

The double burden of malnutrition

Policy Brief

TARGET:

Ending all forms of malnutrition is the global goal

The double burden of malnutrition offers an important point for intervention and action



ENDING MALNUTRITION

On 1 April 2016, the United Nations General Assembly adopted a resolution proclaiming a *United Nations Decade of Action on Nutrition* from 2016 to 2025 (1). This Decade of Action aims to trigger intensified action to end hunger and eradicate all forms of malnutrition worldwide, and ensure universal access to healthier and more sustainable diets – for all people, whoever they are and wherever they live. This policy brief explains the **double burden of malnutrition** now facing many countries worldwide – characterized by the coexistence of undernutrition along with overweight, obesity or diet-related noncommunicable diseases (NCDs). The purpose of this policy brief is to increase attention to, and action for cost-effective interventions and policies to address the double burden of malnutrition within the Decade of Action – and, through this, to contribute to achieving the Sustainable Development Goals of ending all forms of malnutrition (SDG2) and ensuring healthy lives and well-being for all at all ages (SDG3) (1, 2).

Combating malnutrition in all its forms is one of the greatest global health challenges. Influenced by economic and income growth, urbanization and globalization, a significant shift in the quality and quantity of human diets and nutrition-related epidemiology has occurred in the past few decades (3, 4). Nutrition and associated epidemiological and demographic transitions were once accepted as near-linear, gradual processes. Instead, countries are now experiencing a fast-evolving and more complex nutrition paradigm.

Today, nearly one in three persons globally suffers from at least one form of malnutrition: wasting, stunting, vitamin and mineral deficiency, overweight or obesity and diet-related NCDs. In 2014, approximately 462

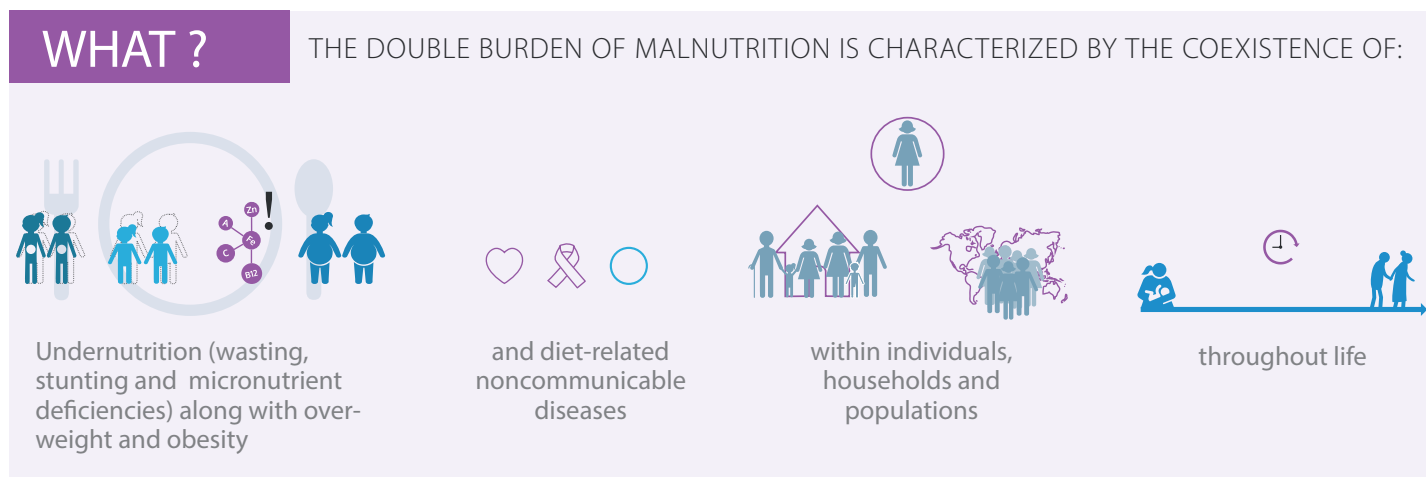
million adults worldwide were underweight, while 1.9 billion were either overweight or obese (5). In 2016, an estimated 41 million children under the age of 5 years were overweight or obese, while 155 million were chronically undernourished (6). Nutrition-related factors contribute to approximately 45% of deaths in children aged under 5 years (mainly due to undernutrition), while low- and middle-income countries are now witnessing a simultaneous rise in childhood overweight and obesity (7, 8).

The developmental, economic, social and medical impacts of this global burden of malnutrition are serious and lasting, for individuals and their families, for communities and for countries.

WHAT IS THE DOUBLE BURDEN OF MALNUTRITION?

