

BREAKING THE CYCLE

The cost of malnutrition to girls



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EXECUTIVE SUMMARY

Girls' malnutrition is a pervasive global crisis with far-reaching implications. Hunger not only undermines girls' health and well-being but also jeopardises their education, future earnings, and the health of their children, creating a vicious cycle. We estimate this cycle **costs the global economy 1.6 trillion dollars annually** in lost productivity and potential. Today, over one billion adolescent girls and women suffer from different forms of malnutrition, including being under or overweight, stunting, or experiencing micronutrient deficiencies including anaemia.¹ Almost one in ten adolescent girls is underweight, a statistic that has shown no improvement in recent years,² and over a quarter of all women are food insecure.³

Globally, climate change, conflict and the impact of COVID-19 have led to a sharp increase in the numbers of people affected by hunger after decades of progress, with women and girls worst affected. More than 2.3 billion – or more than a quarter of the world's population – could not regularly access enough food in 2023⁴. Women and girls make up 60 percent of the world's chronically malnourished⁵ and suffer most due to climate, economic, and conflict related shocks; during the COVID-19 pandemic, the gender gap more than doubled from 49 million to 126 million, as the pandemic exacerbated inequalities and wreaked havoc on women and girls' ability to work, support themselves and access nutritious food.⁶

Malnutrition severely impacts the health of girls and women, particularly during adolescence and pregnancy, when their nutritional needs are highest. A malnourished girl, or woman, who was stunted in childhood, is also more likely to give birth to underweight children, at

high risk of malnutrition themselves. Action is especially urgent in light of the current hunger crisis; after the COVID-19 pandemic, 80 percent of breastfeeding women and girls were food insecure, and more than 66 percent had reduced their food groups.⁷

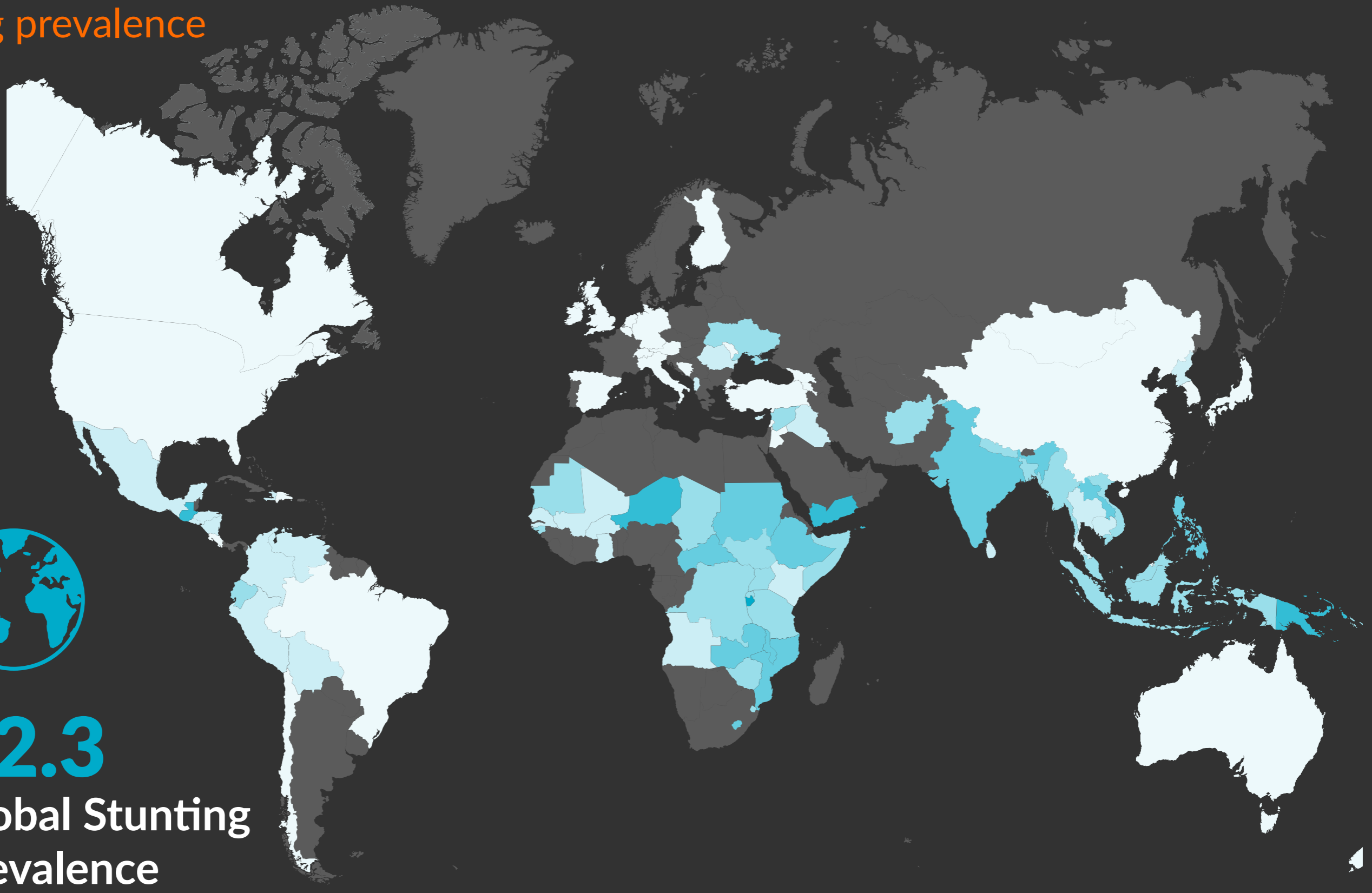
Addressing malnutrition is crucial for girls' futures, to break the cycle of poverty, and help them reach their potential with better education and stable employment. This report presents a review of some of the highest costs of malnutrition to women and girls, based on a review of academic literature and creates new projections based on currently available global data. These estimates are not perfect, but they provide illustrative estimates and demonstrate the cost of malnutrition to girls. For more details on how the estimates were calculated, please refer to the Annex.

In the worst cases, malnutrition and food insecurity are costing women and girls their lives, especially during childbirth. When and where they survive, however, they are still paying a high cost in lost opportunity and potential, with lower rates of educational attainment, a higher likelihood of living in poverty, and high risk of experiencing stress and violence. These costs are universal, and are felt to some extent in every country in the world. No one country has fully eliminated hunger, but by investing in essential nutrition actions and addressing systemic issues, we can enhance health, expand educational opportunities, and improve future economic outcomes for women and girls, and future generations. The world must take action in order to achieve the Sustainable Development Goals and ensure a healthier, more equitable future for coming generations.

Stunting prevalence



22.3
Global Stunting
prevalence



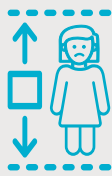
DEFINITIONS



Hunger - hunger is when people do not receive enough food (in the form of calories) per day. **Hunger refers to the uncomfortable or painful physical sensation caused by inadequate intake of dietary energy.** Typically measured as the prevalence of undernourishment, this does not take into account the quality or nutrition of what a person eats, or whether a person gets enough micronutrients.⁸



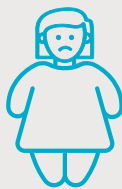
Malnutrition - malnutrition is when people do not receive enough of the right nutritious foods. **It is a physiological condition resulting from the inadequate, unbalanced, or excessive intake of macronutrients (carbohydrates, proteins, and fats), which provide dietary energy, and micronutrients (vitamins and minerals), essential for physical and cognitive growth and development. It can manifest in various forms, including undernutrition (insufficient nutrient intake), micronutrient deficiencies (lack of essential vitamins and minerals), and overnutrition, which can lead to obesity and related health issues.**



Stunting: stunting is when a child is extremely short for their age, and can be considered a sign of chronic malnutrition and infection. Stunting has lifelong physical and cognitive impacts. A child is stunted when under the age of 5 if their height for age is more than two standard deviations below the WHO Child Growth Standards median, and are considered severely stunted if their height is below three standard deviations.⁹



Wasting: also known as acute malnutrition, wasting is when a child is too thin for their height. Wasting occurs as a result of recent rapid weight loss or a failure to gain weight, most often caused by insufficient food intake and/ or disease. It is a life-threatening condition, increasing the risk of serious illness and death.¹⁰ A child is wasted when under the age of 5 if their weight for height is less than two standard deviations from the WHO Child Growth Standards median, if they have a low mid-upper arm circumference, or if they have nutritional oedema.



