

## REVIEW

# The double burden of malnutrition in SE Asia and the Pacific: priorities, policies and politics

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The double burden of malnutrition is defined by the co-existence of serious levels of under- and overnutrition.<sup>1</sup> Nowhere have overweight rates risen as fast as in the regions of South East Asia and the Pacific. The regions are also burdened with high and often stagnant levels of undernutrition. For countries for which data are available, the regions contain nearly half of the individuals, world wide, suffering from a double burden of malnutrition. This article reviews the trends and their consequences and for nine countries in these two regions it reviews the drivers of the problem and attempts to manage it. The article concludes with an analysis of the political challenges and opportunities presented by the double burden and some suggestions for a leadership agenda within the region to address it.

**Keywords** Double burden, malnutrition, pacific, policy, review, South East Asia

## KEY MESSAGES

- Nowhere have overweight rates risen as fast as in East Asia and the Pacific.
- The region contains nearly half the individuals living in countries that are experiencing a double burden of malnutrition.
- The drivers of the problem are well known but the policy priorities differ in each of the nine countries reviewed.
- The complexity of the problem is daunting for policymakers, but there are political opportunities to take action.

## Introduction

Over the past 20 years, the countries of Asia and the Pacific have been among the world's most economically dynamic nations. The pressure for these growth rates to be translated into broad-based improvements in citizen wellbeing is large, as is the pressure to sustain such impressive economic growth. The attainment of these two goals is, however, in serious danger due to the double burden of malnutrition: the simultaneous presence of under- and overnutrition.

Undernutrition represents a set of adverse health outcomes that are caused by imbalances in diet and their interactions with infection. For European and North American countries the twentieth century saw an orderly transition from problems of

undernutrition such as underweight, stunting and micronutrient deficiency diseases to problems of overnutrition, such as overweight, obesity and diet-related non-communicable chronic diseases such as diabetes, high blood pressure and coronary heart disease. In the twenty-first century, the countries of South East (SE) Asia and the Pacific have had less time than others to make this transition (Popkin 2012; Shrimpton and Rokx 2013).

We have known about the problem of the double burden of malnutrition in this region for some time (e.g. Gillespie and Haddad 2001). But as we will show, the situation is getting more serious because the increases in overweight rates over the past 30 years have been most rapid in this region of the world. We will also show that the region is now home to nearly half of

the world's population simultaneously experiencing a double burden of stunting rates above 30% and adult female overweight rates above 25%. Given the increased complexity of the malnutrition problem, the speed of change in the region and its already large share of the double burden, policy innovation is vital, with the promise of lesson learning for other regions of Asia and beyond.

This article addresses a series of issues. First, is the double burden really affecting countries of SE Asia and the Pacific the most intensely? This is not straightforward as there is no accepted definition of whether or not a country is experiencing a double burden. Second, why does this double burden matter? We will review, briefly, the mortality, morbidity and economic consequences of under- and overnutrition. Third, for nine countries from the region, the article highlights policy and programme areas that appear to be priorities for further malnutrition reduction. Finally, we review the political opportunities and challenges of addressing the double burden within the region. If undernutrition reduction has political dimensions, then the double burden has many more. This is due to the competition for financial, human and organizational resources to address under- and overnutrition and the sharper potential for conflict between commercial and public health imperatives. The article concludes with some suggestions for a leadership agenda within the region.

## Methods

We address these questions through the analysis of extant data, and a review of literature of nine countries from the region. The review is guided by a conceptual framework we developed.

The nine countries selected—Cambodia, Indonesia, Lao People's Democratic Republic (PDR), Myanmar, the Philippines, Papua New Guinea (PNG), the Solomon Islands, Timor Leste and Vietnam—represent a wide variety of contexts and malnutrition outcomes in SE Asia and the Pacific. For these countries, we review the literatures on the determinants of malnutrition. In addition we identify evidence from the region on interventions to prevent and control overnutrition. We focus less on interventions to prevent and manage undernutrition given the publication of a recent exhaustive study of these (Bhutta *et al.* 2013).

Figure 1 develops a simple conceptual framework to address the double burden. The figure combines the United Nations Children's Fund (UNICEF) framework for undernutrition (UNICEF 1990), the framework developed in the recent Lancet series on obesity (Swinburn *et al.* 2011) and the expansion of the basic determinants of the UNICEF framework in Gillespie *et al.* (2013). This combination of frameworks is possible as the determinants of both under- and overnutrition can be divided into three levels with similar components: immediate, underlying and basic.

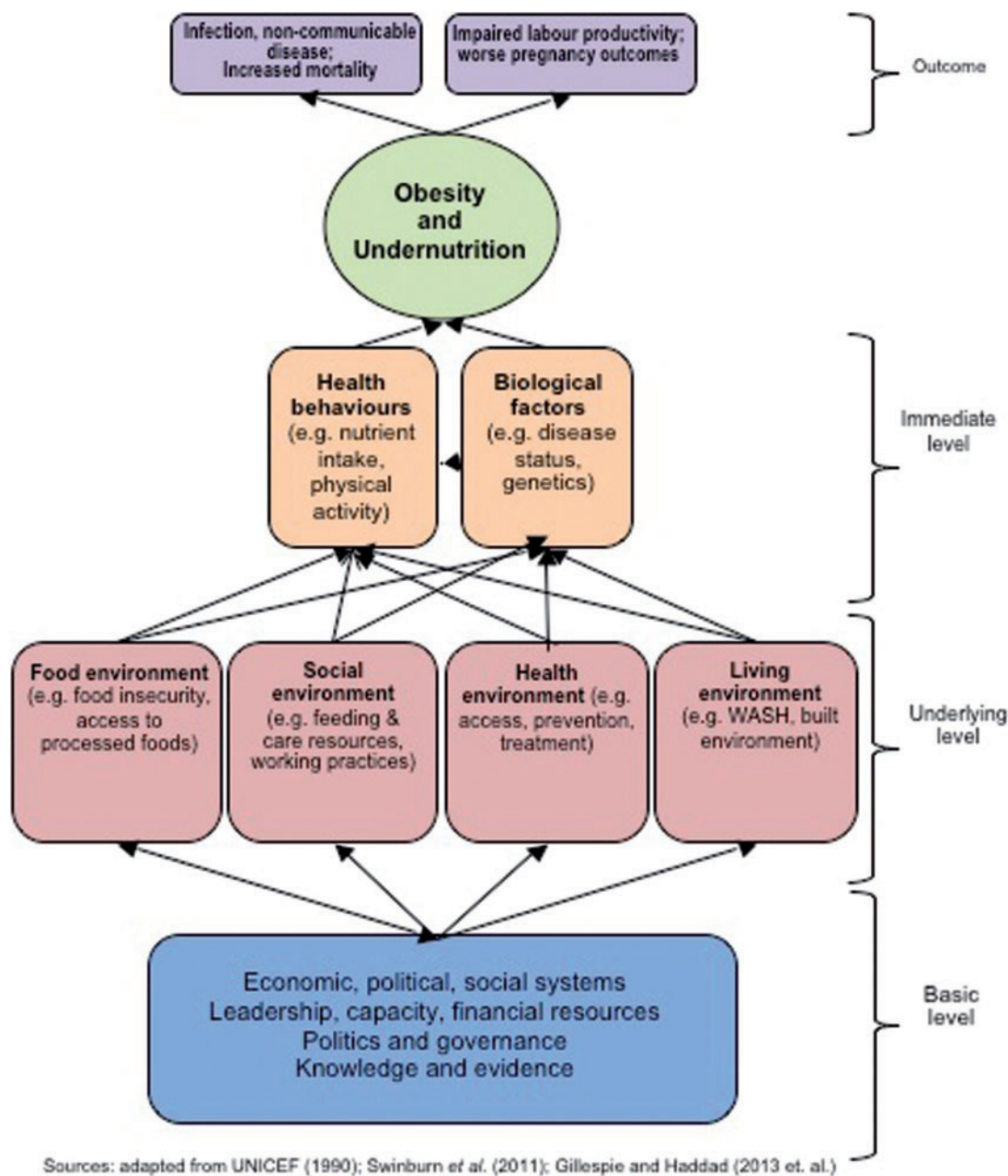
At the immediate level, both forms of malnutrition result from an imbalance between the amount of nutrients and energy required by the body and the amount of nutrients and energy consumed. In the context of undernutrition, insufficient dietary intake and/or poor health due to infection can lead to a negative balance in nutrients and energy. In early childhood infection and undernutrition are often interlinked in an ongoing cycle. Infections such as diarrhoea and intestinal infestations can reduce appetite, impair absorption and lead to

