ADDRESSING THE DOUBLE BURDEN OF MALNUTRITION IN ASEAN

A POLICY NOTE BY THE WORLD BANK

as a contribution to Thailand's ASEAN Chairmanship 2019

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Foreword

The double burden of malnutrition is a common challenge facing a number of ASEAN Member States. It has hindered ASEAN's human capital and socio-economic development, especially the development to the fullest potential of our children who are our future. It has also affected ASEAN's overall efforts towards the realisation of the Sustainable Development Goals (SDGs). ASEAN therefore attached great importance to collectively resolving this issue, as reflected in the adoption of the ASEAN Leaders' Declaration on Ending All Forms of Malnutrition in November 2017 in Manila, the Philippines, and reiterated at the ASEAN Leaders' Gathering in Bali, Indonesia, in 2018.

As the ASEAN Chair in 2019, Thailand wishes to further contribute to our Leaders' shared goal in addressing this issue in a sustainable and inclusive manner by promoting an effective, collaborative and multi-sectoral approach and fostering partnerships within ASEAN and with external partners. In this connection, Thailand requested the World Bank to prepare a Policy Note on this issue, in consultation with ASEAN Member States and the ASEAN Secretariat, as it is a key priority identified at the Second High-Level Brainstorming Dialogue on Enhancing Complementarities between the ASEAN Community Vision 2025 and the UN 2030 Agenda for Sustainable Development in Bangkok in 2018, to provide possible recommendations for ASEAN to consider as appropriate in accordance with ASEAN's policy and practices. This Policy Note reviews the situation in ASEAN and recommends potential ways forward. Practical recommendations include the development of a strong surveillance and monitoring and evaluation (M&E) framework with clear targets and timeline to support ending all forms of malnutrition in ASEAN. The ASEAN Centre for Sustainable Development Studies and Dialogue (ACSDSD) in Bangkok launched in November 2019 can also support this undertaking and the development of an M&E framework.

This Policy Note complements ASEAN's ongoing efforts to end all forms of malnutrition such as the implementation of the ASEAN Strategic Framework and Action Plan for Nutrition (2018-2030) and the envisaged publication in 2020 of a Regional Report on Nutrition Security in ASEAN. Through collective political commitment and strong partnerships, ASEAN can improve nutrition and ensure healthy lifestyles of our peoples, which will help contribute to a more healthy, prosperous and sustainable ASEAN Community that is people-centred, leaves no one behind and looks to the future.

Department of ASEAN Affairs,
Ministry of Foreign Affairs of the Kingdom of Thailand
December 2019

Addressing the Double Burden of Malnutrition in ASEAN[1]

I. Executive Summary

Malnutrition, which encompasses both undernutrition and overnutrition, presents a significant human capital as well as economic development challenge across most ASEAN Member States. A healthy, well-nourished, well-educated and skillful population provides the foundation for a productive life and enables future workers to compete in the dynamic labor markets of digital economies. However, most of ASEAN's lower-income countries face an unfinished agenda with regard to undernutrition. Undernutrition elevates the risk of infant and child morbidity and mortality, increases expenditure on health care and social safety nets, lowers the efficiency of investments in education, and decreases lifelong income-earning potential and labor force productivity, with the potential to be transmitted across generations. Estimates for some ASEAN member states show undernutrition resulting in annual losses of between 2.4% - 4.4% of GDP Overnutrition compounds the challenges.

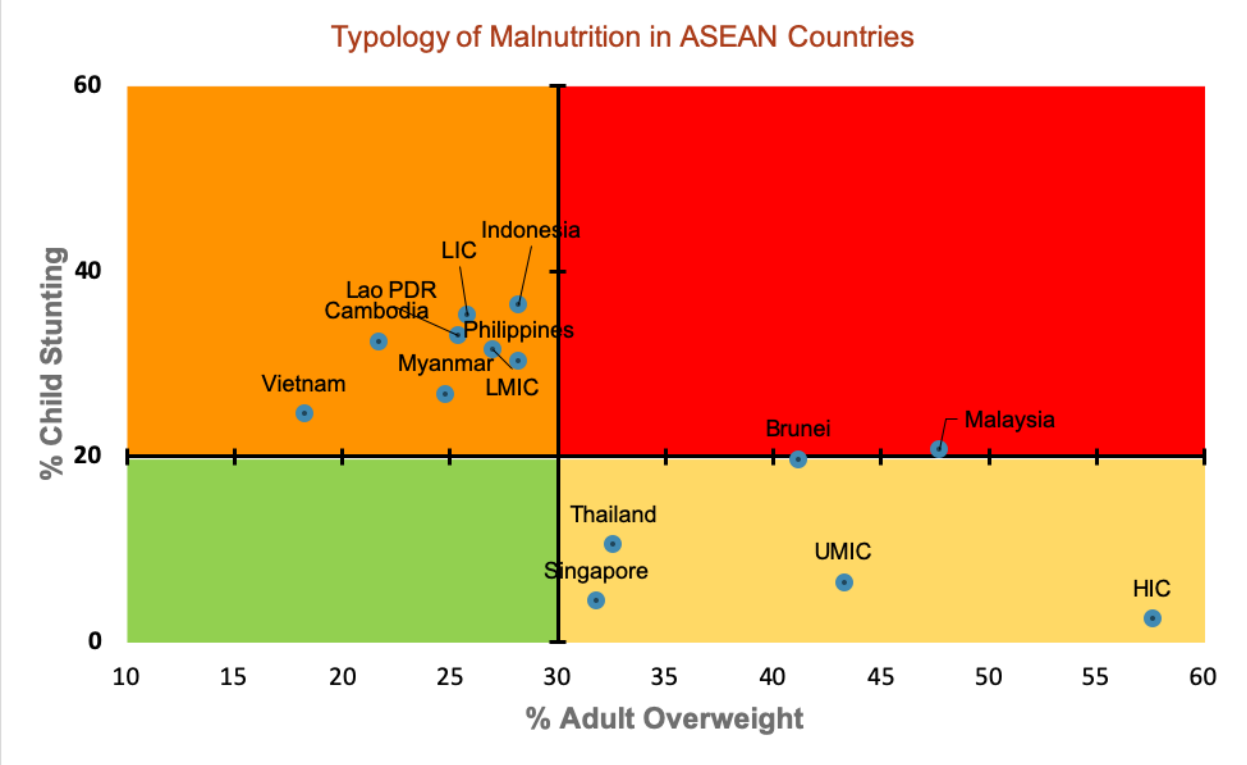
Overnutrition is posing an increasing challenge to ASEAN, with some countries having high prevalence of obesity and overweight. In the last 35 years obesity prevalence across ASEAN increased over 7-fold, most rapidly in Cambodia, Indonesia, and Lao PDR, where obesity rates have risen more than 10-fold. Childhood overweight and obesity is likewise a growing problem, especially in Brunei, Malaysia, and Thailand where childhood overweight prevalence exceeds 25%. Overweight and obesity among ASEAN member states have high direct costs for some countries, for example in Brunei it is 16%. Direct health care costs related to treatment of obesity and associated chronic diseases due to obesity as well as indirect costs, particularly from the loss of labor productivity, are expected to increase in many ASEAN countries.

Several ASEAN countries face both undernutrition and overnutrition simultaneously, sometimes within the same households, and even the same individual over time. ASEAN countries vary widely in this *double burden,* with respect to population-level prevalence of overnutrition among adults and undernutrition among children under five. In this report malnutrition was classified into four categories based on their burden (Figure 1). Malaysia and Brunei are in the red zone of the figure, exhibiting high double burden. Those in the orange area, the Philippines, Cambodia, Lao PDR, Myanmar, Indonesia, and Viet Nam have very high stunting rates with low but rising

[1] Prepared by Nkosinathi Vusizihlobo Mbuya, Sutayut Osornprasop and Clarissa David. Sarulchana Viriyataveekul and Jewelwayne Cain provided data update support. This note is based on the publication: "Nkosinathi V. Mbuya and Anne Marie Provo (2016), *Tackling Malnutrition in East Asia and Pacific – An Agenda for Growth and Inclusion*. In "Reducing Vulnerabilities." East Asia and Pacific Economic Update (October), World Bank, Washington, DC. doi: 10.1596/978-1-4648-0991-0. License: Creative Commons Attribution CC BY 3.0 IGO". Some of the information in this note is also presented in that publication with the same content and format.

prevalence of adult overweight. Thailand and Singapore have high levels of adult overweight and low child stunting, classified as "medium double burden" of malnutrition. None of the ASEAN countries are experiencing neither challenge, that is, belong to the "green" category (low levels of child stunting and adult overweight).

Figure 1. Typology of Malnutrition in ASEAN Countries[2]



Sources: WHO. 2016. Prevalence of overweight among adults, BMI >= 25 (age-standardized estimate) (%); UNICEF, WHO, World Bank, 2019. 'Joint Malnutrition Estimates'. HIC refers to high-income countries (average, globally). LIC refers to low-income countries (average, globally). LMIC refers to lower middle-income countries (average, globally). UMIC refers to upper middle-income countries (average, globally).

The causes of undernutrition among ASEAN Member states are multisectoral, and a basic cause is poverty, where poor countries and poor households suffer more from higher rates of undernutrition. Immediate causes include poor infant and young child feeding practices, including low prevalence of exclusive breastfeeding up to 6-months and suboptimal complementary feeding of infants beyond 6-months, especially in poor households. The underlying drivers related to maternal and child care practices, lack of early stimulation, low access to nutritious foods, weak preventive and primary health care, unsafe drinking water and poor sanitation facilities. Of specific

[2] *Note:* Adult overweight prevalence data of Malaysia is obtained from the National Health and Morbidity Survey (NHMS) 2015.

concern as well is the role of women's social status in driving undernutrition, where low power status of women in some countries are tied to the quality of health and nutritional care they receive and can provide to their children.

Drivers of overnutrition on the other hand are predominated by changing lifestyles and urbanization. Adult overweight rates are strongly correlated with average income per capita, and the link, in turn, arises because the rapid income growth and economic transformation is accompanied by rapid urbanization and changes in dietary patterns, physical exercise, and exposure to mass media. Urban areas have different food environments, associated with increased consumption of highly processed foods, increased intake of refined carbohydrates, added sugars, fats, and animal-source foods. Preferences for foods with suboptimal nutrition are affected by mass media marketing, shifting people away from traditional diets and toward unhealthy processed foods.