Overweight: overweight is the opposite of wasting, and is when a child is consuming too many calories for their activity level. Being overweight increases risk of illness and can have long term physical impacts. A child is overweight when under the age of 5 if their weight for height is more than two standard deviations above the WHO Child Growth Standards median.

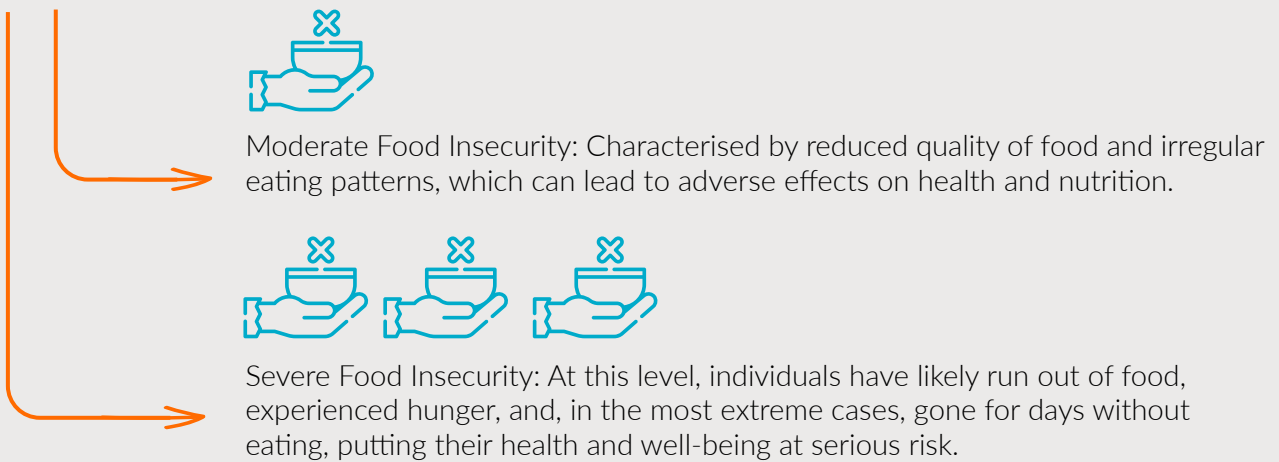
Micronutrient deficiencies: shortages in specific vitamins and minerals essential to the body for growth and development. For example, iron deficiency anaemia is especially common in girls and is a common micronutrient deficiency.



Anaemia: Iron deficiency is the most common cause of anaemia and nutritional deficiency. It is required for red blood cell synthesis and is essential for immune response, cognitive development, temperature regulation, and work performance.¹¹ Haemoglobin is a major component of red blood cells. If it falls, the oxygen capacity of the blood decreases can lead to fatigue, reduced work capacity and productivity, increased risk for disease and disability, and poor reproductive outcomes.¹² Iron-deficiency-anaemia is often used as a proxy for the prevalence of anaemia.¹³



Food security - Food Insecurity refers to the lack of consistent access to adequate food, which can compromise dietary quality, disrupt normal eating patterns, and negatively impact nutrition, health, and overall well-being. It measures a person's ability to access food, and can be impacted by budget, conflict and displacement. A person who is moderately or severely food insecure is unable to regularly access enough food.



Children living in food poverty: defined as the percentage of children under 5 years of age consuming foods and beverages from four or fewer of the eight defined food groups.¹⁴ These eight groups are: breast milk; grains and roots; pulses, nuts and seeds; dairy; meat and fish; eggs; Vitamin A rich fruits and vegetables; and other vegetables.¹⁵ Children are said to be living in severe food poverty if they are only eating 0-2 of these food groups.



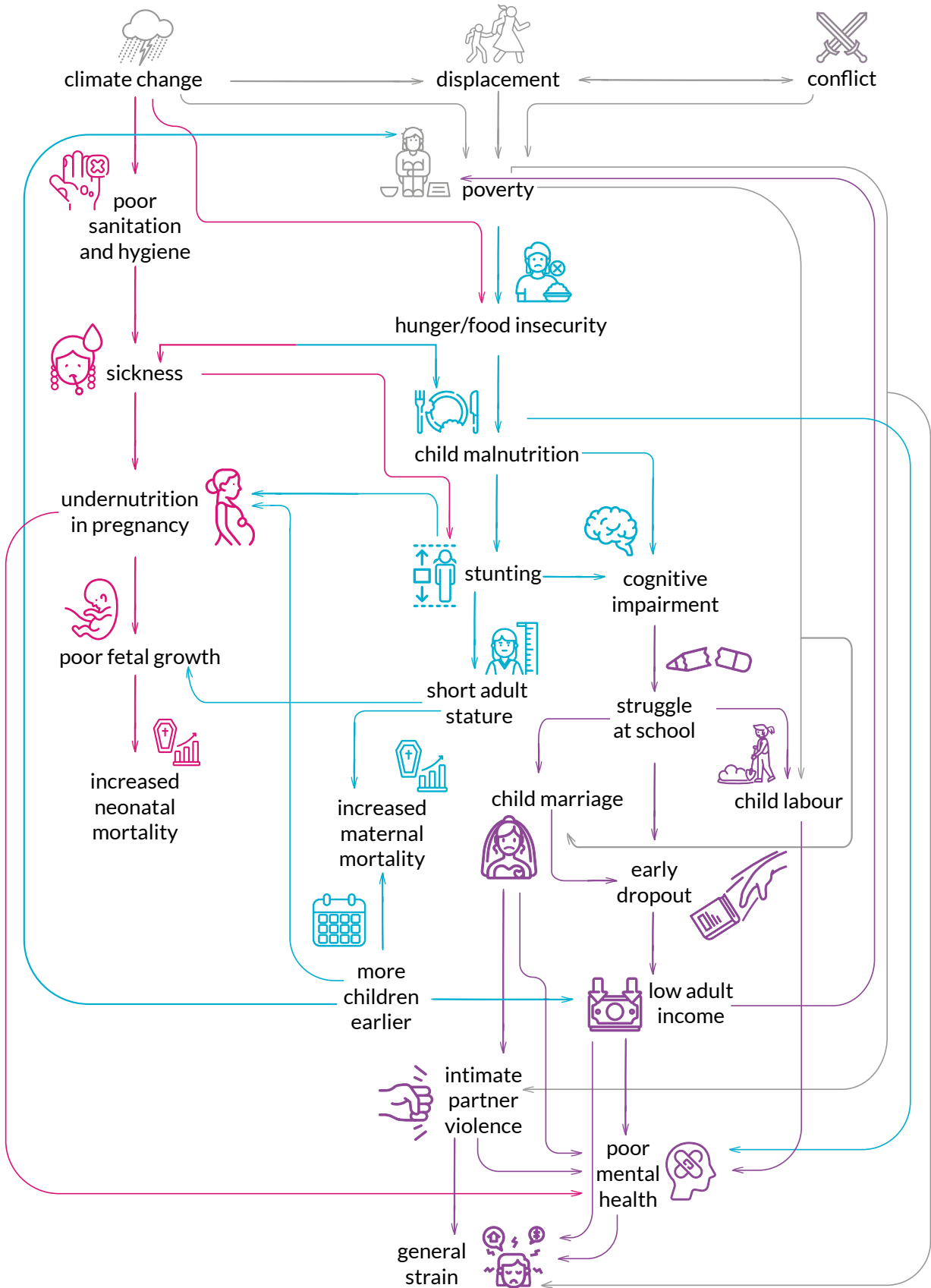
Minimum diet diversity: defined as the percentage of children under 2 years of age consuming foods and beverages from at least five out of the eight defined food groups.¹⁶



