Double Burden of Malnutrition 3

Double-duty actions: seizing programme and policy opportunities to address malnutrition in all its forms

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Actions to address different forms of malnutrition are typically managed by separate communities, policies, programmes, governance structures, and funding streams. By contrast, double-duty actions, which aim to simultaneously tackle both undernutrition and problems of overweight, obesity, and diet-related non-communicable diseases (DR-NCDs) have been proposed as a way to effectively address malnutrition in all its forms in a more holistic way. This Series paper identifies ten double-duty actions that have strong potential to reduce the risk of both undernutrition, obesity, and DR-NCDs. It does so by summarising evidence on common drivers of different forms of malnutrition; documenting examples of unintended harm caused by some undernutrition-focused programmes on obesity and DR-NCDs; and highlighting examples of double-duty actions to tackle multiple forms of malnutrition. We find that undernutrition, obesity, and DR-NCDs are intrinsically linked through early-life nutrition, diet diversity, food environments, and socioeconomic factors. Some evidence shows that programmes focused on undernutrition have raised risks of poor quality diets, obesity, and DR-NCDs, especially in countries undergoing a rapid nutrition transition. This Series paper builds on this evidence to develop a framework to guide the design of double-duty approaches and strategies, and defines the first steps needed to deliver them. With a clear package of double-duty actions now identified, there is an urgent need to move forward with double-duty actions to address malnutrition in all its forms.

Introduction

Most countries, at all levels of development, experience multiple forms of malnutrition.1 The coexistence of nutritional deficiencies and overweight or obesity and associated diet-related non-communicable diseases (DR-NCDs)—ie, the double burden of malnutrition (DBM), which is observed within communities, households, and individuals.1 In high-income countries, where overweight and obesity affects more than half of the population, food insecurity among people with low incomes manifests as low-quality diets often dominated by high consumption of foods, snacks, and beverages high in energy, sugar, fat, and salt.1 These diets lead to excessive intakes of energy, DR-NCDs, and deficiencies in protein and essential micronutrients such as iron, folate, vitamins B6, B12, C, D, and calcium.4 At the other extreme, low-income and middle-income countries (LMICs) still struggling with persistent problems of maternal undernutrition, child stunting and wasting, and widespread micronutrient deficiencies are having a rapid rise in overweight and obesity at lower levels of national income than previously seen.1

The DBM presents new challenges for policy and programming. In LMICs, national nutrition policies and donor funding have historically focused on undernutrition. Yet there is no longer just undernutrition, but also overweight, obesity, and DR-NCDs to deal with. There has been increasing global recognition that all types of malnutrition need to be addressed (panel 1). Target 2.2 of the Sustainable Development Goals is to “end malnutrition in all its forms”25 and the Lancet Commission on the global syndemic of obesity, undernutrition, and climate change highlights the need to tackle these interconnected problems simultaneously.29

Nevertheless, actions to address the different manifestations of malnutrition are still isolated from each other and implemented through different governance and funding mechanisms (panel 1). Studies over a decade

Key messages

• Actions to address undernutrition, and overweight and obesity have historically been developed and delivered separately from one another. Some evidence shows that programmes addressing undernutrition have unintentionally increased risks for obesity and diet-related non-communicable diseases (DR-NCDs) in low-income and middle-income countries where food environments are changing rapidly. Yet policies and interventions to address undernutrition typically fail to consider these risks.
• By contrast, double-duty actions aim to simultaneously prevent or reduce the risk of both nutritional deficiencies leading to underweight, wasting, stunting or micronutrient deficiencies, and obesity or DR-NCDs, with the same intervention, programme, or policy.
• Double-duty actions are based on the rationale that all forms of malnutrition share common drivers that can be leveraged for double impact. These drivers include early life nutrition, diet diversity, food environments, and socioeconomic factors.
• The available evidence indicates that there are ten strong candidates for double-duty actions across different sectors. These actions include interventions delivered through health services, social safety nets, educational settings, agriculture, food systems, and food environments.
• Putting a double-duty approach into operation involves assessing the potential harm of existing actions and redesigning programmes and policies with a focus on double-duty actions. Changes in governance, financing, and capacity building will be needed to put the approach to use.
• Double-duty actions are urgently needed as part of a holistic approach to ending malnutrition in all its forms by 2030.
Panel 1: The pathway to double duty

International and national policy response to the double burden of malnutrition (DBM)

In 1992, in the World Declaration on Nutrition, 159 countries pledged to reduce all forms of malnutrition. Nevertheless, the nutrition plans developed by low-income and middle-income countries following the Declaration still tended to focus on undernutrition. Nevertheless, at the global level, the existence of the DBM continued to be discussed and recognised. In 2000 the Commission on the Nutrition Challenges of the 21st Century proposed what it termed a new paradigm of a DBM. The UN System Standing Committee on Nutrition (UNSCN) hosted a conference on the DBM in 2005, and UNSCN News published a special issue dedicated to the topic. In 2012, the member states of WHO endorsed a Comprehensive Implementation Plan for Maternal, Infant and Young Child Nutrition, which introduced six global nutrition targets (stunting, wasting, overweight in children younger than 5 years, breastfeeding, low birthweight, and anaemia in women of reproductive age). This plan was the first time that childhood overweight had been included as a global goal in an international strategy also including undernutrition.