The double burden of malnutrition is characterized by the coexistence of undernutrition along with overweight, obesity or diet-related NCDs, within individuals, households and populations, and across the life-course. Fig. 1 illustrates this definition.

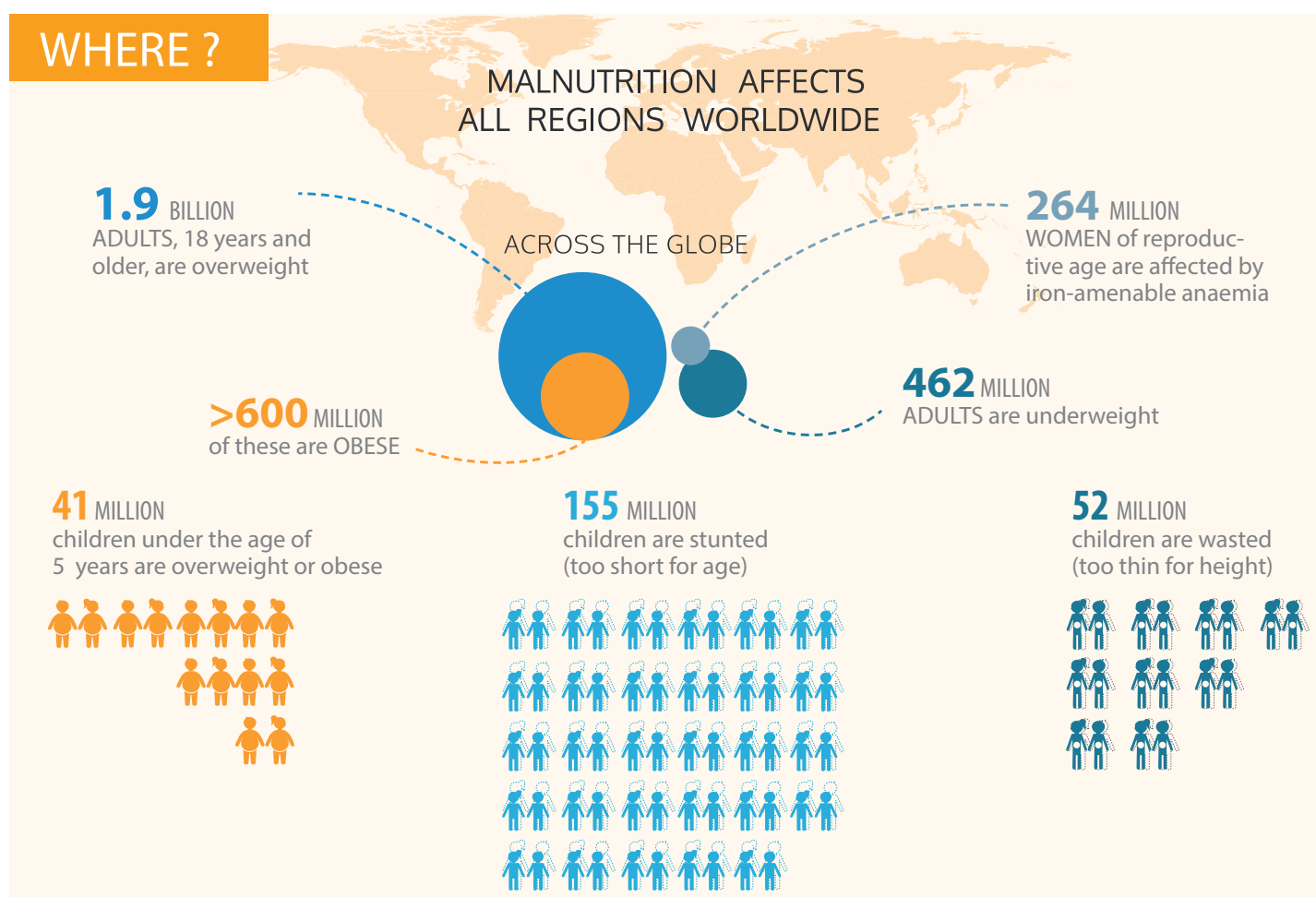
Fig. 1. The double burden of malnutrition



WHERE IS THE DOUBLE BURDEN OF MALNUTRITION FOUND?

The double burden of malnutrition is a global challenge. Fig. 2 illustrates the burden worldwide.

Fig. 2. Mapping the double burden of malnutrition (5, 6, 9)



WHO IS AFFECTED?