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INTRODUCTION: Impact of hunger, food insecurity and malnutrition on girls and women

The highest numbers of women and girls with undernutrition, micronutrient deficiencies and anaemia are concentrated in South Asia and sub-Saharan Africa, but women are consistently at higher risk of moderate or severe food insecurity than men in every region of the globe, with a widening gender gap in Asia, North America, Europe, and Latin America and Caribbean.¹⁷ The gender food gap is especially high in countries in Latin America, the Caribbean and South Asia;¹⁸ girls in South Asia are more than twice as likely to be underweight or short as their peers in sub-Saharan Africa.¹⁹ Even within families, inequitable allocation of food (both quantity and quality) often favours men and boys.²⁰ One study in Ethiopia found that adolescent girls are more likely to report being food insecure than boys living in the same household.²¹



Based on Hodinott, J., Behrman, J. R., Maluccio, J. A., Melgar, P., Quisumbing, A. R., Ramirez-Zea, M., Stein, A. D., Yount, K. M., & Martorell, R. (2013). *Adult consequences of growth failure in early childhood*. *The American journal of clinical nutrition*, 98(5), 1170–1178. and Nadia Akseer, Hana Tasic, Michael Nnachebe Onah, Jannah Wigle, Ramraj Rajakumar, Diana Sanchez-Hernandez, Jonathan Akuoku, Robert E Black, Bernardo L Horta, Ndidi Nwuneli, Ritta Shine, Kerri Wazny, Nikita Japra, Meera Shekar, and John Hodinott. (2022) *Economic costs of childhood stunting to the private sector in low- and middle-income countries*. *eClinicalMedicine*;45: 101320



Rise in Ultra-Processed Foods and Impact on Nutrition of Women and Girls

Even in families where girls may be eating enough food to fill their bellies, they still may not be getting enough nutrient rich foods for good nutrition. Partially due to the current economic crisis, ultra processed foods now make up to 80 percent of diets in high-income countries and 30 percent in middle-income countries—adding another layer of complexity to the nutritional crisis.²²

In sub-Saharan Africa prior to the pandemic, income growth combined with urbanisation was already driving increased demand for more processed foods that lack nutritional value.²³ In

the United Kingdom, 68 percent of teens' caloric intake comes from ultra processed foods²⁴ and a recent UNICEF report found that 42 percent of adolescents in low and middle income countries consume carbonated soft drinks at least once daily.²⁵ Over 55 percent of adolescents in low and middle-income countries consumed fast food at least one day a week, and over 10 percent, four to seven times per week.²⁶ All this has led to an alarming rise in children who are both overweight and stunted,²⁷ leading to a future generation not only struggling with malnutrition, but also facing the growing prevalence of diet-related non-communicable diseases.

Child Food Poverty and Nutrient Deficiency in Girls

Partially linked to the preponderance of ultra processed foods, today two-thirds of children under five are living in food poverty in low and middle income countries, increasing their risk of stunting and micronutrient deficiencies.²⁸ One in three children are living in severe food poverty, often only eating some milk and grain every day. Globally, although there have been improvements in some regions, other countries have seen the situation get worse, and there has been no net reduction in child food poverty since 2011.²⁹ This is not a problem restricted to low income countries; it also affects 43 percent of children in upper middle income countries.³⁰

The increased consumption of ultra processed foods and low diversity diets has led to stubbornly high levels of micronutrient deficiencies in 69 percent girls, affecting their health, education, productivity, and even hope for the future. Micronutrient deficiencies (including essential vitamins and minerals such as Vitamin A, iron, folate and zinc) affect a whopping 75 percent of women and girls in South Asia, but also affect almost half of all women and girls in high-income countries.³¹

Girls and women are especially at risk of iron-deficiency; around the world, adolescents from lower socio-economic families consume fewer high-iron foods, such as beans, meats, and eggs.

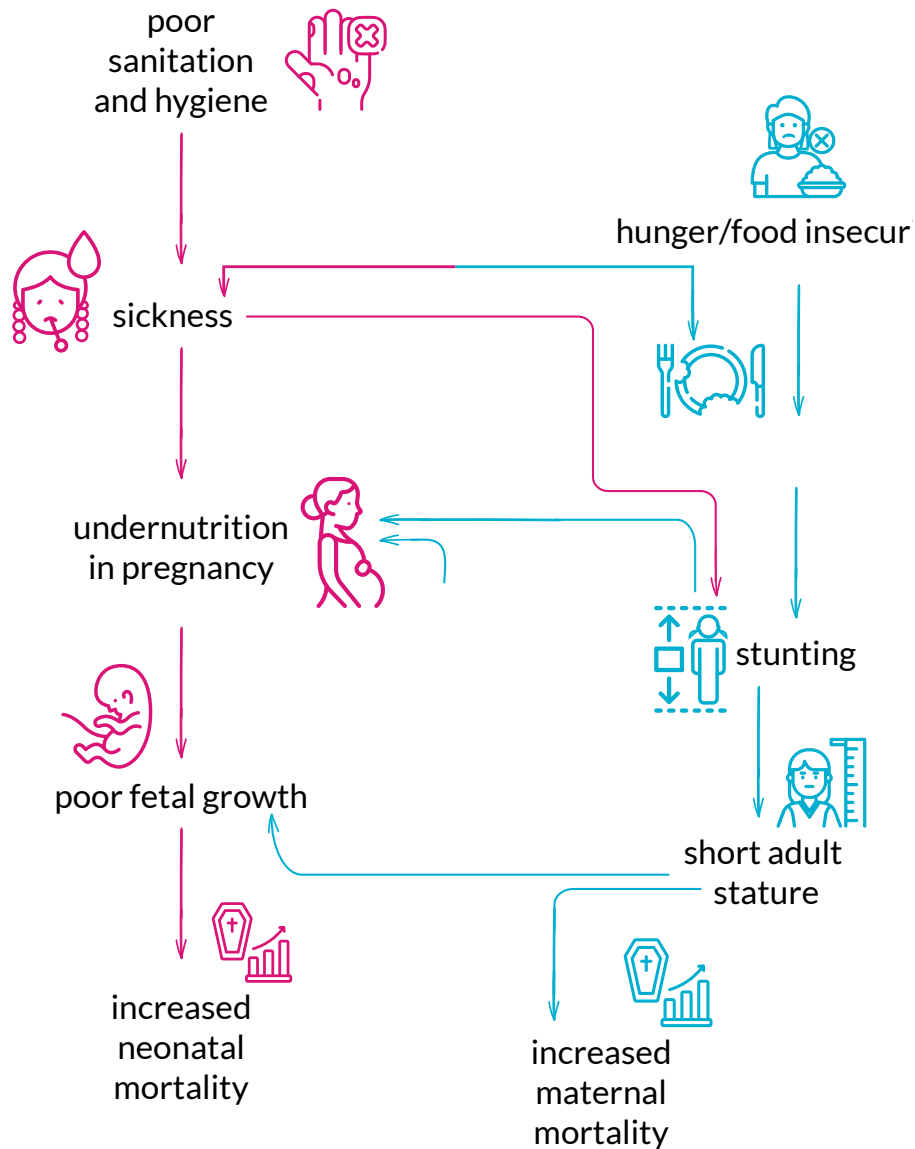
This leads to an increased risk of anaemia, a micronutrient deficiency affecting 30 percent of girls and women globally, which is caused by a lack of iron and other micronutrients, infections, and illness.³² Maternal iron deficiency and/or anaemia can increase the risk of maternal death from postpartum haemorrhage, low birthweight in infants, and iron deficiency in babies leading to impaired child development. Moreover, iron deficiency and/or anaemia can harm a woman's productivity and income generating ability, and reduce the health (including mental health) and quality of life for millions of women.³³

Overall, the health impacts of each of these forms of malnutrition are severe, and the cumulative effects even worse: malnutrition compromises girls' immune systems, increases their susceptibility to disease and risks during childbirth, and results in higher mortality rates.³⁴ The educational consequences are equally dire, with malnourished girls experiencing reduced cognitive function and school performance, which hampers their ability to reach their full potential. As girls grow older, this educational setback then limits future opportunities and earning potential, perpetuating cycles of poverty and inequality for both them and their children. Unless governments and world leaders act, girls and future generations will continue to pay the cost of hunger and malnutrition.