Appropriate policy responses to malnutrition will vary across the region, depending on the degree and type of malnutrition. Overall, many high-return, operationally proven strategies are available. But successfully addressing the challenge requires tackling the critical determinants across multiple sectors. In particular, undernutrition is not solely a function of poverty. Its drivers include maternal and childcaring practices, partly shaped by inadequate information; food security; access to health, clean water, and appropriate sanitation; and the social status of women. Comprehensive behavioral and nutritional interventions from conception through early childhood hold particular promise for ensuring that every child reaches his or her full physical and cognitive potential.

Recommendations

Policy and programmatic steps to address the double burden of malnutrition in ASEAN is best informed by a comprehensive understanding of key drivers**.** Appropriate policy responses to malnutrition will vary across Member States, depending on the type and degree of malnutrition they face. With strong political commitment and concerted action across multiple sectors, countries with high stunting burden and high overweight can achieve significant improvements in nutritional outcomes in the near future.

Countries with elevated stunting levels can dramatically reduce prevalence by adopting a package of interventions delivered through maternal and child health programs at scale. Nutrition-specific interventions with behavior change programs targeted toward the critical first 1,000 days from conception up to 2-years old have been shown to result in significant reductions in stunting levels and a high return on investment. Nutrition-specific interventions can be conducted through a reprioritization of interventions within health investments, not necessarily an increase in investments. Targeting nutrition services to the poorest, rural, and most remote populations who shoulder the most burden would deliver the fastest results. Immediate and underlying determinants of undernutrition can be addressed through social transfers in the form of conditional cash transfers and other similar poverty-reducing measures. Agricultural programs can help reduce malnutrition by improving access to and affordability of nutrient-rich diets.

Improved water, sanitation and hygiene (WASH) interventions through full WASH interventions should accompany nutrition-specific interventions to protect any gains children and mothers achieve through proper nutrition. In order to efficiently target and effectively monitor stunting, countries need to ensure the availability of national, sub-national, and ethnicity-disaggregated nutrition data.

Countries with high burden of overweight and obesity can pursue action at multiple levels to both halt the rise of overweight, as well as meet the challenge posed by current high levels obesity. A set of recommendations related to regulating the food environment, guiding the food system toward coherence with health, and instilling health-positive behaviors are presented in the paper. These include specific recommendations to improve nutrition information by regulating food marketing and improving food labeling, scaling up nutrition education, embark on media-based behavior change programs, regulating food composition through industry-focused policies, and encouraging dietary changes through targeted taxes, subsidies, and urban planning. These countries also need to improve primary health care delivery system to detect non-communicable diseases (NCDs), diagnoses and case management.

Double-burden countries can focus on addressing food insecurity without adding to the burden of obesity and overweight and devising food-based safety-nets specifically for young children, in addition to the interventions and policy recommendations outlined above.

The health sector alone cannot address these challenges and their social and economic costs. Countries in the region must make targeted investments in nutrition programs (particularly in early life), in health, social protection, agriculture, and education, and develop the frameworks to promote healthy diets and physical activity. In turn, this will help create a healthy workforce capable of adapting to the rapidly changing global economic landscape.

Finally, strong management information system, surveillance as well as monitoring and evaluation (M&E) mechanisms, including regular national nutrition surveys, are needed to support ending all forms of malnutrition in ASEAN. In addition to effective multisectoral interventions to address the double burden of malnutrition, it is important to ensure that there is a strong surveillance and M&E framework with clear targets and timeline. It is crucial that the implementation progress is regularly tracked and that any lack of progress is addressed promptly.

II. Investment in Nutrition in ASEAN: An Essential Foundation for Human Capital Formation and Sustained Economic Growth

Advances in human capital – the sum of a population's health, skills, knowledge and experience, that enables people to realize their full potential – have driven economic growth and lifted millions of people out of poverty. The rapid ascent of the East Asian miracle economies was due in large part to their efforts to improve human capital. With rapid technological change, the wealth of ASEAN Member States has become closely tied to their level of economic growth and development (World Bank 2019). By improving their human capital, people can be more productive, flexible and innovative. Therefore, countries that often underinvest in human capital, miss an opportunity to create a virtuous cycle between physical and capital and growth and poverty reduction.

Malnutrition – encompassing both under- and overnutrition – on the other hand presents a significant human capital as well as economic development challenge across most ASEAN Member States (Box 1)**.** A healthy, well-nourished, well-educated and skillful population provides the foundation for a productive life and enables future workers to compete in the dynamic labor markets of digital economies. However, most of ASEAN's lower-income countries face an unfinished agenda with regard to undernutrition. In these countries, at least one in five children (under age five) will likely face lifelong learning and productivity impairments due to stunted physical and cognitive development. Simultaneously, the growing prevalence of overweight and obesity, among both children and adults, generates large societal and economic costs. The associated noncommunicable diseases (NCDs), the cost of managing and treating them, the inevitable premature deaths, and the impact on productivity (Bloom et al. 2011) are enormous challenges facing the region.

Box 1. What exactly is malnutrition?

The term "*malnutrition*" refers to a deviation from optimal nutritional status and includes both undernutrition and overnutrition.

Undernutrition refers to a state of nutritional deficiency and presents the most serious risks to health and development when experienced by women during pre-pregnancy/pregnancy/lactation and young children. There are a variety of measures of undernutrition,[1] but young child *stunting* (low height-for-age in children under five years of age) is the type of undernutrition of most concern for policy makers. Stunting results from chronic undernutrition and indicates a failure of a child to attain the height expected among healthy children. Height growth and brain development not achieved during the first 1,000 days of life (from conception to two years of age) is largely irrecoverable and is associated with measurable negative consequences for health, cognition, productivity, and income across the life course (Horton and Hoddinot 2014; Victora et al. 2010). *Wasting*, measured by weight-for height, describes the recent or current severe process leading to significant weight loss, usually a consequence of acute starvation or severe diseases. It is a preferred indicator of use in emergency situations such as famine. *Underweight*, low weight-for-age is the least specific and most difficult indicator to interpret. Underweight can be the result of small body size (stunting) or small body mass (wasting).

Micronutrient deficiencies occur when there is insufficient dietary intake, insufficient absorption, and/or suboptimal utilization or excessive loss of vitamins or minerals. Globally, the most critical deficiencies for which data is available are vitamin A, iron, iodine, zinc, and folic acid, due to their importance in immune function, organ development, and growth. Micronutrient deficiencies can lead to many health problems.

Overnutrition represents an oversupply of nutrients (usually macronutrients) relative to the body's physiological needs. Overnutrition is often measured as high Body Mass Index (BMI), and a person is considered *overweight* if his or her BMI is equal to or greater than 25 kilograms per square meter (kg/m^2), and *obese* if BMI is equal to or greater than 30 kilograms per square meter.[2] Elevated BMI is a major risk factor for cardiovascular diseases, diabetes, musculoskeletal disorders, and some cancers.

1. Additional measures of undernutrition at the population level include micronutrient deficiencies among adult and child subgroups, such as iron-deficiency anemia, iodine deficiency, and vitamin A deficiency.

2. BMI is calculated by dividing weight in kilograms by height in meters squared (kg/m^2). BMI is a screening tool that provides the most useful population measure of increased health risks due to excess body fatness. However, it is not a perfect measure at the individual level because it does not measure body composition, that is, how much fat compared to muscle one has. Hence, the index can be misleading for individuals with high muscle tissue, which pushes up their weight. Nonetheless, BMI is highly correlated with gold standards of body composition measurement and, at the population level, BMI is still a reliable indicator of overnutrition.

The Impact of Malnutrition on Health and Economic Growth

Poor nutrition hampers poverty reduction efforts. When children suffer from poor nutrition they are saddled with poor physical status and impaired cognitive development which in turn, results in direct productivity loss as well as indirect losses in total factor productivity. Lifelong consequences of malnutrition also include poor overall health outcomes. Countries with high levels of under- and overnutrition have higher prevalence of ailments and thus, higher personal and public health care expenditures.

Child undernutrition in Asia has been estimated to cost between 4% to 11% of GDP (Horton and Steckel 2013). Estimates for some ASEAN Member States show undernutrition[3] resulting in annual losses of US$400 million (2.5% of GDP) in Cambodia (Bagriansky et al. 2014) and US$200 million (2.4% of GDP) in Lao PDR (Bagriansky and Voladet 2013). In the Philippines undernutrition has been estimated to cost society 2.8% of GDP in terms of lower skills and productivity and 0.05 – 1.6% of GDP in terms of additional health costs (Save the Children 2016).

Overweight and obesity across the Asia and Pacific region have estimated costs of 12.36% in health care expenditure and 0.78% of GDP[4] (Helble and Francisco 2017). Among ASEAN Member States, estimates from the same report show Brunei at 16%, Malaysia at 8% and Thailand at 4%. In terms of indirect costs of overweight and obesity to total health care expenditure, Indonesia had the highest costs at 10%, followed by Myanmar at 9% and Lao PDR at 8%.

[3] The estimates are for the costs of malnutrition, evidenced by ten indicators of undernutrition, along four major pathways: child mortality, decreased future productivity; depressed current productivity; and excess healthcare expenditures.

[4] Estimates of the economic costs of overweight and obesity suggest a wide range because the methods used to estimate these costs vary considerably. Nonetheless, there is global consensus that whatever the estimates, the costs are high and that overweight and obesity should be a cause of major concern to policy makers.

Morbidity, mortality, and disability

Malnutrition in all its forms, including undernutrition, obesity, and other dietary risks for non-communicable diseases (NCDs), is by far the biggest cause of ill-health and premature death globally (19%) (Lancet commission on Obesity 2019). Globally, undernutrition is the underlying cause of about 20% of maternal deaths and over 45% of child deaths each year (Black et al. 2008; Black et al. 2013). Undernutrition puts children at greater risk of dying from common childhood illnesses (such as diarrhea, pneumonia and malaria), increases the frequency and severity of such illnesses and delays recovery. In ASEAN Member States with high levels of stunting (Cambodia, Lao PDR, Indonesia and Myanmar), child and maternal undernutrition is among the top three risk factors for disability, morbidity, and premature mortality. Child and maternal undernutrition were the greatest risk factors for death and disease in the region in 1990, only to be displaced by dietary risks in 2013 (**Table 1**).