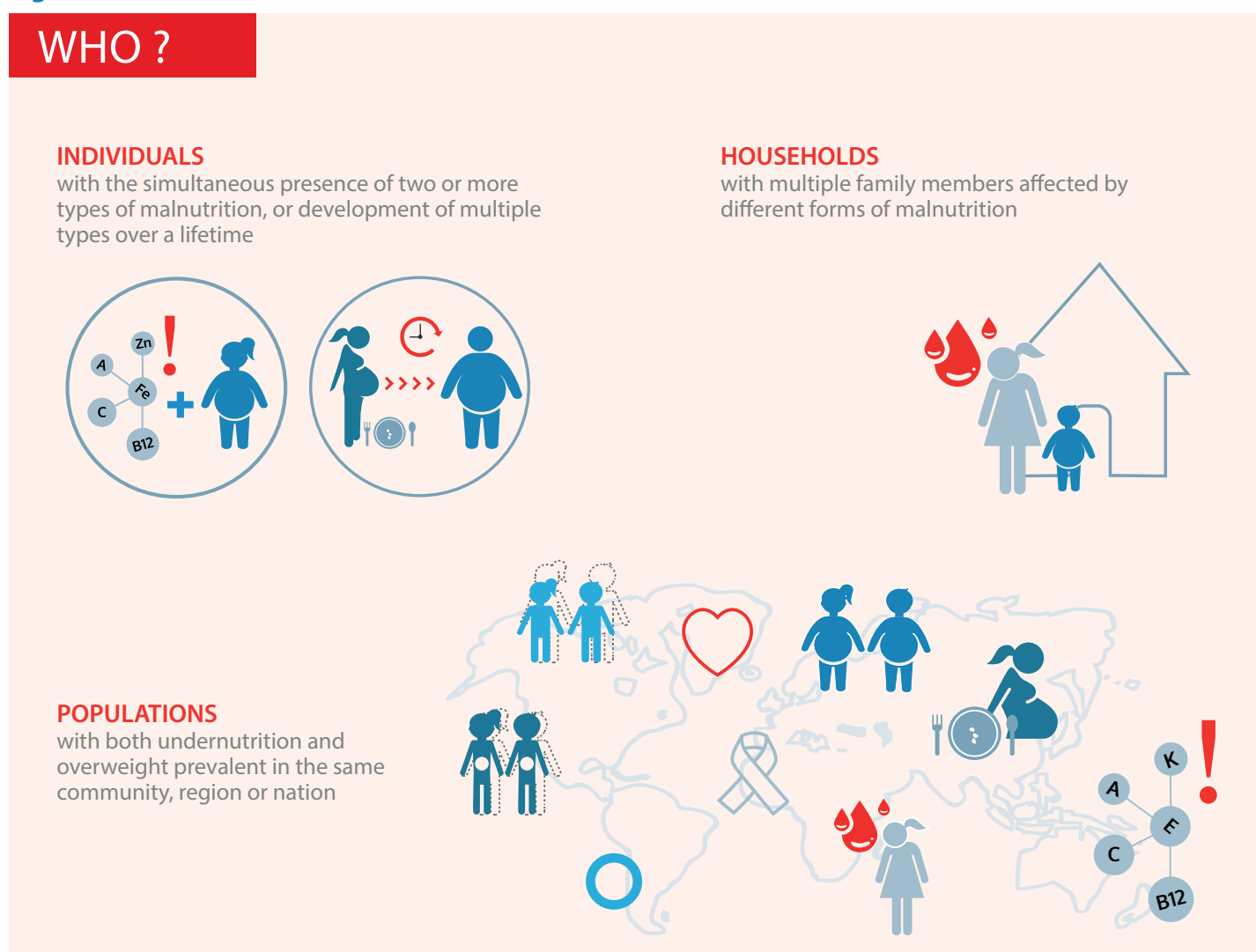
The double burden of malnutrition can manifest at three levels, and in two temporal dimensions (see Fig. 3).

Firstly, it occurs at the **individual level** through the **simultaneous** development of two or more types of malnutrition – for example obesity with nutritional anaemia or any vitamin or mineral deficiencies or insufficiencies. It can also occur across the life-course and be **temporally separated**, owing to contrasting nutrition environments resulting from a shift in economic or other circumstances, for example overweight in an adult who was previously stunted from chronic undernutrition during childhood.

Secondly, this double burden can occur at the **household level**. An example would include nutritional anaemia in a mother, with a child or grandparent who is overweight or has diabetes (type 2). The dual-burden household is more common in middle-income countries undergoing rapid nutrition transition (10).