a loss of nutrients, whereas systemic infections such as pneumonia or measles increase the need for nutrients. This cycle leads to nutrient deficiencies. Adequate supply of nutrients is especially important in early childhood, when many of the body's immune and cognitive functions are being developed. Once these systems are compromised, repair and catch up are very difficult. In the context of overnutrition, high intake of food energy (e.g. high consumption of sugar, salt and saturated fats) combined with low levels of physical activity and high amounts of sedentary behaviour can lead to a positive energy balance and excess weight (Swinburn *et al.* 2011). Genetic predispositions can increase the risk for obesity further via an interaction with these behaviours within an obesity-promoting or 'obesogenic' environment (Hetherington and Cecil 2010). Under- and overnutrition are also thought to be linked. Insufficient supply of nutrients in the first 2 years of life and during foetal growth has been shown to increase the risk for obesity and non-communicable diseases significantly (Victora *et al.* 2008; Adair *et al.* 2013; Black *et al.* 2013).

On the underlying level, several environmental determinants including food, living, social and health environments underpin individual-level health behaviours and biological factors. In the context of undernutrition, the ability to ensure adequate dietary intake at all times depends on household food security which includes the availability and physical and economic access to sufficient amounts of nutritious and culturally accepted food to meet dietary requirements. Health-promoting care and feeding practices depend on supportive social environments that, for example, empower mothers to breastfeed and equip households and communities with resources to access services. Lack of affordable, good quality health service or barriers to access of these services, unhygienic, overcrowded living conditions and poor access to clean and safe water and sanitation facilities further increase the risk of undernutrition.

In the context of overnutrition, food environments characterized by high availability and promotion of processed, low-cost, energy-dense foodstuffs (e.g. via fast-food outlets, supermarket chains) can result in overconsumption. Social environments that support larger body sizes promote unhealthy eating patterns (e.g. high-caloric snacking) and sedentary working practices may further increase the risk for obesity. Built or natural living environments can support or discourage a physically active lifestyle. Finally, a health care system that does not actively respond to the burden of obesity can further aggravate obesity and its associated health problems.

On the basic level, different system-level factors can act as directional forces for the underlying and immediate factors and ultimately for both under- and overnutrition. For instance, economic growth has the potential to improve household food security, regulate food markets for processed foods and beverages, provide safe living environments that offer opportunities to be physically active, support social environments that encourage health-promoting practices and deliver good quality and comprehensive preventive and curative health care. But economic growth is also associated with increases in overweight and obesity (Ruel and Alderman 2013). The quality of governance is also thought to be a major driver of the strength of determinants and responses to malnutrition. From quality of service delivery, to the ability to co-ordinate across sectors,



**Figure 1** Conceptual framework for determinants of malnutrition. WASH: Water, Sanitation and Hygiene.

quickly prioritize actions, regulate and incentivize different public and private actors and learn from interventions, the quality of governance is important for managing and reducing malnutrition (Gillespie *et al.* 2013).

We use this conceptual framework to structure our review of literatures on the determinants of malnutrition in the nine countries. We also, wherever possible, review the policy and intervention space for these countries. All countries—whether single burden, double burden or on the verge of double burden—need to bring a wide array of policy instruments to the malnutrition problem. Food policy can help make different types of healthy foods available, affordable and nutritious and it

can restrict the advertising of unhealthy foods and introduce nutrition labelling on high caloric foods. Health policy can make sure breastfeeding is promoted and the balance between preventive and curative, primary and other health care is appropriate. Water and sanitation policy can expand coverage of improved services to as wide a segment of the population as possible, to prevent diarrhoea and other infectious diseases that raise nutrient requirements and reduce nutrient retention and absorption. Changes in urban planning and transport policies can make living environments safer and encourage active modes of transport. Poverty policy is vital to transfer cash to those most in need to help them avoid selling off assets due to shocks and the

**Table 1** Links in the conceptual model of good nutrition

Level of determinant/ intervention	Nature of link and evidence area reviewed
Immediate	Link 1: Nutrition-specific, 1000 days
	Link 2: Nutrition-specific, adolescent and WRA
	Link 3: Nutrition-specific overnutrition
Underlying	Link 4: Health system
	Link 5: Food and agriculture
	Link 6: Safe water and sanitation
	Link 7: Women's empowerment
	Link 8: Social protection
Basic	Link 9: GDP, inequality and poverty reduction
	Link 10: Drivers of further overnutrition
	Link 11: Policy approach to overnutrition
	Link 12: Commitment to undernutrition reduction
	Link 13: Government effectiveness

WRA: Women of Reproductive Age, GDP: Gross Domestic Product.

cash transfers can be tied to healthy behaviours. Urban development policy is crucial to ensure healthy built environments with space to safely walk, cycle, play and breathe clean air.

Using the conceptual framework as a guide we identify 13 areas or links in the production of good nutrition that correspond to various levels of determinants: immediate, underlying and basic (Table 1). We summarize evidence for the nine countries across the links, looking for vulnerabilities in the production of good nutrition. The analysis attempts to draw out high-level priority areas for each country. We do this through a subjective assessment of evidence in each link, assigning a traffic light rating (highly vulnerable, medium vulnerable and less vulnerable) to each.