The development of strategies focused on obesity and non-communicable diseases took a separate path. In 2004, the member states of WHO endorsed The Global Strategy on Diet and Physical Activity and an NCD Global Monitoring Framework in 2013, introducing nine reduction targets for non-communicable diseases, including one on no increase in the prevalence of overweight and obesity in diabetes in adolescents and adults. The first Global Action Plan for the Prevention and Control of NCDs was adopted in 2013.

In 2014, the Rome Declaration on Nutrition emerging from the second International Conference on Nutrition became the first to use the term malnutrition in all its forms. The Global Nutrition Report then brought the Maternal, Infant and Young Child Nutrition targets and diet-related non-communicable diseases targets from the NCD Monitoring Framework together in its tracking. Ending malnutrition in all its forms became target 2.2 of the Sustainable Development Goal and central to the work programme of the UN Decade of Action on Nutrition 2016–25.

During this period, nation states increasingly recognised the importance of addressing the DBM. For example, 42% of countries (from a sample of 162 countries) now have between six and eight nutrition targets, including both undernutrition and obesity-related targets and 84% of countries now have targets for adult overweight or obesity. Nevertheless, in their policies and interventions, countries continue to take disparate approaches to different forms of malnutrition. For example, in Bangladesh, Indonesia, and Guatemala (three countries identified in the first paper in this Series 2 as having a high DBM) all acknowledged the existence of the DBM. Yet these countries have separate strategies and different actions to tackle different forms of malnutrition. The Tanzania National Multisectoral Nutrition Action Plan (NMNAP) published in 2016 is a rare example of a strategy that explicitly states it is a double-duty action plan but nevertheless lists separate actions for different forms of malnutrition.

In this context, the Global Nutrition Report 2015 noted a gap in efforts to combat both undernutrition and obesity and non-communicable diseases at once, with its authors calling for a package of what they termed double-duty actions “that address both undernutrition and unhealthy diets in an internationally agreed-upon package.”

See Online for appendix.

ago raised the concern that taking a siloed approach to tackling food insecurity and undernutrition could do harm to obesity, and miss opportunities to use the same platforms for shared action.

The objective of this Series paper is to explore the potential for a more holistic approach to address the DBM. Double-duty actions, a term coined in the 2015 Global Nutrition Report, are interventions, programmes, and policies that simultaneously prevent or reduce the risk of both nutritional deficiencies leading to underweight, wasting, stunting and micronutrient deficiencies, and problems of obesity and DR-NCDs. Instead of narrowly focusing on one problem at a time, these actions aim to maximise the benefits of taking action on one form of nutrition for another, and minimise the risks of any form of malnutrition. The term triple duty has also been used to refer to actions that address additional development problems, such as climate change.

This Series paper answers the call to identify priority double-duty actions. It does so, firstly, by setting out the rationale for double-duty actions (that different forms of malnutrition share common drivers) and using this evidence to develop a simple framework of the factors that need to be considered when designing actions to address more than one form of malnutrition. Second, using this framework as a guide, we review the literature to identify existing evidence that actions focused on undernutrition introduce risks or cause harm for obesity and DR-NCDs (see appendix pp 2–4 for method); and third, we identify the opportunities to retrofit existing, established actions focused on undernutrition to also address obesity and non-communicable diseases. The Series paper ends by setting out the next steps for using the double-duty approach and identifying research priorities.

Rationale: common drivers of the DBM

The common drivers of different forms of malnutrition have been identified as biology, epigenetics, early-life nutrition, diets, socioeconomic factors, food environments and food systems, and governance. The first and second papers in this Series provide evidence that biological and epigenetic factors, and global food systems policies are common drivers, and the Lancet Commission on the global syndemic of obesity, undernutrition, and climate change identifies shared systems drivers.

Four intermediate (and modifiable) drivers for which there is evidence of influence on multiple forms of malnutrition are early-life nutrition, diet quality, food environments, and socioeconomic factors. The evidence shows that actions that promote healthy growth in early life and nutritious diets throughout the life course, combined with healthy food environments, adequate income and education, and the knowledge and skills that support these goals have the potential to benefit multiple forms of malnutrition. The figure provides a simple depiction of how interventions could leverage these common drivers to deliver on multiple forms of malnutrition.

Early-life nutrition

Nutrition in mothers during pregnancy and lactation, and in infants and young children during their first few years of life, has profound implications for malnutrition
in all its forms throughout the life course. Inadequate nutrient intake in early life not only leads to undernutrition among infants but also predisposes them to a more central distribution of body fat if they gain weight later in life. This early undernutrition increases the so-called toxicity of obesity—ie, compared with adults who did not experience early undernutrition, DR-NCDs manifest at lower body-mass index (BMI) thresholds for those who did. This finding might explain, at least in part, the recent explosion of DR-NCDs in LMICs as they continue to develop. Extensive evidence shows that rapid weight gain during early life (which might occur in response to interventions aimed at treating or preventing undernutrition) increases the risk of adult obesity and DR-NCDs. Another way early life is important is through the tastes that infants are exposed to, because a varied exposure has been shown to facilitate acceptance of nutritious foods both at the time and in later life. Promotion of good nutrition during early life is thus a unique opportunity to tackle all forms of malnutrition.