COST TO LIFE: Health in the first five years



We approximate 3,107,059 girls may die in the next four years due to low birthweight and Vitamin A deficiencies. This includes 2,546,130 girls dying before age 5 due to Vitamin A deficiencies³⁵ and 140,232 more female babies dying every year due to low birthweight than would otherwise.³⁶



Malnutrition adversely affects girls' lives and health from before they're even born. Many of these risks come from three crucial aspects: maternal nutrition, inappropriate or not enough food and breastfeeding, and negative gender norms.

Risks at birth

Low birthweight, mainly a result of poor maternal nutrition, affects 1 in 7 newborns worldwide,³⁷ and significantly raises the risk of a baby not surviving their first 28 days of life.

We approximate that every year, this leads to the avoidable deaths of more than 140,000 babies who do not make it to one month old.³⁸ The problem is most severe in South Asia and sub-Saharan Africa, where maternal malnutrition is high, and the vast majority of low birthweight (73%) and stunting (74%) occur.³⁹ The current global food and nutrition crisis has exacerbated these challenges, with a 25 percent increase in the number of acutely malnourished pregnant and breastfeeding women between 2020 and 2022 in the 12 hardest-hit countries.⁴⁰



Antenatal care is crucial to provide health and nutrition services during pregnancy. Micronutrient supplementation for mothers can reduce low birthweight by 16 percent, iodine supplements can reduce under 5 deaths by 29 percent, and iron folate supplements can reduce the risk of maternal mortality by 23 percent, and the risk of anaemia at term by 73 percent.⁴¹ Mothers

need supplementation and follow-up care from a healthcare provider or community health worker who can assist her and provide advice on affordable nutrition and provide micronutrients. Without better support for women's nutrition and efforts to address the broader structural issues that perpetuate malnutrition, mothers and babies will continue to experience increased risks of neonatal and maternal mortality.



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Risks during the first six months

Boys and girls are equally at risk of low birthweight, but negative gender norms quickly kick in after birth. One study has found that girls are 40 to 50 percent more likely to die in infancy and childhood than boys, mostly because parents prioritise nutrition and medical care for sons over daughters.⁴²

Globally, only 46 percent of newborns are breastfed within an hour of their birth,⁴³ putting their survival, health, nutrition, and development at risk. Exclusive breastfeeding is one of the most important contributions possible to infant health and nutrition and can give infants all the nutrition they need for the first six months. However, marketing, prejudice and cultural practices sometimes mean mothers prefer formula or other foods and water, which may make children sick, especially in low and middle income countries if they aren't coming from safe sources. In some cultures, a preference for boys means that girls are less likely to be breastfed, and are breastfed for less time when they are, as mothers are under pressure to get pregnant again quickly.⁴⁴ This pressure to try again for a son negatively impacts the nutrition of both mother and daughter, and the health of any future children.

Risks as girls grow older

Malnutrition in the mother and poor child feeding practices, including suboptimal breastfeeding, can contribute to micronutrient deficiencies. Shortages in Vitamin A, Zinc, and iodine increase babies' risk of death due to infection, measles, diarrhoea, malaria, pneumonia and other causes by age five.⁴⁵ Zinc deficiency increases children's susceptibility to pneumonia, diarrhoea, and malaria,⁴⁶ and is common without supplementation if children are eating a mainly plant based diet, whether due to culture or budgetary constraints. Most children also need Vitamin A supplementation.⁴⁷ **We approximate that Vitamin A supplementation could save the lives of over 2.5 million girls worldwide in the next four years.**⁴⁸

As children approach the age of five, wasting and stunting continue to pose a negative threat to their lives and health. Severely underweight children are more than nine times more likely

to die, and severely wasted children more than 12 times more than children who are a healthy weight.⁴⁹ Overall, undernutrition and micronutrient deficiencies can lead to long-term health consequences in girls, including stunted growth, weakened immune systems, and increased susceptibility to diseases. For those who survive their first few years of life, adolescence presents a second opportunity to improve nutrition and catch up on missed growth, but it also presents more risks to nutrition for girls and heightened threats.⁵⁰

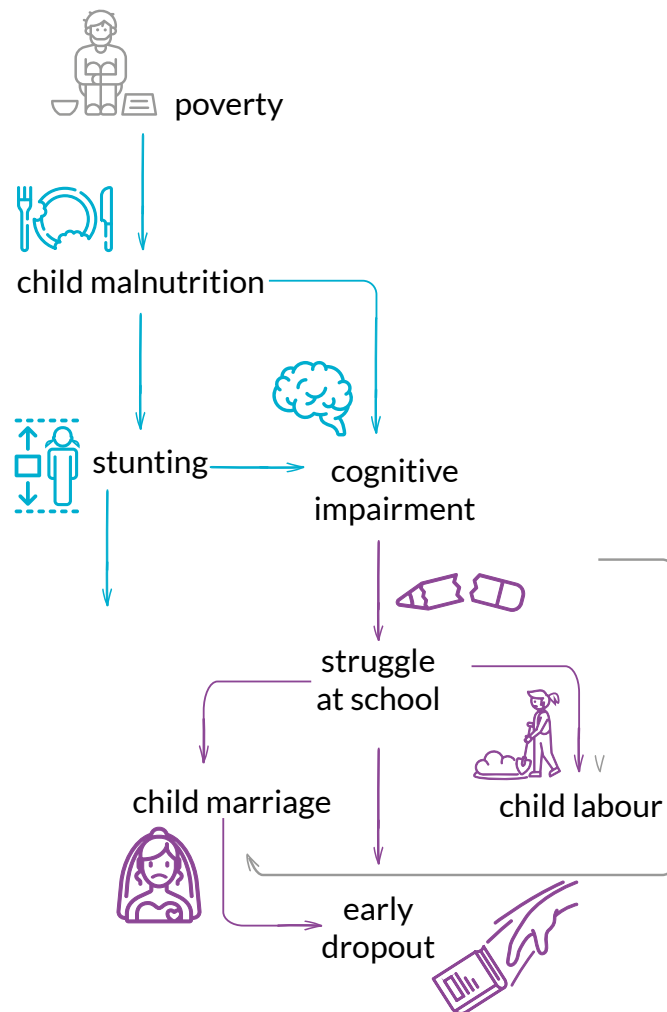


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COST TO EDUCATION AND OPPORTUNITY



We approximate that without the effects of stunting and anaemia, 15.8 million more girls would complete secondary school every year.⁵¹ Similarly, we project 1.7 million years of girls' education are lost every year due to stunting.⁵²



The repercussions of malnutrition extend beyond health, significantly impacting girls' education and opportunities. Stunting affects children's cognitive ability and behavioural development;⁵³ undernourished children are more likely to suffer developmental delays that hinder their academic performance and future employment prospects.⁵⁴ One study in Guatemala found that being stunted at age two was associated with completing almost five fewer grades, leaving school three years earlier, and poorer performance on maths and reading exams.⁵⁵ Another meta-study found that children

who were more severely stunted completed a half year less of school, and were 24 percent less likely to graduate from secondary school.⁵⁶

Anaemia has similar negative impacts. Children are likely to have a lower IQ score, the lower their blood iron levels⁵⁷ and are 5 percent less likely to progress to the next grade in school if they have anaemia.⁵⁸ No region is on track to meet the 2030 global targets for reducing anaemia⁵⁹ and prevalence in 10 to 19 year old girls actually increased between 1990 and 2021.⁶⁰

Malnutrition accelerating negative gender norms

Girls are at increased risk of malnutrition, and then when malnutrition makes girls do more poorly in school, negative gender norms make them less likely to persist with education and make it more likely for them or their parents to consider alternatives such as child marriage or child labour. This works in three ways: first by their greater risk of stunting due to unequal sharing of food in the household, second by their increased risk of anaemia, and third by negative social and gender norms which undervalue girls based on the hierarchical belief that their worth is mainly as wives and mothers and not in the workforce.