We should note that the nature of the literature surveyed does not lend itself to a systematic review methodology following the Cochrane guidelines. First, much of the evidence on drivers is drawn from a very diverse set of socioeconomic literatures where there are differing standards for assessing quality. Second, we look to draw on country specific evidence whenever possible, much of which is unpublished and not obviously peer reviewed. Third, the sheer number of literatures we would have to review systematically (9 countries x 13 links) makes a formal systematic review a very large undertaking that would result, in our opinion, in a very small set of studies emerging from the inclusion criteria.

We therefore employed a scoping review approach following Arksey and O'Malley (2005) and Rumrill (2010) to gain an overview of the extant, nature and scope of the existing evidence including literature from multiple sources and grey literature. Evidence search was carried out between June and August 2013. No language or time restrictions were used. Electronic databases searched included Ovid Medline, Web of Knowledge (now known as Web of Science), EconLit and the Economics Search Engine. Search terms included 'dual burden' or 'double burden' or 'dual form' and 'malnutrition' or 'overweight/nutrition' and 'underweight/nutrition' and 'Asia

Pacific' or any of the nine selected countries. Grey literatures, including reports, PhD theses and full conference papers, were identified by searching Google scholar and websites on global nutrition (Eldis, World Health Organization, International Food Policy Research Institute). Only studies that focused on the double burden of malnutrition were considered for inclusion. Data extraction and mapping were guided by our conceptual framework and the 13 identified links and was conducted by the three authors.

Of course such a prioritization process is best done at the country level through a process that brings together technical needs, political opportunities and capacity realities.

## Results

This section presents overweight trends in SE Asia and the Pacific in relation to other regions. It then presents the results of our review of literature for the nine selected countries.

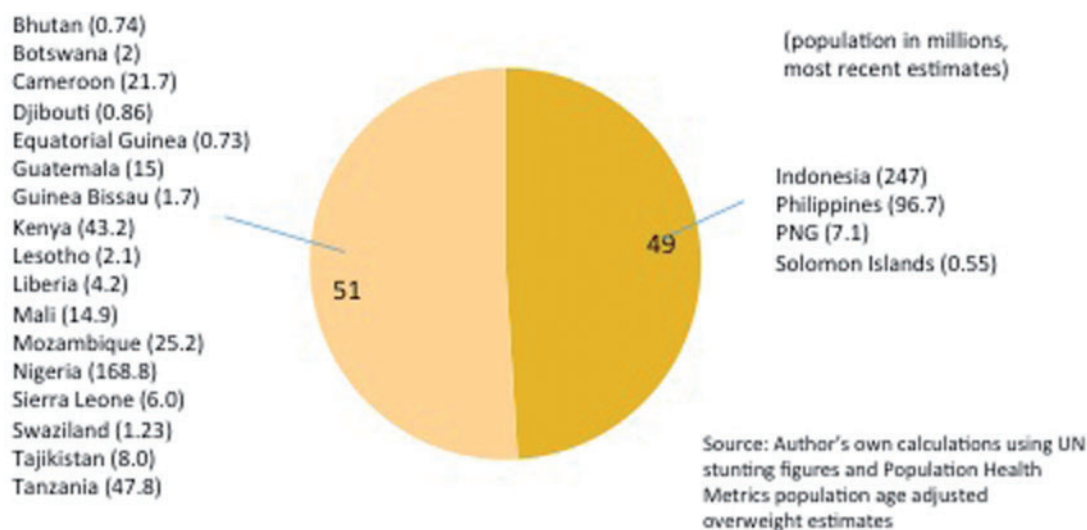
### How important is the double burden in SE Asia and Pacific and why does it matter?

As far as we can tell, there is no population-based definition of the double burden. At the household level a double burden is thought to exist if a household contains a stunted child and an overweight/obese mother (Oddo *et al.* 2012; Roemling and Qaim 2012). Here we define a country as experiencing a double burden if the following co-exist: stunting of under 5s at 30% or above (30–39% is classified as 'high' by WHO<sup>2</sup>), and an age-adjusted overweight rate (for females) of above 25% (i.e. above the population weighted average for low-middle income countries and far above the average for low-income counties; WHO 2011). This is arbitrary but it seems reasonable. Using this definition the countries of SE Asia and the Pacific account for just under half of the population affected by this double burden (Figure 2). This is primarily driven by Indonesia and the Philippines with contributions from PNG and the Solomon Islands.

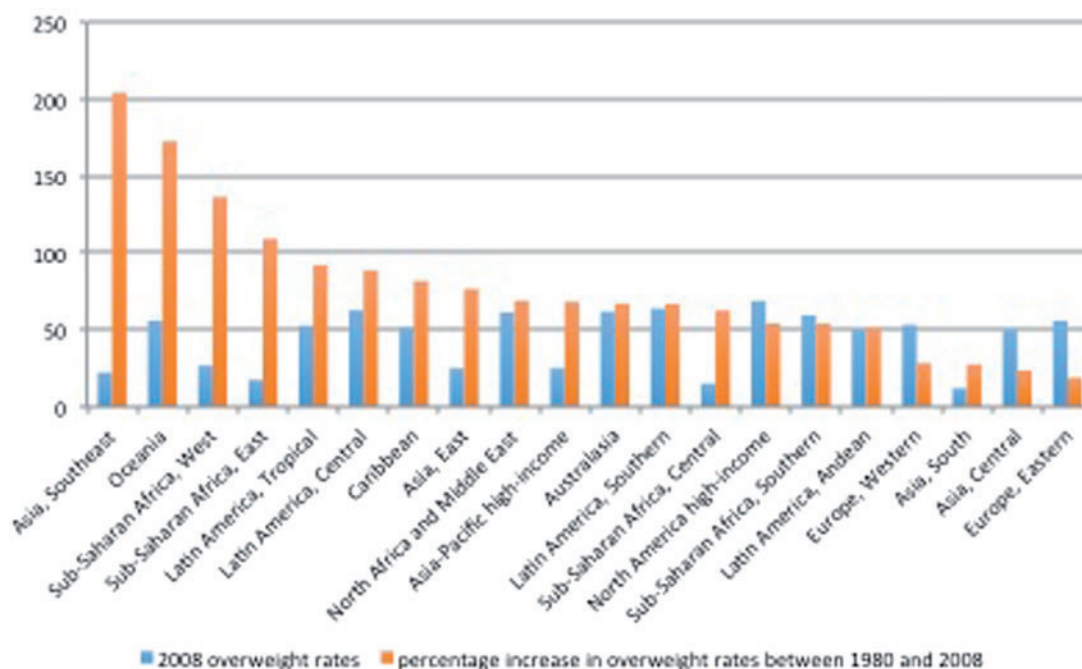
The data in Figure 2 are restricted to countries that have stunting and overweight data and they can only paint a static picture. Figure 3<sup>3</sup> presents overweight rate estimates (male and female) for all regions, between 1980 and 2008. It is clear from Figure 2 that SE Asia (204%) and Oceania (174%) have experienced the fastest growth in overweight rates between 1980 and 2008, despite the fact that the overweight rates for SE Asia are low relative to some other low- and middle-income regions.