**Diet quality**

High-quality diets reduce the risk of malnutrition in all its forms by promoting healthy growth, development, and immunity, and preventing obesity and DR-NCDs at all stages of the lifecycle. The components of healthy diets are: optimal breastfeeding practices in the first 2 years; a diversity and abundance of fruits and vegetables, wholegrains, fibre, nuts, and seeds; modest amounts of animal source foods; and minimal amounts of processed meats, and foods high in energy, free sugar, saturated fat, trans fat, and salt. A diverse diet combining starchy staples, vitamin A-rich and other fruits and vegetables, and animal source foods is associated with lower levels of stunting, and diets containing plenty of wholegrains, nuts, vegetables, and fruits, and modest amounts of animal source foods along with low levels of salt can make substantial contributions to reducing the burden of diet-related diseases. Conversely, inadequate consumption of fruits and vegetables is a risk for both micronutrient deficiencies and DR-NCDs. High consumption of fast foods and sugary drinks is associated with increased risks of obesity in children, adolescents, and adults and with gestational diabetes in pregnant women in high-income countries. Evidence on the association between the consumption of foods, snacks, and beverages high in energy, sugar, fat, and salt and undernutrition is still emerging. Studies from LMICs indicate that high consumption of these foods is associated with lower micronutrient intake, micronutrient deficiencies in children, lower length-for-age Z scores, and the coexistence of child stunting and maternal overweight. Actions that reduce intake of these foods while promoting fruits, vegetables, wholegrains, nuts, seeds, and adhering to recommended levels of animal source foods, therefore provide an opportunity to tackle multiple forms of malnutrition.

**Food environments**

The foods available to people, the cost of these foods, and how they are marketed and promoted (often termed food environments) emerge as a common driver of the DBM owing to their role in shaping what people eat. Evidence shows that healthier food environments are associated with greater intake of nutritious foods. Yet as described in the first paper in this Series, worldwide availability of unhealthy processed foods, snacks, and beverages high in energy, sugar, fat, and salt has soared since 2004. Sales of breastmilk substitutes, including follow on formulae, are also growing at an unprecedented pace. Manufacturers, supermarkets, food vendors, and restaurants make these foods easily accessible and affordable, often using aggressive marketing techniques. Heavy promotion of breastmilk substitutes and follow-on formulas, and of inappropriate complementary foods, snacks, and sweetened beverages targeted to children influences consumption. Companies promote foods such as biscuits, snacks, instant noodles, sugary breakfast cereals, and drinks fortified with micronutrients as healthy by including a nutrient claim, or other suggestive indicators on the food packaging. Very young children in LMICs are regularly consuming these snacks and foods high in fat, added sugar, and salt, and little nutritional value. Acting on food environments to ensure that they make healthy diets available, affordable, and...
appealing and discourage promotion and marketing is thus a shared opportunity to prevent malnutrition in all its forms.

**Socioeconomic factors**

Income and education are important drivers for the risk of both undernutrition, and obesity and DR-NCD. Rises in income per capita are associated with reductions in child stunting.\(^{54,55}\) Wealth, however, is a double edged sword for malnutrition since its effects on increasing overweight or obesity are larger than its effects on reducing childhood stunting.\(^{16}\) The first paper in this Series\(^ {2}\) describes how the effects of wealth on different forms of malnutrition differ by the countries’ economic development. Education is closely associated with income and wealth and generally has positive influences on nutrition\(^ {17}\) Enhancing both education and income while mitigating the risks associated with the latter will be a key element of addressing malnutrition in all its forms.

**The evidence: what are the opportunities and risks of undernutrition-focused actions for obesity and DR-NCDs?**

We now present evidence on how interventions already designed to address undernutrition through multiple sectors—health, social safety nets, education, agriculture, food systems, and food environments—could be designed to take account of the four reviewed drivers to leverage opportunities and manage risks to do no harm.

**Health services**

**Opportunities**

The table summarises the basic preventive health interventions targeting undernutrition delivered through health service facilities and networks of community-based health workers at different stages of the lifecycle.\(^ {54,19}\) Since most interventions target maternal and early-life nutrition, they offer a prime opportunity to prevent and treat malnutrition in all its forms especially given that they require regular contact between health workers and caregivers.

Antenatal care during pregnancy is a key intervention designed to support optimal growth of the fetus and positive birth outcomes. The 2017 WHO antenatal care recommendations include a focus on dietary interventions to promote healthy diets and prevent both undernutrition and obesity, making these interventions a double-duty action (panel 2).\(^ {52}\)

For lactating mothers and their infants, one very widely adopted intervention around the world is the protection, promotion, and support of optimal breastfeeding practices.\(^ {52}\) Evidence shows that breastfeeding helps to prevent undernutrition and stimulates immunity and cognitive development, while also reducing the risk of overweight and obesity in childhood, obesity and DR-NCDs later in life, and, for the mother, delays future pregnancies and reduces the risk of breast cancer.\(^ {15-46}\)

Scaling up efforts to promote and protect optimal breastfeeding practices is thus a second, unequivocal opportunity for a double-duty action, providing benefits (and no risks) to both mother and child in both the short and long term (panel 2). Proven interventions to promote breastfeeding through the health system include social behavior change communication strategies combining facility-based and community-based nutrition counselling interventions and mass media.\(^ {67,68}\)

Promotion of complementary feeding practices is also a widespread intervention in LMICs,\(^ {44}\) for which well designed strategies for social behaviour change communication (with or without food and micronutrient supplementation) have been shown to be effective.\(^ {70-72}\)

The timely introduction of nutritious, diverse fresh foods in sufficient quantity and quality at 6 months not only fosters children’s growth and cognitive development but can also prevent overweight and obesity during early childhood, and obesity and DR-NCDs at adulthood.\(^ {11}\)

However, guidance on complementary feeding has tended to focus on undernutrition and ignored the emergence of unhealthy food environments that promote the consumption of processed sweet and salty snacks among young children. A third double-duty action is thus to redesign complementary feeding guidance and actions to ensure that they include not only the foods that should be consumed, but also those to be avoided (panel 2).

