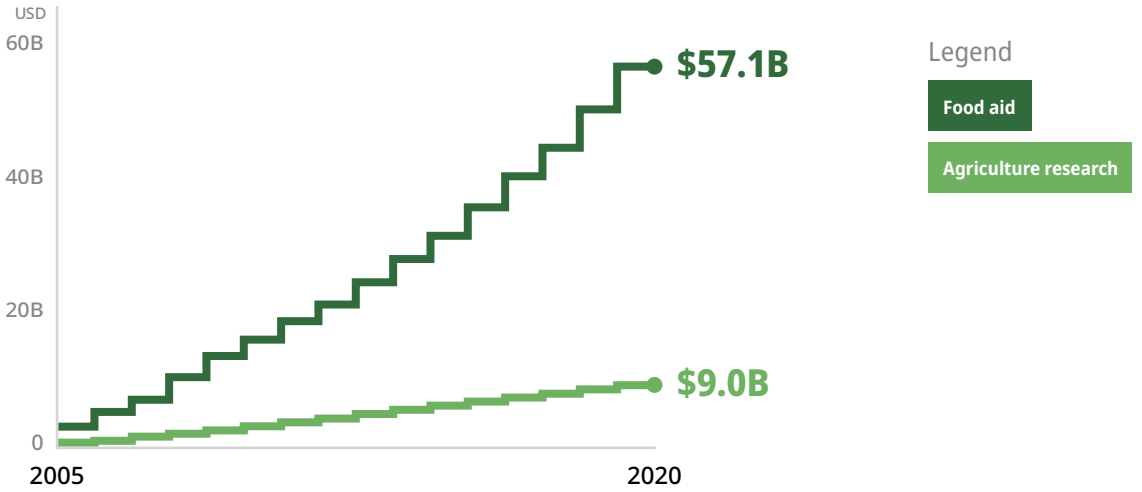
Innovations like *DroughtTEGO* maize and short-duration rice give me a lot of hope that agricultural productivity can still increase despite the changing climate. But I wish these new seeds would be adopted more quickly. Investment in agricultural R&D is still much too small.

Let's go back to that skyrocketing graph of food assistance and place it next to the R&D budget for new innovations like magic seeds. That line is flat by comparison.

A missed opportunity to solve hunger over the long term

Cumulative spending on food aid and agriculture research

Total starting from 2005



To address the current food crisis and increase agricultural productivity, one important solution is making the slopes of these two lines look more like each other, with big funding increases for magic seeds—and other fundamental investments in agriculture, too.

After all, productivity is not simply a "Jack and the Beanstalk" problem, where farmers can plant magic seeds and—poof!—their crops grow sky high. It's more complicated than that. Farmers need support in many different ways, such as micro-financing so they can afford to buy fertilizer, or rural infrastructure like new roads so their crops can be easily transported to market. Even the "magic seeds" need adjacent investments so they can keep working like magic.

And they need to go through the proper checks, too. For countries that want to take advantage of these and other innovations, it helps to have strong systems and policies in place to help evaluate performance and safety, while efficiently delivering products to small-scale farmers. It's critical if we want to get the latest seed technology to farmers as fast as we can.

AI for Ag

Short-duration rice and *DroughtTEGO* maize are producing big yields today, but they aren't guaranteed to continue doing that in 2030 or 2050. Farmers will need to plant even newer seeds as the environment changes in unpredictable ways. How do farmers and researchers determine what those seeds should be? Or when they should be planted? We can't rely on what's worked before.

Wheat trainees study seedling rust symptoms in El Batan, Mexico.

© CIMMYT/X. Fonseca

For most of history, agriculture has been a process of slow evolution, something farmers could tweak and perfect over the centuries because the conditions were roughly the same. Everybody's farm looked more or less like their grandparents', so they planted the same things at the same time, maybe making a few innovations on the margins.

At the same time, breeding the best crops has largely been a slow, manual process conducted by a handful of modern plant breeders. CGIAR (formerly known as the Consultative Group for International Agricultural Research) is the world's largest network of crop breeders, and in Africa, they have just three people devoted to selecting the best bean varieties out of millions of potential options.

We need to speed this plant breeding work up, and one solution is what researchers call "predictive modeling." It's artificial intelligence software that processes the genome sequences of crops along with environmental data—everything from soil samples to satellite imagery—and then conjures up a data-based vision of what farms will need to look like in the future. From this computer model, researchers can identify the optimal plant variety for a particular place. Or they can do the reverse: pinpoint the optimal place to grow a specific crop.

This technology is still in its early stages, but similar predictive models—ones that anticipate where farms might be hit by an invasive species or crop disease—have already seen huge results. For example, last year, farmers in Ethiopia

worried that an outbreak of a disease called wheat rust would devastate the country's harvest, but an "early warning system" alerted farmers to where exactly the rust would spread so they could take preventative measures. By the end of 2021, Ethiopia hadn't seen its wheat crop decline at all. In fact, the country had its largest harvest ever.

Innovation, not just donations

Hunger might not be a completely solvable problem. No one can reasonably promise that every one of the world's eight billion humans will always have enough to eat. *But ensuring that sub-Saharan Africa and other low-income regions can feed their own people?* That's a very achievable challenge, so long as the world changes how it approaches food crises.

It's good that people want to prevent their fellow human beings from starving when conflicts like Ukraine interrupt the food supply, but we also have to recognize that those crises are symptoms of a deeper problem—many countries don't grow enough yet, and climate change is making farming even harder. That challenge can't be solved with donations. It requires innovation.

Explore the Data

Each year, Goalkeepers shares the latest data on 18 key data indicators, ranging from poverty to maternal mortality to education. These indicators help us understand our progress toward the Global Goals—where innovation and investment are creating bright spots, and where we're collectively falling short. Taken together, the data reminds us that progress is possible but not inevitable.

Interact with the data
Visit our website to view an interactive version of these charts and access the raw data.
https://gates.ly/GK22Data

Poverty

Stunting, Agriculture

Maternal Mortality, Under-5 Mortality, Neonatal Mortality, HIV, Tuberculosis, Malaria, Neglected Tropical Diseases, Family Planning, Universal Health Coverage, Smoking, Vaccines

Education

Gender Equality

Sanitation

Financial Services for the Poor

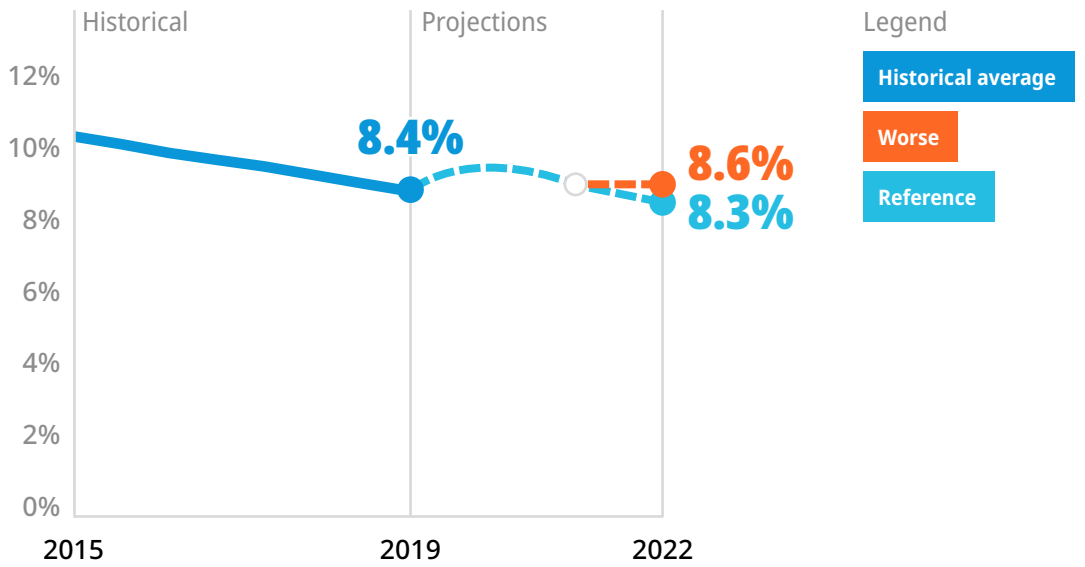
Poverty

SDG Target 1.1

Eradicate extreme poverty for all people everywhere.

The world continues to face headwinds to economic growth and poverty reduction. Global shocks including the impact of the COVID-19 pandemic, conflicts, economic crises, and subsequent food insecurity limit opportunities for poverty reduction in countries and regions where poverty is most concentrated.

Percentage of population below the international poverty line (US$1.90/day)



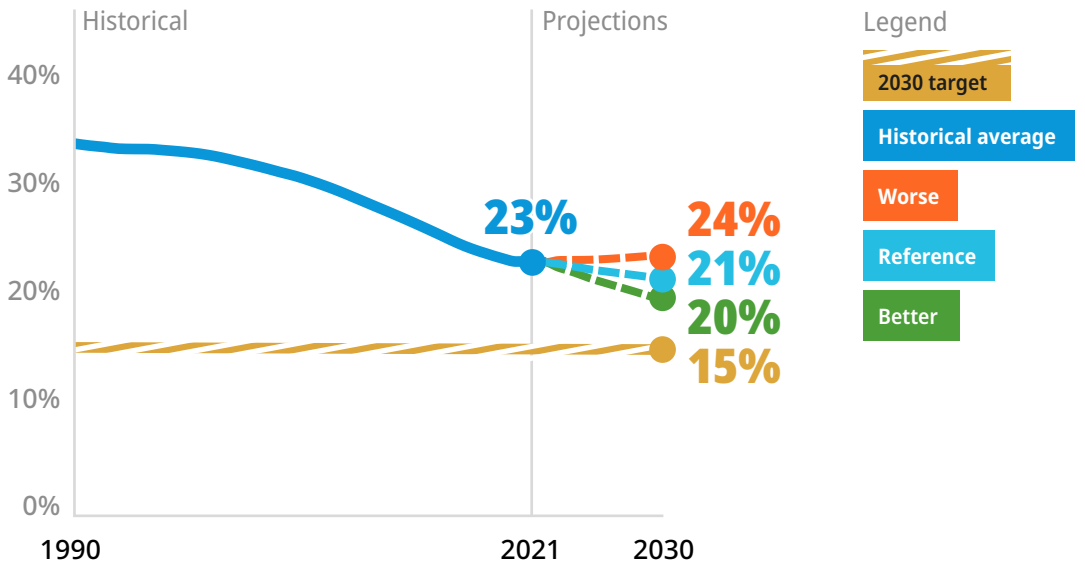
Stunting

SDG Target 2.2

End all forms of malnutrition, including achieving, by 2025, the internationally agreed targets on stunting and wasting in children under five years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women and older persons.

In the global estimate for 2021, 23% of children under age 5 were stunted. The 2030 projection suggests 21% of children under age 5 will be stunted.