Table 1. Rank of key nutrition-related risk factors for death and diseases in select ASEAN countries, 2017

	High BMI	*Dietary risks*	*Malnutrition*	*Low physical activity*
Brunei	5	2	9	12
Cambodia	9	3	1	17
Indonesia	6	1	5	13
Lao PDR	8	4	1	16
Malaysia	4	1	9	13
Myanmar	7	4	1	16
Philippines	6	1	3	16
Singapore	5	1	10	13
Thailand	3	1	13	15
Viet Nam	7	1	8	15

Source: IHME 2017 (https://vizhub.healthdata.org/gbd-compare/heatmap)

Note: Risk factors are ranked 1 to 19 based on the total number of disability-adjusted life years per 100,000 in the country. High BMI refers to death and disease for which elevated BMI is a known risk factor. Dietary risks refer to diseases (mainly noncommunicable) for which a diet low in whole grains, fruits, and/or vegetables is a known risk factor.

Overnutrition poses a significant challenge to ASEAN Member States, in particular in countries with high prevalence of obesity and overweight. The top risk factor for death and disease in 6 out of 10 ASEAN countries is dietary factors such as high sodium intake, low consumption of fruits, vegetables, nuts and seeds, and whole grains. Poor diets can lead to overweight and/or obesity, part of a progressive disease state that starts with carrying excessive weight and leads to the development of non-communicable diseases (NCDs), putting an individual at greater risk for premature death. Excess body fat is a known risk factor for the leading cause of death in ASEAN, cardiovascular disease. It also leads to type 2 diabetes, and some cancers (endometrial, breast, and colon). An overweight man is over twice as likely as a man with a healthy weight to develop diabetes and an overweight woman has an almost four times greater risk. Obese men are almost seven times more likely and obese women over 12 times more likely to have

diabetes than normal-weight adults (Guh *et al.* 2019). Healthy life years[5] lost due to high BMI increased by 81% between 1990 and 2013 in ASEAN and the broader East Asia and the Pacific region.

The consequences of malnutrition can be passed from mother to offspring, resulting in the intergenerational transmission of impaired human capital. Stunted mothers are three times as likely to have undernourished infants, and up to half of growth failure accrued by a child's second birthday can be attributed to poor growth as a fetus (Dewey and Huffman 2009). Undernutrition early in life also increases a child's risk of obesity and other NCDs later in life (Godfrey et al. 2007). Similarly, obesity and hypertension among mothers is associated with higher infant mortality as well as obesity, hypertension, insulin resistance, and diabetes in later life of the child (O'Reilly and Reynolds 2013).

Labor productivity

Malnutrition is associated with lower labor force productivity in both the short and long term. Stunting has been associated with cognitive delays (Grantham-McGregor et al. 2007) and lower educational attainment.[6] Relatedly, stunting in childhood is associated with reduced height and productivity as an adult.[7] Conversely, children who are well nourished during their early years have 5% to 50% higher incomes as adults, and are 33% more likely to escape poverty (Hoddinott et al. 2011).

High childhood malnutrition will likely undermine the ability of ASEAN Members States to benefit from their demographic dividend. Countries with high stunting are in general also those that have yet to reap the full benefits of the expansion in the relative size of their labor force (Figure 2). New workers will be able to generate a demographic dividend, boosting growth and breaking the intergenerational cycle of poverty, only if they are and/or were well nourished as children.

Obesity, on the other hand, is associated with an increased risk of temporary work loss such as sick leave (absenteeism) and reduced productivity while being present at work (Chenoweth 2005, Neovius *et al* 2008). Disability caused by obesity have direct effects on overall productivity, as well as indirect effects on labor productivity of family who care for those who fall ill as a result of obesity. Young girls are routinely taken out of school to look after their sick parents, compromising the possibility of the next generation having improved living standards. Diseases

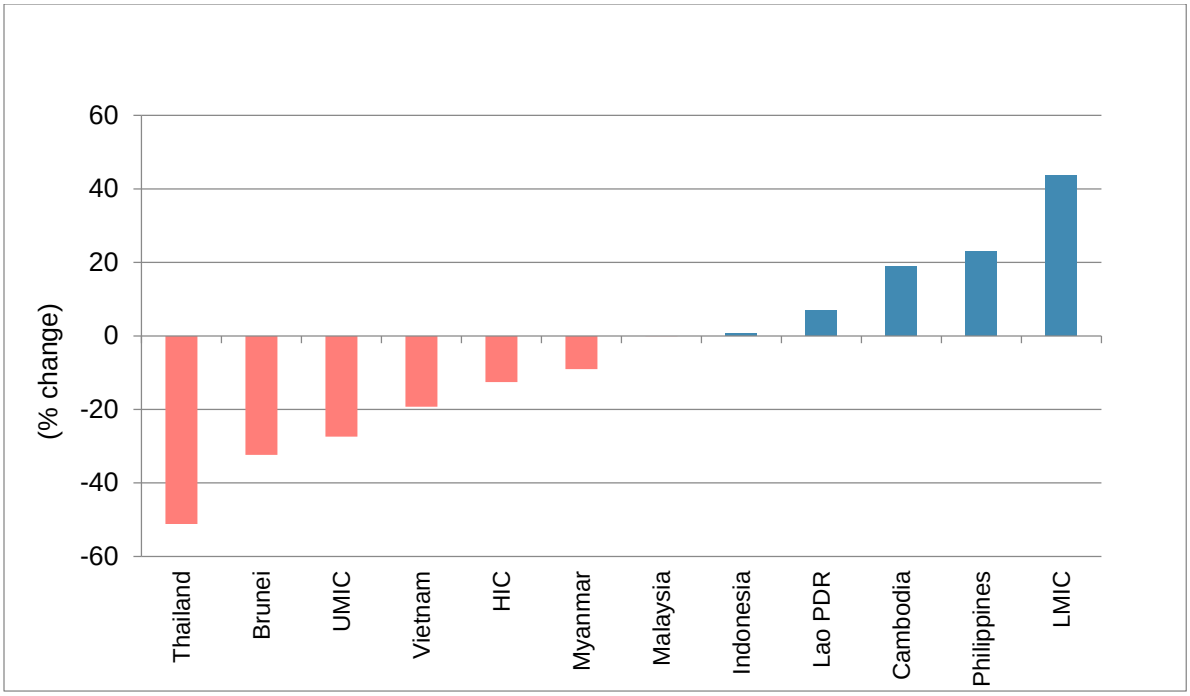
[5] Measured in disability-adjusted life years (DALYs): the sum of years lost due to premature death and years lived with disability.

[6] On average, stunting and associated nutrient deficiencies can result in delays in starting school, loss of attained schooling (Hoddinott et al. 2013), and a higher likelihood of children dropping out of school. Additionally, children suffering from iodine deficiency lose on average 13 IQ points, and iron deficiency anemia reduces performance on tests by 8 IQ points (World Bank 2006).

[7] Several studies document associations between height and labor market outcomes (Hoddinott et al. 2013). For example, a 1% increase in adult height is associated with 2.4% increase in productivity (Thomas and Strauss 1997). The effect may arise because adult height is a proxy for general health, social skills, and social class.

and disability caused by obesity also affect the savings potential and capital accumulation of individuals due to direct out-of-pocket (OOP) spending on health, which could otherwise be invested in productive assets for households (World Bank, 2017).

Figure 2. Expected relative change in working-age population, 15–64, 2020–2100



Sources: UN Population Estimates, 2017. 'Probabilistic projection of population age 15-64 (both sexes combined) by region, subregion, country or area 2020-2100 (thousands)'.

Expenditure on health and social services

Malnutrition leads to increased and less efficient expenditure on health and social services, often borne by the public fiscal system. The impacts of poor nutrition on morbidity, mortality, and poverty result in higher frequency and severity of illnesses for different subpopulations, and therefore, increased health care costs[8]. High levels of childhood stunting in countries makes education spending less efficient because malnourished children are likely to suffer from cognitive delays, schooling deficits, and poorer learning outcomes. In high stunting burden countries, up to half of children are unable to realize the full benefit of public investments in education.

In particular, overweight/obesity and the associated diet-related NCDs are a growing challenge to financing health. Direct health care costs related to treatment of obesity and associated chronic diseases due to obesity are expected to increase in many ASEAN countries

[8] In Cambodia, for instance, undernutrition results in an additional US$10.3 million in public and private health care costs (Bagriansky et al. 2014).

(Ng et al. 2014).[9] Relatedly, many countries with high stunting burden currently lack the capacity to identify overweight/obesity and treat associated diet-related NCDs. This may result in lower health care expenditures, but also in significantly increased disability and premature mortality.

High-impact investments in malnutrition are available; in many cases they will require coordinated multisectoral strategies. Interventions in nutrition have very high returns and are extremely cost-effective.[10] Comprehensive reviews of interventions to address undernutrition and micronutrient deficiencies in women and children identified high-impact, direct nutrition interventions[11] that can accelerate improvements in nutritional outcomes and these include vitamin A supplementation for children, salt iodization, behavior change and communication to promote optimal infant and young child feeding practices, and management of severe acute malnutrition. Nutritional outcomes can be greatly improved by also adopting multi-sectoral approaches which address the underlying determinants of malnutrition.