In summary, SE Asia and the Pacific have nearly half of the world's population simultaneously experiencing high stunting and high overweight, and female overweight rates have increased faster in this region than in any other in the past 30 years.

Why does the double burden matter? As noted earlier, malnutrition has consequences for individuals and for society. For the six of our nine countries that have country level Burden of Disease estimates,<sup>4</sup> approximately 25% of disability adjusted life years are associated with seven diet malnutrition risk factors.<sup>5</sup> For undernutrition, 45% of all child deaths under the age of 5 years are attributable to stunting (Black *et al.* 2013) and from the most rigorous study in Guatemala, we see that the prevention of stunting at age 3 years can generate adult improvements in wage rates of 48% for those with a job and



**Figure 2** Share (%) of population in countries that are experiencing under five stunting rates greater than or equal to 30% and age adjusted estimated female overweight rates (adults  $\geq 20$  years) of greater than or equal to 25%.



**Figure 3** Levels and trends in adult females  $\geq 20$  years (age-adjusted) overweight rate (Body Mass Index  $> 25$ ) estimates, by region.

can lead to a 33% increased chance of living in a house with an income above the poverty line (Hoddinott *et al.* 2008).

At the macro level, conservative estimates of Gross National Product (GNP) losses for Asia due to low adult height driven by infant stunting are 11%, year on year (Horton and Steckel 2013). For obesity for China, careful estimates show year on year losses of 9% of GNP by 2025 (Popkin *et al.* 2006). Similar GNP losses are reported for other countries (World Bank 2011). The economic case for the reduction and prevention of malnutrition will increase as the ratio of individuals of working age to those of non-working age in SE Asia increases to a peak between 2025

and 2030 (Bloom and Canning 2011). This so-called demographic dividend will be most fully realised when the productivity of new labour force entrants is boosted by preventing undernutrition and by minimizing premature care burden of those beyond working age by better management of overnutrition.

### Where are the selected countries vulnerable to malnutrition?

This section summarizes the nature of the malnutrition burden in each of the nine countries using two indicators: under 5

**Table 2** Classification of the nine countries by stunting and overweight rates (x%, y%)

		Overweight (Based on overweight (>25 kg/m <sup>2</sup> ) in adults)	
		Female age adjusted overweight prevalences 25% or higher	Female age adjusted overweight prevalences below 25%
Undernutrition (based on stunting among under five children)	30% or higher stunting prevalence	Indonesia (36, 26)	Myanmar (35, 23)
		Philippines (32, 29)	Lao PDR (48, 18)
		PNG (43, 50)	Cambodia (40, 15)
		Solomon Islands (33, 71)	Timor Leste (58, 16)
	Below 30% stunting prevalence		Vietnam (23, 11)

Sources: Stunting: UNICEF/WHO data at <http://data.un.org/Data.aspx?d&equals;SOWC&f=inID%3A106>; Overweight: Population Health Metrics data at: <http://www.pophealthmetrics.com/content/10/1/22>. Colour versions of the tables in this manuscript are provided online at <http://heapol.oxfordjournals.org/>.

stunting rates and age adjusted estimates of female overweight rates. Then we summarize evidence under each of the 13 links and assign subjective grades to each link to help assess priorities for action.

On the nature of malnutrition, Table 2 classifies the nine countries by the 30% and 25% double burden cutoffs and finds that Indonesia, the Philippines, PNG and the Solomon Islands are in the double burden space with Myanmar on the cusp. Timor Leste, Lao PDR and Cambodia are predominantly experiencing undernutrition and Vietnam has relatively low rates of stunting and overweight.

#### Link 1: Nutrition-specific interventions: first 1000 days

From the data in Table 3, we can see that Cambodia is one of the strongest performers across the programme indicators. For example there are high levels of early initiation of breastfeeding, exclusive breastfeeding for the first 6 months, vitamin A supplementation and iodized salt coverage. Vietnam, despite its impressive reductions in stunting, has scope to improve breastfeeding performance and iodized salt coverage. The remaining countries lie somewhere between these two.

#### Link 2: Nutrition-specific adolescent and women of reproductive age

The nutrition status of adolescent girls and women of reproductive age is vital for their own health and for the health of any children they give birth to. Table 4 presents several indicators of the nutrition status and associated risk factors. The Philippines has a puzzlingly high rate of low birth weight (which is an indicator of poor weight gain during pregnancy), Cambodia and Timor Leste have low rates of antenatal care visits and PNG, Cambodia and Lao PDR have low rates of female secondary education (which is a useful marker of the status of girls and is a risk factor for early marriage and pregnancy, themselves a risk factor for poorer birth outcomes). The paucity of data for the nine countries in this area is surprising and is of concern.

#### Link 3: Nutrition-specific—overweight and obesity

Children are a major target group for interventions aiming to prevent overweight and obesity. A systematic review (Waters *et al.* 2011) of interventions aimed at preventing obesity in childhood identified the following interventions as promising: school curriculum that includes healthy eating, physical activity

and body image; increased sessions for physical activity; improvements in the nutritional quality of food in schools; support for teachers and other staff to implement health promotion strategies and activities and parent support and home activities that encourage children to be more active, eat more nutritious foods and spend less time in screen-based activities. None of the studies were from low-income countries and only one was from Asia (Thailand). The Thailand study (Mo-Suwan *et al.* 1998) was an intervention at kindergarten that included a 15-min walk and 20 min aerobic exercise program three times a week. There was no discernible impact on body mass index (BMI) or triceps skinfold measures at the end of the 30 week programme, nor 6 months after the intervention.

Verstraeten *et al.* (2012) examined the effectiveness of preventive school-based obesity interventions in low- and middle-income countries. The review concludes that such interventions have the potential to improve dietary behaviour, increase physical activity and prevent unhealthy body weights. Only one of the 22 studies was from the SE Asia region—Thailand. The Thai study examined an intervention that promoted a healthy diet, 30 min of daily physical activity and improved school lunches and was associated with a small reduction in the consumption of fast food (Banchonhattakit *et al.* 2009).

#### Link 4: Health systems

For malnutrition to be reduced, effective health inputs need to be available at an affordable price, hence the quality of health systems is a key underlying factor in the promotion of nutritional status. Health systems performance data (Tandon *et al.* 2001) for 191 countries estimate that the Philippines (60th) and Indonesia (92nd) have health systems that rank in the top half of the 191 countries surveyed, with Myanmar performing the worst out of the countries surveyed. None of the nine countries perform well, however. This is of concern, because the burdens on the health systems are set to increase dramatically, with WHO (2010) citing the need for overnutrition to be integrated into primary health care.