Prevalence of stunting among children under age 5

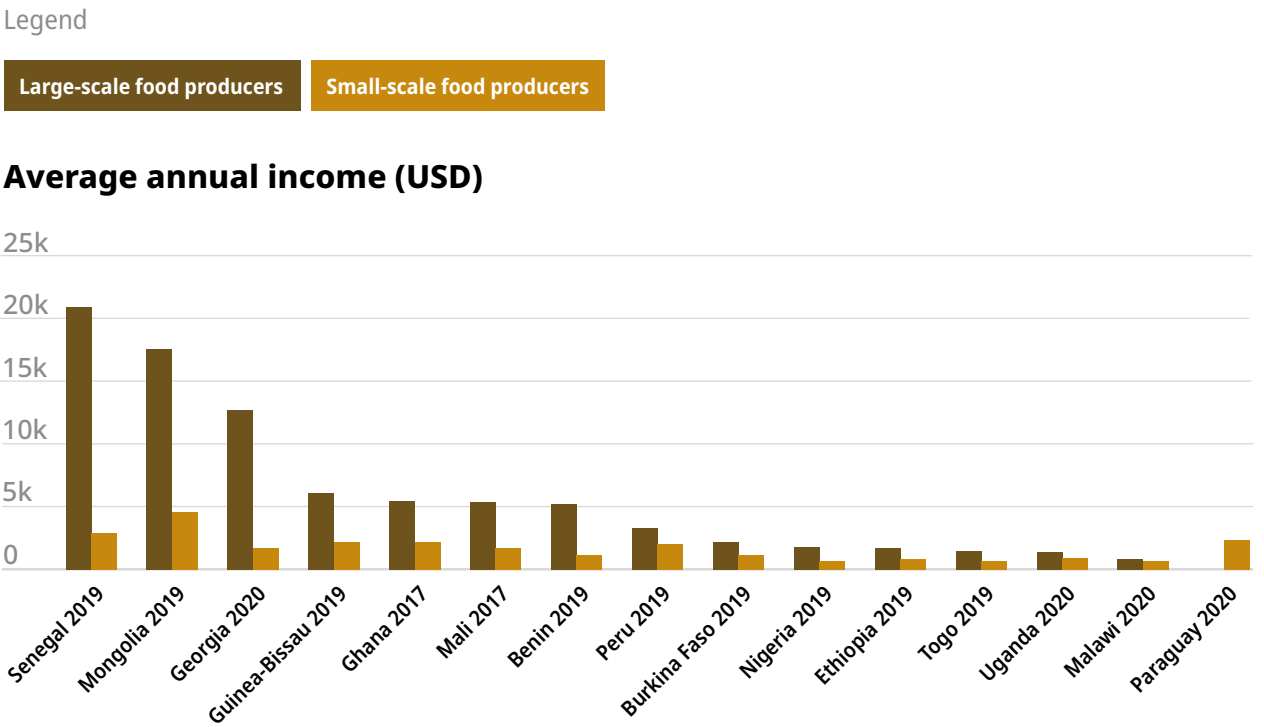


Agriculture

SDG Target 2.3

Double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment.

Over the past several years there has already been pressure on global food security due to climate change and other challenges, including the conflict in Ukraine, which has added significantly more pressure to production. We continue to see that small-holder producers lag large-scale producers and face an even bigger income and productivity crisis.



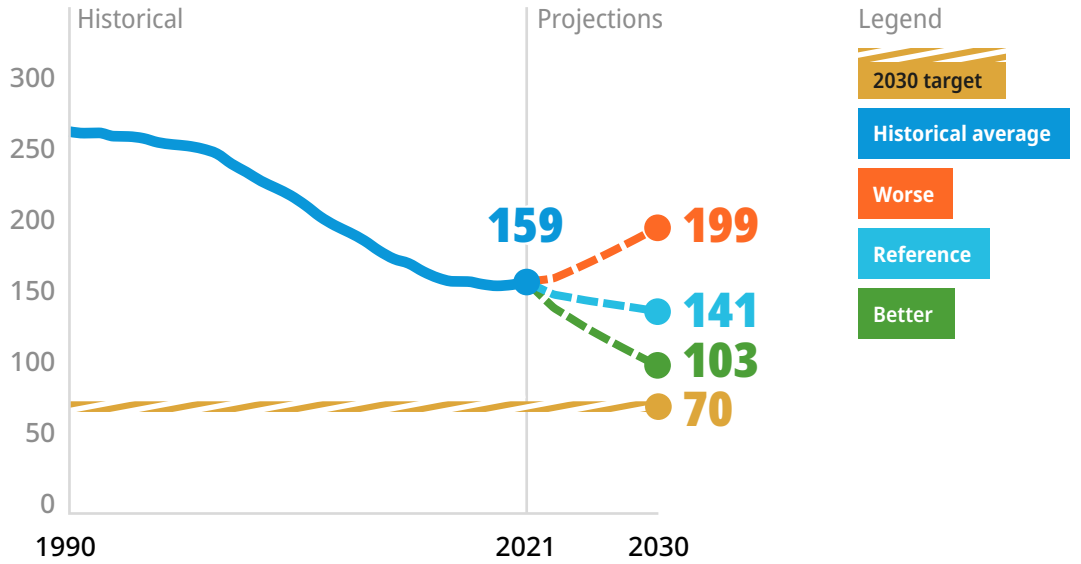
Maternal Mortality

SDG Target 3.1

Reduce the global maternal mortality ratio to less than 70 per 100,000 live births.

Globally we do see a change in the maternal mortality ratio (MMR) in 2021 to 158.8 deaths per 100,000 live births, compared to 157.1 deaths per 100,000 live births in 2020. The trajectory projects 140.9 deaths per 100,000 live births in 2030, which is double the SDG target. However, there are likely subnational variations in MMR in larger countries, highlighting the need for continued focus on ensuring equitable access to high-quality care and lifesaving interventions during pregnancy and childbirth, as well as the need to address underlying causes of MMR. In addition, we recognize that national MMR estimates are unreliable, data is of poor quality, and there is a need for additional investment in improving MMR estimation.

Maternal deaths per 100,000 live births



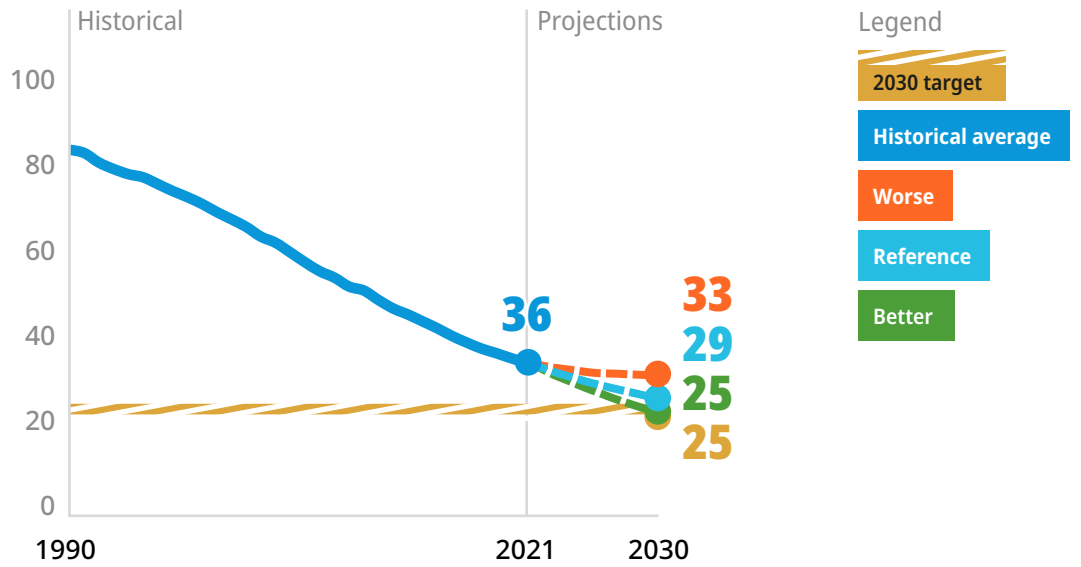
Under-5 Mortality

SDG Target 3.2

End preventable deaths of newborns and children under five years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births.

While under-5 mortality continues to fall globally, communicable and infectious diseases continue to be leading causes of deaths.

Under-5 deaths per 1,000 live births



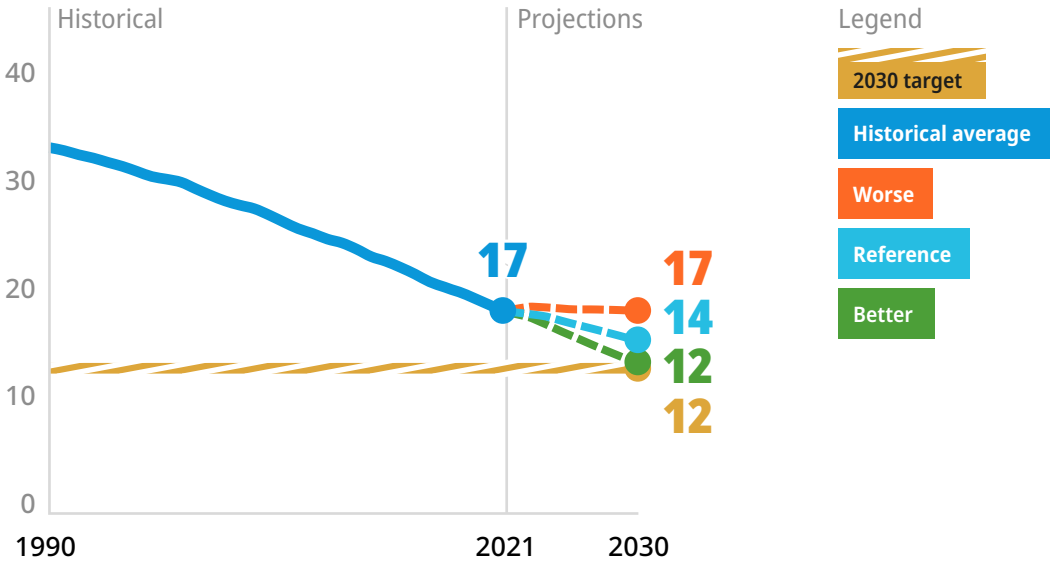
Neonatal Mortality

SDG Target 3.2

End preventable deaths of newborns and children under five years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births.

A large proportion (almost half) of under-5 deaths occur during the neonatal period. Globally, premature birth and birth complications (birth asphyxia and birth trauma), pneumonia, diarrhea, and malaria remain the leading causes of preventable deaths of children under 5 years old, highlighting how vulnerable babies are to shocks and disruptions to health systems. The global estimate for neonatal mortality in 2021 is 17.3 deaths per 1,000 live births, the same as in 2020. This trajectory projects 14.3 deaths per 1,000 live births in 2030, not meeting the SDG target.

Neonatal deaths per 1,000 live births



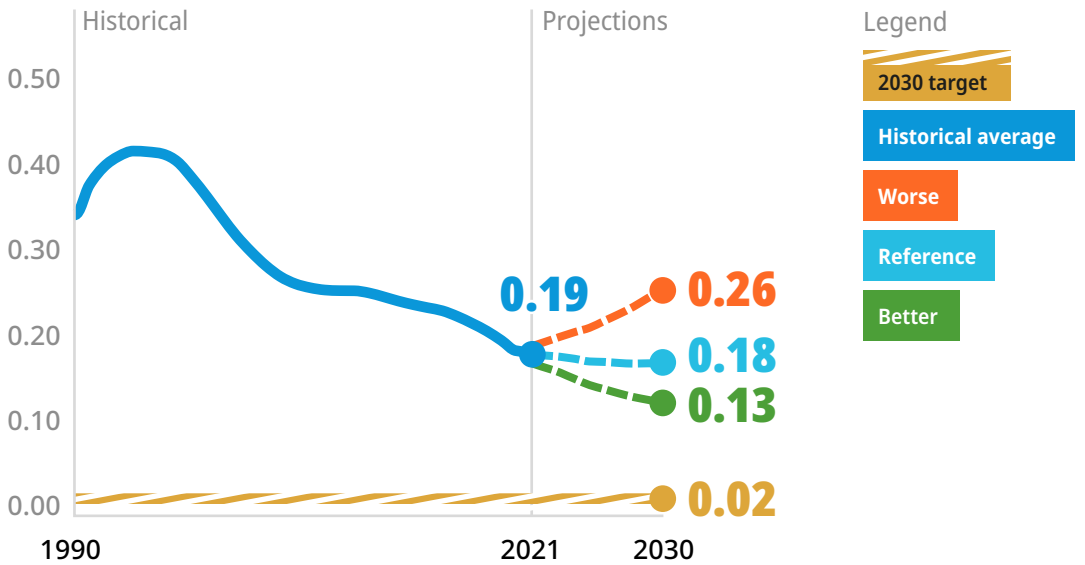
HIV

SDG Target 3.3

End the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases.

To make sustainable progress in the fight against HIV/AIDS, we must continue the delivery of effective HIV treatment along with expanded access to lifesaving prevention options.