Another primary health-care programme designed originally to address undernutrition is growth monitoring and promotion.\(^ {57}\) The main purpose of growth monitoring is to identify children who are failing to thrive by regularly measuring their weight and then provide nutrition and health counselling to promote optimal growth. WHO recommends some modifications of growth monitoring and promotion programmes to include detection of overweight and related counselling, making it a fourth option for a specific double-duty action (panel 2). The feasibility of adding these components should be carefully assessed, given the well documented operational challenges and inconclusive evidence of effectiveness of growth monitoring and promotion programmes on child growth.\(^ {74-76}\)
Panel 2: Ten priority candidates for double-duty actions

Health services

1. Scale up new WHO antenatal care recommendations

New WHO antenatal care recommendations focus on:

- Counselling about healthy eating and keeping physically active during pregnancy to stay healthy and prevent excessive weight gain
- In undernourished populations, behaviour change communication on increasing daily energy and protein intake is recommended to reduce risk of low birthweight
- In undernourished populations, balanced energy and protein dietary supplementation is recommended to reduce risk of stillbirths and neonates who are small for gestational age; cash or food vouchers might be tested to improve maternal diets

An additional recommendation for double-duty actions:

- Carefully monitor targeting of protein and energy supplements (or cash or food vouchers) to prevent unintended excess weight gain during pregnancy

2. Scale up programmes to protect, promote, and support breastfeeding

- Scale up interventions to promote and support breastfeeding initiation, exclusive breastfeeding for 6 months and continued breastfeeding up to age 24 months or beyond
- Eliminate the promotion of breastmilk substitutes (infant formula and follow-on formula)

3. Redesign guidance for complementary feeding practices and related indicators

- Incorporate messages to emphasise healthy and diverse diets, including daily intake of vegetables and fruits
- Include recommendations to avoid feeding young children foods, snacks, and beverages high in energy, sugar, fat, and salt
- Include specific guidance on the selection of healthy snacks
- Revisit guidance on energy density in complementary foods taking into account the risks of excessive energy density, especially in countries and regions where energy intake is not limited in the diet
- Include new training curricula for primary health-care workers to provide double-duty nutrition counselling

4. Redesign existing growth monitoring (GMP) programmes

For ongoing GMP programmes in contexts where childhood overweight is, or is becoming, a problem:

- Include the measurement of child weight and height or length in primary care centres, if feasible*
- Use the weight-for-height or weight-for-length (or body-mass-index-for-age) indicators and growth charts to diagnose the risk of overweight and obesity, if feasible*, alongside wasting
- Include referral and appropriate counselling on healthy diets and snacks to address all types of malnutrition

5. Prevent undue harm from energy-dense and micronutrient-fortified foods and ready to use supplements

- Promote healthy diets as the default measure to prevent undernutrition
- Establish clear criteria on when the distribution of energy-dense and micronutrient-fortified foods and supplements targeted to mothers during pregnancy and lactation, and children aged up to 24 months is justified; and establish targeting guidelines based on household food insecurity and individual nutritional status
- Include nutrition counselling on healthy diets and snacks for mothers and young children in all supplement distribution programmes
- Ensure careful choice and targeting of high-energy, micronutrient-fortified foods and supplements provided to treat moderate and severe acute malnutrition or to prevent stunting or wasting
- Manage duration of food supplementation to avoid excessive or rapid weight gain beyond needed for recovery or prevention of moderate or severe acute malnutrition; limit sharing of food supplements with siblings; and incorporate nutrition counselling on healthy diets and snacks as components of prevention programmes for undernutrition

Social safety nets

6. Redesign cash and food transfers, subsidies, and vouchers

- Include strong education and behaviour change communication focused on healthy diets, physical activity, and preventive use of health services
- Include regular health check-ups for all household members and early detection of overweight or obesity, and DR-NCDs
- For subsidies or food vouchers, focus on and link to retailers providing nutritious foods; exclude foods, snacks, and beverages high in energy, sugar, fat, and salt
- Introduce rewards for transfers or vouchers spent on nutritious foods
- Implement complementary measures to rebalance food environments towards healthier food choices and outcomes, such as restrictions on marketing, taxes, and nutrition labelling

Educational settings

7. Redesign school feeding programmes and devise new nutritional guidelines for food in and around educational institutions

- Ensure that guidelines for school feeding programmes and food provided by the commercial sector in day care, preschools, and schools meet energy and nutrient needs and restrict foods, snacks, and beverages high in energy, sugar, fat, and salt
- Involve parents and children in planning meals and food in and around schools

(Continues on next page)
Risks
Supplementation with energy, protein, and micronutrients is another action with proven benefits on maternal or child micronutrient status, birth outcomes, and child growth, especially in food insecure environments.\(^{39,77-80}\) A study of food supplementation during pregnancy and early childhood in Guatemala found that supplementation improved early child nutrition and growth and had long-term positive effects on many outcomes later in life, including height, cognitive development, schooling achievement, economic productivity, and reproductive health in women, and significantly lowered the risks of diabetes at adulthood.\(^{81}\) However, the study showed that the group who received the high energy supplement with protein, had greater BMI, body fat, and central adiposity at adulthood (37–54 years) than did a group that received a low energy supplement without protein in early life.\(^{82}\) The study signals the potentially negative effects of food (energy) supplementation in populations who have poverty and food insecurity in early life but who might be exposed to rapidly changing and increasingly obesogenic food environments as they move into adult life in countries undergoing rapid income growth and an accelerated nutrition transition.