Finally, this burden is also observed at the **population level** – with both undernutrition and overweight, obesity or NCDs prevalent in the same community, region or nation. Undernutrition and overweight, obesity or NCDs now coexist in many countries, with women disproportionately affected at the population level (11, 12). While rates of undernutrition are declining in many countries, the dramatic increases in overweight, obesity and associated NCDs place heavy tolls on individuals, families, economies and health-care systems (5, 13).

Fig. 3. The double burden of nutrition can occur at three levels



WHAT ARE THE DRIVERS AND DETERMINANTS OF THE DOUBLE BURDEN OF MALNUTRITION?

The causes of the double burden of malnutrition relate to a sequence of epidemiological changes known as the nutrition transition, the epidemiological transition and the demographic transition.

The nutrition transition describes the shift in dietary patterns, consumption and energy expenditure associated with economic development over time, often in the context of globalization and urbanization. This change is associated with a shift from a predominance of undernutrition in populations to higher rates of overweight, obesity and NCDs.

The epidemiological transition describes the changes in overall population disease burden associated with the increase in economic prosperity – with a shift from a predominance of infection and diseases related to undernutrition to rising rates of NCDs.

Finally, **the demographic transition** describes the shift in population structure and lengthening lifespans. This sees a transformation from populations with high birth rates and death rates (related to the above transitions), with relatively high proportions of younger people, to populations with increasing proportions of older people (with age also being a risk factor for many NCDs).

In the last two centuries, these three processes have occurred slowly and in a near-linear fashion in most high-income countries. The nutrition transition, accompanied by and linked to the epidemiological and demographic transitions, has resulted in **intergenerational**, incremental

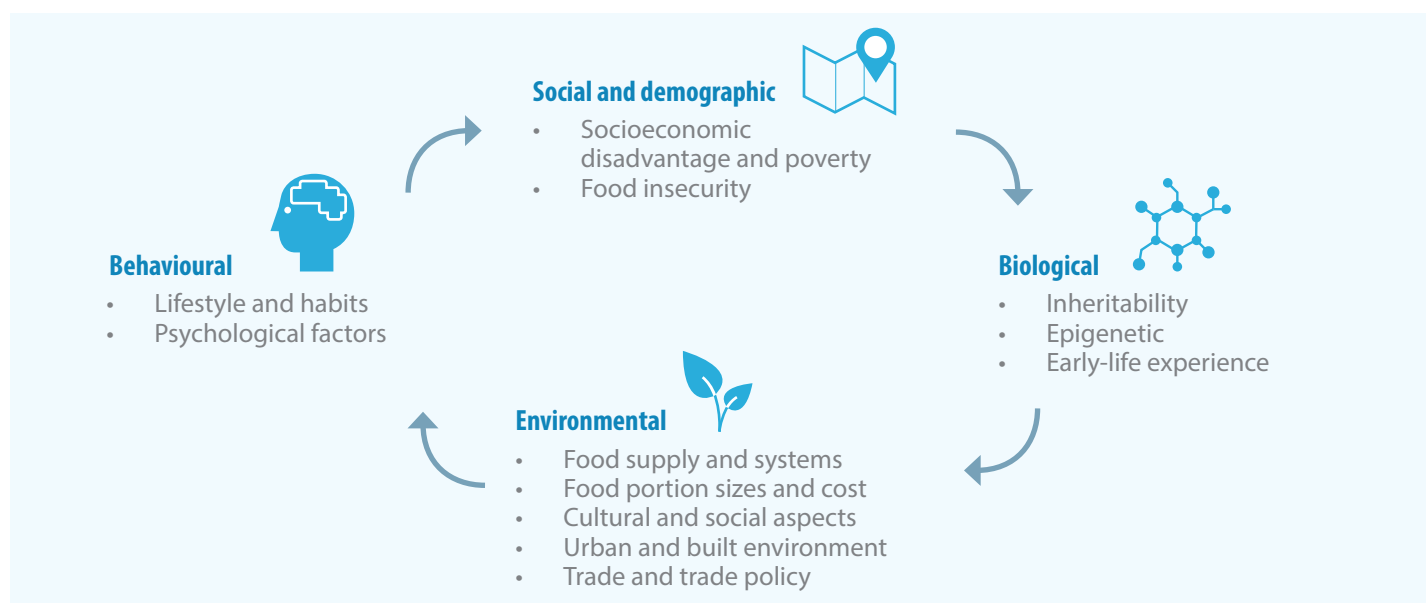
and controlled increases in population height and lifespans. The improved nutrition and higher caloric opportunity is associated with gradual increases in population health, but also a rise in overweight, obesity and NCDs (14).