III. Malnutrition in ASEAN

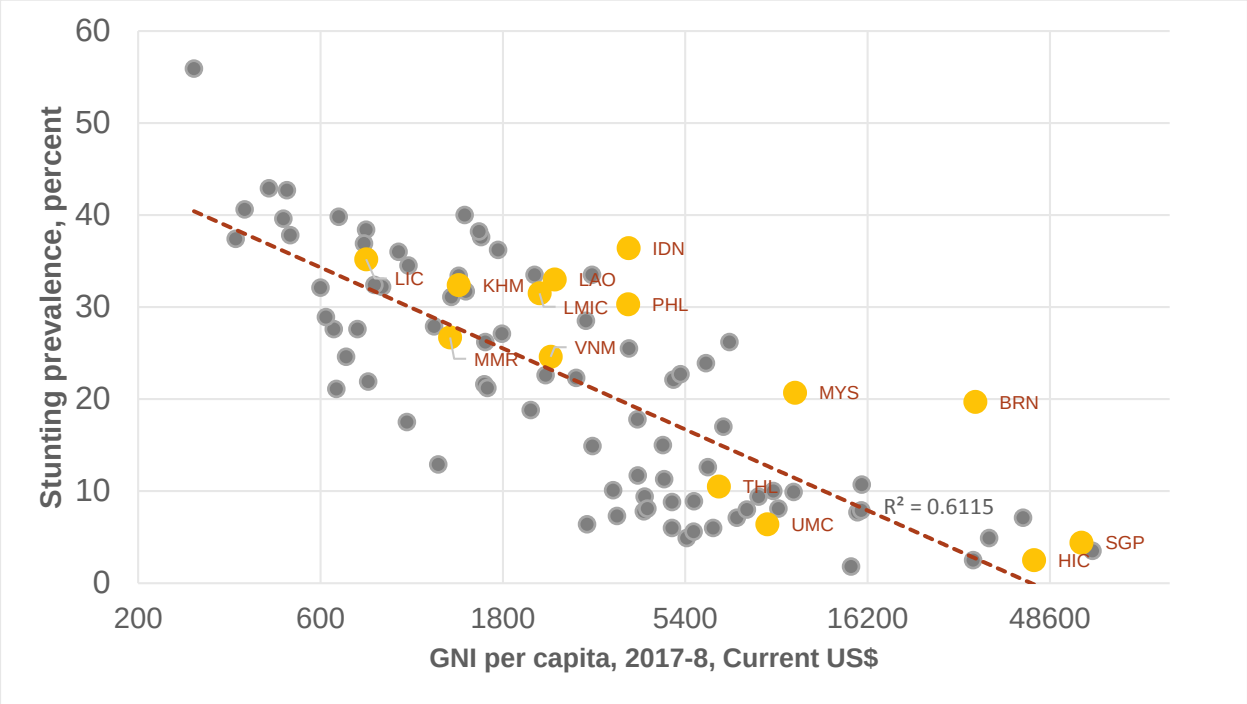
Undernutrition **remains highly prevalent in many ASEAN Member States, despite decades of strong economic growth and poverty reduction.** Chronic undernutrition, indicated by measuring childhood stunting, is associated with severe and largely irreversible cognitive (brain) under-development. The prevalence of stunting in several ASEAN Member States remains high compared to levels observed in other developing countries, and what would be expected given average GDP per capita. For instance, Indonesia and the Philippines are on the verge of achieving upper-middle-income status yet have the same prevalence of stunting as some South Asian and Sub-Saharan Africa countries with have considerably lower levels of economic development (Figure 3). None of the Member States have a stunting prevalence considered to be "low", based on WHO's cut-off values for the level of public health significance of stunting prevalence (Table 2). Cambodia, Indonesia, Lao PDR, Myanmar and Philippines have stunting rates that are classified as being of "very high" public health significance, Viet Nam and Malaysia are classified as "high" (Viet Nam and Malaysia) and Brunei Darussalam and Thailand are classified as "medium".

[9] In the Republic of Korea, for instance, the socioeconomic costs of overweight and obesity among adults aged 20 and older were approximately 0.22% of GDP and 3.7% of national health care expenditures in 2005 (Kang et al. 2011). In Thailand, the total cost of obesity is estimated at 0.13% of GDP; health care costs attributable to obesity are estimated at 1.5% of national health expenditure (Pitayatienanan et al. 2014). The annual cost of glucose testing strips per individual exceeds Vanuatu's total health expenditure per capita (Anderson 2013).

[10] See, for instance, the Copenhagen Consensus Project (http://www.copenhagenconsensus.com/copenhagen-consensus-iii).

[11] Salt iodization; multiple micronutrient supplementation in pregnancy, including iron-folate; calcium supplementation in pregnancy; energy-protein supplementation in pregnancy; vitamin a supplementation in childhood; zinc supplementation in childhood; breastfeeding promotion; complementary feeding education; and management of severe acute malnutrition.

Figure 3. The stunting-income relationship[12]



Source: UNICEF, WHO, World Bank, 2019. Joint Malnutrition Estimates; World Bank. 2019. GNI per capita (current US$) for most recent available for the period 2017-2018. (BRN-Brunei, IDN-Indonesia, KHM-Cambodia, LAO-Lao PDR, MMR-Myanmar, MYS-Malaysia, PHL-the Philippines, SGP-Singapore, THL-Thailand, VNM-Viet Nam, HIC-high-income countries, LIC-low-income countries, LMIC-lower middle-income countries, UMIC-upper middle-income countries).

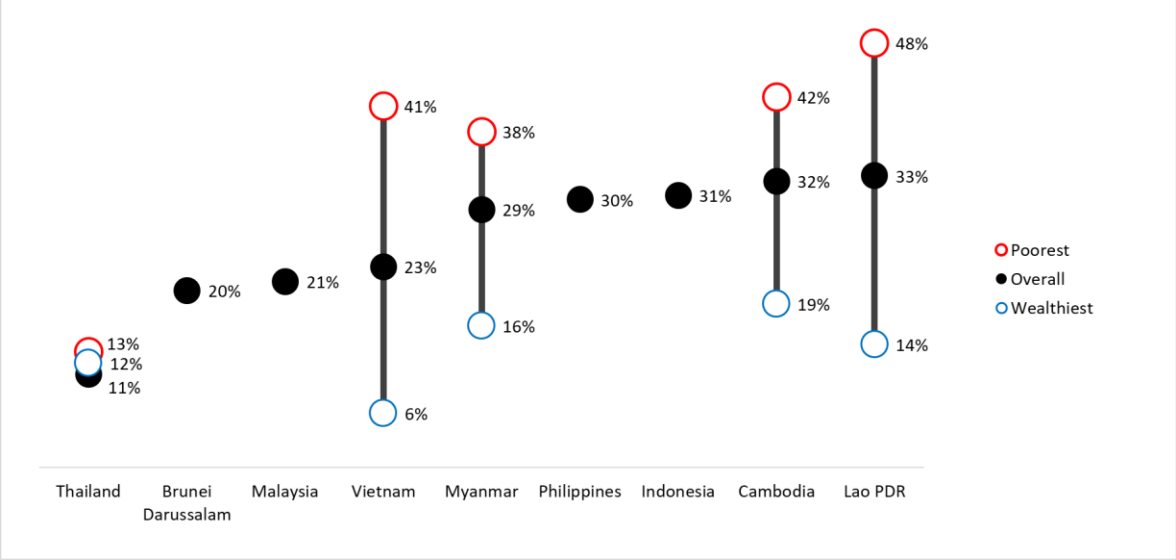
Table 2. Public Health Significance of Child Undernutrition based on WHO cut-off values (2018)

	Levels of public health significance by prevalence (%) of undernutrition			
	Low	Medium	High	Very high
Stunting	<10	10–19	20–30	>=30

[12] *Note:* Stunting prevalence for the period 2010–18 (most recent), except for Brunei Darussalam (2009) and Singapore (2000); Stunting prevalence data of Lao PDR is obtained from Lao Social Indicator Survey II; Stunting prevalence data of Myanmar is obtained from Myanmar Micronutrients and Food Consumption Survey 2017-8; Stunting prevalence data of the Philippines is obtained from Philippines National Nutrition Survey 2018.

In some countries, undernutrition affects all segments of the populations, in others, it mirrors broader inequalities in income, geography, and status. For example, in Cambodia and Lao PDR, undernutrition affects all segments of the populations. On the other hand, disaggregated data reveal alarming disparities within Indonesia, the Philippines, and Viet Nam. In these countries, there is much lower prevalence of stunting among the wealthier households while it remains very high among the poor (as shown in Figure 4), rural and lagging geographical areas, as well as marginalized subpopulations, such as ethnic minorities. In Viet Nam in 2010, the Kinh majority ethnic group had a stunting prevalence of 17.5%, whereas the prevalence amongst minority ethnic groups was 31.4%. The gap in prevalence between the majority and ethnic minority groups had even widened over time, from a 14.3 percentage point difference in 2010 to 16.4 percentage point difference in 2015.

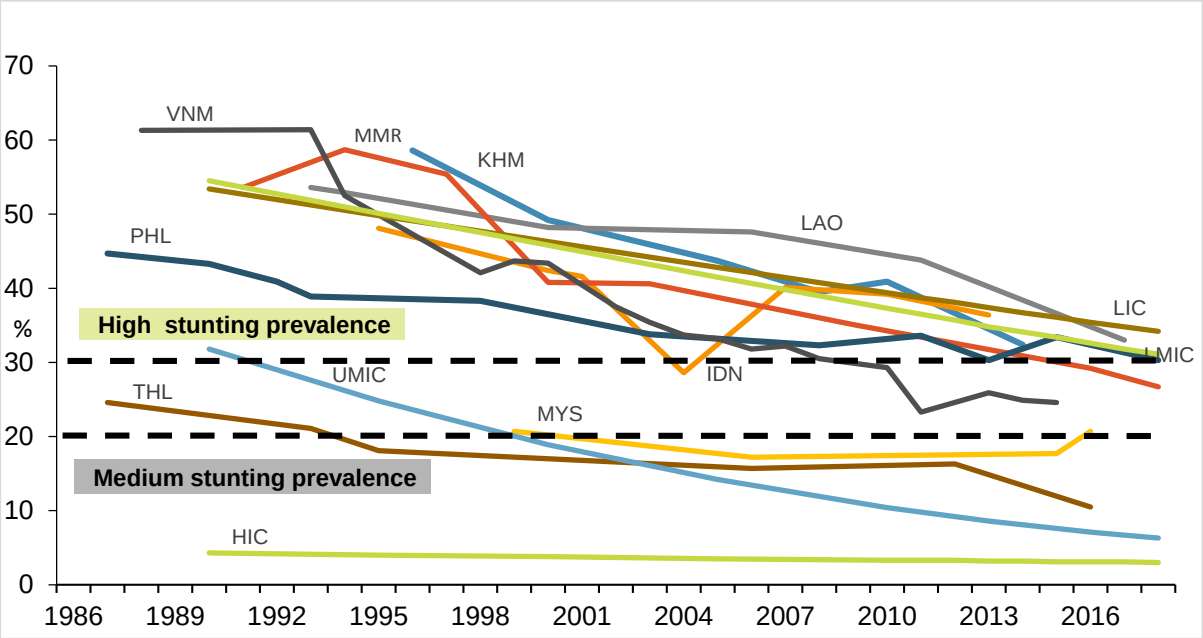
Figure 4. – Prevalence of stunting by income quintiles in ASEAN



Source: World Bank, Human Development Index; The Philippines' National Nutrition Survey 2018; National Institute of Health Research and Development (NIHRD). 2018. Riset Kesehatan Dasar. Jakarta: Ministry of Health, Republic of Indonesia.