Concerns have also been raised about food supplements designed to treat and prevent acute malnutrition. Ready-to-use therapeutic foods (a type of lipid-based nutrient supplement high in energy, fat, and sugar, high-quality protein, and micronutrients) is a proven life-saving treatment for severe acute malnutrition.\(^{83,84}\) Other lipid-based nutrient supplement products with lower concentrations of energy, fat, and sugar are used in small doses as a preventive measure to improve nutrition and growth in young children in food insecure areas, or to treat children with moderate acute malnutrition. Four concerns have been raised, which are still to be fully substantiated, about the potential risks associated with the intake of these products. First, rapid weight gain during early childhood, which these products might trigger, might lead to excess adiposity, and metabolic syndrome later in life, especially in countries undergoing a rapid nutrition transition.\(^{85-88}\) Second, intake of these supplements over several months might affect the gut microbiome of the recipient and might also influence their taste preferences and later life consumption patterns.\(^{89,90}\) Third, potential mis-targeting of supplements because of errors in the detection of moderate acute malnutrition or severe acute malnutrition in children, or sharing with siblings, might lead to excess energy intakes among children who are not energy deficient or acutely malnourished.\(^{91}\) Fourth, the distribution of supplements might displace nutrition counselling programmes aimed

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(Panel 2 continued from previous page)

- Eliminate the promotion and sale of foods, snacks, and beverages high in energy, sugar, fat, and salt around schools
- Build knowledge and skills to create awareness, shape tastes, and motivate consumption of healthy diets through education, school gardens, and mainstreaming food throughout the curriculum
- Incorporate the promotion of nutritious foods and healthy diets using innovative communication tools tailored to youth

**Agriculture, food systems, and food environments**

8. **Scale up nutrition-sensitive agriculture programmes**

- Promote diversity in food production and consumption among poor households living in remote areas with little access to markets
- Include approaches to empower women in agricultural programmes
- Provide counselling and behaviour change communication focused on nutritious foods and healthy diets for all household members; for small producers of nutritious foods, educate on benefits of saving some of the production for own consumption or purchasing other nutritious foods
- Carefully design and support urban and periurban agriculture to promote and support the growing demand for nutritious foods in urban areas

9. **Design new agricultural and food system policies to support healthy diets**

- Refocus agriculture towards the production of nutritious foods such as fruits, vegetables, nuts, legumes, and whole grains, and making these foods more affordable for all
- Align actions through the food system to ensure that diversity of nutritious foods produced by agriculture reach consumers through the value chain

10. **Implement policies to improve food environments from the perspective of malnutrition in all its forms**

In addition to the actions in 1–9 that aim to improve food environments, implement policies such as:

- Eliminate the promotion of breastmilk substitutes and follow-on formula and reduce the marketing of foods, snacks, and beverages high in energy, sugar, fat, and salt, including those which are fortified
- Monitor and restrict nutrition and health claims on foods, snacks, and beverages high in energy, sugar, fat, and salt
- Use well targeted taxes on foods, snacks, and beverages high in energy, sugar, fat, and salt and subsidies for nutritious foods
- Improve the nutritional quality of the food supply through incentives to community food production, fortification, biofortification, and reformulation
- Set incentives and rules for retailers and traders to ensure a healthier community food environment

\(^*\)The operational feasibility of these changes should be tested, given the added complexity of incorporating length measures and messaging on overweight and obesity.
at promoting optimal complementary feeding practices and healthy diets.

Research on the long-term effects of the regular use of these different products in early childhood is needed to better evaluate the risks. However, no alternative product that is equally safe, convenient, and effective for use at the community level is available for treating severe acute malnutrition. A fifth double-duty action would thus be to continue treatment for severe acute malnutrition but to establish clear criteria and manage the potential long-term risks of energy-dense micronutrient-fortified foods and supplements used for prevention and treatment of different forms of undernutrition (panel 2).

Social safety nets

Opportunities

Social safety net programmes include income support (cash transfers and benefits or welfare programmes) and food transfers or subsidy programmes (providing vouchers or subsidised prices on select foods). The goal of these programmes is generally to reduce poverty among poor and marginalised groups and reduce food insecurity. Some, particularly the conditional cash transfer programmes, target women and promote the use of health, nutrition, and education services as conditions for receipt of income, in an effort to build human capital.10

Social safety net programmes have had positive effects on undernutrition outcomes. As described in detail in the appendix (pp 5–7), conditional cash transfer and food transfer or subsidy programmes in Mexico, Egypt, and the USA improve elements of diet quality, food insecurity, poverty and undernutrition outcomes and, in some cases, the use of health and education services.10 These programmes reach millions of poor people and provide cash that can be spent on nutritious foods, increase access to education on healthy eating, and provide direct food subsidies or packages. Therefore, they present an important opportunity for a sixth double-duty action to enhance diets, education, and resources that could reduce the risk of obesity and non-communicable diseases while also improving undernutrition outcomes (panel 2).