#### Link 5: Food and agriculture

The performance of the food and agriculture sectors is important for nutrition because they produce food, jobs and income—all of which are important for the promotion of healthy diets and nutrition status. The Food and Agriculture Organisation of

**Table 3** Indicators relevant to the nutrition status of infants and young children under 2 years of age

Country	Early initiation of breastfeeding 2007–11	% of children (2007–11) who are				Vitamin A supplementation full coverage % 2011	Households with iodized salt % 2007–11
		Exclusively breastfed <6 months	Introduced to solid, semi solid or soft food 6–8 months	Breastfed at age 1 year 12–15 months	Breastfed at age 2 years 20–23 months		
Cambodia	65	74	82	83	43	92	83
Indonesia	29	32	85	80	50	76	62
Lao PDR (WHO 2012)		26					
Myanmar	76	24	81	91	65	96	93
Philippines	54	34	90	58	34	91	45
PNG	–	56	76	89	72	12	92
Solomon Islands	75	74	81	Not found	67	Not found	Not found
Timor Leste	82	52	82	71	33	59	60
Vietnam	40	17	50	74	19	99	45

Source: UNICEF (2013).

**Table 4** Indicators relevant to the nutrition status of adolescent and women of reproductive age (aged 15–49 years)

Country	Low birth weight (%) <sup>a</sup>	Antenatal care $\geq 4$ visits <sup>b</sup>	% women < 18.5 BMI <sup>c</sup>	Female secondary education rates % <sup>d</sup>
Cambodia	11	Poor	18.2	44
Indonesia	9	Medium	Not found	77
Lao PDR (WHO 2012)	11	Not found	15	38
Myanmar	9	Not found	Not found	Not found
Philippines	21	Medium	14	86
PNG	11	Not found	Not found	36
Solomon Islands	13	Not found	1.9	Not found
Timor Leste	12	Poor	25.6	Not found
Vietnam	5	Not found	25.5	81

<sup>a</sup>UNICEF (2013).<sup>b</sup>UNDP (2012)<sup>c</sup>WHO BMI Global Database <http://apps.who.int/bmi/index.jsp>.<sup>d</sup>Smith and Haddad (2014).

the UN classifies all of the eight of the nine countries as food deficit (Vietnam is the exception). FAO undernourishment<sup>6</sup> data (FAO 2012) show that Cambodia, Indonesia and Vietnam are doing well in reducing the levels of undernourishment but that Lao PDR and the Philippines have static levels. There are no data for Timor Leste, PNG, Myanmar and the Solomon Islands.

### Link 6: Safe water and sanitation

Safe water and sanitation are key to the prevention of undernutrition. Lack of quality services makes infection much more likely with diarrhoea and other faecal-related diseases. Table 5 shows that the Philippines, Timor Leste and Vietnam are on track in both domains. Indonesia and the Solomon Islands are making slow progress in both domains, Myanmar and Lao PDR are slow in safe water provision with Cambodia is doing much better in safe water provision than in improved sanitation provision. PNG appears to be regressing in both areas, which is a very serious situation.

### Link 7: Women's empowerment

Women's empowerment is key to caregiving. The Social Watch Gender Equity Index (GEI)<sup>7</sup> measures the gap between women and men in education, the economy and political empowerment. The GEI is a simple average of three gaps: in education enrolment at all levels and in literacy; in income and employment and in highly qualified jobs, parliament and senior executive positions. It is available for all countries except Solomon Islands and Timor Leste, and for Myanmar it is only available for some components. Overall the Philippines scores best and the Cambodia the worst. PNG, Cambodia and Lao PDR do very poorly on the women's empowerment indicator, with Cambodia and Lao PDR doing relatively poorly on gender equity in education, and Indonesia doing relatively poorly on equity in economic activity.

### Link 8: Social protection

Social protection programmes can transfer resources to poor families and help them purchase nutrition inputs. Social protection programmes can be unconditional or they can

**Table 5** Safe water and improved sanitation in the SE Asian countries and PNG

Country	Percentage of households with access to safe water % [Smith and Haddad (2014), from the WHO/UNICEF Joint Monitoring Report 2013] (progress) from regional MDG report	Percentage of households with access to improved sanitation % [Smith and Haddad (2014), from the WHO/UNICEF Joint Monitoring Report 2013] (progress) from regional MDG report
Cambodia	64 (on track)	31 (slow)
Indonesia	82 (slow)	54 (slow)
Lao PDR	59 (slow)	48 (on track)
Myanmar	70 (slow)	77 (on track)
Philippines	92 (on track)	72 (on track)
PNG	40 (regressing)	46 (regressing)
Solomon Islands	79 (slow)	29 (slow)
Timor Leste	60 (on track)	50 (on track)
Vietnam	95 (on track)	76 (on track)

MDG: Millennium Development Goal.

condition the receipt of transfers on certain types of health or education-related behaviours. For the countries that are the focus of this report, the Hunger and Nutrition Commitment Index (HANCI; te Lintelo *et al.* 2013) ranks Myanmar and Cambodia as doing least well in social protection provision. In addition, Weigand and Grosh (2008) show that Indonesia spends less on its social protection programmes than the Philippines and Vietnam, despite having a similar HANCI score.

### Link 9: Gross Domestic Product growth, inequality and poverty reduction

Although poverty reduction is not the same as stunting reduction, the two are correlated, with plausible causal links between the two. The Philippines, PNG and Timor Leste show economic growth rates that lag behind other countries in the region (World Bank 2010). As rigorous analysis of Vietnam's recent experience has shown, it is easier to reduce stunting when income growth is high and inequality is low and steady (O'Donnell *et al.* 2009). Lao PDR has the highest poverty rate (World Bank, most recent year<sup>8</sup>), and a rapidly increasing level of inequality (Bowlen *et al.* 2012), which suggests that its growth will not have much of an impact on poverty and hence stunting, and may increase the overnutrition problem for the upper income groups that are capturing much of the rapid income growth.

### Link 10: Drivers of further overnutrition

Living in urban environments with lack of open spaces (e.g. parks) and recreational facilities, high traffic density and lack of sidewalks, crime and violence can discourage physical activity. High levels of occupational sitting and the use of passive motorised transport further decrease overall physical activity levels. Urban populations need to purchase the majority of the food they consume. Especially in poor neighbourhoods access to fresh products including fresh fruit and vegetables is often limited and consumption of energy-dense processed food including convenient, fast and obesogenic food is common (Dixon *et al.* 2007; Guldán 2010).

Of the countries considered in this report, Lao PDR, Cambodia and Vietnam are the countries that urbanized most quickly over the 1990–2010 period, but all from relatively low rates or

urbanized levels. Indonesia's urbanization rate is also high (% urban in 1990 was 30.6 and 44.3 in 2010) and from an already high level of urbanized population.<sup>9</sup> This high rate of urbanization in a large city context presents many opportunities for the expansion of retail marketing of healthy and unhealthy foods.