New cases of HIV per 1,000 people



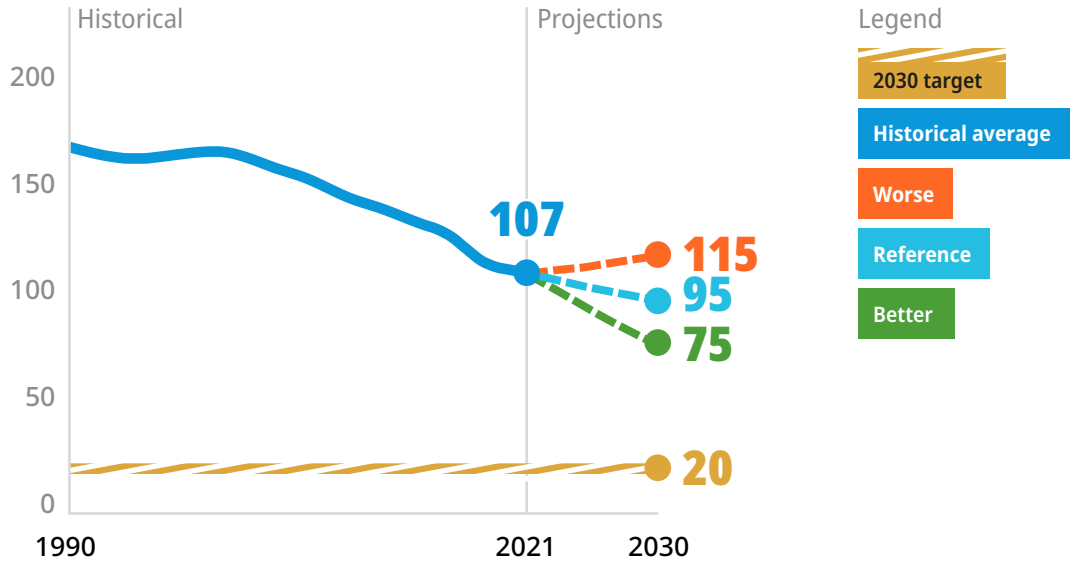
Tuberculosis

SDG Target 3.3

End the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases.

The current data suggests we are not on track to end tuberculosis by 2030. In order to make significant progress, more people need access to effective treatment, and we need to identify new TB infections that may have been missed during the pandemic.

New cases of tuberculosis per 100,000 people



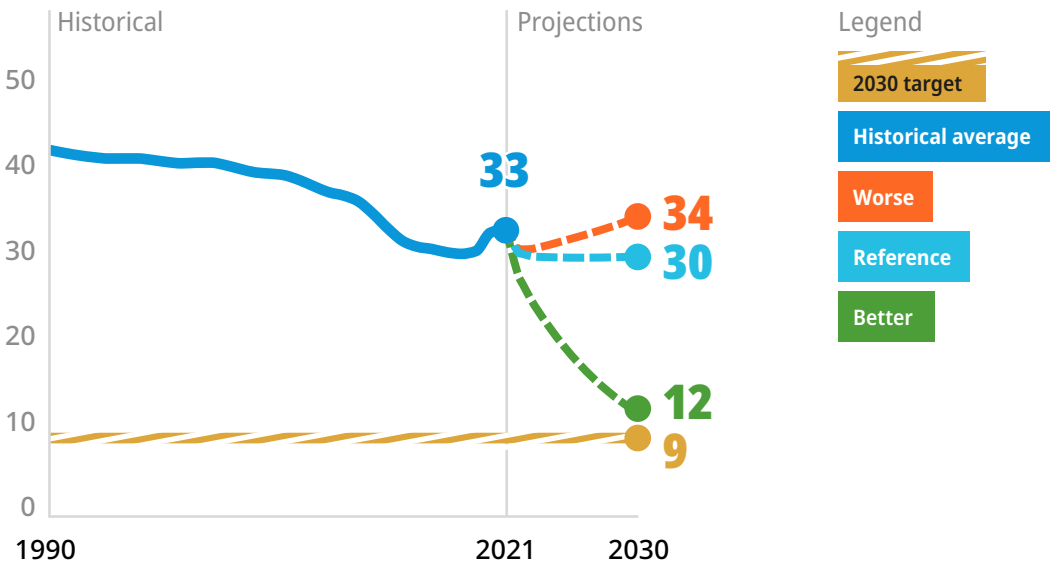
Malaria

SDG Target 3.3

End the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases.

We are on the cusp of being able to strengthen health systems, to introduce new innovations in malaria prevention and treatment, and to kickstart rapid declines in cases if donors and malaria-endemic countries increase their investments now and prioritize ending malaria, even in the face of dealing with COVID-19.

New cases of malaria per 1,000 people



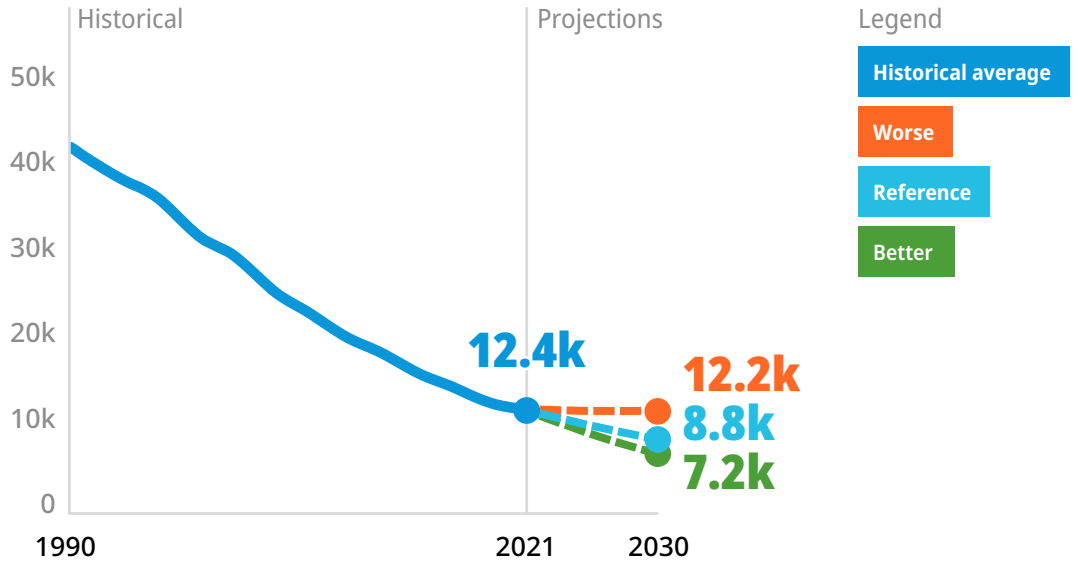
Neglected Tropical Diseases

SDG Target 3.3

End the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases.

The global estimate for 2021 was 12,375 cases of 15 neglected tropical diseases (NTDs) per 100,000 people, with a 2030 projection of 8,850 cases of 15 NTDs per 100,000 people.

Prevalence of 15 NTDs per 100,000 people



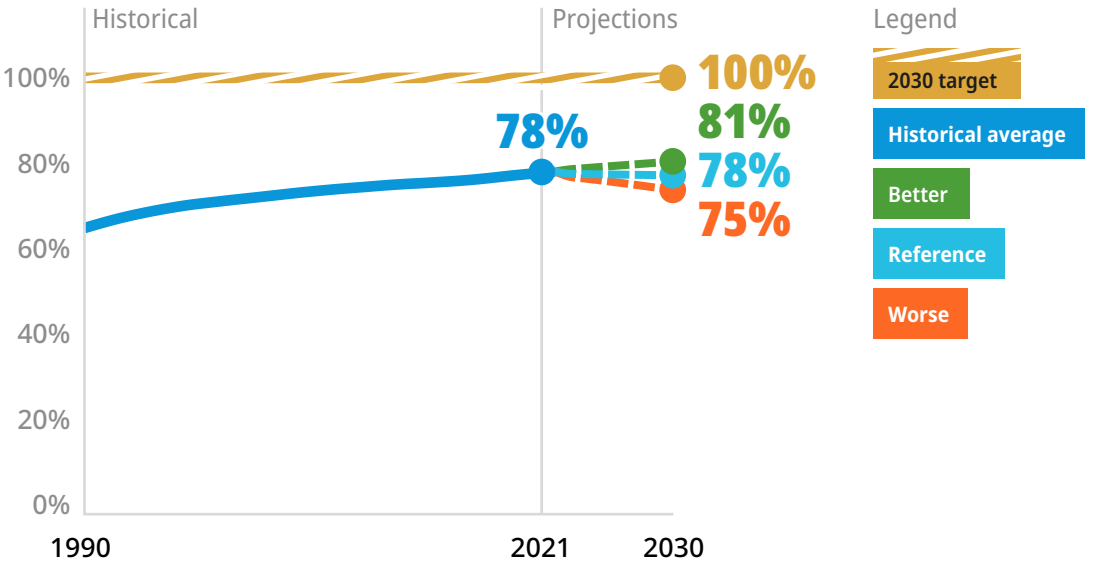
Family Planning

SDG Target 3.7

Ensure universal access to sexual and reproductive health-care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programs.

The global estimate for 2021 showed that 78.4% of women ages 15–49 had their family planning needs met with modern methods. The 2030 projection suggests that 77.9% of women ages 15–49 will have their family planning needs met with modern methods.

Percentage of women of reproductive age (15–49) who have their need for family planning satisfied with modern methods



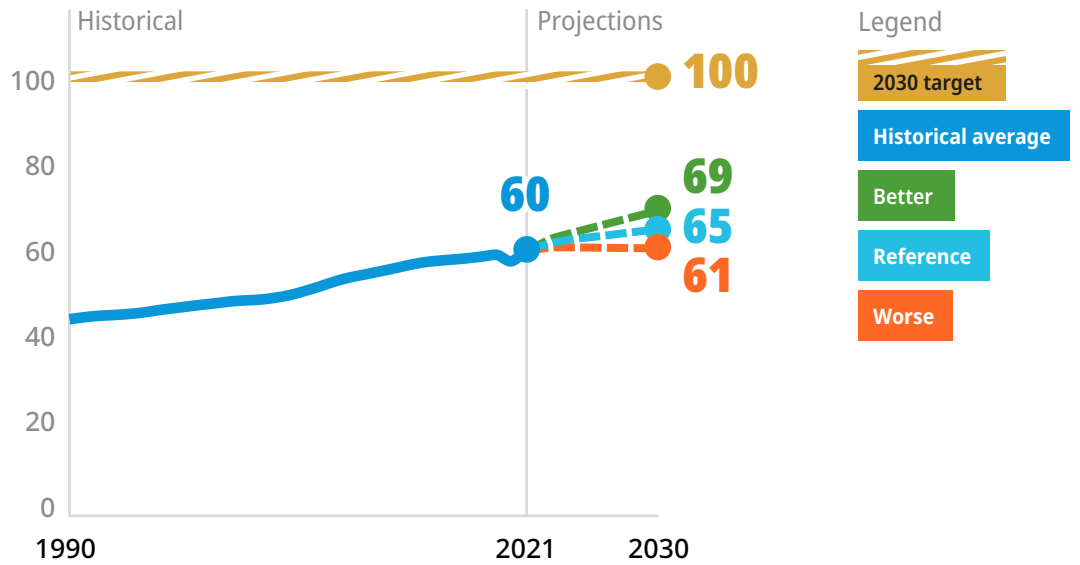
Universal Health Coverage

SDG Target 3.8

Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all.

The Universal Health Coverage Index is a key and early indicator demonstrating the COVID-related step back in progress. Despite a decline in coverage of essential health services in 2020, health systems have demonstrated resilience and have continued long-term trends of progress from 2021.

Performance score of the UHC Effective Coverage Index



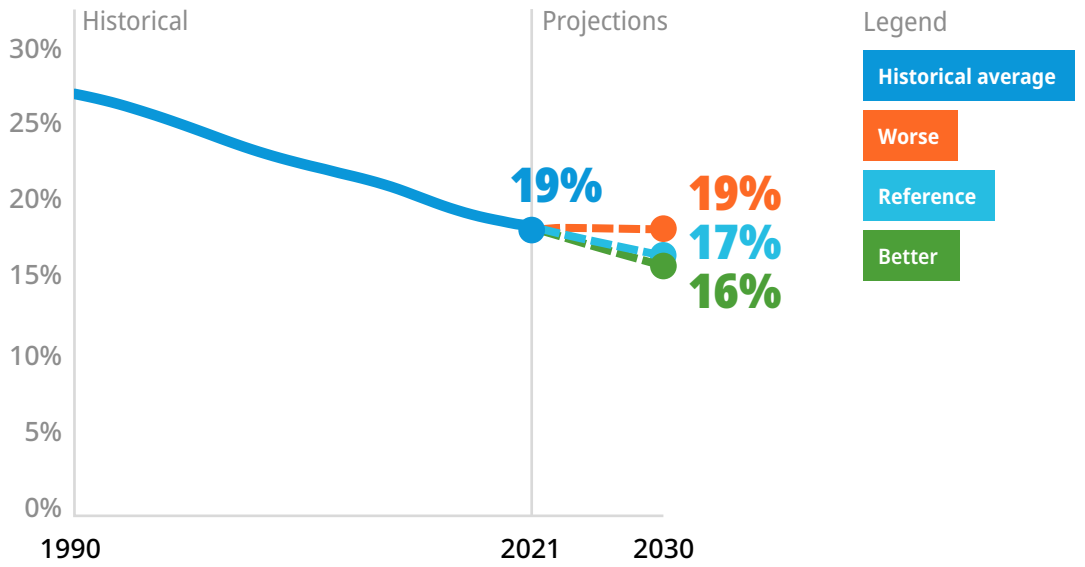
Smoking

SDG Target 3.A

Strengthen the implementation of the World Health Organization Framework Convention on Tobacco Control in all countries.