Risks

From the evidence presented earlier, social safety net programmes are clearly an important and effective tool to reduce poverty and food insecurity. However, despite their benefits, some programmes have had unintended negative effects on some aspects of diet quality and the risk of obesity and DR-NCDs (appendix pp 5–11).10 These effects appear to be either because the programme directly provided or subsidised foods, snacks, and beverages high in energy, sugar, fat, and salt, or because they provided income that could be used to purchase these types of foods, which had become readily available and affordable in transitioning food environments. For example, the conditional cash transfer programme in Mexico (Oportunidades) was associated with excessive weight gain among women in urban areas who were already overweight or obese before entering the programme,9,10 and the PAL programme increased total energy intake in a population that already consumed excess energy at baseline (appendix p 5).10 Similar evidence from Guatemala shows that a food assistance programme that provided food rations to mothers and children during the first 1000 days reduced child stunting by 11% but increased women’s weight (by 600 g) at 24 months post partum in a population in which more than 42.5% of women (non-pregnant or non-lactating) were overweight or obese at baseline.102 Further evidence of harm comes from non-experimental evaluations of conditional cash transfer programmes in Brazil and Colombia and various food assistance programmes in Peru (appendix pp 8–11).

For food subsidy programmes, in Egypt, mothers in urban areas receiving food rations under the national food subsidy programme (providing bread and flour, and a targeted ration card that provided subsidies for rice, sugar, cooking oil, and black tea) had higher BMI and their children were more likely to be stunted or obese than non-beneficiaries (appendix p 6).103 Beneficiaries in urban areas also had poorer diet diversity and lower frequencies of vegetable, meat, and fish consumption than did non-beneficiaries. The evidence, therefore, suggests that the subsidy programme might have caused double harm by increasing both chronic undernutrition and overweight in children and exacerbating the existing problem of overweight and obesity in women. Despite their documented unintended negative effects, these safety net programmes also provide prime examples of how redesigning programmes can leverage opportunities for double duty. For example, the Mexico conditional cash transfer programme incorporated a new health component designed to track both child undernutrition, and overweight and obesity; regular check-ups for the detection of diabetes, hypertension, overweight, and obesity in adults; and a revamped social behaviour change communication strategy that includes counselling on healthy diets to prevent the risk of obesity and DR-NCD (appendix p 5).104 In Egypt, the government reform of the programme in 2014, expanded the variety of subsidised foods to include micronutrient-rich foods such as lentils, fava beans, meat, chicken, fish, milk, and cheese, and restricted the bread subsidy to ration-card holders (appendix p 6). Enhancements have also been made to the PAL programme in Mexico and the SNAP programmes in the USA to reduce the risk of exacerbating obesity and DR-NCD (appendix p 5 and p 7). These examples confirm the large potential of social safety net programmes to serve as a double-duty approach if they are designed to address malnutrition in all its forms (panel 2).
Educational settings

Opportunities

School feeding programmes that offer meals, snacks, or take-home rations exist in at least 150 countries, serving 368 million children.\textsuperscript{105,106} In LMICs, these programmes are established to improve nutrition, cognitive and psychosocial development, and dietary behaviours.\textsuperscript{107,108} In higher-income countries, direct provision of nutritious foods or standards to limit the availability of foods, snacks, and beverages high in energy, sugar, fat, and salt has been shown to improve targeted dietary behaviours.\textsuperscript{10}

By giving the opportunity to provide a healthy diet directly to children, combined with the possibility of school-based food and nutrition education, healthy school meals emerge as a seventh opportunity for double-duty action.\textsuperscript{109} However, this opportunity has yet to be fully leveraged. Nutritional guidelines for schools in LMICs rarely appear to consider malnutrition in all its forms, having been developed either for contexts where undernutrition historically dominates or those with high prevalence of obesity.\textsuperscript{110,111}

Risks

Providing food or meals in schools becomes a risk if it increases the accessibility of unhealthy snacks and foods high in fat, added sugar, and salt and provides little nutritional value. There is surprisingly little information on the quality of school meals in LMICs but some evidence shows that foods eaten in schools and sold in the vicinity are of poor nutritional quality. Evidence from Brazil, Iran, Mexico, Haiti, Guatemala, India, South Africa, and the Philippines shows that foods sold by vendors in and outside of schools include chips, cookies, crackers, ice cream, fried foods, sugary drinks, hamburgers, pizza, and confectionery.\textsuperscript{47,112–119} A review of school food policies in eight countries in Latin America also reported widespread availability of these foods in kiosks in and out of schools.\textsuperscript{120}

Studies also found that substantial proportions of students consume snacks and sugar sweetened beverages on and off school property,\textsuperscript{117,121} and that promotion of snack foods and drinks inside schools is widespread,\textsuperscript{122} such as signage boards with the school’s name advertising a food or beverage.\textsuperscript{123} Double-duty actions for schools thus need to consider not only the quality of the food available through official channels in schools, but also the unhealthy food vending practices in and around schools.

The review identified one example in which schools had taken the opportunity to retrofit an established programme to a double-duty approach. The National Nursery Schools Council Program (JUNJI) in Chile is a free day-care programme that provides two meals and a snack to children younger than 6 years from low-income backgrounds. Concerned by the high rates of obesity, the programme reduced the energy content of the meals by 100 kcal.\textsuperscript{124} The intervention was unsuccessful in reducing obesity, but a follow-up pilot study tested a new approach involving parents and focusing on improving diets at home and at school. Significant reductions in energy and fat intakes and snack consumption were achieved, as well as increases in fruit and vegetable intakes and physical activity.\textsuperscript{125} The example emphasises the potential of using educational platforms for double-duty action by focusing on both home and school environments (panel 2).