While all Member States have managed to reduce stunting prevalence since the early 1990s, Indonesia, Lao PDR, and the Philippines have experienced only limited reduction in stunting (Figure 5). There have been noteworthy reductions of stunting in Thailand and Viet Nam. In Thailand, which now has the lowest stunting rate among all ASEAN countries[13], stunting rates among children under the age of five have fallen over the past 30 years from 24.6% (1987) to just 10.5% (2017). The stunting rates in Viet Nam for the same age group dropped from 61% in 1990 to 25% in 2015.

Figure 5. Changes in stunting prevalence between 1990 and 2017 in ASEAN countries



Source: UNICEF, WHO, World Bank: Joint child malnutrition estimates (JME). 2019. Prevalence of stunting, height for age (% of children under 5).

Note: Stunting prevalence data of Lao PDR is obtained from Lao Social Indicator Survey II; Note: Stunting prevalence data of Myanmar is obtained from Myanmar Micronutrients and Food Consumption Survey 2017-8; Stunting prevalence data of the Philippines is obtained from Philippines National Nutrition Survey 2018;

[13] excluding Singapore, for which records on stunting rates were not available.

***Micronutrient Deficiencies* are a significant public health concern amongst ASEAN Member States**. For example, in the region as a whole, approximately 36% of pregnant women are anemic and 38% of children 6 – 59 months old suffer from anemia (ASEAN/UNICEF/WHO 2016). Amongst pregnant women, the prevalence of anemia is reportedly 32.8% in Viet Nam (GOVN 2018), 40% in Myanmar (NNC 2019), 44% in Cambodia (for women of reproductive age) (Wieringa *et al* 2016), 49% in Indonesia (NIHRD, 2018), 36% in Lao PDR, 30% in Thailand, 29.3% in Malaysia (NHMS 2016), 28% in Brunei, and 28% in Singapore* (ASEAN/UNICEF/WHO 2016).

Across ASEAN, the prevalence of overweight and obesity has risen sharply in the past three decades. Between 1980 and 2016, the prevalence of overweight[14] among adults in ASEAN countries measured by BMI, on average increased by nearly 200%. Currently, the country with the highest overweight rates in ASEAN is Malaysia, where 47.7% of adults are overweight. Malaysia is followed by Brunei (41.2%), Thailand (32.6%), Singapore (31.8%), as per Table 3.

Countries with high stunting rates in ASEAN are experiencing the highest increase in overweight at the same time. For example, Indonesia is the country in ASEAN with highest percentage increase in overweight prevalence (275% increase between 1980 and 2016), with 28.5% of adults being overweight. In Malaysia and Cambodia, prevalence of overweight has increased by 246% and 229% respectively in the past 3 decades, with over 47.7% of Malaysian and 21.7% of Cambodia adults being overweight.

[14] BMI greater than or equal to 25.

** As mentioned in the ASEAN Regional Report on Nutrition Security in ASEAN, Volume 2, Singapore was unable to verify the estimates.*

Table 3. Overweight rate among adult males and females (18+), BMI ≥ 25, age-standardized, by country and World Bank income group, 1980-2016[15]

	1980			2016			Percentage Increase		
Region	Overall	Male	Female	Overall	Male	Female	Overall	Male	Female
Brunei	17.6	14.3	21.6	41.2	41	41.4	134.09	186.71	91.67
Cambodia	6.6	5.2	7.6	21.7	18.6	24.2	228.79	257.69	218.42
Indonesia	7.6	5.4	9.6	28.5	25	31.2	275.00	362.96	225.00
Lao PDR	7.1	5.5	8.5	25.4	22.5	27.9	117.39	309.09	228.24
Malaysia	13.8	11.3	16.3	47.7	46.6	48.9	245.65	312.39	200.00
Myanmar	8.5	6.3	10.4	24.8	11.4	22.9	191.76	80.95	120.19
Philippines	10.3	8.5	11.9	27.6	26.1	28.9	167.96	207.06	142.86
Singapore	23.5	21.8	25	31.8	36.3	27.4	35.32	66.51	9.60
Thailand	10.2	7.7	12.6	32.6	29.2	35.6	219.61	279.22	182.54
Vietnam	5.7	4.1	7.0	18.3	15.8	20.5	221.05	285.37	192.86
LIC	10.6	7.6	13.2	25.8	19.1	32.0	143.40	151.32	142.42
LMIC	12.1	9.6	14.5	27	23.9	30.0	123.14	148.96	106.90
UMIC	22.7	19.4	25.6	43.3	43.5	42.9	90.75	124.23	67.58
HIC	38.2	41.4	35.1	57.6	63	52.0	50.79	52.17	48.15

Source: http://apps.who.int/gho/data/view.main.BMI25AWBv?lang=en;
http://apps.who.int/gho/data/view.main.CTRY2430A?lang=en

Between 1980 and 2016, obesity rates (BMI greater than or equal to 30) in ASEAN has also risen at an alarming rate, by over 7-fold. The country with the highest obesity rates in ASEAN is Malaysia (17.7%), followed by Brunei (14.1%), and Thailand (10%), as per Table 4. The most rapid increases have been observed in Cambodia, Indonesia, and Lao PDR, where obesity rates have increased more than 10-fold. It is also noteworthy that Asians store more fat around their

[15] *Note:* Data for Myanmar is from Myanmar Micronutrients and Food Consumption Survey 2017-18. Data for Malaysia is based on the actual national prevalence as reported in the National Health and Morbidity Survey (NHMS) 2015.

organs and in the belly area than do Europeans with the same BMI. This means that for any given BMI, Asians face a greater risk than other races of developing overnutrition-related NCDs such as type 2 diabetes mellitus and adverse cardiovascular outcomes (Low et al. 2009; Wen et al. 2009).

Table 4. Prevalence of Obesity in ASEAN, 1980-2016[16]

Country/ Region	1980			2016			Percent Increase		
	Overall	Male	Female	Overall	Male	Female	Overall	Male	Female
Brunei	2.9	1.9	4.4	14.1	12.5	15.7	386.21	557.89	256.82
Cambodia	0.3	0.2	0.5	3.9	2.7	4.8	1200.00	1250.00	860.00
Indonesia	0.6	0.2	0.9	6.9	4.8	8.9	1050.00	2300.00	888.89
Lao PDR	0.4	0.2	0.7	5.3	3.7	6.7	1225.00	1750.00	857.14
Malaysia	2	1	3.1	17.7	15	20.6	785.00	1400.00	564.52
Myanmar	0.7	0.3	1.1	5.8	4	7.3	728.57	1233.33	563.64
Philippines	0.9	0.5	1.3	6.4	5.2	7.5	611.11	940.00	476.92
Singapore	3.2	1.8	4.6	6.1	5.8	6.3	90.63	222.22	36.96
Thailand	1.2	0.5	1.8	10	7	12.7	733.33	1300.00	605.56
Vietnam	0.2	0.1	0.3	2.1	1.6	2.6	950.00	1500.00	766.67
LIC	1.2	0.4	1.9	6.8	3.6	9.9	466.67	800.00	421.05
LMIC	2.2	1	3.4	7.6	5.3	9.9	245.45	430.00	191.18
UMIC	5	2.5	7.3	13.8	11.3	16.2	176.00	352.00	121.92
HIC	9.8	8.2	11.2	24.6	24.5	24.7	151.02	198.78	120.54

Source: http://apps.who.int/gho/data/view.main.BMIPLUS2C05-09v;
http://apps.who.int/gho/data/view.main.CTRY2450A?lang=en

Overweight and obesity affect more females than males in ASEAN. In several ASEAN countries, the female overweight/obesity rates are nearly two times that of male overweight/obesity rates. In Thailand, the ratio is 13:7. In Indonesia, the ratio is 9:5. Female obesity is particularly challenging because of its intergenerational consequences. Pre-pregnancy overweight or obesity is associated with increased risk of maternal and neonatal complications, including stillbirth and congenital anomalies. Children of obese women are more likely to develop obesity, diabetes mellitus, and cardiovascular diseases in their lifetime (Haddad et al, 2014).

[16] *Note:* Adult obesity prevalence data for Malaysia is based on the actual national prevalence as reported in the National Health and Morbidity Survey (NHMS) 2015.

ASEAN is also facing a growing problem of childhood overweight/obesity. Brunei (30.4%), Malaysia (26.8%), and Thailand (25.8%) are the top three ASEAN countries with the highest overweight rates among children aged 5-9 years. Over the past 3 decades (1980-2016), the prevalence of overweight in the majority of ASEAN countries has risen more than 10 times, with the prevalence in Cambodia, Lao PDR, Indonesia and Viet Nam growing more than 18 times, as per Table 5. The emergence of overweight at younger ages is a particular cause for concern. Without intervention, overweight infants and young children are likely to remain overweight or obese until adulthood, developing risk of early onset diet-related NCDs.