Families prioritise investment in the education of their sons,⁶¹ and when the effects of malnutrition impact girls' educational performance, these negative gender norms are further triggered, making parents more likely to give up on their daughters' education. Malnutrition among school-age girls is a significant risk factor for high absenteeism, early dropouts, low school enrollment, and unsatisfactory classroom performance.⁶²

In many developing countries, the onset of a girl's menstrual cycle compounds the twin forces of malnutrition and traditional gender norms further, and negatively impacts her education in three ways:



Lack of toilet facilities or sanitary products may make her less likely to attend school during her period⁶³



The onset of her period may signal a cultural transition from girl to someone who can be considered ready for marriage, or at least, at risk of becoming pregnant, often hastening the push towards marriage.



For many girls, heavy periods may exacerbate iron-deficiency anaemia, which negatively impacts test scores, the likelihood of grade progression, and even aspirations for the future. One study in Peru found that children treated for anaemia quickly began to believe in their own possibilities more, including the possibility of moving away from home after school and continuing to tertiary education.⁶⁴



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Only one of these effects is directly related to girls' nutrition, but the other impacts of the onset of a menstrual cycle exacerbate the challenges malnourished girls already face in completing their education. As girls do increasingly poorly in school and attend school less, their risk of dropping out of school increases and the risk that they will be pushed to other 'options' like child marriage and child labour increase.

In some places child marriage becomes a coping mechanism to address food insecurity. This in turn has a negative impact on girls' education. In countries where child marriage is common, marriage may look more attractive to parents as a way to have one less mouth to feed at home, know their daughter is being taken care of elsewhere, and is not at risk of becoming a single mother. Parents also sometimes marry their daughters in exchange for the money and economic relief a dowry might bring. In Ethiopia, reports indicate that in regions experiencing drought, child marriage more than doubled in one year, while a recent survey from Afghanistan indicates that child marriage is on the rise with roughly one in eight households arranging a marriage for a girl under 18 because of food insecurity.⁶⁵

In other contexts, child labour may become a preferred alternative to school, as a form of short term relief from economic stress and food insecurity. Research supports this; food insecurity accompanied by famine often leads parents and caregivers to make survival decisions that increase availability of food and provide additional household income.⁶⁶ In many countries where World Vision works, there are costs associated with secondary schooling, either direct (tuition fees) or indirect (books, lunch money, uniforms), and these, combined with general financial pressures, can lead to children increasing their workload to something that approximates child labour, either while still attending some school or dropping out altogether.

In humanitarian crises, having to flee their homes means parents and caregivers are unable to work, and if children are separated from their

parents, they may find themselves in a position where they must earn money to survive. Both instances push children into the labour market.⁶⁷ In a survey of families experiencing reductions in food assistance in six humanitarian crises earlier this year, almost half (45%) of parents said there had been an increase in child labour.⁶⁸ However, taking a job in search of immediate relief from poverty and hunger may have long term consequences. Especially if girls have not finished their education, child labour will place them on a long term trajectory of lower income and chronic food insecurity as an adult, and increase the risk of their children experiencing the same struggles.

This compounded impact of malnutrition, poverty, and lack of education makes it incredibly challenging for girls and women to break free from a cycle of deprivation.



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Faith's story | hunger and education in Kenya

15-year-old Faith lives in a rural Kenyan town called Bamba. She and her family have been struggling to find food because the drought of the last few years has made it increasingly difficult. Rain has always been unpredictable in Bamba, but the recent drought has pushed many households to desperation, reaching a crisis point after the rains failed to come the previous September as well. Adding to the challenge, there are also many elephants in the area who come out of the nearby national park looking for food when it's dry, uprooting the few crops that people have been able to grow.

"I often think - and wish - that we were in a position to get food. We wouldn't be in the situation we are in," said Faith.

Faith's family frequently doesn't have enough food to feed them all, and they often go to bed hungry.

William Thoya, the head teacher at Kilifi primary school in Bamba, says recently many parents weren't able to feed their families, and were resorting to leaving their children behind, for days at a time, while they travelled to other areas where bigger trees grow to make charcoal to sell at the market. The money they earn is rarely enough to cover their family's needs, but people in the area have no other way to make a living. As well as causing rising malnutrition and health issues, hunger also caused many children to drop out of school because they couldn't face the walk to get there.

Older boys sometimes try to earn some money taxiing passengers on a motorbike, while girls are sometimes married off.

"Hunger increases risk of child marriage. The parents want to get money, in terms of dowry, in order to buy food, so they may be tempted to marry off their daughters early," William noted.

Faith says many girls her age are chasing after the boys who taxi people between villages on their motorbikes because they have money for food.

"If there is no food at home, girls look for motorcycle riders who have money to marry them," Faith explains. Several of those girls have ended up pregnant and dropping out of school as a result.

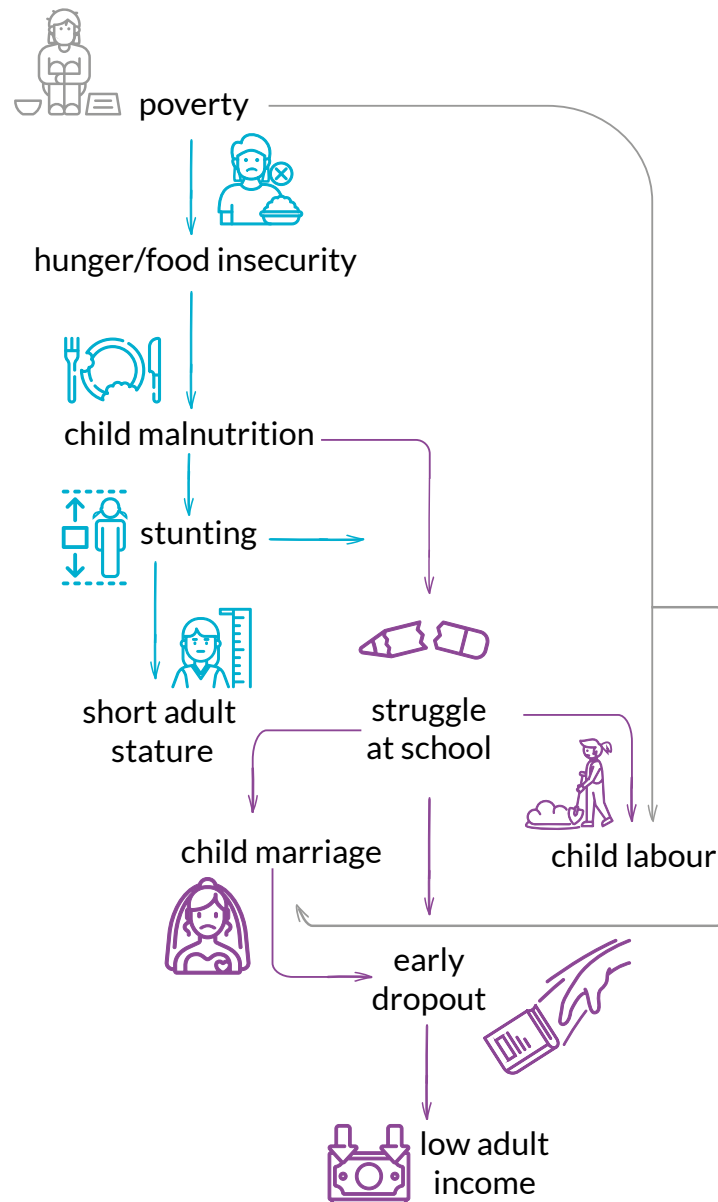
World Vision has been helping children and the community in Bamba to tackle their biggest challenges for more than ten years, and together, have continued to stand with them to face the hunger crisis as it escalated in their region. A school feeding programme launched in January to provide urgently needed help for Bamba's children. Twelve schools received maize, beans and cooking oil at the start of the term, enabling them to provide daily meals for each child who attends. At one primary school alone, attendance went up by about 40 students within the first term of the school feeding programme because children knew they would have something to eat at school.