In low- and particularly middle-income countries, these processes have been accelerated – with the transitions described occurring over decades rather than centuries. This has resulted in **intragenerational** changes in diet quality and quantity for individuals and populations. This more rapid change has condensed these three transition processes, leading to a coexistence or overlap of overweight and undernutrition, or greater heterogeneity of nutritional status within populations. For example, this may result in obesity in individuals who experienced stunting as children, reflecting a changing food environment, diet and behaviours over interim decades; or obesity and micronutrient deficiency in a single household.

While the actual weight of an individual within a generation can be reduced to a conceptual balance between the number of calories consumed and the number used through metabolic activity, the determinants of weight, weight loss and weight gain are much more complex.

In reality, it is a combination of biological, environmental, social and behavioural factors that leads to individual weight status, a dimension that is particularly important and apparent when considering the global scale of the double burden of malnutrition (see Fig. 4).

Fig. 4. Drivers of the double burden of malnutrition



Epigenetics

Alterations in the expression of genes, not just the genes themselves, are thought to influence the risk of low birth weight, overweight, obesity and NCDs. These changes can be affected by, for example, intrauterine growth restriction resulting from maternal undernutrition, which leads to changes in the way the infant's body then regulates energy. These changes can be passed on between generations, even once the stimulus (in this case undernutrition) is no longer present (15).

Early-life Nutrition

The in-utero and early-life nutrition environments have significant and often lifelong impacts on health. The quality and quantity of nutrition during fetal development and infancy impact on the body's immune function, cognitive development and regulation of energy storage and expenditure – including fat stores (16–18).

Poor maternal nutrition prior to, and during pregnancy can also lead to increased risk of maternal anaemia, preterm birth and low infant birth weight; in turn, low-birth-weight infants can be at higher risk of metabolic disease and abdominal adiposity later in life (17, 18).

Women who are overweight or experience excess weight gain during pregnancy are at a greater risk of gestational diabetes and larger birth weights in their offspring, putting their infants at higher risk of obesity later in life; in addition, accelerated weight gain early in life is associated with higher body mass index and obesity later in life (16–18).

Lifestyle Factors

Unhealthy behaviours that lead to greater energy consumption may not always be based on conscious decisions, but may be automatic or learnt responses to cues or nudges in the immediate environment. Once these behaviours are repeated and reinforced, they can become habits that lead to longer-term weight gain, and a difficulty in losing weight (19).

Food Access, Portion Sizes and Cost

The quality and quantity of foods, combined with the systems that produce them, have a profound influence on the nutrition status of populations. In the last half century, portion sizes of many packaged, restaurant and take-away snacks and meals have increased, and their relative costs have decreased. Meanwhile, the cost of fresh produce has increased – particularly among poor consumers in low- and middle-income countries and countries importing food (20).

In areas affected by instability, conflict or natural disasters, where food becomes unaffordable, inaccessible or unavailable, inadequate food intake, and portion sizes that do not meet the nutrition and energy requirements

of growing children, contribute to undernutrition, predisposing to infection, wasting and even stunting.

Socioeconomic Disadvantage, Inequality and Poverty

Malnutrition is intimately related to poverty and disease. Each contributes to the presence and permanence of the others (21).

Low socioeconomic status decreases an individual's ability to afford nutrient-rich foods, predisposing to undernutrition, and also to overweight and obesity (21).

Evidence also suggests a correlation between food insecurity, poverty and obesity, with a socioeconomic gradient of overweight and obesity prevalence in many middle- and high-income countries (22). Globally, obesity is affecting countries across all income groups. While the highest age-standardized prevalence of overweight is found in upper-middle-income countries, most low- and lower middle-income countries have a prevalence of overweight between 10% and 30% (3).

Urbanization, Urban Design and the Built Environment

With more than half of the world's population now living in urban environments, urban systems play an important role in the nutritional status of individuals and populations.

Urban environments with inadequate water and sanitation infrastructure can place populations at greater risk from water-borne diseases, and resulting undernutrition (23). Several infections related to hygiene, sanitation, safe water and water management are significant contributors to anaemia worldwide (24).

Associated with economic growth, urbanization itself can improve or worsen nutrition outcomes for populations (25). Urban design and the built environment may discourage physical activity and active travel. They may also lead to reduced reliance on smallholder and home-grown foods and greater reliance on bought foods – altering a population's risk of food insecurity (25). Combined with the increasing ease of access to unhealthy foods, industrial food systems and food advertising, urbanization can also be associated with an increase in overweight and obesity, particularly among the poor.