Agriculture, food systems, and food environments

Opportunities

In the past decade, there has been a concerted effort in LMICs to build nutrition goals into agricultural development programmes. Such programmes (often termed nutrition sensitive agriculture) include biofortification, homestead food production, aquaculture, livestock and dairy programmes, agriculture extension services, nutrition-sensitive value chains, and irrigation interventions.\textsuperscript{126} The aim of these programmes is typically to promote diversity in production of nutritious foods for direct consumption and possibly for income from the sale of surplus production. A recent review found that these programmes consistently improve food environments by enhancing household access to nutritious foods, thereby leading to increased quality of mothers’ and young children’s diets.\textsuperscript{127} Thus, these agricultural development programmes have the potential to promote nutritious diets that benefit multiple forms of malnutrition, making the scale-up of these programmes an eighth candidate for double-duty actions.

School gardens also have the potential to shape attitudes and behaviours of school aged children around diet and indirectly by influencing attitudes at home, and improving food environments.\textsuperscript{128–130} In cities, agricultural programmes such as urban agriculture and direct farm-consumer markets could also play a role in improving food environments and food security if provided with sustained support.\textsuperscript{131}

Risks

The review by Ruel and colleagues\textsuperscript{132} identified no risks from nutrition-sensitive agricultural programmes, although the programmes reviewed were implemented in extremely poor rural communities. One potential risk of these types of programmes for obesity and DR-NCDs is their potential effect on increasing income from the sale of agricultural products. If this additional income is used to purchase foods, snacks, and beverages high in energy, sugar, fat, and salt available in food environments, the programmes could inadvertently increase the risks of obesity.\textsuperscript{130}

Larger agricultural development investments have typically been implemented without any specific nutrition objectives, and their historical focus has been on delivering enough dietary energy to prevent hunger and food insecurity.\textsuperscript{133} Historically, policies have incentivised the production of grains, oilseeds, and sugar.\textsuperscript{134} Breeding programmes designed to increase yield of staple crops
initially funded in the 1940s took off in Latin America and Asia to become the so-called Green Revolution. Still today, the Consultative Group of International Agricultural Research Centers (CGIAR) allocates about half of its resources to research on rice and maize.\textsuperscript{133} The concern has been voiced that the narrow focus on dietary energy has created risks for other aspects of diets.\textsuperscript{134} For example, the Green Revolution is credited with boosting overall energy consumption from basic cereals (rice, wheat); however, it did little to improve dietary diversity and micronutrient intake, and might have even worsened trends.\textsuperscript{135} Overall, increasing productivity of cereals and oilseeds provided cheap feed for livestock and inputs for processed foods, arguably introducing a risk for obesity and DR-NCDs by providing low-cost ingredients used by manufacturers in industrially processed foods.\textsuperscript{132,134} A ninth double-duty action is thus to explore how agriculture and food systems policies can incentivise larger scale shifts to transform the dynamics of the food supply that underpins food environments.\textsuperscript{135}

Food environments are also a key component of food systems. The evidence presented on double-duty actions 1–9 show that healthy food environments are crucial to any double-duty approach. Unhealthy food environments that make foods, snacks, and beverages high in energy, sugar, fat, and salt, readily available, affordable, appealing, and aspirational undermine the benefits of providing adequate incomes through social safety nets, making nutritious foods more available through educational settings and agricultural programmes, and offering the provision of guidance and counselling to promote healthy diets. Yet, advice on how to avoid these foods is rarely featured in guidance, education, or counselling in health service programmes. A tenth double-duty action, cross-cutting actions 1–9, therefore relates to policies to reduce the availability, affordability, and appeal of foods, snacks, and beverages high in energy, sugar, fat, and salt in food environments, and vice versa for nutritious foods (panel 2). To date, such policies have typically been proposed and implemented to address obesity, notably the taxation of sugar-sweetened beverages. The evidence in this Series paper shows that double-duty food environment policies should be designed to address malnutrition in all its forms, including the risks of low protein and micronutrient intake that are caused by high consumption of foods, snacks, and beverages high in energy, sugar, fat, and salt. Such policies introduced by governments to tackle obesity now need to be adapted to promote diets that benefit all forms of malnutrition. Research to better understand the effects of these foods on undernutrition is also urgently needed (panel 3).\textsuperscript{136}

Next steps: putting a double-duty approach into operation

The evidence presented in this Series paper indicates that continuing with business as usual with existing nutrition programmes and policies is not fit for purpose in the new nutrition reality. The ten identified double-duty actions are a means of leveraging shared opportunity and reducing risks of established programmes and policies currently addressing undernutrition (panel 2). Two steps are needed: designing a double-duty strategy; and then delivering it.