Table 5. Prevalence of overweight (BMI > +1) among children aged 5-9 years[17]

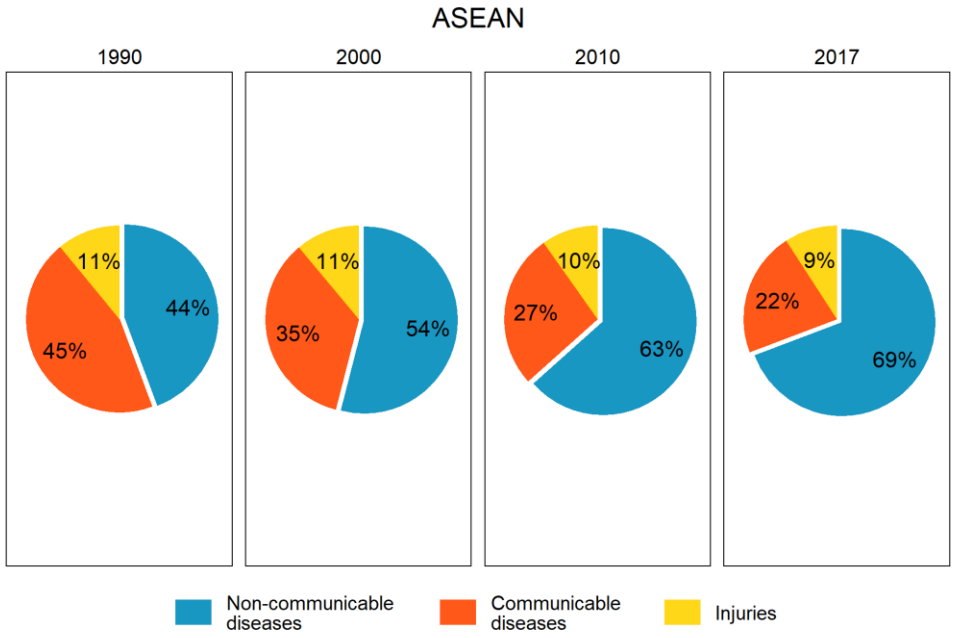
Country/Region	*1980*	*2016*	*Percent increase*
Brunei	6.4	30.4	375
Cambodia	0.6	12.7	2016.67
Indonesia	0.9	17.6	1855.56
Lao PDR	0.7	15.7	2142.86
Malaysia	2.9	26.8	824.14
Myanmar	1.1	13.4	1118.18
Philippines	1.6	14.4	800
Singapore	22.3	25.2	13.00
Thailand	1.9	25.8	1257.89
Vietnam	0.6	11.9	1883.33
LIC	1.5	11.5	666.67
LMIC	1.6	12.7	693.75
UMIC	5.1	32.6	539.22
HIC	17.4	35.2	102.30

Source:http://apps.who.int/gho/data/view.main.BMIPLUS1C05-09v;
http://apps.who.int/gho/data/view.main.BMIPLUS1CWBv?lang=en

[17] Overweight prevalence data for Malaysia is obtained from the National Health and Morbidity Survey (NHMS) 2015.

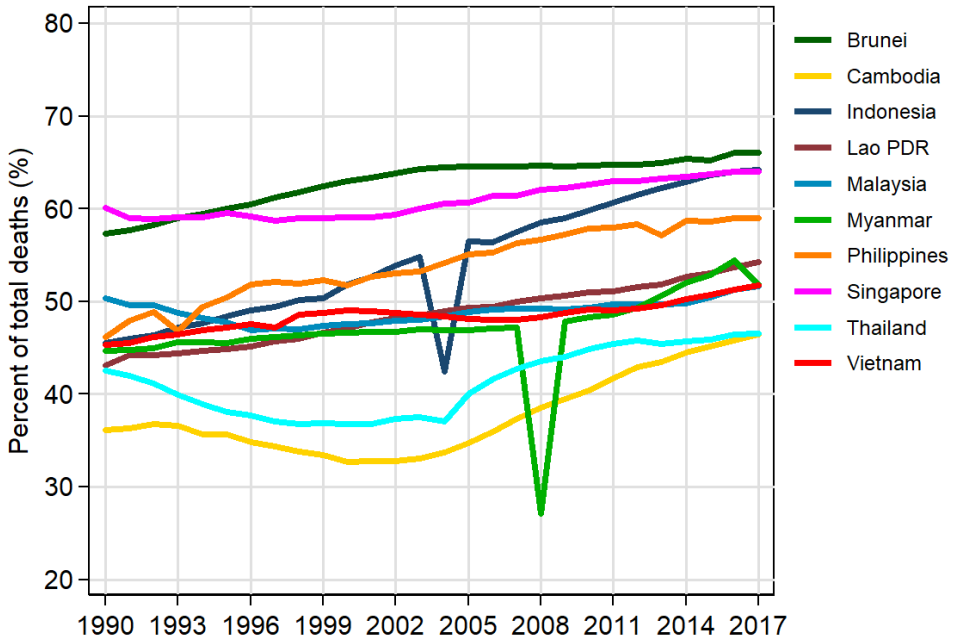
As prevalence of overweight and obesity rise in ASEAN, so does the burden of NCDs. As per Figure 6, in 1990, NCDs accounted for 44% of the burden of disease in ASEAN, slightly lower than that of communicable diseases. However, in 2017, NCDs accounted for more than two-thirds of the burden of disease, and the figure is still rising. In addition, NCDs now account for over half of all premature deaths among age group 15-49 in 8 out of 10 countries in ASEAN (Figure 7). Dietary risks have been identified as the top risk factor attributed to deaths due to NCDs of people 15-49 in all ASEAN countries, except in Myanmar where dietary risks came as the second top risk factor.

Figure 6. Burden of Disease in ASEAN, 1990-2017



Source: Institute of Health Metrics and Evaluation

Figure 7. Deaths attributable to noncommunicable diseases of people 15 to 49 in ASEAN, 1990 to 2017



Source: Institute for Health Metrics and Evaluation.

Several ASEAN countries face a *double burden of malnutrition* – both undernutrition and overnutrition occur simultaneously, sometimes within the same households, and even the same individual over time (Shrimpton and Rokx 2012). The *double burden* in this report is defined with respect to population-level prevalence of overnutrition among adults and prevalence of undernutrition among children under five[18]. In this regard, East Asian countries vary widely. Malnutrition can be classified into four categories based on their burden (refer to Figure 1 in the executive summary). "Red" countries can be classified as having a "high *double burden*" and include Malaysia and Brunei. "Orange" countries, including the Philippines, Cambodia, Lao PDR, Myanmar, Indonesia, and Viet Nam, have very high stunting rates and low but rising burdens of adult overweight. "Thailand and Singapore have high levels of adult overweight, but limited child stunting and hence are classified as experiencing a "medium *double burden of malnutrition*, reflected as "Yellow" countries. None of the ASEAN countries are experiencing neither challenge, that is, belong to the "green" category (low levels of child stunting and adult overweight).

[18] Although the *double burden* can be analyzed and described at individual, household/community, and national levels, and within a population of adults and children.

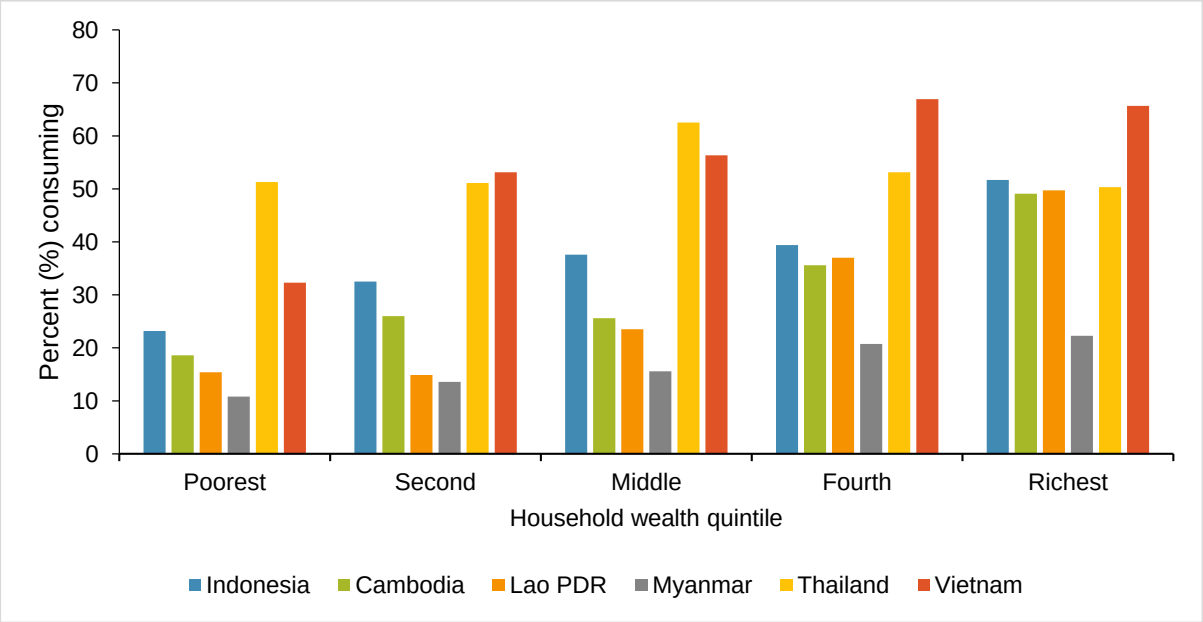
IV. Drivers of Undernutrition

The causes of undernutrition in the region are multisectoral. Malnutrition is an outcome of immediate, underlying and basic causes: at the immediate level, nutritional status is ultimately determined by the availability of nutrients to the body to meet its requirements and the status of health; while the underlying and basic causes are related to food security (access, availability and utilization of food), maternal and child caring practices, water and sanitation and personal hygiene. These determinants are heavily influenced by the social status of women, institutional/organizational, political and ideological, economic as well environmental constraints.

Immediate Causes

Poor infant and young child feeding practices. Adequate dietary intake for children involves household food security plus optimal infant and young child feeding practices: breastfeeding, age-appropriate introduction of complementary foods and minimum acceptable diet that includes dietary diversity and appropriate frequency. Early and exclusive breastfeeding up to the age of six months is an important factor in promoting adequate nutritional intake and decreasing susceptibility to infection. Exclusive breastfeeding rates among children under six months range from 23% in Thailand to 65% in Cambodia. In addition, complementary feeding practices are suboptimal in many ASEAN countries (Figure 8), particularly among poorer households. Infants undergo rapid growth and development between birth and two years of age, and upon introduction of complementary foods at six months, a diverse diet is necessary in order to achieve adequate intake of a wide variety of macronutrients and micronutrients.