In the long term, World Vision is continuing to support families in Bamba to build economic resilience to future emergencies, helping families to diversify their income streams and start small businesses, like tailoring or small stores, and to manage, save and borrow money through savings groups.

COST TO INCOME



Approximately \$1,643,806,194,966.57 in income lost from women's stunting annually⁶⁹



Perhaps one of the most alarming impacts of malnutrition on girls' futures is the lifelong impact that their stunting before age two will have for the rest of their lives. Because stunting is more common in lower-income countries, it is sometimes difficult to disentangle the results of stunting as a child, on income as an adult, from the impact of growing up in a poor family. Different

studies have found a wide range of figures, with anything from a 25 percent to 46 percent cost in adult wages for stunting. The World Bank has said undernutrition may account for a 4 to 11 percent decrease in GDP in sub-Saharan Africa and Asia.⁷⁰

For women and girls, gender inequality sharpens the effects of stunting and other forms of malnutrition on income through reduced access

to finance, limited employment opportunities, and increased domestic expectations.⁷¹ One meta study found that each additional centimetre in adult height is associated with a 6 percent increase in wages for women,⁷² while another study in Guatemala found that women who were stunted as children were 41 percent less likely to work in a white collar or skilled labour job, and were 42 percent more likely to be living in poverty.⁷³ Overall, we applied a conservative finding that distinguishes the cost of being stunted from poverty⁷⁴ to the potential incomes of women alive today, and **approximate \$1.6 trillion in lost income.**

Anaemia also has severe impacts on adult income due to its effect on physical and mental productivity, and can be caused by malaria, hookworm infections, and other diseases in addition to iron deficiency.⁷⁵ Worm infections, although more a cause than a form of malnutrition itself, affect many children and adults in developing or rural settings, often

sapping strength and concentration as a result. Studies that have treated adults with deworming medication have found that adults who are dewormed are able to work 12 percent more, are less sick by a third, and earn 29 percent more. For women, this means they are able to move from low paid domestic labour jobs, to better paid jobs in manufacturing or other sectors.⁷⁶ Overall, it's estimated that the current caseload of anaemia in low and middle income countries costs children and women \$110 billion in lost productivity.⁷⁷

This also has knock-on effects for the next generation - the OECD estimates that every 1 percent increase in maternal employment is associated with a .4 percent decrease in child poverty. Unfortunately, there has not been any progress in this area; since the 1990s the number of children living in poverty has actually increased in more than half of OECD countries.⁷⁸ The vicious cycle of poverty and malnutrition has sobering costs for the next generation, as we will see in the next section.



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Ei's story | Hunger and child labour

In Myanmar, where 14-year-old Ei lives, a combination of conflict and climate change has made life very difficult. Having enough food to eat has been a constant worry for Ei and her mother, Daw Aye Aye Mya, as well as most of the people in her community. Parents are unable to send their children to school because they are struggling to make ends meet. When Ei's father died, life became even more difficult, leaving her mother to support the family alone. Work is scarce, and even when it's available, doesn't pay enough to support the family's needs.

When Ei was younger, her mother struggled a lot and had no other choice but to pull Ei out of school to help her with work.

"Back then we faced many difficulties. My mother worked as a laundry woman. My mother and I had to deliver clothes and collect money at night since my mother had to do laundry all day," explained Ei.

"I still remember those times very vividly. My mother carried me on her back at night delivering laundry to many houses. There were always dogs chasing us and my mom gave me rocks so I could throw them to scare off the dogs when they try to come and bite us," added Ei.

But Ei wasn't alone. Many other children in her community had to work as well because their families also couldn't afford to eat three meals a day. Some made the decision themselves to drop out of school to work instead.

"Some children collect bottles in the street, some work in a garment factory, and others work in a restaurant. Some boys work in masonries and some girls choose to work as maids." Ei added.

A few years ago, Ei and her mother were able to access nutritional and financial support from World Vision, and it helped them transform their lives.

"My daughter didn't eat healthily before due to our struggle, so she was small and very skinny. Her lack of nutrition had caused her to become extremely thin, which devastated me," said Daw Aye Aye Mya.

"With the knowledge I have learned from World Vision, I was able to cook healthy for my daughter. She's now eating three meals a day and thriving. She grew a lot during these past years; she's even taller than me, and she is beautiful now, not skinny like before, and she can easily study her lessons very well," her mother added.

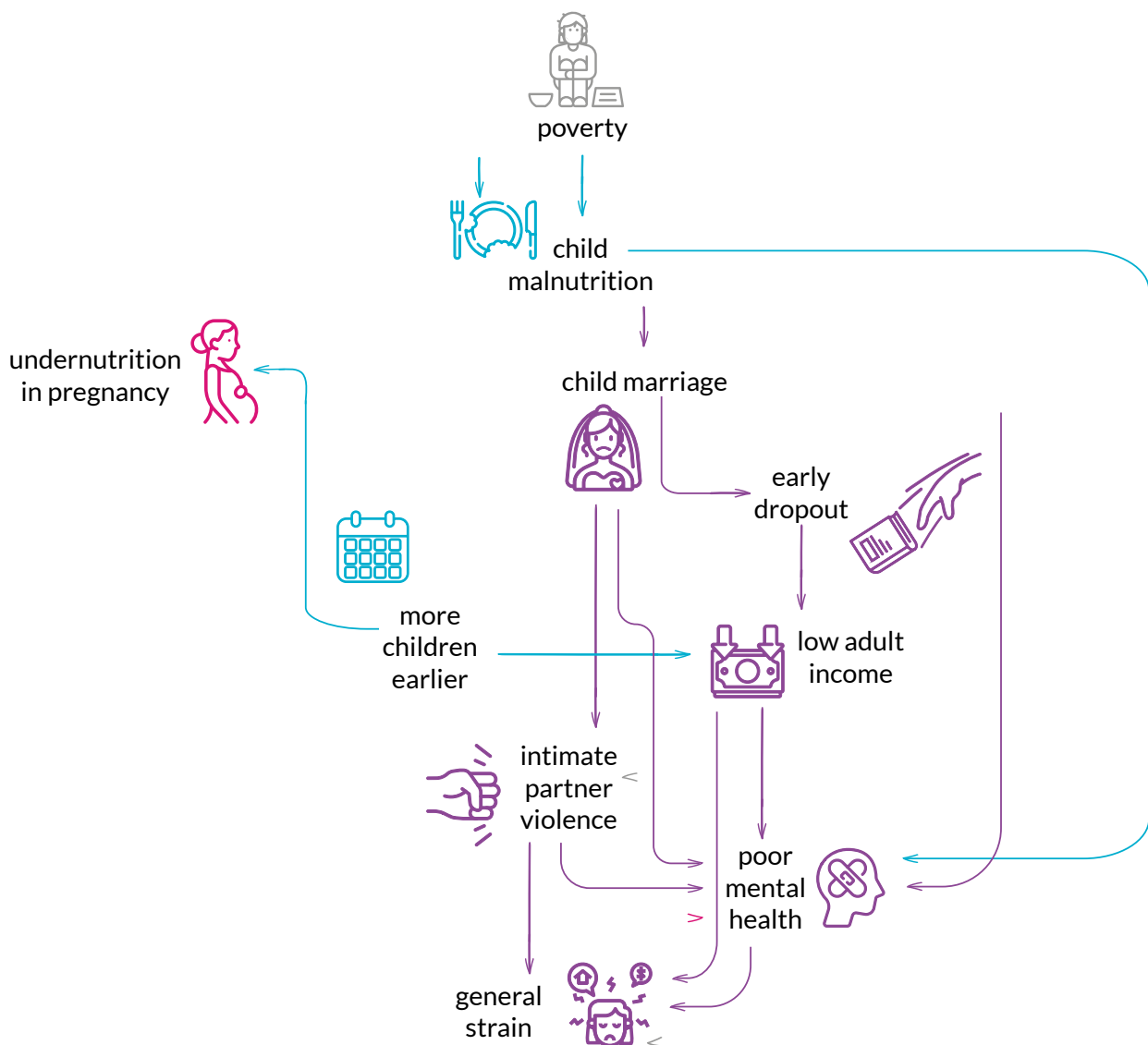
Through the support of World Vision programmes in Myanmar, Ei has learned that nutritious and healthy food is important for children's growth and development.