Designing a double-duty strategy

The design of a double-duty strategy should include the three following processes.\textsuperscript{8} First, existing programmes and policies targeting undernutrition should be reviewed to assess whether they are presenting risks or doing harm, and what opportunities they provide to be retrofitted as double-duty actions. The framework in the figure provides a starting point for how this assessment

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Panel 3: Research priorities to advance the double-duty agenda

Diets, food environments, and food systems

- Development of simpler tools to measure dietary intake; and design and validation of indicators of diet quality that capture both risks of undernutrition and of obesity and diet-related non-communicable diseases (DR-NCDs) for use across populations
- Detailed assessment of dietary intake of individuals at different stages of the lifecycle in populations living in different contexts including urban and rural areas, and low-income and middle-income countries
- Analyses of the association between consuming foods, snacks, drinks high in energy, sugars, fat, and salt and undernutrition, and concomitant association with obesity and DR-NCDs
- Analysis of the role of food environments in dietary intake and patterns in the context of other drivers (eg, socioeconomic status) in different contexts and their influence on different forms of malnutrition
- Assessment of how food systems processes and policies influence both sides of the double burden of malnutrition, including the role of different system sectors (eg, agricultural production, trade, processing, retail) and environmental aspects such as climate change

Impact assessments

- Assessment of short-term and long-term effects of interventions focused on undernutrition during early life (eg, food supplements, fortified foods and products [eg, lipid-based nutrient supplements and ready-to-use therapeutic foods], follow-on formula) on diets, undernutrition, and obesity and DR-NCD outcomes
- Assessment of the effects of redesigned or newly designed double-duty actions in health, social safety nets, education, and agriculture on short-term and long-term diets, undernutrition, and obesity and DR-NCD outcomes at different stages of the lifecycle
- Assessment of the effects of food environment policy innovations to improve access to healthier diets on changes in diets, undernutrition, and DR-NCDs

Operational issues

- Assessment of the feasibility and quality of implementation of redesigned or newly designed double-duty actions in health, social safety nets, education, and agriculture to identify bottlenecks that might prevent efficiency and effectiveness given increased complexity
- Assessment of cost and staff workload of redesigned or newly designed double-duty actions
- Assessment of operational issues related to scale-up of double-duty actions
could be done. Following the framework, this assessment should explore how existing actions are influencing—or failing to influence—the common drivers, as a means of identifying the risks and opportunities created. Second, existing programmes and policies should be redesigned to take a double-duty approach using the ideas laid out in panel 2. Third, new actions should be designed, as needed, purposively to tackle malnutrition in all its forms at all stages of the lifecycle and especially for women during pregnancy and lactation, infants, preschoolers, school age children, and adolescents. Evaluations should be built into the design and redesign of double-duty actions to ensure their effects on outcomes related to the DBM can be assessed, including possible unintended consequences (panel 3).

**Delivering a double-duty strategy**

To enable the delivery of the double-duty strategy, more fundamental changes will be needed in governance, funding, capacity, and research. Signs that countries are improving the governance of nutrition are encouraging, with an increasing number of countries having created a nutrition coordination mechanisms in high governmental offices, many of which are in the president or prime minister’s office. These actions now need to incorporate malnutrition in all its forms and one minister or ministry must be made responsible for all.

The stimulus for a change in governance is unlikely unless there are changes in funding. Financing of action for nutrition is still largely channelled to undernutrition and, with an increasing number of countries having created a nutrition coordination mechanisms in high governmental offices, many of which are in the president or prime minister’s office. These actions now need to incorporate malnutrition in all its forms and one minister or ministry must be made responsible for all.

At the national level, if and how actions designed to address overweight and obesity are costed in nutrition plans in countries with the DBM is unclear. In countries with costed nutrition plans that include overweight and obesity and DR-NCDs, funding does not appear to be available to deliver these actions. Double-duty actions provide an opportunity for donors to continue with existing programming while building in considerations for the new nutrition reality. This approach will require new strategic alignments by donors towards malnutrition in all its forms along with different funding streams. Understanding the costs of double-duty actions, as well as their cost-effectiveness, could help to inform this process, as addressed in the fourth paper in this Series.

Given the entrenched nature of existing approaches, individual and institutional capacity strengthening will be needed to change mindsets and enable action. For example, educational institutions and professional bodies should teach the knowledge and build the skills needed to tackle malnutrition in all its forms simultaneously. Policy makers (nutrition policy leads and those working in other ministries responsible for relevant programmes) and implementers, such as health workers delivering nutrition counselling, will also need training on the double-duty approach. The capacity to deliver double-duty actions does not yet exist and will need to be built and appropriately funded. To guide and justify the allocation of resources, research will also be needed to assess what works and at what cost, and how capacity can be most effectively built, as indicated in panel 3.

To accelerate progress, the nutrition community needs to take ownership of the double-duty agenda and adopt a new paradigm and mindset that favours a more holistic approach to designing actions to simultaneously address the whole spectrum of malnutrition problems. The evidence presented in this Series paper highlights the urgency of moving forward with double-duty actions if the world is to have any hope of attaining the sustainable development goal of ending malnutrition in all its forms.

**Contributors**

CH led the conception and preparation of the paper, bringing in the different authors, leading the preparation of the manuscript, and structuring and restructuring after receiving the reviewers comments. MTR led the literature search and write up on programmes that caused harm and how they were modified, and contributed to the literature search, tables and figures, study design, data interpretation, writing, and addressing reviewers comments. LS contributed to literature searching, synthesis of information, write up of paper, and editing final draft. BS contributed to conceptualising the paper, reviewed the scientific literature on the effect of healthy diets on both sides of the DBM, contributed to the section on common drivers of the DBM, and reviewed and commented on drafts and the final paper. FB contributed to conceptualising the paper, provided an analysis of country policy documents and costed action plans on the DBM, and reviewed and commented on drafts and the final paper.

**Declaration of interests**

We declare no competing interests.

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