Projections suggest that global smoking prevalence could continue to decline from 19.1% (2021) to 17.1% in 2030. Many governments are seeing the health and livelihood impact that comes with strong tobacco control policy and are advancing protections in line with the WHO Framework Convention on Tobacco Control. In Africa, there has been notable progress, such as Botswana adopting the comprehensive 2021 Tobacco Control Bill. According to the 2021 WHO Tobacco Trends report, 25 African countries are on track to meet or exceed a 30% reduction in tobacco use prevalence from 2010 through 2025.

Age-standardized smoking prevalence among people ages 15 and older



Vaccines

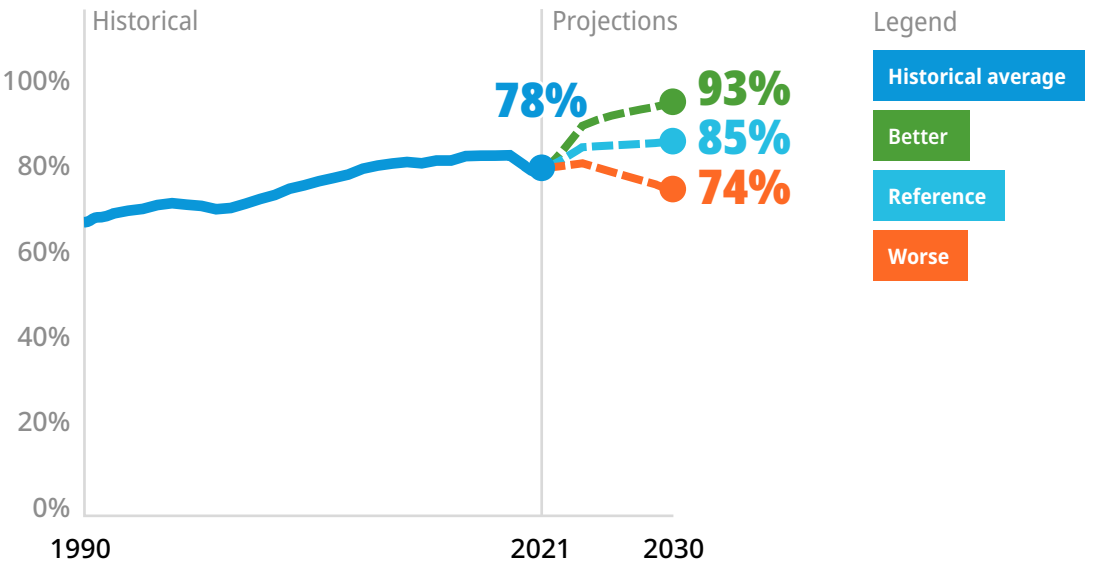
SDG Target 3.B

Support the research and development of vaccines and medicines for the communicable and non-communicable diseases that primarily affect developing countries and provide access to affordable essential medicines and vaccines.

We are currently experiencing major disruptions for routine immunization and other lifesaving health services due to a range of COVID-19-related issues, the increased number of people living in conflict and fragile settings, and increased misinformation. Many immunization programs also face the challenge of catching up on missed child vaccinations while also rolling out COVID-19 vaccines.

These ongoing disruptions underscore the importance of ensuring global, equitable access to all vaccines, highlighting the need for governments, civil society, and others to work in concert in identifying innovative solutions. The health and well-being of millions of people across the globe depends on it.

Coverage of DTP (third dose)



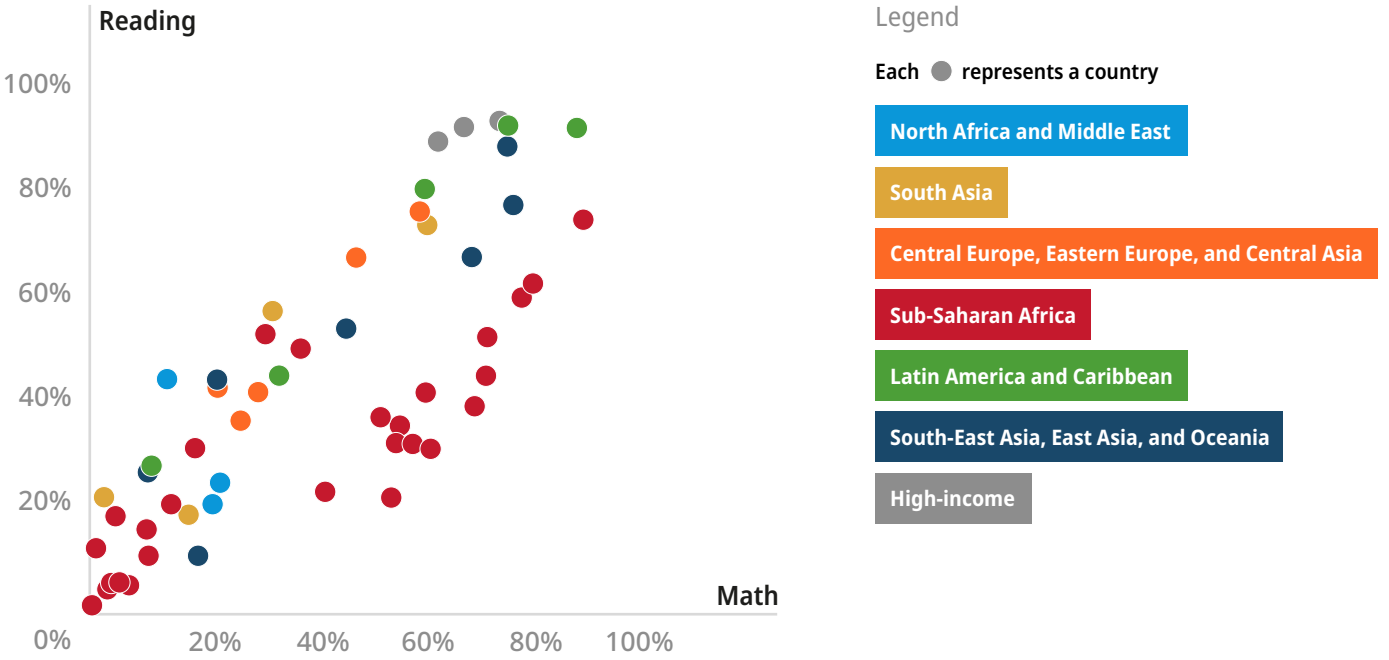
Education

SDG Target 4.1

Ensure that all girls and boys complete free, equitable, and quality primary and secondary education leading to relevant and effective learning outcomes.

In countries where data has been collected, math and reading proficiency for girls and boys in grades 2 and 3 fall short of the levels needed to meet the target for 2030, which represents a minimum level of mastery of foundational skills. Measures of learning proficiency remain scarce, particularly in low- and middle-income countries, and their reliability is often questionable.

Percentage of students in grade 2 or 3 achieving at least minimum proficiency level in math or reading, both sexes

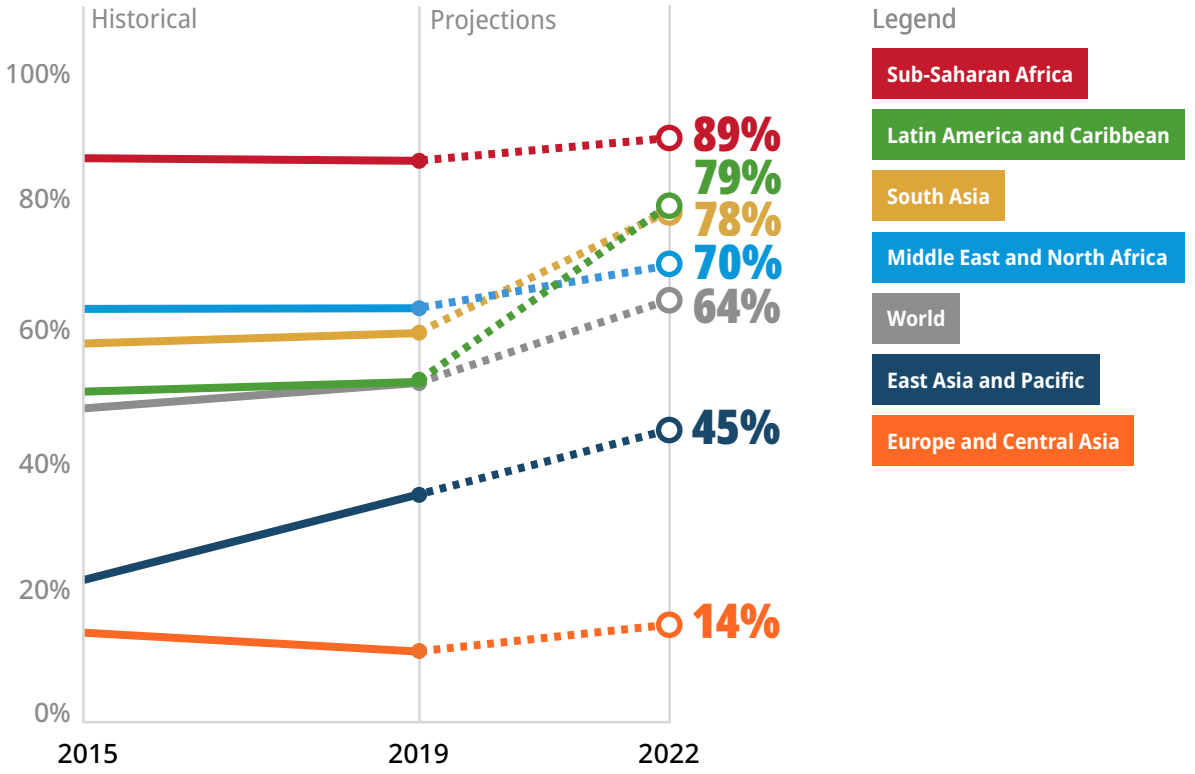


Learning Poverty

Learning Poverty measures the proportion of children who cannot read and understand a simple text by age 10. Before the COVID-19 pandemic, the rate of learning poverty was already 57% in low- and middle-income countries. Simulations from 2022 suggest that it is now 70% in low- and middle-income countries.