"If we eat healthy food our brains and bodies can develop much better which means we will be able to chase our dreams properly," concluded Ei.

COST TO FUTURE GENERATIONS: malnutrition, violence and stress



On average, we predict a stunted girl will approximately be married more than 3 years earlier, have babies almost 6 years earlier, and have 1.5 more children over the course of her lifetime.⁷⁹



Food insecurity and malnutrition are both causes and consequences of child marriage. As we explained in the section on education, discriminatory gender norms, exacerbated by extreme poverty and lack of food security, can push girls and their families into child marriage. **We approximate that a girl stunted at 2 years old, is likely to marry three years earlier than a girl who is not. She is also likely to have 1.5 more children (independent of whether or not she is married), and be almost six years younger than her non-stunted peers at the age of first birth.⁸⁰**

Unfortunately, not only does early marriage, early pregnancy, and more pregnancies come with further risks to a girls' health, it also risks her baby, and increases the likelihood of a continued cycle of poverty and malnutrition.⁸¹

Alongside other issues, teen pregnancy has high health risks for both mother and baby and to make matters worse, in many countries, young girls experience stigma accessing healthcare, especially if unmarried.⁸² Improving the nutritional status of adolescent girls can significantly improve newborns' nutritional status and break the intergenerational cycle of anaemia. Malnutrition affects not only individuals, but also extends across generations; girls who were once stunted are more likely to suffer health and birth complications, including death, and her baby is more likely to have a low birthweight and higher risk of malnutrition and death.⁸³ If they survive, babies may experience developmental delays.⁸⁴ Globally, about half of stunted children become stunted during pregnancy and the first six months of life when they are entirely dependent on their mothers for nutrition.⁸⁵ The leading cause of death for adolescent girls, 15-19 years, is pregnancy complications and unsafe abortions.⁸⁶

The mothers' level of education also seems to be a strong predictor for children's nutrition and even mortality,⁸⁷ and another way in which stunting's

impact on girls' education perpetuates the cycle for another generation. Adolescents with mothers who had completed high school are less likely to be anaemic than adolescents with mothers with less than three years of formal education.⁸⁸

Trapped: violence and stress

Babies born into food insecure families are more likely to experience not just malnutrition themselves, they are also more likely to experience and witness violence. Much of the available research on the subject comes from the United States, where studies have found that children living in homes experiencing continuous food insecurity face an increased risk of violence, including physical violence, witnessing physical fights among family members and breaking of household property. One-fifth of persistent food insecure households report high levels of parent-child psychological and physical violence, in comparison to seven percent of food secure households.⁸⁹ The likelihood of children under four years of age witnessing violence or victimisation is almost six times greater in persistently food insecure households than food secure households.⁹⁰

The mothers themselves are also at increased risk of experiencing violence. In another American study, women who had experienced



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sexual, physical or psychological violence were three times more likely to have very low food security.⁹¹ The link between sexual violence and food security also means that survivors are less likely to have the resources to easily leave the relationship, exposing both women and children to continued violence. Factors include poverty, stress, and restricted access to finances and financial reliance on another person; instances of intimate partner violence increase with the level and duration of household food insecurity.⁹² In some cases, women resort to engaging in transactional sex and employing other negative coping mechanisms to acquire food. Evidence from developing countries points to a similar relationship; girls living in drought conditions experience an increase of 15 percent of physical violence and 29 percent of sexual violence.⁹³

Stress, violence and food insecurity are all interlinked, and the impact on mothers' mental health may also impact their ability to care for their children.⁹⁴ The general strain theory posits

that stress causes individuals, in this case parents and caregivers, to suffer from anxiety, depression, and anger. A lack of positive coping strategies, coupled with general strain and food insecurity, then sometimes leads to violent behaviours in the household.⁹⁵ In other cases, mental health struggles can lead to food insecurity and then violence - for families experiencing mental illness, moderate-to-severe food insecurity is linked with a 34 percent increase in the odds of witnessing physical violence.⁹⁶

Overall, the combined effects of hunger and malnutrition will lead girls to experience poor health outcomes, including mental health, struggle or shorten their education, and reduce their ability to maintain employment and protect their own children.⁹⁷ Breaking this cycle requires focused interventions that address the nutritional needs of both mothers and children, ensuring that women have access to adequate nutrition before and during pregnancy to give their children the best start in life.



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Sozinha José's story | Climate change and El Niño in Mozambique

"Because of hunger, other children and I dropped out of school," says Sozinha José, a 16-year-old girl severely affected by drought in central Mozambique.

The El Niño phenomenon is adding food security to the worries of thousands of families who were already in a vulnerable situation following cyclone Freddy, which hit Sozinha José's district, Mutarara, in 2023.

The 2024 Mutarara Government's Mid-Year Performance Report revealed that the district's population is now being affected by the El Niño phenomenon, which has caused a lack of rainfall leading to drought, and resulting in the loss of almost 16 thousand hectares of ploughed and sown land, or 26 percent of the total.

Girls' malnutrition is a pervasive global crisis with far-reaching implications. Hunger doesn't just compromise the health and wellbeing of girls like Sozinha Jose, but also threatens their education, future earnings, and health. The future of their children is also at stake; in a vicious cycle that if not tackled, will continue to cost 1.6 trillion dollars annually in lost productivity and potential.

Sozinha José, who has lost both her father and mother, lives with her grandmother Fanita and cousin Ismael. "I'm suffering with hunger here.

Before, we used to produce [food] normally, but now we're suffering because of drought," said Sozinha Jose.

"Even though we grew some crops, all the produce dried up because of lack of rain. In these last two years, from 2023 to 2024, we haven't been able to produce anything in the field," added Sozinha Jose.

Sozinha Jose is only one example of the 31,000 families directly affected by the drought caused by El Niño in that part of the country. The health impacts are severe, especially for girls. Malnutrition compromises girls' immune systems, increases their susceptibility to disease and risks during childbirth, and results in higher mortality rates.

"To survive, my grandmother and I go to the river to look for water lily tubers to cook and eat. Some days we don't manage to find the tubers. In those days we have nothing to eat," Sozinha Jose adds.

The educational consequences are equally dire, with malnourished girls experiencing reduced cognitive function and school performance, which hampers their ability to reach their full potential. This educational setback limits future opportunities and earning potential, perpetuating cycles of poverty and inequality.

CONCLUSION

The cost of malnutrition for girls and women is profound, undermining their health, educational achievements, and long-term prospects. The severe impact of malnutrition perpetuates existing inequalities and hinders efforts toward equitable and sustainable development. It is imperative to address this crisis through a multifaceted approach that targets the root causes and ensures comprehensive solutions.