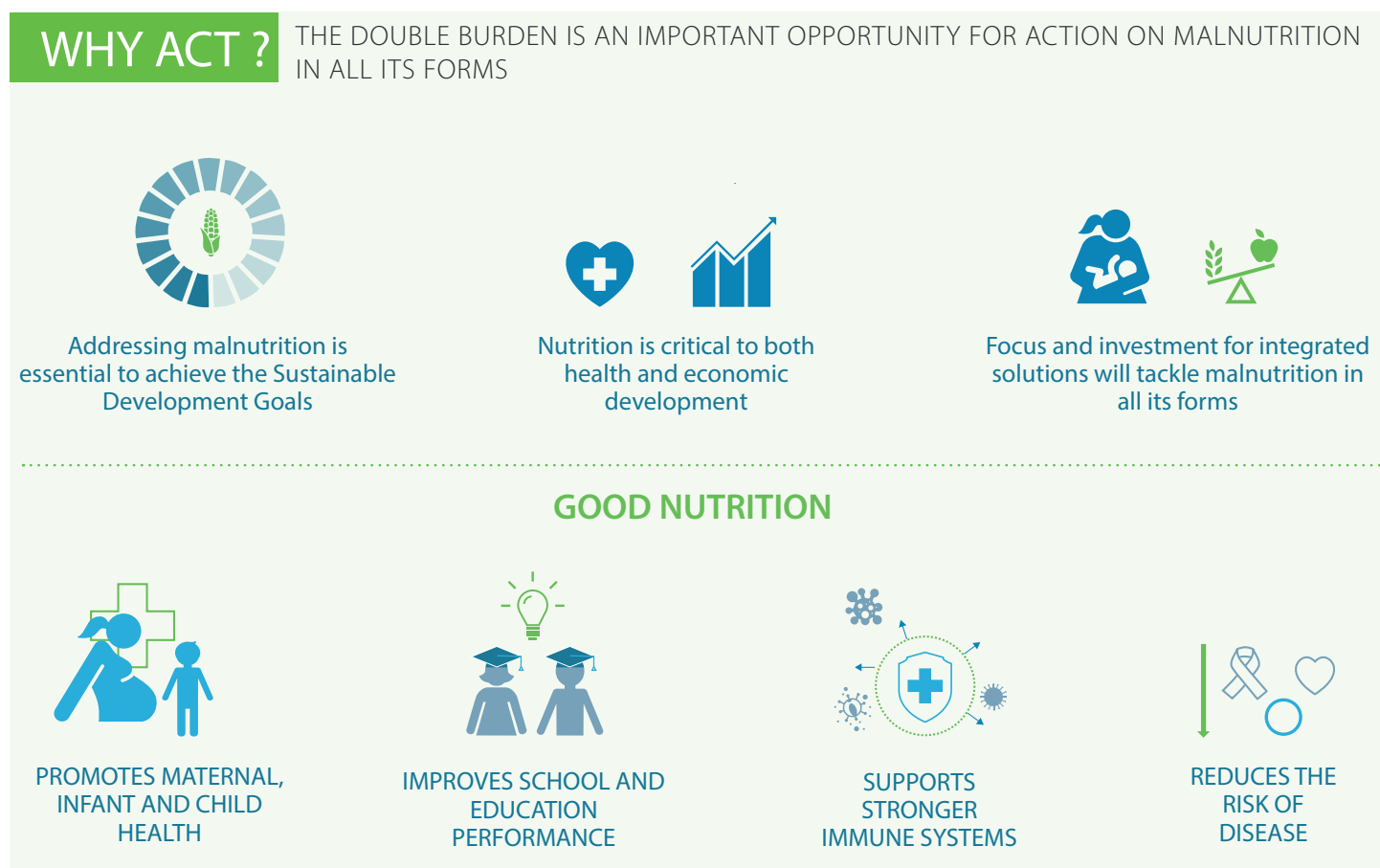
Food Systems

Major qualitative and quantitative changes in global food production and the related food systems have led to greater and near-universal access to processed and unhealthy foods in many countries worldwide (26, 27). The trend has been to a homogenization of diets that are higher in saturated fats, salt and sugar, and lower in vitamins and minerals, than the traditional or local diets they often replace.

WHY ACT?

The double burden of malnutrition offers a focused point for integrated intervention on all forms of malnutrition. Fig. 5 illustrates why it is important to act now.

Fig. 5. Why it is important to act



The double burden of malnutrition confers a serious and negative economic impact on individuals and populations. Through its effects on health, malnutrition increases health-care costs, reduces productivity and slows economic growth, which in turn can perpetuate a cycle of poverty and ill-health. The direct and indirect, macro- and micro-economic costs incurred by individuals and populations are often unsustainable and contribute a significant barrier to economic and social development. As the burden of malnutrition continues to rise, so too does its economic toll.