Figure 8. Consumption of a nutritionally acceptable diet among infants and young children (age 6 to 23 months) by, household wealth quintile, selected ASEAN countries



Source: UNICEF. 2019. 'Complementary Feeding (6-23 months)'. (https://data.unicef.org/wp-content/uploads/2018/07/UNICEF_Expanded_Global_Databases_Complementary_Feeding_May2019.xlsx)

Note: Minimum acceptable diet defined using WHO (2010) guidance and is a composite indicator of the frequency and appropriate diversity of foods consumed by the infant or young child (age 6 to 23 months) during the 24-hour period prior to the survey.

Underlying Causes

The underlying drivers of undernutrition relate to maternal and child caring practices – including lack of early stimulation; food security, that is the availability and affordability of nutritious foods; access to health, clean water, and appropriate sanitation; and the social status of women. A key role is played by information: households do not always know which foods or feeding practices are best for their children or themselves, nor can they visually identify when children are stunted or micronutrient deficient (World Bank 2006). All these factors may be correlated with income, but are conceptually distinct from it.

Low access to nutritious foods. Food security has improved across the region in the past decade. In particular, food balance sheets[19] indicate growing availability of calories at the population level.[20] However, measures of caloric sufficiency do not capture the degree to which households

[19] A food balance sheet is a comprehensive compilation of a selected country's food supply during a specific time period. The food balance sheet shows the food items for human consumption, along with how it is produced, used, imported/exported, and how it benefits the society (per capita supply).

[20] The percentage of undernourished individuals (with insufficient [<2,100 kcal] caloric intake) is highest in Lao PDR (27%), but ranges from 8% to 16 % across other countries in the region.

can access an affordable, safe, and diverse diet that delivers the right mix of macro- and micronutrients needed to promote optimum growth. Many of the high stunting burden countries are characterized by poor diet composition, with a higher share of total dietary calories from staple foods than the average across developing countries.

Weak preventive and primary health care. In several ASEAN countries, public spending on health is low, leading to high out-of-pocket expenditures in health, creating financial barriers for low-income households to access quality health care. In some more developed ASEAN countries, health care tends to overemphasize hospital-based service delivery, with a lack of focus on the delivery of quality preventive and primary care services, which are essential for the prevention of undernutrition.

Unsafe drinking water and poor sanitation facilities. Much of the region enjoys access to improved drinking water. However, sanitation and hygiene are often inadequate, especially in rural areas and in high stunting burden countries. Open defecation, common across the region, also contributes to stunting.

Women's social status. Gender disparities remain significant across much of the region.[21] The low status of women contributes to maternal and child undernutrition. Women with low status (defined as women's power relative to men) tend to have weaker control over household resources, tighter time constraints, less access to information and health and nutrition services, poorer mental health, and lower self-esteem. These factors are closely tied to women's own nutritional status and the quality of care they receive, and, in turn, the quality of health and nutritional care they provide to their children (Smith et al. 2003).

Basic Causes - Poverty

Poor countries and poor households suffer from higher rates of undernutrition. At the country level, economic growth, particularly starting from low initial GDP, is associated with reductions in stunting.[22] Rising incomes enable improvements in access to sanitation, women's education, and the quantity and quality of food (Smith and Haddad 2015). At the individual level, across most of the region, stunting rates are higher among poorer households (refer to Figure 4). Good nutrition is a long-term investment, and poor families lack the resources and knowledge to finance this investment. Nonetheless, it is noteworthy that in many ASEAN Member States including Cambodia and Lao PDR, stunting is prevalent even among the wealthiest quintile. This pattern is not unique to these countries: middle-income countries in Latin America, South Asia, and Africa display similar trends.

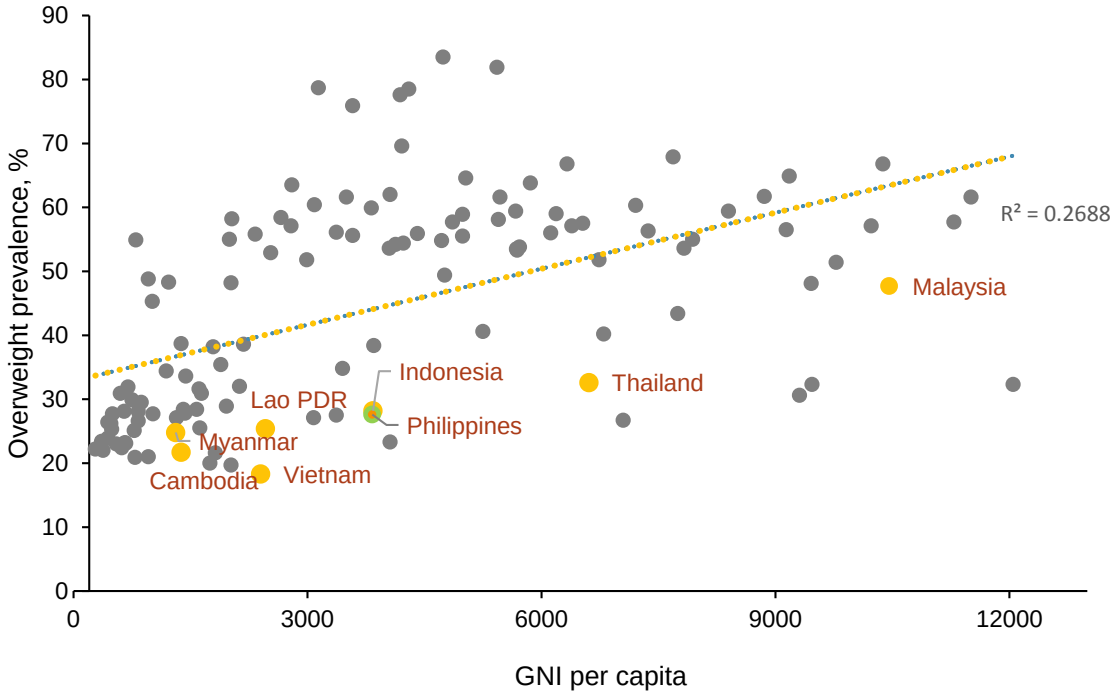
[21] Women often enjoy less access to productive resources. For instance, in Indonesia and Vietnam, female-headed households have less land than male-headed households (World Bank 2012). More broadly, Indonesia in particular performs poorly on gender equity in economic activity (Haddad et al. 2014).

[22] On average, globally, a 10% increase in GDP per capita is associated with a 6.3% decrease in stunting in the long term, and a 1.7% decrease in the short term (Smith and Haddad 2015).

V. Drivers of Overnutrition: Urbanization and Changing Lifestyles

Adult overweight rates are strongly correlated with average income per capita (Figure 9). Country-level wealth, as measured by GDP (or GNI) per capita has the strongest association with overweight and/or obesity over time. The link between overweight and income, in turn, arises because the rapid income growth and economic transformation experienced by many Asian economies has been accompanied by rapid urbanization, changes in individual lifestyles, including changes in dietary patterns.[23] It is noteworthy that although globalization (as indicated by trade liberalization) has been widely assumed to be a key driver of increases in overweight and obesity worldwide there has been no empirical evidence of this association.

Figure 9. Adult (18+) overweight (BMI ≥25) by GNI per capita, developing countries, 2016[24]



Sources: World Bank, 2019. GNI per capita (current US$) for most recent available for the period 2017-2018; WHO, 2016. 'Prevalence of overweight among adults, 18+, BMI >= 25, age standardized estimate (%)'

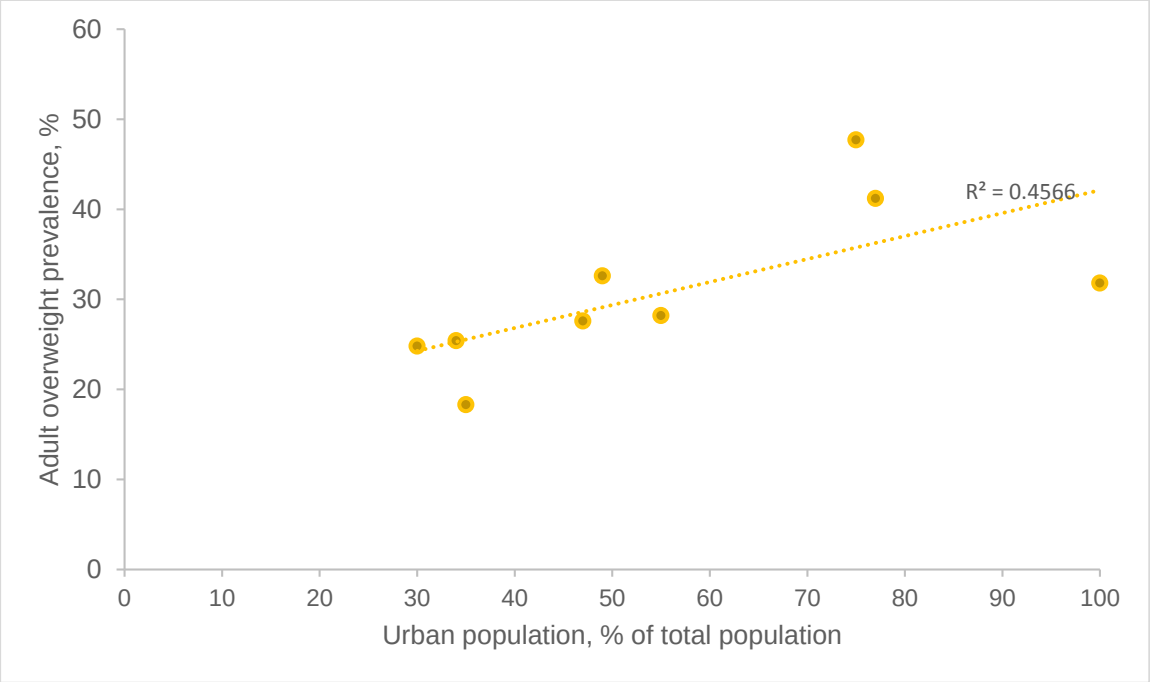
Note: GNI = gross national income; PICS: Pacific Island Countries.

[23] Urbanization increased from 18% in 1950 to 48% in 2014, with Asia experiencing the fastest pace of urbanization across major areas for the period 1985-2014 (United Nations 2014).