Preventing malnutrition, including micronutrient deficiencies and stunting is not simply about eating more or better food, or receiving supplements. Rather, as explained in this report,

the links between malnutrition and a girls' life are pervasive and complex, and preventing and treating stunting, adolescent anaemia, and other forms of malnutrition involves addressing drivers and complex behaviours at multiple levels, from an adolescent's knowledge, attitudes, emotions, to power dynamics within households, accessibility to health and protective services, enforcement of child marriage and labour laws, and education and health policies.⁹⁸

We call governments and implementing partners to implement the following critical actions to tackle malnutrition and its effects on girls:



Expand Nutrition Services for Children: Universal coverage of Essential Nutrition Actions and services must be prioritised to prevent and treat malnutrition, especially for women and girls. This involves strengthening health systems, investing in nutrition training, and rapidly scaling up community health worker programs to ensure comprehensive coverage and effective interventions



Address Adolescent Nutrition: Implement policies and programmes to enhance adolescent nutrition, including with multiple micronutrient supplementation, now categorised by the World Health Organisation as an [essential medicine](#). Prioritise reducing adolescent anaemia through improved dietary practices and equitable food distribution within households



Combat Gender Inequality: Address the gender-specific challenges that exacerbate malnutrition, such as child marriage, and limited access to education and resources for girls. Support interventions that improve harmful gender norms, enhance the nutritional status of girls and women, contributing to breaking the cycle of intergenerational malnutrition. Although multi-sectoral interventions are more complex and must be tailored to each context, programmes that address interpersonal, community, institutional, and policy drivers of nutrition could help break the vicious cycle of malnutrition for good.



Leverage Schools for Nutritional Interventions: Utilise school meal programs and the broader school environment to address children's nutritional needs and support health education. Schools can serve as crucial platforms for promoting dietary diversity, fortification, and supplementation, as well as for connecting families with social protection and health services.



Increase funding to address the root causes of malnutrition and food insecurity, to meet immediate needs and prevent malnutrition in future generations. [Less than a quarter](#) of current aid flows directed toward food security and nutrition address root causes, with the majority allocated to food consumption. An [additional USD 10.8 billion per year](#) is required to eliminate child wasting, stunting, and anaemia.



Regulate and Monitor Food Environments: Governments should establish mandatory food regulation policies tailored to each context to support healthy diets for all, especially children and adolescents, while also promoting and supporting exclusive breastfeeding. This should include reducing the consumption of unhealthy foods and ultra processed foods among children and adolescents and restrictions on marketing, fiscal policies such as taxes, and clear labelling to counteract the commercial pressures driving poor nutritional choices. Women and newborns are especially harmed by misleading marketing of breastmilk substitutes, which is why implementation and enforcement of the [WHO BMS Marketing Code](#) is so crucial.



Integration: Develop guidance and policies integrating child nutrition-sensitive approaches with humanitarian response and nexus, food security, and climate-resilience.

By implementing these recommendations, we can significantly mitigate the effects of malnutrition on girls and women, paving the way for healthier communities and a more equitable future. Addressing this issue with urgency and commitment is not only a moral imperative, but a necessary step toward achieving sustainable development and improving the lives of countless individuals.



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ANNEX 1: Cost of malnutrition equations

This report includes figures for nine 'costs' of malnutrition. These were chosen from a literature review of gray and academic literature on the topic, with preference given to meta and global studies where multiple were available. The literature review employed a snowball method.

| Cost | Source | Relationship | Equation |
|---|-------------------------------|---|---|
| Stunting on years of schooling | Adair et al. 2013. | 1 SD increase --> .48 additional years schooling completed | $Y = \text{stunting prevalence at age 2} * \text{female population at age 2} * .48 * 2$ |
| Stunting on secondary school completion | Adair et al. 2013. | 1 SD increase --> 24% reduced risk of non-completion of secondary school | $Y = 1 - \text{odds completion of secondary} - .24(1 - \text{odds completion of secondary}) - .24((1 - \text{odds completion of secondary} - .24(1 - \text{odds completion of secondary}))$ |
| Vitamin A deficiency on under 5 mortality | Beaton et al. 1993 | supplementation reduces all cause mortality 23% | $Y = u5 \text{ population} * 1000 * (u5 \text{ mortality} - 1 - u5 \text{ mortality new} / 1000)$ |
| Underweight on neonatal mortality | Black et al. 2008 | Infants born at term weighing 1500–1999 g were 8.1 (95% CI 3.3–19.3) times more likely to die, and those weighing 2000–2499 g were 2.8 (95% CI 1.8–4.4) times more likely to die from all causes during the neonatal period than were those weighing more than 2499 g at birth. (5.45 mean) | $\text{excess deaths} = \text{number of births} * \text{rate of neonatal mortality for healthy bw} - \text{number of births} * \text{current rate of neonatal mortality}$ |
| Anaemia on school enrolment | Chong et al. 2016 | 5 percentage points less likely to advance to next grade | $\text{excess out of school} = \text{total girls 15-19} * \text{rate of secondary school completion w/o anaemia} - \text{total girls 15-19} * \text{current rate of secondary school completion}$ |
| Stunting on adult income | Grantham-McGregor et al. 2007 | loss in adult income from being stunted but not in poverty = 22.2% | $Y = \text{GNI if no stunting} * \text{total adult female population} - \text{GNI} * \text{total adult female population}$ |

| Cost | Source | Relationship | Equation |
|-----------------------|------------------------|------------------------------------|--|
| Age at first birth | Hoddinott et al. 2013. | minus 4.26 years younger | Uses the IV value for a dichotomous (stunted/ not stunted) relationship at age 2 (Column 7 in Table 2 of publication). Value has been converted to a % of the mean, to partially mitigate the fact that this was a single country study. |
| Total children | Hoddinott et al. 2013. | plus 1.74 children | |
| Age at first marriage | Hoddinott et al. 2013. | minus 2.58 years at first marriage | |

NOTES:

1. In some places, pooled numbers for the impact of malnutrition (Stunting + anaemia, and low birthweight + Vitamin A deficiency) on secondary school completion and under 5 deaths, respectively, have also been produced. There is a possibility this creates a slight overcount, but based on findings of Black et al; 2008 we believe is a reasonable assumption.
2. All equations with the exception of the effect of stunting on total schooling (line 2) and Vitamin A deficiency on under 5 mortality (line 3) are based on the premise that current country averages for the repeated statistics include the effects of malnutrition (be it anaemia, stunting or other micronutrient deficiencies). Therefore the predicted value if there were no malnutrition can be found by: $\text{total population} * \text{average value} = \text{population_no_malnutrition} * \text{predicted_value} + \text{population_malnutrition} * \text{relationship}$ and solving for the predicted value. The difference is then found by solving $\text{total_population} * \text{predicted_value} - \text{total_population} * \text{average_value}$.
3. Economic costs are annual, and use GNI per capita, as separate gender measures are not available. This is likely an overestimate of lost income as it assumes gender parity, but an underestimate of stunting's impact, assuming stunting rates have decreased over time, and given lack of gender specific stunting rates in global figure.
4. For values based on Hoddinott et al, the % is a % of the mean, not a % of the non stunted population, and therefore has been applied to the simple average.
5. Missing values were imputed for all data, with the exception of population, which are official UN forecasts and had no missing values.
6. Where possible, female specific data was used. In some cases (stunting, low birthweight and GNI per capita, female specific data was not available, and the overall rate has been used)

Data Sources

| Name | Country Source | Global source (if different) | Gender/Age |
|---|---|---|----------------|
| Height-for-age <-2 SD (stunting) | UNICEF | WHO | All, 24 months |
| Completion rate for youth of upper secondary education school age | UNICEF | | female |
| Under-five mortality rate | Childmortality.org | | female |
| Prevalence of vitamin-A deficiency | Our World in Data | | all |
| Neonatal mortality rate | Child mortality.org | | female |
| Low birth weight % | WHO | World Bank | all |
| Prevalence of anaemia in women of reproductive age (aged 15-49) (%) | WHO | WHO | Female, 15-49 |
| Gross national income (GNI) per capita | World Bank | | all |
| Age at First Marriage | World Population Review | | female |
| Fertility rate, total (births per woman) | UNICEF | | female |
| Mother's mean age at first birth | World Factbook | World Population Review | female |
| Female population by five-year age group (thousands) | United Nations, Department of Economic and Social Affairs, Population Division (2024). World Population Prospects 2024. | | female |
| Number of births | UNICEF | | total |

To see the full data set and costs for 97 countries around the world, please visit: www.wvi.org/report/cost-malnutrition-girls/data

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