Supermarkets have been expanding rapidly in all regions of the world, but most rapidly in Asia with their large domestic markets, rapid economic growth and high rates of urbanization. Data from Reardon *et al.* (2012) show that the rate of sales of leading modern retail chains that market food has not slowed down between 2001–5 and 2005–9. Vietnam has a very rapid rate of growth for such sales, albeit from a very low base. In terms of countries with established sales Indonesia (after China) is the fastest growing location for retail food sales.

Insufficient physical activity is a significant determinant of overweight and obesity and a leading risk factor for mortality from Non-communicable diseases (Haskell *et al.* 2007). Rates of physical inactivity are very high in the Pacific, in accordance with the very high rates of obesity. Physical inactivity is less common in most of Asia, with some exceptions. Over 60% of Malaysians are physically inactive. Almost 30% of Indonesians are inactive. Cambodia has the lowest level of physical inactivity of the countries for which we have data in Asia, with just over 10%. This compares with 5% in Bangladesh.

### Link 11: Policy approaches to overnutrition

Dans *et al.* (2011) documents national government responses to the pending obesity epidemic in countries for which data are available. The review covers six of the nine countries. Only two of the six countries have existing operational strategies for promoting healthy dietary factors (Indonesia and Myanmar) and none have strategies to promote physical activity.

Regulatory change that can positively affect the environment to make it less obesogenic includes mandatory nutritional labelling on processed foods, restrictions on advertising of unhealthy products, taxes on unhealthy foods and subsidies on healthy foods. Since 2003, 20 countries globally have developed or are developing policies aimed at restricting television advertising of unhealthy foods to children (Hawkes and Lobstein 2011). This includes Malaysia, which has restrictions

on advertising of fast food to children aged 4–9 years and Thailand, which imposes restrictions on the amount of TV advertising on junk food to children under the age of 12 years and any promotions using characters popular with children. None of the nine countries in our review were listed by Hawkes and Lobstein (2011).

Another potential avenue is through policies that affect the relative prices of healthy and unhealthy food and drinks. This can be accomplished by taxes on unhealthy foods and drinks and subsidies (or reduced taxes) on healthy foods. There is some evidence that such approaches could work, but there are no examples from the region and the evidence from elsewhere is contested (Mytton *et al.* 2012). Trade policy is another potential tool. Many foods that contribute to obesity in the Pacific are imported so in theory increasing tariffs and duties on these items could reduce their intake. In 2006 Fiji introduced an import duty of 5% on soft drinks. Samoa similarly has an import excise on soft drinks. We could find no assessments of their effectiveness in terms of consumption effects. Such measures, however, could be contrary to World Trade Organisation agreements. Many of the existing import controls on such food items in the Pacific may be phased out as a result of regional trade agreements (Clarke and McKenzie 2007; Thow *et al.* 2011).

#### Link 12: Commitment to undernutrition reduction

The section on social protection programmes highlighted the commitment to hunger and undernutrition reduction levels of five of the nine selected countries as assessed by the HANCI index (te Lintelo *et al.* 2013). For a more comprehensive score that covers all 22 indicators of government commitment, Table 6 shows that Myanmar in particular has a very low level of commitment as demonstrated by food and nutrition spending, policies and laws.

#### Link 13: Government effectiveness

Earlier we noted that the quality of governance is likely to be a major driver of the strength of determinants and responses to malnutrition. The quality of service delivery, ability to co-ordinate across sectors, regulate and incentivize different public and private actors and learn from interventions is key to stemming and reversing malnutrition. To assess general governance performance for the countries, we use an aggregate measure from the World Bank's World Governance Indicator dataset, Government Effectiveness.<sup>10</sup> The World Bank describes the indicator as 'Government effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.' Scores for 200 countries over the 1996–2011 period are normalized around zero. A more positive score signals more effective government. Of the countries with data considered in this report, the Philippines has the worst recent score and is on a downward trend. Indonesia is on a positive trend, but still has a worse score than Cambodia, Lao PDR and Vietnam. Vietnam is the only country with a positive (above the median) score.

Table 7 summarizes the evidence reviewed under each of the 13 links. For many countries and links we could not find any

country-specific evidence. The top row of the table describes the nature of the nutrition problem and the bottom row summarizes the priorities we derive from this analysis.

## Discussion

As is clear from Table 7, every country has a unique set of vulnerabilities to the generation of malnutrition. Table 8 classifies countries by their location in the double burden space and summarizes conclusions from the link analysis and gives our suggestions of priority actions for each.

Even within county groupings there are no obvious common pathways to improved nutrition across countries. Some key components show up more frequently than others: greater attention to adolescent girls and women of reproductive age (Cambodia, Lao PDR, PNG, Timor Leste). All countries except Cambodia and Vietnam need to develop and strengthen overnutrition strategies, especially the Philippines, Indonesia and Myanmar. Cambodia, PNG, Myanmar and Vietnam all need to strengthen their health environments. PNG and the Solomon Islands need to embed disaster risk reduction strategies within their approaches to food security. The members of Scaling up Nutrition (SUN) need to leverage their participation to accelerate undernutrition and, in addition, use that momentum to address overnutrition (e.g. Indonesia and the Philippines).

There are, however, some discussion points that are common to many of the nine countries.

First, effective action in contexts where undernutrition is still widespread and overweight rates are increasingly rapidly requires a whole of government approach, with an emphasis on policy coherence. However, this whole of government approach makes it more likely that non-health and health policy goals compete. For example what makes sense commercially in the trade arena may not make sense nutritionally (e.g. the export of high fat mutton flaps from Australia to the countries in the region).

Second, there needs to be a coherent policy towards the role of the private sector in promoting nutrition. Once the over-nutrition agenda is recognized, it is even more difficult to ignore the private sector as it affects much of what we eat. If engagement with the private sector in the undernutrition space is challenging, then it is even greater in the overnutrition space where there is more, commercially, at stake in terms of volumes of sales (Moodie *et al.* 2013).

Third, overnutrition is an issue on which the richer countries have less credibility. They have failed to control rates of overweight and obesity and have much higher rates than most regions of the world (Stevens *et al.* 2012). There are few successful models at scale to be adopted or adapted from the high-income world. The absence of strong evidence on what works opens the door for more politicized debates.

Fourth, a key challenge of addressing the double burden is that the undernutrition agenda becomes deprioritized and neglected. Although the relationship between wealth, urban location and diet-related chronic disease is not straightforward the risk is that their needs will tend to dominate public policy.