Learning poverty globally and by region, 2015 and 2019, with 2022 estimates

Share of children at the end-of-primary age below minimum reading proficiency, adjusted by out-of-school children



Gender Equality

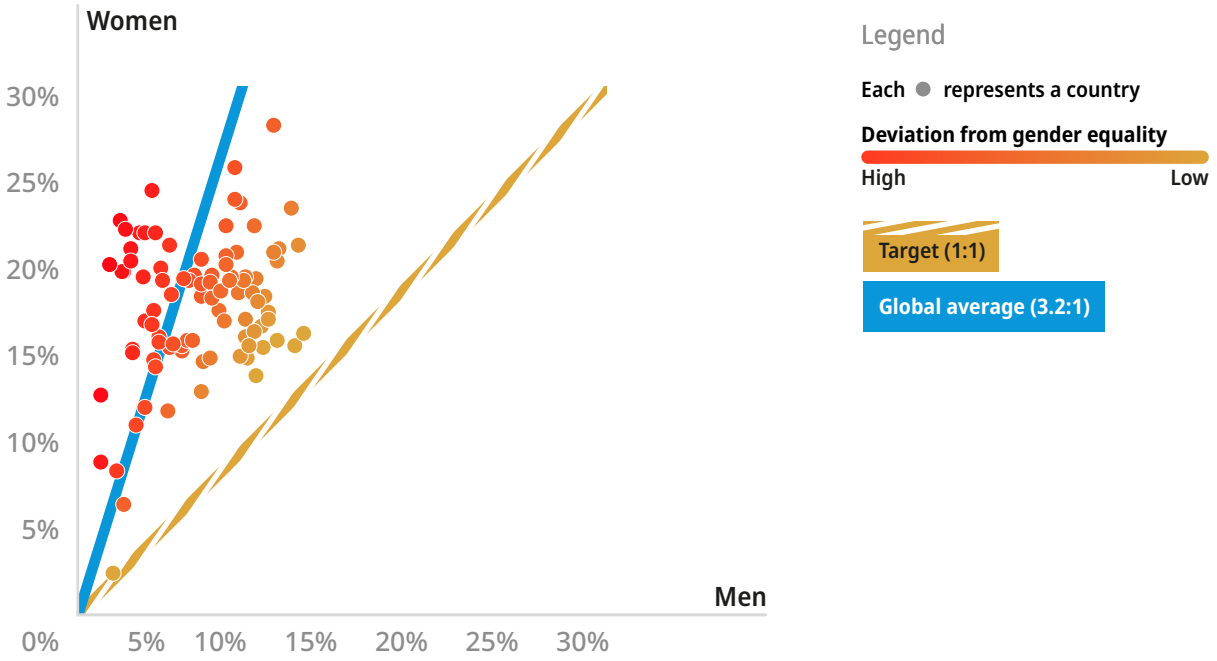
SDG Target 5.4

Recognize and value unpaid care and domestic work through the provision of public services, infrastructure, and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate.

Globally, women spend 3.2 times as many hours as men performing domestic and care work, with the largest gap between men and women on average being in the North African and West Asian groups of countries. Updated statistics that include the addition of India increased the unpaid care work ratio in Central Asia and South Asia from 4.5 to 5.0 and slightly increased the global average from 2021 to 2022.

Global progress for gender equality

Unpaid domestic and care work by sex and region



Sanitation

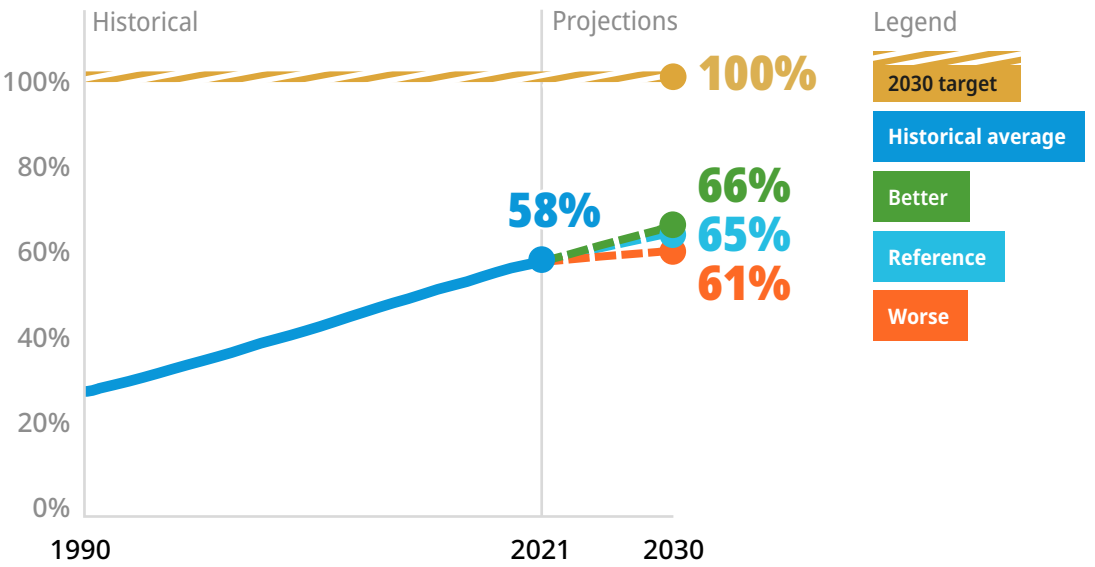
SDG Target 6.2

Achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations.

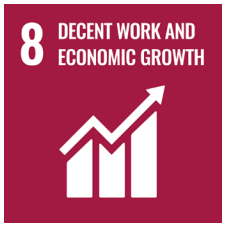
Although the Millennium Development Goals (MDGs) focused only on access to toilets, the SDGs rightly established a new indicator for "safely managed" sanitation, which includes both improved toilet facilities as well as ensuring that the excreta are safely disposed of. One means of safe disposal is a sewer connection to a functioning wastewater treatment plan, but other, lower-cost technologies to safely manage waste also exist or are under development. The information to track progress on this new measure remains imperfect, but the amount of available data has increased sufficiently for this year's report to project safely managed sanitation for the first time.

The current pace of change indicates that the world remains significantly delayed in achieving the SDG target of universal access to safely managed sanitation by 2030.

Prevalence of population using safely managed sanitation



Financial Services for the Poor

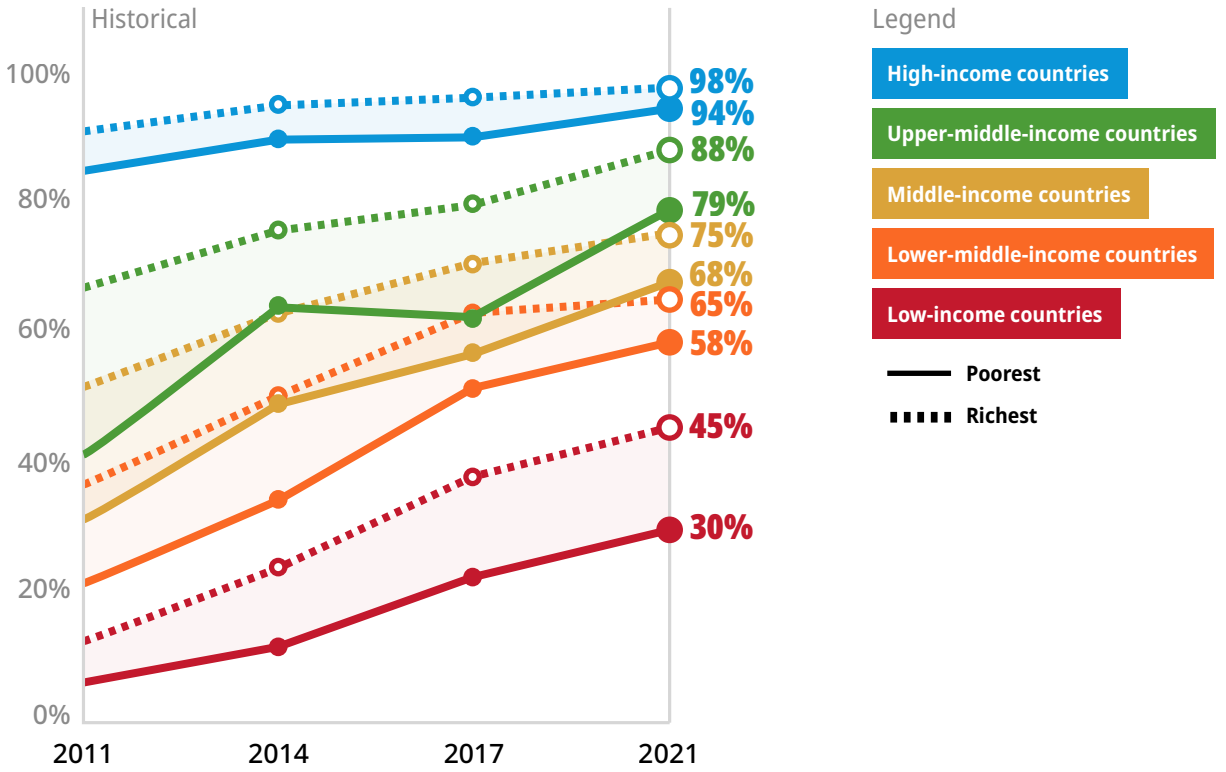


SDG Target 8.10

Strengthen the capacity of domestic financial institutions to encourage and expand access to banking, insurance, and financial services for all.

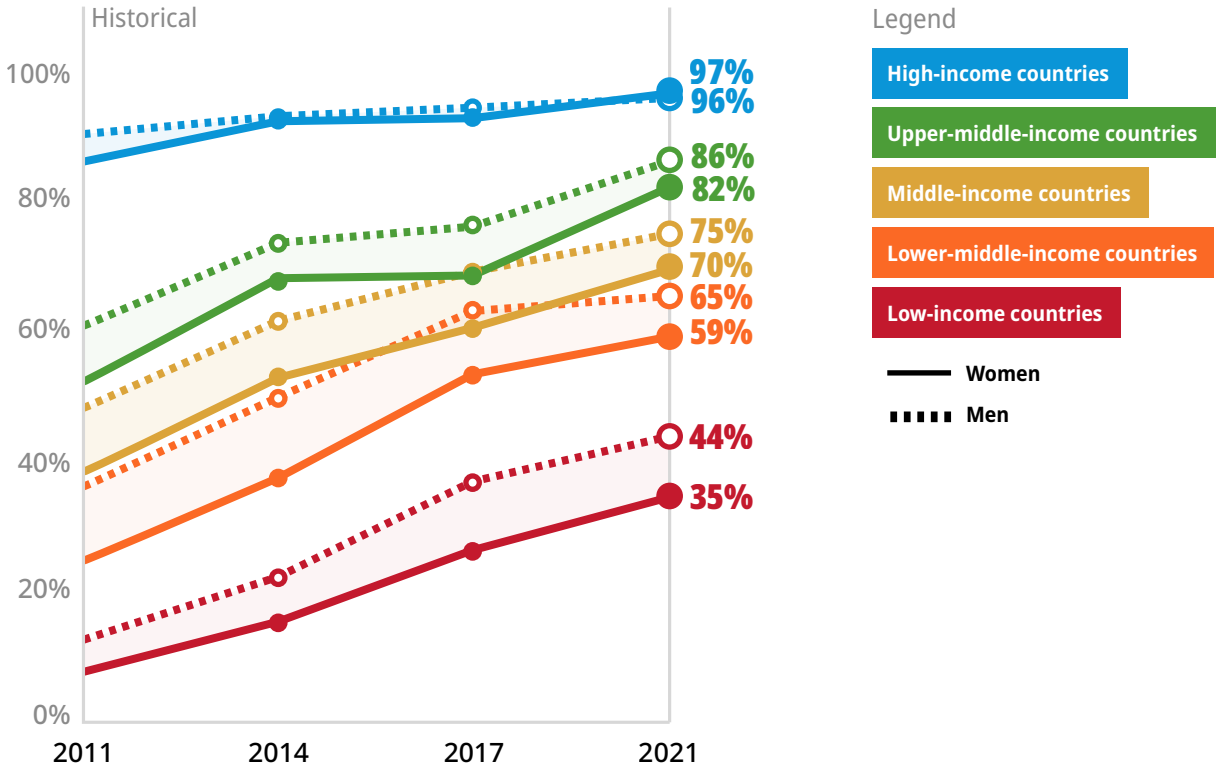
Over the past decade, the world has made rapid progress in expanding financial inclusion. Globally, 76% of adults now own a financial account, up from 51% a decade ago. In developing countries, 71% of adults now own a financial account, representing a 30-percentage point increase over the last decade.

Adults with a bank account, poorest and richest



Importantly, the gender gap in account ownership is decreasing: In developing countries, it moved from a 9-percentage point gap in 2017 to a 6-percentage point gap in 2021.