While the double burden of malnutrition may pose a significant public health challenge for all nutrition-related sectors and actors, it also presents an important **opportunity** for integrated action.

Addressing the double burden of malnutrition offers an opportunity for alignment and coordination between those charged with addressing undernutrition, early nutrition, overweight and obesity, infectious diseases,

NCDs, maternal and child illnesses, and diseases associated with ageing (for the reasons outlined above).

Addressing the double burden of malnutrition should also be regarded as a catalyst for addressing policy challenges beyond health – including reducing health and social inequities within populations, and raising educational attainment.

Finally, actions to achieve optimal nutrition for individuals and populations will be key to achieving the targets of the Sustainable Development Goals (2); the commitments of the *Rome Declaration on Nutrition* (28) within the *United Nations Decade of Action on Nutrition* (1); the Global Nutrition Targets 2025 (29); the targets of the *Comprehensive implementation plan on maternal, infant and young child nutrition* (30) and the *Global strategy for women's, children's, and adolescent's health 2016–2030* (31); and the targets outlined by the *Global action plan for the prevention and control of noncommunicable diseases 2013–2020* (32).

AN INTEGRATED RESPONSE

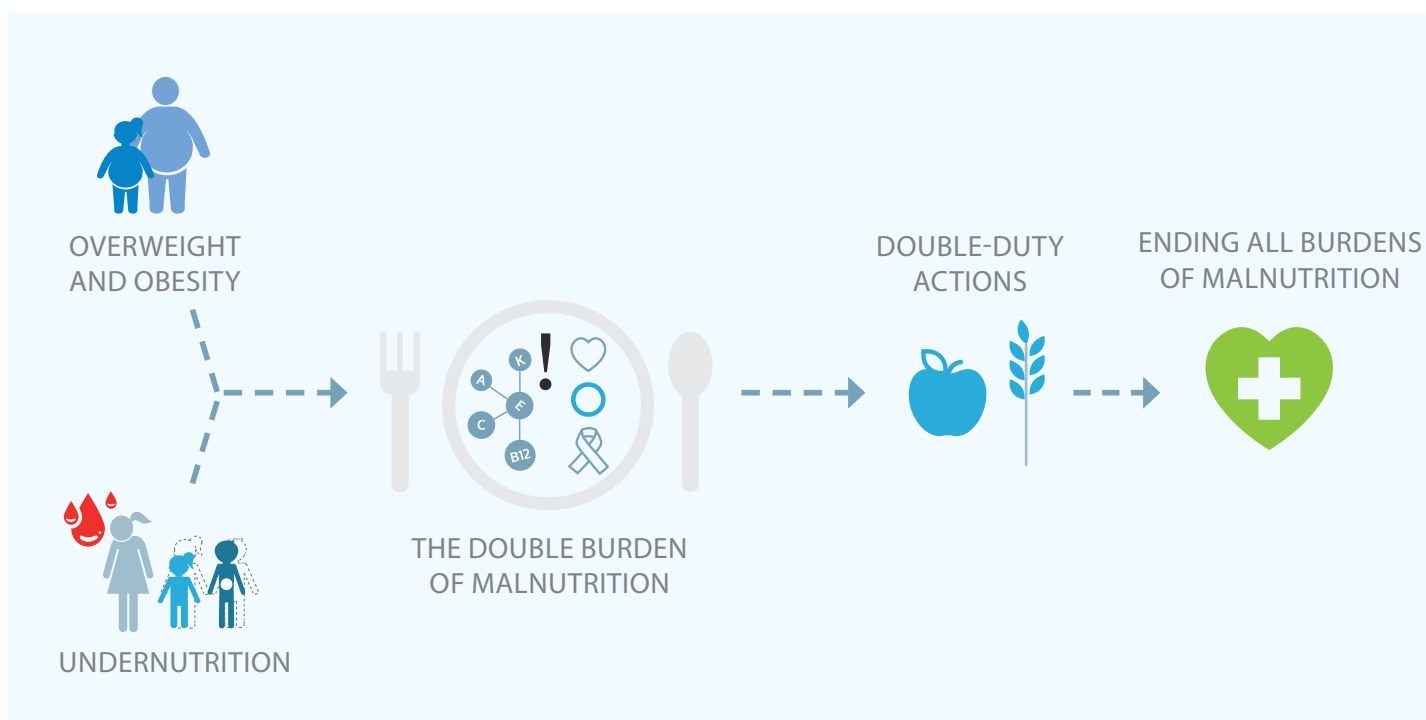
DOUBLE DUTY ACTIONS

As the global community transitions to the broader nutrition focus of the Sustainable Development Goals (2), including malnutrition in all its forms and NCDs, the double burden of malnutrition offers a vital link between established and successful policies and initiatives, and emerging nutrition interventions. In this widened context, the intersection of seemingly contrasting and often confounding forms of malnutrition represented in the double burden of malnutrition lends a critical point of renewed focus and intervention.