Fifth, the complexity of malnutrition outcomes will make it even clearer that there is no single pathway to good nutrition

**Table 6** Commitment to hunger and undernutrition nutrition

HANCI indicator	Cambodia	Indonesia	Myanmar	Philippines	Vietnam
Hunger Reduction Commitment Index (HRCI) Rank (1 is best, out of 45)	17	14	43	9	18
Nutrition Commitment Index (NCI) (1 is best, out of 45)	22	7	35	11	17
Hunger and Nutrition Commitment Index (HANCI) (1 is best, out of 45)	18	7	41	6	14

Source: Adapted from te Lintelo (2013).

(Lukito and Wahlqvist 2006). The policy context will be characterized by uncertainty about what works and tradeoffs between policy objectives, generating plenty of unintended consequences. Here is a chance to become adroit in formulating policy in complex contexts.

Finally, compounding all of these challenges is the weak evidence base. The evidence gaps are immense and undermining of effective action and they need to be filled. There are basic holes in malnutrition situation data, little evidence from the region on economic consequences, an absence of evidence on some links for some countries, lack of evidence on resource allocation data to malnutrition and very few credible impact assessments of interventions. Most importantly very few analysts are putting all of this information together at the country level to assess what are the priorities, what has and has not worked in the past, why and what to do differently. Very few analyses take an institutional and political perspective—most are purely technical.

In particular, it is striking how little we know about what works with regard to reversing or slowing population weight gain. Although governments in low- and middle-income countries are slowly recognizing the problem and getting themselves organized to address the problem of overweight/obesity, there are currently relatively few programmes up and running and even fewer that have had their impact assessed. Those evaluations that do exist are normally of small-scale interventions. The systematic reviews of the literature almost uniformly conclude that more research is needed. Adding to this difficulty is that evaluations of interventions aimed at reducing the weight of SE Asian and Pacific Nations are virtually non-existent.

In the region, Singapore is the exception and it seems to offer an example of an effective control strategy in the region, albeit in a high-income country. Singapore launched a National Healthy Lifestyle programme in 1992. The approach was to empower communities through collaboration with public, private and community organizations. Surveys in 1992, 1998 and 2004 showed an increase in regular exercise and reductions in diabetes, high cholesterol and smoking (Bhalla *et al.* 2006). The administrative and resource challenges of mounting similar campaigns in low- and middle-income countries are not insignificant but Singapore's example shows that relatively low cost measures can have a positive impact.

Other existing initiatives in the region include Malaysia's 'Healthy Lifestyle Campaign'<sup>11</sup> which was launched in 1991. This programme focused on school students and school personnel and aimed to develop desirable knowledge and attitudes to health.

Malaysia also had the 'Healthy Eating Campaign' operating between 1997 and 2002 that emphasized appropriate nutrition, body weight monitoring, nutrition labelling and food hygiene. Indonesia's 'Jump Rope for Heart' school programme<sup>12</sup> focused on physical activity and stopping smoking. Unfortunately we were unable to find evaluations of these initiatives.

Close to the region, a review of the evidence from Australia by Gortmaker *et al.* (2011) concludes that 8 of the 20 preventative and treatment interventions for obesity that are reviewed are actually cost saving. The three most cost-saving interventions were the ones that shaped the environment to enable individuals to make healthier choices—taxes on unhealthy foods, easy to understand nutrition labelling and reductions in junk food advertising to children.

## Conclusions and policy implications

The double burden of malnutrition is defined by the co-existence of serious levels of under- and overnutrition. We have shown that nowhere have overweight rates risen as fast as in the regions of SE Asia and the Pacific. The regions are also burdened with high and often stagnant levels of undernutrition. For countries for which data are available, the regions contain nearly half of the individuals, world wide, suffering from a double burden of malnutrition. This article has reviewed these nutrition status trends and has summarized their consequences and for nine key countries in these two regions it has reviewed the drivers of the problem and attempts to manage it. Even within country groupings there are no obvious common pathways to improved nutrition across countries and even if there were, the challenges of accelerating action are significant.

But if the challenges are large, so too are the opportunities. Tackling the double burden of malnutrition takes us into a post-2015 mode of thinking about development. Overweight and obesity are issues that affect all countries, regardless of GNP (Black *et al.* 2013). Therefore, the potential for mutual learning and for working together is large. In addition, addressing the malnutrition issue requires a whole of government approach involving policies, legislation and spending, often with Overseas Development Assistance (ODA) being a small component of spending. Trade policy, urban policy and agricultural policy will be as important perhaps as health policy. Here is an opportunity to focus public policy on issues rather than sectors.

Political leaders in SE Asia and the Pacific have a real opportunity to put the double burden high on the agenda, to undertake policy innovation and to evaluate what works and

Table 7 Scorecard for each country

	Cambodia	Indonesia	Lao, PDR	Myanmar	Philippines	PNG	Solomon Islands	Timor-Leste	Vietnam
Nature of the problem	Good on stunting reduction but can it accelerate? Serious micronutrient deficiencies	Serious double burden and likely to worsen micronutrient deficiencies	Stunting seems to be stuck. Serious micronutrient deficiencies	Stunting reduction good—accelerate? Serious micronutrient deficiencies. Some overnutrition	Serious double burden, fairly static	Serious double burden, no movement	Serious double burden, fairly static	Very serious undernutrition situation, worsening	Generally strong performance—but some vulnerabilities
Link 1: Nutrition-specific, 1000 days	Green	Orange	Orange	Orange	Orange	Orange	Green	Orange	Green
Link 2: Nutrition-specific, adolescent and WRA	Red	Orange	Red	Orange	Red	Red	Green	Red	Orange
Link 3: Nutrition-specific overnutrition	Not enough evidence on interventions								
Link 4: Health system	Red	Orange	Red	Red	Green	Red	Green		Red
Link 5: Food and agriculture	Green	Green	Orange		Orange	Green	Green		Green
Link 6: Safe water and sanitation	Red	Orange	Orange	Red	Green	Red	Red	Orange	Green
Link 7: Women's empowerment	Orange	Red	Orange		Green	Red	Red		Orange
Link 8: Social protection	Orange	Orange		Red	Green				Green
Link 9: GDP growth, inequality and poverty reduction	Orange	Orange	Red		Orange	Orange		Orange	Green
Link 10: Drivers of further overnutrition		Red	Orange		Orange		Green	Red	Orange
Link 11: Policy approach to overnutrition	No need (yet)	Green	No need (yet)	Green	Red				Green
Link 12: Commitment to undernutrition reduction	Orange	Green		Red	Green				Orange
Link 13: Government effectiveness	Orange	Orange	Orange		Red	Green	Green		Green

Notes: The subjective rankings are based on authors' interpretation of evidence in each link section. Green = less vulnerable, red = most vulnerable. Blank means insufficient evidence to make an assessment. GDP: Gross Domestic Product. Colour versions of the tables in this manuscript are provided online at <http://heapol.oxfordjournals.org/>.