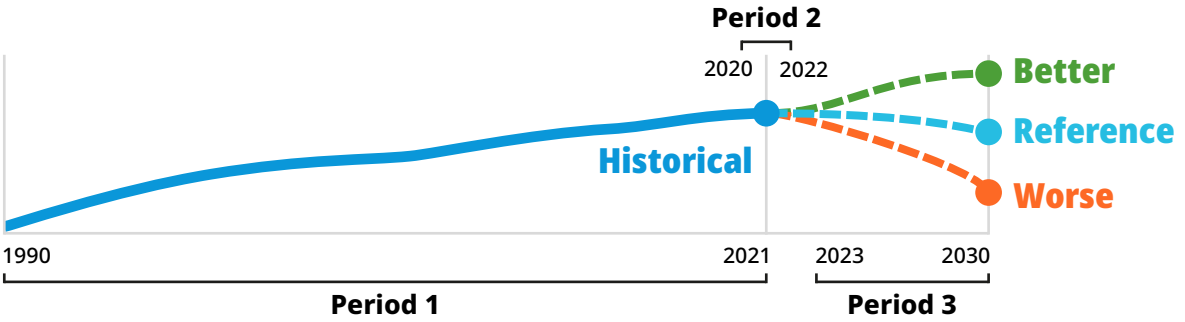
Adults with a bank account, women and men



Methodology

Our primary data partner, the Institute for Health Metrics and Evaluation (IHME), worked together with many partners and used novel methods to generate a set of contemporary estimates for how the pandemic has affected global progress on the SDGs.

This diagram provides a snapshot of IHME's three-part process and the data and methods used in each.



Period 1, 1990–2021

This is historical data drawn from thousands of sources around the world, backed by published evidence that has been checked and re-checked by global health researchers.

Period 2, 2020–2022

This is the period disrupted by the pandemic, and the most challenging period to assess given the uncertainty and immediacy of the data. Here IHME is using contemporary data gathered from surveys, mobility data of populations, administrative data from governments and WHO, and COVID-19 case data in order to assess how the disruptions from the pandemic have affected progress on the Global Goals from 2020 to 2022.

Period 3, 2023–2030

This is trying to predict the future, using the past as a guide. IHME looked at how economic growth and development progress have affected these indicators in the past and then projected possible trends for the future. So, if all countries make progress as well as the best historical performers (top 15%), the indicators will follow the green line. But if the development trends are in line with the worst performers, the indicators will follow the red line.

Sources and Notes

The data sources for facts and figures featured in the 2022 Goalkeepers Report are listed here by section. Brief methodological notes are included for unpublished analyses. Full citations, links to source materials, and additional references can be found on the Goalkeepers website at **https://gates.ly/GK22DataSources**

Introduction

The Institute for Health Metrics and Evaluation (IHME) calculated the annualized rate of change for each health indicator tracked by them in this report for three time periods: from 2015 to 2021, from 2021 to 2030 as predicted by the reference scenario forecast, and the rate of change that would be required to meet the SDG target between 2021 and 2030. We compared these rates of change to evaluate the extent that our past and expected progress compared to what would be required to meet the SDG targets. For most of the indicators that we track with IHME, the pace of change needs to increase at least fivefold to meet the target by 2030.

A dramatic shift toward progress in the HIV/AIDS epidemic

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Global Fund. (2021). Trends in AIDS-related deaths [Figure]. In *Results Report 2021* (p. 25). Retrieved August 2022. https://www.theglobalfund.org/en/results/#download

Gender equality depends on women having power, not just "empowerment"

UN Women. (2022, June 14). *Are we on track to achieve gender equality by 2030?* https://data.unwomen.org/features/are-we-track-achieve-gender-equality-2030

The years to gender equality estimate is based on data from the Equal Measures 2030 (EM2030) SDG Gender Index. An independent audit of the 2022 SDG Gender Index was carried out by the European Commission's Competence Centre on Composite Indicators and Scoreboards (JRC-COIN). Note: In the data, the estimated year to reach gender equality assumes that: (i) the 2021 global measured rate of progress in 2021 will be maintained until 2030; and (ii) a generation is approximately 28 years.

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The economic side effects of COVID-19

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The difference between having money—and being able to spend it

Gentilini, U. (2022, July 13). Ten lessons from the largest scale up of cash transfers in history. *World Bank Blogs: Let's Talk Development*. https://blogs.worldbank.org/developmenttalk/ten-lessons-largest-scale-cash-transfers-history

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Riley, E. (2020). *Resisting social pressure in the household using mobile money: experimental evidence on microenterprise investment in Uganda* (CSAE Working Paper Series No. WPS/2022-04). (S. Quinn, Ed.). Center for the Study of African Economies (CSAE), University of Oxford. 2022-04(04). https://ora.ox.ac.uk/objects/uuid:b7ed6a67-88a9-4714-a419-b4c43decc7e8/download_file?file_format=&safe_filename=Riley_2022_Resisting_social_pressure.pdf&type_of_work=Working+paper

Aker, J. C., Boumnijel, R., McClelland, A., & Tierney, N. (2016). Payment mechanisms and antipoverty programs: Evidence from a mobile money cash transfer experiment in Niger. *Economic Development and Cultural Change, 65*(1), 1–37. https://doi.org/10.1086/687578

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A bright spot of progress—and opportunity

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The difference between a job being available—and being able to take it.

International Labour Organization (ILO). (2018). *Care work and care jobs for the future of decent work.* https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms_633135.pdf

A smart investment in women, families, and societies

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We need to change how we think about world hunger

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Food aid to low-income countries is at record levels—and rising

Organisation for Economic Co-operation and Development (OECD). (2022). *OECD Data: Food aid* [Graph]. Accessed July 2022. https://data.oecd.org/oda/food-aid.htm

The size of your crop often depends on where you live

This internal analysis was developed from Food and Agriculture Organization FAOSTAT data. Note: The average area-weighted crop yield (AAWY) is calculated by (i) summing the total production for the main staple crops, (ii) summing the total area planted to those crops, and then dividing (i) by (ii), using FAOSTAT data. AAWY must be calculated separately for seed-propagated and vegetatively propagated crops, due to the great difference in water content of the two crop types. Considering national trends in AAWY, rather than individual commodities, provides insights into overall national conditions for intensification. AAWY is expected to be less affected by the weather variability that often impacts individual crops at sensitive stages while having little effect on crops at other stages. It is also less subject to the effect of variations in crop prices that arise from policies focusing on one value chain, or from global commodity price swings driven by events outside the region. AAWY also allows crop yield trends to be compared across countries with different crop mixes. It is a national index of the extent to which governments are successful in facilitating access to production inputs, output markets, and production information.

Food and Agriculture Organization of the United Nations (FAO). (2022.) *Crop and livestock products* [Data set]. FAOSTAT. Accessed April 8, 2022. https://www.fao.org/faostat/en/#data/QCL. License: CC BY-NC-SA 3.0 IGO.

Current domestic production isn't enough to feed Africa

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Sub-Saharan Africa's most important crops are at risk

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How can farmers fight climate change? Magic seeds

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A missed opportunity to solve hunger over the long term

Ceres2030 and International Food Policy Research Institute (IFPRI) analysis of data from the Organisation for Economic Co-operation and Development Development Assistance Committee Creditor Reporting System.

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Indicators Estimated by IHME

Data source information for each indicator is listed below and will be available online at https://ghdx.healthdata.org/ following publication of GBD 2021.

Stunting

IHME measures stunting prevalence as height-for-age more than two standard deviations below the reference median on the height-age growth curve, based on WHO 2006 growth standards for children of age 0–59 months. Projections to 2030 were modeled using an ensemble approach to forecast the prevalence of stunting, using SDI as a key driver in order to capture the effects of the COVID-19 pandemic on income per capita and education.

Estimates in Global Burden of Disease (GBD) 2020 leveraged several methodological advances including ensemble model predictions for severity-specific stunting prevalence and mean height-for-age z-scores (HAZ), further disaggregation of <5 age groups, and an improved distribution fitting model that focuses on HAZ scores of < -2 (i.e., under the range for stunting) rather than across the full range of HAZ scores. This led to improved estimates in a number of countries, notably including South Africa, the Democratic Republic of the Congo, India, and Pakistan. In addition, new data has improved estimates in a number of countries as well, including Pakistan.

Maternal Mortality Ratio

The maternal mortality ratio (MMR) is defined as the number of maternal deaths among women ages 15–49 years during a given time period per 100,000 live births. It depicts the risk of maternal death relative to the number of live births and essentially captures the risk of death in a single pregnancy or a single live birth. Projections to 2030 were modeled using an ensemble approach to forecast MMR, using SDI as a key driver in order to capture the effects of the COVID-19 pandemic on income per capita and education.

Our analysis of direct and indirect maternal mortality in selected countries showed no significant relationship between direct mortality and indicators of the COVID-19 pandemic (i.e., COVID-19 infection incidence rate, COVID-19 mortality rate, changes in mobility). However, there was a significant effect of the COVID-19 pandemic on indirect maternal mortality. This effect on indirect maternal mortality was modeled using COVID-19 mortality rate as a covariate. This year, our estimates of excess indirect maternal mortality also include a correction for the proportion of deaths that are considered incidental, or unrelated to pregnancy status. Currently available data does not suggest a consistent relationship between the pandemic and indicators of maternal care (antenatal care, skilled birth attendance), and IHME has not incorporated an effect of the pandemic on these indicators.

Under-5 Mortality Rate

IHME defines the under-5 mortality rate (U5MR) as the probability of death between birth and age 5. It is expressed as number of deaths per 1,000 live births. Projections were based on a combination of key drivers, including GBD risk factors, selected interventions (e.g., vaccines), and SDI. Additional short-term disruptions (2020–2021) from the COVID-19 pandemic incorporated the reductions seen in child deaths from infectious diseases (flu, respiratory syncytial virus, measles, pertussis) observed during the pandemic, driven primarily by social distancing and mask use, as well as increases in child deaths due directly to COVID-19. Most of the changes in U5MR estimates in the current Goalkeepers Report results came from new and additional input mortality data that IHME has incorporated since the GBD 2019 study, including estimates of excess mortality observed during the COVID-19 pandemic.

Wang, H., Paulson, K. R., Pease, S. A., Watson, S., Comfort, H., Zheng, P., Aravkin, A. Y., Bisignano, C., Barber, R. M., Alam, T., Fuller, J. E., May, E. A., Jones, D. P., Frisch, M. E., Abbafati, C., Adolph, C., Allorant, A., Amlag, J. O., Bang-Jensen, B. L., . . . Murray, C. J. L. (2022). Estimating excess mortality due to the COVID-19 pandemic: A systematic analysis of COVID-19-related mortality, 2020–21. *The Lancet, 399*(10334), 1513–1536. https://doi.org/10.1016/S0140-6736(21)02796-3

Neonatal Mortality Rate

IHME defines the neonatal mortality rate as the probability of death in the first 28 completed days of life. It is expressed as the number of deaths per 1,000 live births. Projections were based on a combination of key drivers, including GBD risk factors, selected interventions (e.g., vaccines), and SDI. Most of the changes in neonatal mortality estimates in this year's Goalkeepers Report are the result of new data, including estimates of excess mortality observed during the COVID-19 pandemic.

Wang, H., Paulson, K. R., Pease, S. A., Watson, S., Comfort, H., Zheng, P., Aravkin, A. Y., Bisignano, C., Barber, R. M., Alam, T., Fuller, J. E., May, E. A., Jones, D. P., Frisch, M. E., Abbafati, C., Adolph, C., Allorant, A., Amlag, J. O., Bang-Jensen, B. L., . . . Murray, C. J. L. (2022). Estimating excess mortality due to the COVID-19 pandemic: A systematic analysis of COVID-19-related mortality, 2020–21. *The Lancet, 399*:(10334), 1513–1536. https://doi.org/10.1016/S0140-6736(21)02796-3

HIV

IHME estimates the HIV rate as new HIV infections per 1,000 population. Forecasts of HIV incidence were based on forecasted ART, prevention of maternal-to-child transmission (PMTCT) coverage, and incidence as inputs into a modified version of Avenir Health's Spectrum software. Adult ART is forecasted using the expected spending on HIV curative care—which in turn was forecasted based on income per capita, including the effect of the COVID-19 pandemic—and ART prices. GBD estimates incorporated methodological changes to cause of death data for HIV as well as the adjustment of incidence estimates, to be consistent with vital registration data.