The double burden of malnutrition can be seen as a dual nutrition challenge, or an **opportunity for double returns**. Programmes and policies that aim to address this nutrition burden through double-duty or “win-win”, common, evidence-based actions are likely to be both efficacious and cost-effective (see Fig. 6).

Double-duty actions include interventions, programmes and policies that have the potential to simultaneously reduce the risk or burden of **both** undernutrition (including wasting, stunting and micronutrient deficiency or insufficiency) **and** overweight, obesity or diet-related NCDs (including type 2 diabetes, cardiovascular disease and some cancers). Some examples may include policies to ensure access to optimal maternal and antenatal nutrition and care; the protection, promotion and supporting of breastfeeding, including exclusive breastfeeding during the first 6 months, and appropriate complementary feeding in the first 2 years of life; programmes that foster healthy diets in preschools, schools, public institutions and workplaces; measures and policies that improve food security and ensure access to healthy foods by all individuals and families; and initiatives that ensure access to healthy and sustainable diets from appropriate and resilient food systems.

Fig. 6. Double-duty actions for nutrition



Of particular importance are interventions aimed at optimizing nutrition early in the life-course – ensuring the best possible start in life for the developing fetus, infant or child. Optimal-quality antenatal care and nutrition during the first 1000 days (during pregnancy and up to 2 years of age) are not only critical for the health of both mother and child at that time-point, but lay the foundations for future health across the child’s life-course.

For more information on double-duty actions, see the WHO 2017 publication, Double-duty actions. Policy brief.

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Actions and food systems to promote and provide healthy, sustainable diets, including national policies and investments and the integration of nutrition objectives into food and agriculture policy; strengthening local food production and processing, especially by smallholder and family farmers; and establishing and strengthening institutions, policies, programmes and services to enhance the resilience of the food supply in crisis-prone areas, including areas affected by climate change.

Implementation of nutrition education and information interventions based on national dietary guidelines and coherent policies related to food and diets; incorporation of nutrition objectives into social-protection programmes and into humanitarian assistance safety-net programmes; and the use of cash and food transfers, including school feeding programmes and other forms of social protection for vulnerable populations.

Health-care strengthening and universal health coverage; health-systems strengthening to integrate nutrition actions effectively; the promotion of universal access to all direct nutrition actions and relevant health actions impacting nutrition through health programmes.

Identification of opportunities to achieve global food and nutrition targets, through trade and investment policies; and improvement in the availability and accessibility of the food supply through appropriate trade agreements and policies.

This action area reflects the importance of environmental determinants of malnutrition outcomes. It spurs commitment and policy action for addressing the social and environmental determinants of malnutrition, including in school, workplace and city contexts; as well as integrating actions on water, sanitation and hygiene; and the promotion, protection and support of optimal breastfeeding practices.

Action focuses on the policies, plans and frameworks of Member States' governance. It includes measures for reviewing, updating and strengthening national strategies; strengthening and establishing, as appropriate, national cross-government, intersectoral, multi-stakeholder mechanisms; improving the availability, quality, quantity, coverage and management of multisectoral information systems; and, where appropriate, developing, adopting and adapting international guidelines on healthy diets.

CONCLUSIONS

Nutrition is a cross-cutting determinant for both health and development challenges, with the ability to catalyse the achievement of key global goals and targets. In the broader context of malnutrition in all its forms, the intersection of seemingly contrasting and often confounding forms of malnutrition provides a critical point for renewed focus, as well as policy and programme interventions.

The double burden of malnutrition – the coexistence of undernutrition along with overweight, obesity or diet-related NCDs, within individuals, households and populations, and across the life-course – poses a real and growing global health challenge. The identification,

promotion and implementation of double-duty actions that simultaneously and synergistically address undernutrition as well as overweight, obesity and diet-related NCDs across six policy action areas are important opportunities and immediate priorities as we embark on the *United Nations Decade of Action on Nutrition* (1).

Addressing the double burden of malnutrition will be of critical importance in achieving the ambitions of the *United Nations Decade of Action on Nutrition* (1) and the Sustainable Development Goals (2).

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FOR MORE INFORMATION

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