**Table 8** Priorities for further progress in reducing malnutrition

Typology	Country	Priorities for further progress in reducing malnutrition
Double Burden	Philippines	<ul style="list-style-type: none"> <li>• Overall effectiveness of government programmes to improve.</li> <li>• Urgently need to develop an overnutrition strategy.</li> </ul>
	PNG	<ul style="list-style-type: none"> <li>• Commitment to malnutrition reduction.</li> <li>• Collect data on the nutrition situation.</li> <li>• Improve health environment.</li> <li>• Adolescents and WRA.</li> <li>• Women's empowerment.</li> <li>• Food security policy needs to embed disaster risk reduction within it.</li> </ul>
	Solomon Islands	<ul style="list-style-type: none"> <li>• Improve sanitation levels.</li> <li>• Increased promotion of environments that are conducive to increased physical exercise.</li> <li>• Food security policy needs to embed disaster risk reduction within it.</li> </ul>
On verge of double burden	Indonesia	<ul style="list-style-type: none"> <li>• Use SUN to realise potential for a big push on undernutrition.</li> <li>• Need to ramp up attention to overnutrition.</li> <li>• Link women's empowerment to nutrition efforts.</li> </ul>
	Myanmar	<ul style="list-style-type: none"> <li>• Use SUN to realise increased commitment to stunting reduction.</li> <li>• Improve health environment.</li> <li>• Strengthen social protection.</li> <li>• Focus on strengthening rights basis of service provision.</li> <li>• Develop an overnutrition strategy.</li> </ul>
On the way to double burden	Lao PDR	<ul style="list-style-type: none"> <li>• Use SUN to realise increased commitment to stunting reduction.</li> <li>• Strengthen implementation capacity.</li> <li>• Adolescents and WRA.</li> <li>• Promote smallholder growth.</li> <li>• Build in accountability mechanisms.</li> </ul>
	Timor Leste	<ul style="list-style-type: none"> <li>• Commitment to malnutrition reduction.</li> <li>• Strengthen implementation capacity.</li> <li>• Adolescents and WRA.</li> <li>• Monitor any growing threat of overnutrition.</li> </ul>
Substantial progress in reducing undernutrition, no take-off of overnutrition	Cambodia	<ul style="list-style-type: none"> <li>• Adolescents and women of reproductive age.</li> <li>• Improve health environment.</li> <li>• Ensure income growth continues to reduce stunting.</li> </ul>
	Vietnam	<ul style="list-style-type: none"> <li>• Focus more on improving infant feeding, enforce new legislation.</li> <li>• Need health system strengthening.</li> </ul>

why. First, they should support each other to join the SUN movement. At the time of writing only four of the nine countries are members (Indonesia, Lao PDR, Myanmar and Vietnam).<sup>13</sup> If more countries joined, they would bring the problems of the double burden within the supportive solutions focused environment of SUN.

Second, leaders in the region should spearhead the build up of a globally accessible and increasingly valuable evidence base of what works in the region. This can be done through commissioning national institutes to undertake national reviews of existing research and evidence and through the commissioning of new research via regional evaluation funds which pair national and international research organizations.

Third, the countries in the region should develop capacity within the region to address the varied forms of malnutrition. Capacity is a major constraint to efforts to reduce undernutrition and the capacity demands at the individual, organization and system levels are even more demanding for countries that are experiencing or are on the threshold of the double burden. Efforts here could be focused on peer support to develop country plans (with associated business plans) that are likely to reduce malnutrition and the provision of support for the development of new university curricula that address the current face of malnutrition in the region.

Fourth, there is the opportunity to be leaders in innovating around the role of the private sector. How can public policy do better to incentivize and guide private sector action towards healthy outcomes and what are some of the private-public networks and partnerships that have worked well in the health area and which stand the greatest promise of working in the nutrition context? Public incentives to change the actions of the private sector by shaping the purchasing, diet and exercise environments seem especially promising.

Finally, there should be a greater emphasis placed on supporting the regional monitoring of nutrition outcomes, drivers, interventions, policies and commitments through initiatives such as International Network for Food and Obesity / non-communicable Diseases Research, Monitoring and Action Support.<sup>14</sup> Monitoring can promote awareness and accountability and this can put pressure on families and policymakers to act.

Policymaking around the double burden is far from easy. But consider the alternatives. In the USA, with over 25% of the adult population suffering from diabetes, over 1 in 5 dollars of healthcare spending is related to the treatment of the disease (American Diabetes Association 2013). Low- and middle-income countries cannot afford to spend this much on these diet-related chronic diseases and if they tried they would deplete health budgets for primary preventive undernutrition

care. Or, put more positively, the G20—hosted by Australia in 2014—pledged to increase economic growth by 0.4% per year above current projections. This is equivalent to the economic growth generated by reducing the mortality rates for non-communicable diseases, for which obesity and overweight are key risk factors, by 8% (Stuckler 2008).

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## Endnotes

- <sup>1</sup> The authors acknowledge that 'overnutrition' is a lay term and that overweight, obesity and diet-related risk factors for non-communicable diseases would be a better umbrella, but we use this term as a shorthand convenience.
- <sup>2</sup> <http://www.who.int/nutgrowthdb/about/introduction/en/index5.html>.
- <sup>3</sup> Source: author's calculations from <http://www.pophealthmetrics.com/content/10/1/22>.
- <sup>4</sup> <http://www.healthmetricsandevaluation.org/gbd/country-profiles>.
- <sup>5</sup> Dietary risks, childhood underweight, high plasma fasting glucose, high total cholesterol, iron deficiency, sub-optimal breastfeeding and high BMI.
- <sup>6</sup> The percentage of the population estimated to have a calorie availability below a required threshold.
- <sup>7</sup> [www.socialwatch.org](http://www.socialwatch.org).
- <sup>8</sup> <http://databank.worldbank.org/data/views/reports/tableview.aspx>.
- <sup>9</sup> <http://www.unescap.org/stat/data/syb2011/1-People/Urbanization.asp>.
- <sup>10</sup> <http://info.worldbank.org/governance/wgi/resources.htm#methodology>.
- <sup>11</sup> [http://www.wpro.who.int/health\\_services/malaysia\\_nationalhealth\\_plan.pdf](http://www.wpro.who.int/health_services/malaysia_nationalhealth_plan.pdf).
- <sup>12</sup> [http://www.world-heart-federation.org/fileadmin/user\\_upload/images/members\\_area/Workshops/2009\\_June\\_healthy\\_lifestyles\\_for\\_Children\\_Geneva/initial%20report%20on%20children%20programmes%202008.pdf](http://www.world-heart-federation.org/fileadmin/user_upload/images/members_area/Workshops/2009_June_healthy_lifestyles_for_Children_Geneva/initial%20report%20on%20children%20programmes%202008.pdf).
- <sup>13</sup> <http://scalingupnutrition.org/sun-countries>.
- <sup>14</sup> <http://www.fmhs.auckland.ac.nz/soph/globalhealth/informas/>.

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