Mahy, M., Penazzato, M., Ciaranello, A., Mofenson, L., Yiannoustsos, C., Davies, M-A., & Stover, J. (2017). Improving estimates of children living with HIV from the Spectrum AIDS Impact Model. *AIDS, 31*(Suppl 1), S13–S22. https://doi.org/10.1097/QAD.0000000000001306

Eaton, J. W., Brown, T., Puckett, R., Glaubius, R., Mutai, K., Bao, L., Salomon, J. A., Stover, J., Mahy, M., & Hallett, T. B. (2019). The Estimation and Projection Package Age-Sex Model and the r-hybrid model: New tools for estimating HIV incidence trends in sub-Saharan Africa. *AIDS, 33*(Suppl 3), S235–S44. https://doi.org/10.1097/QAD.0000000000002437

Jahagirdar, D., Walters, M. K., Novotney, A., Brewer, E. D., Frank, T. D., Carter, A., Biehl, M. H., Abbastabar, H., Abhilash, E. S., Abu-Gharbieh, E., Abu-Raddad, L. J., Adekanmbi, V., Adeyinka, D. A., Adnani, Q. E. S., Afzal, S., Aghababaei, S., Ahinkorah, B. O., Ahmad, S., Ahmadi, K., & Kyu, H. H. (2021). Global, regional, and national sex-specific burden and control of the HIV epidemic, 1990–2019, for 204 countries and territories: the Global Burden of Diseases Study 2019. *The Lancet HIV*, 8(10), e633–e651. https://doi.org/10.1016/S2352-3018(21)00152-1

Tuberculosis

IHME estimates new and relapse tuberculosis (TB) cases diagnosed within a

given calendar year (incidence) using data from prevalence surveys, case notifications, and cause-specific mortality estimates as inputs to a statistical model that enforces internal consistency among the estimates. GBD estimates in this round incorporate methodological improvements in using case notification data.

IHME evaluated the literature on COVID-19 disruptions to TB incidence and identified three types of studies: studies reporting raw data on diagnosis and treatment in 2020, studies reporting on service disruption from new surveys, and studies reporting on models of TB impacts using notification data or theoretical COVID scenarios. Due to the lack of counterfactual data in pre-pandemic time periods and modeling assumptions used in the current studies, IHME could not estimate an additional disruption in TB incidence due to COVID-19. IHME will continue to evaluate and analyze as more data is released. In addition to historical trends, projections to 2030 were modeled using an ensemble approach to forecast the incidence of TB, using SDI as a key driver in order to capture the effects of the COVID-19 pandemic on income per capita and education.

Malaria

IHME estimates the malaria rate as the number of new cases per 1,000 population. To estimate malaria incidence in 2020 and 2021, IHME takes into account updated reports regarding pandemic-related disruptions to malaria interventions and effective treatment with an antimalarial drug (which includes ITN, indoor residual spraying, antimalarial treatment, and drug effectiveness). These reports were used to apply an adjustment to estimates of antimalarial treatment coverage, which were then used to produce estimates of malaria incidence. Projections to 2030 were derived using an ensemble model. First, coverage of ACT and ITNs is forecast as a function of the SDI, which is predicted in turn by projections of income per capita and education. For countries where there exists available data on intervention coverage, malaria incidence is forecasted through 2030 using an ensemble approach, incorporating past trends and forecasts of ACT and ITN coverage to produce the projections. For countries where there is no available data on ACT or ITN coverage, an ensemble approach is used based on past trends in incidence as well as projections of SDI, which incorporates the effects of the COVID-19 pandemic through income per capita and education.

Due to reporting lags, there is still relatively little data to inform pandemic-related impacts on malaria incidence. The WHO global pulse surveys, which were used to adjust 2020 and 2021 incidence results, were applied only to countries in sub-Saharan Africa due to lack of a comparable method for applying the adjustment to other regions arising from the difference in incidence estimation. Furthermore, although those pulse surveys currently allow us to begin trying to capture malaria pandemic-related impacts, the surveys were completed by national-level health officials and capture only their individual assessment of how the pandemic has affected care seeking.

World Health Organization. (2020, August). *Pulse survey on continuity of essential health services during the COVID-19 pandemic: Interim report, 27 August 2020*. Accessed November 2021. https://www.who.int/publications/i/item/WHO-2019-nCoV-EHS_continuity-survey-2020.1

World Health Organization. (2021, April). *Second round of the national pulse survey on continuity of essential health services during the COVID-19 pandemic: January-March 2021* (Interim report). Accessed November 2021. https://www.who.int/publications/i/item/WHO-2019-nCoV-EHS-continuity-survey-2021.1

Neglected Tropical Diseases

IHME measures the sum of the prevalence of 15 NTDs per 100,000 that are currently measured in the annual Global Burden of Disease study: human African trypanosomiasis, Chagas disease, cystic echinococcosis, cysticercosis, dengue, food-borne trematodiases, Guinea worm, soil-transmitted helminths (STH, comprising hookworm, trichuriasis, and ascariasis), leishmaniasis, leprosy, lymphatic filariasis, onchocerciasis, rabies, schistosomiasis, and trachoma. Since the 2020 Goalkeepers Report, changes in historical trends in this indicator reflect updates to the estimated prevalence of each NTD made for the GBD 2020 study. Specifically, changes in the summary NTD prevalence indicator between the 2020 Goalkeepers Report and these estimates largely reflect the addition of new data to STH models, especially in Latin America and South Asia.

In the 2021 Goalkeepers Report, IHME did not estimate a COVID-19 effect on this indicator, due to limited surveillance and control program data availability. Modeling studies and available data suggest that the COVID pandemic likely resulted in disruptions to NTD epidemiology, though these disruptions are likely to vary by disease and location and may be variably amenable to mitigation through increased control efforts. Although modeling studies can characterize potential disruptions under various scenarios, reliable data to quantify the true magnitude of pandemic effects on NTD epidemiology are sparse.

For this year's report, IHME searched for published and gray literature quantifying the impact of the COVID-19 pandemic on NTD prevalence. Due to data gaps, lags in availability, and challenges in accounting for the likely disruptions to NTD surveillance during the pandemic, IHME found evidence to support adjustment for COVID-19 disruptions only for dengue. IHME adjusted dengue estimates in 2020 and 2021 using country-specific estimates of COVID disruptions from Chen et al. (2022), including updated estimates for 2021 graciously provided by the study authors via personal communication. For 2020, IHME adjusted only the proportion of cases occurring in April through December, reflecting the timing of the start of the pandemic; for 2021, IHME adjusted the full year. IHME excluded Brazil from the country-specific analysis due to data inconsistencies. For countries not estimated directly by this analysis, IHME applied regional or global disruption ratios. Projections to 2030 used an ensemble model, driven both by trends in the past as well as projections of SDI, which incorporated disruptions from the COVID-19 pandemic on income per capita and education.

Hollingsworth, T. D., Mwinzi, P., Vasconcelos, A., & de Vlas, S. J. (2021). Evaluating the potential impact of interruptions to neglected tropical disease programmes due to COVID-19. *Transactions of The Royal Society of Tropical Medicine and Hygiene, 115*(3), 201–204. https://doi.org/10.1093/trstmh/trab023

Chen, Y., Li, N., Lourenço, J., Wang, L., Cazelles, B., Dong, L., Li, B., Liu, Y., Jit, M., Bosse, N. I., Abbot, S., Velayudhan, R., Wilder-Smith, A., Tian, H., & Brady, O. J. (2022). Measuring the effects of COVID-19-related disruption on dengue transmission in southeast Asia and Latin America: A statistical modelling study. *The Lancet Infectious Diseases, 22*(5), 657–667. https://doi.org/10.1016/S1473-3099(22)00025-1

Family Planning

IHME estimates the proportion of women of reproductive age (15–49 years) who have their need for family planning satisfied with modern contraceptive methods. Modern contraceptive methods include the current use of male and female sterilization, male and female condoms, diaphragms, cervical caps, sponges, spermicidal agents, oral hormonal pills, patches, rings, implants, injections, intrauterine devices (IUDs), and emergency contraceptives. Projections to 2030 used an ensemble model, based both on past trends and using SDI as a key driver, which incorporates projections of income per capita and education and the effects of the COVID-19 pandemic.

Our analysis of PMA surveys and the smartphone-based follow-up survey referenced above does not show a consistent, significant reduction in contraception use due to the pandemic.

As a result, IHME did not incorporate a short-term effect on the family planning indicator. Changes to the historical estimates can be attributed to methodological updates and the addition of new data sources, including the Generations and Gender Programme surveys. They switched from modeling the demand that is satisfied with modern methods directly for all women to modeling the three underlying components of the indicator separately for partnered and unpartnered women: any contraceptive use, proportion of use that is modern, and proportion of non-use that is unmet need. This modeling approach better aligns with data restrictions such as only surveying partnered (married or in-union) women and allows us to construct the full range of family planning indicators.

Universal Health Coverage

The universal health coverage (UHC) effective coverage index is a metric composed of 23 effective coverage indicators that cover population-age groups across the entire life course (maternal and newborn age groups, children under age 5, youths ages 5–19 years, adults ages 20–64, and adults ages 65 years old and older). These indicators fall within several health service domains: promotion, prevention, and treatment.

Health system **promotion** indicators include met need for family planning with modern contraception.

Health system **prevention** indicators include the proportion of children receiving the third dose of the diphtheria-tetanus-pertussis vaccine and children receiving the first dose of measles-containing vaccine. Antenatal care for mothers and antenatal care for newborns are considered indicators of health system prevention and treatment of diseases affecting maternal and child health.

Indicators of **treatment** of communicable diseases are the mortality-to-incidence (MI) ratios for lower respiratory infections, diarrhea, and tuberculosis, as well as coverage of ART among those with HIV/AIDS. Indicators of treatment of noncommunicable diseases include MI ratios for acute lymphoid leukemia, appendicitis, paralytic ileus and intestinal obstruction, cervical cancer, breast cancer, uterine cancer, and colorectal cancer. Indicators of treatment of noncommunicable diseases also include mortality-to-prevalence (MP) ratios for stroke, chronic kidney disease, epilepsy, asthma, chronic obstructive pulmonary disease, diabetes, and the risk-standardized death rate due to ischemic heart disease.

To produce forecasts of the UHC index from 2022 to 2030, a meta-stochastic frontier model for UHC was fit, using total health spending per capita projections as the independent variable. Country- and year-specific inefficiencies were then extracted from the model and forecasted to 2030 using a linear regression with exponential weights across time for each country level. These forecasted inefficiencies, along with forecasted estimates of total health spending per capita, were substituted into the previously fit frontier to obtain forecasted UHC for all countries for 2022–2030.

Short-term effects due to the pandemic were included in our final results with some exceptions. ART coverage scores and met demand for family planning were not adjusted, due to limitations in data as described in previous indicator sections. Adjustments for vaccine delivery are described in the Vaccines section. For other indicators (19 out of 23), in the absence of data to inform the correspondence between reductions in utilization and reductions in coverage, IHME applied 25% of the reduction in monthly missed medical visits (excluding routine services).

Smoking

IHME measures the age-standardized prevalence of any current use of smoked tobacco among those age 15 and older. IHME collates information from available representative surveys that include questions about self-reported current use of tobacco and information on the type of tobacco product smoked (including cigarettes, cigars, pipes, hookahs, and local products). IHME converts all data to its standard definition of any current smoking within the last 30 days, so that meaningful comparisons can be made across locations and over time. Estimates this year are higher than last year to reflect the update in the indicator from daily smoking to any smoking within the last 30 days, to better align with the SDG definition. Projections to 2030 used SDI as a key driver, which incorporates projections of income per capita, education, and the effect of the COVID-19 pandemic.

World Health Organization. (2021). *WHO global report on trends in prevalence of tobacco use 2000-2025*. (4th ed.). https://www.who.int/publications/i/item/9789240039322. Licence: CC BY-NC-SA 3.0 IGO.

Vaccines

IHME's measurement of immunization coverage reports on the coverage of the following vaccines separately: DTP3, measles second dose (MCV2), and three-dose pneumococcal conjugate vaccine (PCV3). IHME estimated the short-term (2020–2021) effects via administrative data on vaccine doses. In the 2021 Goalkeepers Report, IHME used a two-step random-spline meta-regression model to estimate coverage disruptions, fit to monthly administrative data and using mobility disruptions as a predictor. In this year's report, IHME estimated coverage disruptions due to the COVID pandemic directly within our modeling framework, in the same way that stockouts and other disruptions are accounted for in pre-pandemic years. This change was made for several reasons. First, full-year administrative data for both 2020 and 2021 are now available through WHO and UNICEF's Joint Reporting Process, representing a more comprehensive annual data set than was available for last year's report. Second, the availability of timely monthly coverage data has decreased throughout the pandemic. Third, though mobility disruptions were a strong predictor of coverage disruptions early in the pandemic, the reasons for ongoing vaccination service disruptions have become increasingly complex over time, including persistent supply disruptions, workforce shortages, and decreased care seeking. In this year's report, therefore, IHME has adapted our modeling strategy to leverage the increasing amount of annual data and decrease the model's reliance on mobility as a predictor of coverage disruptions.

To estimate disruptions in vaccine coverage, IHME used administrative vaccine coverage data collected through the 2022 Joint Reporting Form. First, IHME assembled a "shock-free" time series of administrative vaccine coverage data, omitting country-year-vaccine data points for which countries reported stockouts or for which other known service delivery disruptions made sudden decreases in vaccine coverage plausible. In this step, they omitted all data points from 2020 and 2021 for all countries due to the COVID pandemic. Second, IHME then fit spatiotemporal Gaussian process regression (ST-GPR) models to this "shock-free" administrative time series, producing estimates of expected administrative coverage in the absence of disruptions. Third, IHME compared the reported administrative coverage to these expectations, to estimate the magnitude of disruption implied by the administrative data for each country, vaccine, and year. Last, IHME used these estimated disruptions in administrative coverage to generate covariates in our final ST-GPR coverage models, which were fit to survey data and bias-adjusted administrative data. If administrative data was missing in 2020 or 2021, they imputed disruptions using vaccine- and year-specific distributions of observed disruptions in countries with available administrative data, propagating uncertainty throughout this imputation process. This approach allowed IHME to leverage the magnitude of coverage disruptions implied by administrative data, while still adjusting for bias in this data.

Causey, K., Fullman, N., Sorensen, R. J. D., Galles, N. C., Zheng, P., Aravkin, A., Danovaro-Holliday, M. C., Martínez-

Piedra, R., Sohda, S. V., Velandia-Gonzáles, M. P., Gacic-Dobo, M., Castro, E., He, J., Schipp, M., Deen, A., Hay, S. I., Lim, S. S., & Mosser, J. F. (2021). Estimating global and regional disruptions to routine childhood vaccine coverage during the COVID-19 pandemic in 2020: A modelling study. *The Lancet, 398*(10299), 522–534. https://doi.org/10.1016/S0140-6736(21)01337-4

World Health Organization. (2022, February). *Third round of the global pulse survey on continuity of essential health services during the COVID-19 pandemic* (Interim report, November–December 2021). Accessed July 27, 2022. https://www.who.int/publications-detail-redirect/WHO-2019-nCoV-EHS_continuity-survey-2022.1

Sanitation

IHME estimates the proportion of population with access to safely managed sanitation. As defined by the Joint Monitoring Programme (JMP), a safely managed facility must meet three criteria: (i) is not shared with multiple households, (ii) is an improved sanitation facility, and (iii) its wastewater is disposed of safely. Safe wastewater disposal can consist of being treated and disposed of in situ, stored temporarily and treated off-site, or transported through a sewer and treated. Safely managed treated wastewater must have received at least secondary treatment. IHME measured households with piped sanitation (with a sewer connection or septic tank); households with improved sanitation but without a sewer connection (pit latrine, ventilated improved latrine, pit latrine with slab, composting toilet); households without improved sanitation (flush toilet that is not piped to sewer or septic tank, pit latrine without a slab or open pit, bucket, hanging toilet or hanging latrine, no facilities); and wastewater treatment type for sewer-connected households, as defined by the JMP for Water Supply and Sanitation. Two new models were developed for the 2021 Goalkeepers Report, those being the proportion of sewer-connected facilities that are safely managed and the proportion of improved, non-sewer facilities that are safely managed.

IHME used a meta-regression, Bayesian, regularized, trimmed (MR-BRT) spline cascade model, with SDI as a predictor, cascading on super-region and country to estimate the proportion of sewer-connected facilities that are safely managed. Using cross-validation, they selected this model from a collection of candidate models based on out-of-sample root-mean-square deviation (RMSE). The estimates from this model were multiplied by the existing IHME estimates of the proportion of the population with sewer-connected facilities to estimate the proportion of the population with safely managed sewer-connected facilities.

IHME used a shape constrained additive model, with lag-distributed income per capita (LDI) as a predictor and random effects on super-region and country to estimate the proportion of improved, non-sewer facilities that are safely managed. Using cross-validation, they selected this model from a collection of candidate models based on out-of-sample RMSE. The estimates from this model were multiplied by the IHME estimates of the proportion of the population with improved, non-sewer-connected facilities to estimate the proportion of the population with safely managed improved non-sewer facilities.

To estimate the proportion of the total population with safely managed sanitation, the proportion of the population with safely managed sewer-connected facilities were added to the proportion of the population with safely managed improved non-sewer facilities. IHME propagated uncertainty through all components of the modeling chain using posterior simulation in which all calculations were performed on 1,000 draws from the posterior distribution of each model. Projections to 2030 were modeled using an ensemble approach to forecast the summary exposure value of unsafe sanitation, using SDI as a key driver in order to capture the effects of the COVID-19 pandemic and projections of income per capita and education.

World Health Organization & UNICEF Joint Monitoring Programme (JMP) for Water Supply, Sanitation and Hygiene. (2021). *Proportion of population using safely managed sanitation services* [SDG indicator 6.2.1a metadata]. JMP. Accessed December 12, 2021. https://washdata.org/sites/default/files/2022-01/jmp-2021-metadata-sdg-621a.pdf

Zheng, P., Barber, R., Sorensen, R. J. D., Murray, C. J. L., & Aravkin, A. Y. (2021). Trimmed constrained mixed effects models: Formulations and algorithms. *Journal of Computational and Graphical Statistics, 30*(3), 544–556. https://doi.org/10.1080/10618600.2020.1868303

Indicators Estimated from Other Sources

Poverty

Poverty data is based on primary household survey data obtained from government statistical agencies and World Bank country departments. Data for high-income economies comes primarily from the LIS (formerly Luxembourg Income Study) database.

For 2019–2022 estimates, extreme poverty is measured as the headcount ratio of people living on less than US$1.90 per day. 2018 is the last year with official global poverty estimates. Baseline and pessimistic projections utilize growth forecasts based on April 2022 Macro Poverty Outlook data sets from the Poverty and Inequality Platform database. The baseline scenario distributes the impacts of the COVID-19 pandemic, rising inflation, and the conflict in Ukraine equally to all households. The pessimistic scenario includes the disproportionate impact of rising food prices on the bottom 40% compared to the top 60% over the baseline scenario. Official poverty estimates are available for East Asia and Pacific, Europe and Central Asia, Latin America and Caribbean, sub-Saharan Africa, and rest of the world for up to 2019, and for Middle East and North Africa up to 2018. Official South Asia estimates are only available up to 2014. Regions are categorized using the Poverty and Inequality Platform definition.

Luxembourg Income Study Database (LIS). https://www.lisdatacenter.org/

World Bank. *Poverty headcount ratio at $1.90 a day (2011 PPP) (% of population)* [Data set]. Poverty and Inequality Platform: World Development Indicators. Accessed June 2022. https://data.worldbank.org/indicator/SI.POV.DDAY. License: CC BY-4.0.

2019–2022 Estimates

Lakner, C., Mahler, D. G., Negre, M., & Prydz, E. B. (2022). How much does reducing inequality matter for global poverty? *Journal of Economic Equality*. https://doi.org/10.1007/s10888-021-09510-w

World Bank. *Macro Poverty Outlook* [Data set]. Poverty and Inequality Platform: World Development Indicators. Accessed July 2022. https://www.worldbank.org/en/publication/macro-poverty-outlook. Headcount ratio provided by the World Bank upon request.

For methodology, see:

World Bank. (2022). *Poverty and Inequality Platform Methodology Handbook*. https://worldbank.github.io/PIP-Methodology/

Agriculture

The FAO computation on national survey data (RuLIS Project) and official estimates were computed with the support of the 50x2030 Initiative.

50x2030. (2022). *A partnership for data-smart agriculture*. https://www.50x2030.org/

Food and Agriculture Organization of the United Nations (FAO). *Average annual income from agriculture, PPP (constant 2011 international USD)* [Data set]. RuLIS - Rural Livelihoods Information System. FAO. Accessed June 2022. www.fao.org/in-action/rural-livelihoods-dataset-rulis/

The most recent year available was used for selected countries, ranging from 2005 through 2020.

Food and Agriculture Organization of the United Nations (FAO). (2021). *Use of AGRISurvey data for computing SDG's and national indicators: Experience in three countries* [Country brief]. www.fao.org/3/cb4762en/cb4762en.pdf. License: CC BY-NC-SA 3.0 IGO.

For methodology, see:
Food and Agriculture Organization of the United Nations (FAO). (2018). *Rural Livelihoods Information System (RuLIS): Technical notes on concepts and definitions used for the indicators derived from household surveys* [Report]. FAO. www.fao.org/3/ca2813en/CA2813EN.pdf. Licence: CC BY-NC-SA 3.0 IGO

Education
UNESCO Institute for Statistics (UIS). *Sustainable Development Goal 4*. UIS. Data accessed June 2022. http://sdg4-data.uis.unesco.org/

Source for Learning Poverty 2019 data:
World Bank & UNESCO Institute for Statistics. (2019). *Historical data and sub-components* [Data set]. Learning Poverty Database. https://datacatalog.worldbank.org/search/dataset/0038947

Source for Learning Poverty 2022 simulations:
2022 simulation results taken from Azevedo, J. P., Demombynes, G., & Wong, Y. N. 2022. Why has the pandemic not sparked more concern for learning losses in Latin America? *World Bank Blogs: Education for Global Development* (forthcoming).

Gender Equality
The chart is based on data from the United Nations Global Sustainable Development Goals Database, the Government of India's National Sample Survey Office, and the International Labour Organization.

The data is the most recent available for 92 countries and territories (2001–2019). The age group is 15 and older where available (18 and older in Ghana). In a number of cases, data are for those ages 10 and older (n=13) or 12 and older (n=3). The data for Malaysia, Ireland, and Cambodia refers to individuals ages 15 through 64. In the case of Thailand (2015) and India (2019), data covers those ages 6 and older, and in the United Republic of Tanzania (2014) those ages 5 and older. Data for Bulgaria, Denmark, Latvia, the Netherlands, Slovenia, and Spain corresponds to time spent on unpaid care among those ages 20 through 74 only.

Differences across countries should be interpreted with caution, given heterogeneity across surveys and countries in definitions, methodology, and sample coverage. Time-diary data often excludes supervisory responsibilities, leading to underestimation of the time constraints of care.

For further information on the country-level data excluding India and Madagascar, see:
United Nations Statistics Division. (2022, May). *Global SDG Indicators Data Platform*. https://unstats.un.org/sdgs/dataportal

Data for India and Madagascar is available from:
Ministry of Statistics and Programme Implementation. (2019). *Time Use Survey Report*. Government of India. http://164.100.161.63/download-reports

Addati, L., Cattaneo, U., Esquivel, V., & Valarino, I. (2018). *Care Work and Care Jobs for the Future of Decent Work*. Geneva: International Labour Organization. https://www.ilo.org/global/publications/books/WCMS_633135/lang--en/index.htm

Financial Services for the Poor
The "Income" comparison refers to what the World Bank calculates as account ownership of the richest 60% of households and poorest 40% of households, respectively.

Demirgüç-Kunt, A., Klapper, L., Singer, D., and S. Ansar. (2022). *The Global Findex database 2021: Financial inclusion, digital payments, and resilience in the age of COVID-19*. Washington, DC: World Bank. https://openknowledge.worldbank.org/handle/10986/37578 License: CC BY 3.0 IGO.

World Bank. (2022). *Account ownership at a financial institution or with a mobile-money-service provider (% of population ages 15+)* [Data set]. Global Findex Database. Accessed June 2022. https://data.worldbank.org/indicator/FX.OWN.TOTL.ZS License: CC BY-4.0.

For methodology, see:
World Bank. (2022). Survey Methodology. *In The Global Findex database 2021: Financial inclusion, digital payments, and resilience in the age of COVID-19* (pp. 181–197). Washington, DC: World Bank. https://thedocs.worldbank.org/en/doc/f3ee545aac6879c27f8acb61abc4b6f8-0050062022/original/Findex-2021-Methodology.pdf License: CC BY-4.0.f3ee545aac6879c27f8acb61abc4b6f8-0050062022/original/Findex-2021-Methodology.pdf License: CC BY-4.0.