[24] *Note:* Adult overweight prevalence data for Malaysia is obtained from the National Health and Morbidity Survey (NHMS) 2015.

Urbanization is highly correlated with obesity and chronic diseases (Figure 10), although the relationship is strongest amongst countries at lower levels of GDP. In a study of 42 countries, annual overweight/obesity prevalence increased by 0.8 percentage points among urban women in East and Southern Asian countries compared to 0.3 percentage points among rural women over the period 1989-2007 (Popkin et al. 2012). This correlation reflects the impact of urbanization on several underlying risk factors, including diet, physical exercise, and exposure to mass media.

Figure 10. Adult (18+) overweight by degree of urbanization (urban population as percent of total population), ASEAN countries[25]



Source: UNICEF, 2019. 'Complementary Feeding (6-23 months)'

Note: Minimum acceptable diet defined using WHO (2010) guidance and is a composite indicator of the frequency and appropriate diversity of foods consumed by the infant or young child (age 6 to 23 months) during the 24-hour period prior to the survey.

- **Changes in diet.** Globally, there has been an upward trend in the consumption of highly processed foods and sugar-sweetened beverages (also known as the 'nutrition transition') which has accompanied changes in the food system (Popkin et al. 2012). Urbanization alters the food environment, changing availability, affordability, convenience, and desirability of different foods. It is associated with increased intake of refined carbohydrates, added sugars, fats, and animal-source foods. Rural dwellers are more self-reliant in obtaining food and tend to eat traditional diets that are high in grains, fruit, and vegetables, and low in fat. Urban dwellers, in contrast, rely on supermarkets and fast-food stores, which offer a ready supply of

[25] *Note:* Adult overweight prevalence data for Malaysia is obtained from the National Health and Morbidity Survey (NHMS) 2015.

processed foods, high-calorie and high-fat snacks, sweets, and sugary beverages, all of which have been linked to obesity.

- **Physical exercise.** Urbanization is also associated with reduced expenditure of energy on physical activity, with workers transitioning from farming to sedentary, professional and mechanized jobs and leisure time dominated by sedentary activities owing to less outdoor recreational space, and transportation by motorized vehicles rather than walking or biking (Popkin et al. 2012).

- **Exposure to mass media.** Urbanites are more exposed to mass media marketing, which can shift preferences away from traditional diets to unhealthy processed foods. Widespread marketing of foods to children (overwhelmingly for foods high in fat, sugar, and/or salt) is a particular concern. A survey of six Asian countries (India, Indonesia, Korea, Malaysia, Pakistan, and the Philippines) reported that television advertising to children was widespread, and that the diets actively promoted on television ran counter to national nutrition guidelines (Escalante Cruz et al. 2004).

VI. Routes to Better Nutrition: From Drivers to Actions

Policy and programmatic steps to address the double burden of malnutrition in ASEAN is best informed by a comprehensive understanding of key drivers. Appropriate policy responses to malnutrition will, inevitably, vary across Member States, depending on the type and degree of malnutrition they face (Figure 5). Nonetheless, with strong political commitment and concerted action across multiple sectors, countries with high stunting burden could achieve significant improvements in nutritional outcomes in the near future (Box 2).

Countries with elevated stunting levels

Countries with high stunting levels can dramatically reduce prevalence by implementing a package of interventions at scale. Such an approach should include nutrition-specific interventions that can be delivered through primary health care services targeting the critical first 1,000 days, from conception up to 2 years old. Effective, direct, nutrition-specific interventions include (a) behavior change and communication interventions to promote optimal nutrition and care during pregnancy and the early years of infants and young children's lives (including nutritional supplements during pregnancy, breastfeeding within one hour of giving birth and exclusively through the first six months, appropriate complementary/weaning feeds from the age of six months, and early stimulation); (b) micronutrient interventions and deworming to enhance the consumption of essential vitamins and minerals (through foods fortified with key micronutrients, and nutritional supplements); and (c) complementary and therapeutic feeding interventions for the reduction of acute malnutrition. In selected ASEAN countries, the estimated benefit-cost ratios for this package of interventions is remarkably high, reflecting both their low cost and their large impact on labor productivity (Table 6).

Table 6. Benefit-cost ratio per child for nutrition investments in 10 countries for individuals working to age 36

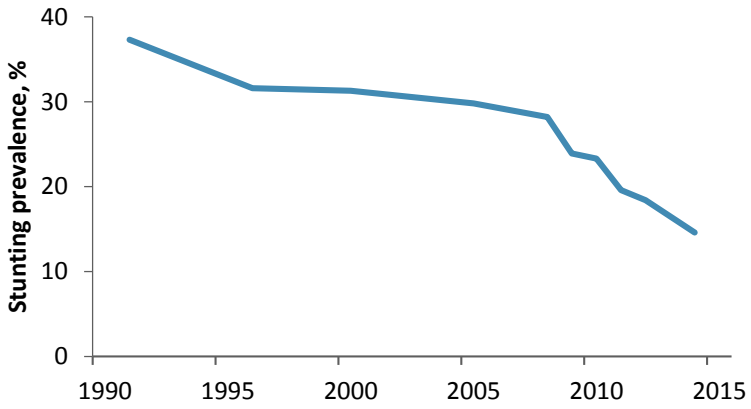
Country	Benefits to age 36
Indonesia	**47.7**
Philippines	**43.8**
Viet Nam	**35.3**
Pakistan	28.9
Yemen	28.6
Nigeria	24.4
Bangladesh	17.9
Kenya	15.2
Tanzania	14.6

Source: Hoddinott et al. 2013.

Box 2. Peru's success in reducing chronic undernutrition

In the early 2000s, over one in three Peruvian children under five years of age suffered from chronic malnutrition. These high levels of stunting remained virtually unchanged until 2008 (Figure 11), despite rapid economic growth and significant expenditure on nutrition programs. Then, between 2008 and 2014, child stunting rates decreased dramatically. Peru's experience ranks among the most successful recent global achievements in child nutrition and is widely attributed to three main factors, which established a clear commitment and collaboration across sectors in tackling undernutrition.

Figure 11. Trends in child (<5) stunting in Peru, 1990–2014



First, Peru rallied strong political commitment and set out a clear direction through measurable, time-bound goals. Alan Garcia, elected president in 2006, committed in his inaugural address to the "5-by-5-by-5 goal" of reducing stunting by 5 points in 5 years for children under five. This ambitious, yet feasible, goal was then translated into specific regional targets, and the focus then turned to achieving them.

Second, Peru adopted a multisectoral strategy supporting both the demand and supply of nutrition services. Peru empowered parents by providing them with information to identify a stunted child and make its consequences visible through a widely disseminated video ("My Future in my First Centimeters"). In addition, the government leveraged the existing conditional cash transfer program for poor families ("Juntos") to reduce child malnutrition, by conditioning transfers on children's receipt of health and nutrition services, including growth promotion checkups and early childhood stimulation. To respond to the increased demand, the government expanded maternal and child nutrition services. Relatedly, it improved the coverage of clean water and proper sanitation.

Third, the government used financing for results and targeted communities with the greatest need. Results-based budgeting through the evidence-based "Articulated Nutrition Program" was used to ensure that demand and supply efforts worked together to achieve established nutrition goals. Each agency was held accountable for improving specific indicators, such as the number of poor children enrolled in the conditional cash transfer program, and the number of child-growth checkups and nutrition counseling sessions to poor families in targeted communities.

Source: Extracted from Marini and Arias (2016).

Improving supply-side delivery of nutrition-specific interventions may not necessarily require increased health investments, but rather a prioritization of low cost, high return interventions targeted at the most vulnerable groups, and especially the first thousand days of life. Most ASEAN Member States have made strong commitments toward achieving universal health coverage over the next 10 to 20 years. In lower-income Member-States with high stunting burdens (including Cambodia and Lao PDR), health insurance coverage is generally low. However, these same countries have made strides in removing financial barriers to health services for targeted subgroups (the poor) and for specific services such as maternal and child health. In addition to extending benefits to vulnerable groups, a costed package of nutrition interventions needs to be included in the health benefits package (or other health financing mechanisms), while community-based and outreach platforms may be necessary to ensure last mile delivery and availability of nutrition services for the poor, rural, and remote populations who shoulder much of the burden of undernutrition. Additional investments are also needed to strengthen institutional as well as human resource capacity and develop quality assurance mechanisms, particularly for counselling and behavior change interventions, such as promotion of breastfeeding and optimum maternal infant and young child feeding, and in lower-level facilities accessed by rural and poor populations.

Social transfers can stimulate demand for essential health and nutrition services, address the immediate and underlying determinants of undernutrition, and improve the non-income dimensions of poverty. These social transfers should be targeted toward the disadvantaged groups who are at greatest risk of undernutrition (poor, rural, ethnic minorities, and/or other groups experiencing forms of social exclusion). Publicly funded social safety net programs play an important role in improving access to special complementary foods (Bloem et al. 2013) and fortified foods for the poor. For example, conditional cash transfers not only can have positive effects on poverty reduction but have also been shown to improve household food consumption,

dietary diversity, and use of preventive and curative nutrition services (Ruel et al. 2013). In addition, in ASEAN Member States where rice is the primary staple food, social safety net programs that distribute fortified rice can provide a means of reaching the poor and those at greatest nutritional risk (Codling, Fabrizio, and Rosenzweig 2015).

Agricultural programs can help reduce malnutrition by improving access to and affordability of adequate, nutrient-rich diets. In several ASEAN countries, agricultural policies and programs have tended to encourage the production of cereals/staple foods and agricultural commercialization through high-value export crops. While enhanced staple food productivity is, to a degree, necessary to meet the caloric needs of growing populations, programs are needed to explicitly target optimal nutrition (Ruel et al. 2013) by, for example, incentivizing diversification of food production. For example, fiscal incentives (healthy food subsidies) can be used to improve the affordability of nutrient-rich foods—particularly for rural households—as can agricultural investments to incentivize the production of nutrient-rich foods (especially fruits, vegetables, pulses/legumes, and animal-source foods).

Improved Water Sanitation and Hygiene (WASH) interventions are critical for reducing undernutrition. To fully realize the impact of WASH interventions, various actions are needed. For example, it is important to design the programs so that they address a full spectrum of WASH-related issues. These include clean water, proper sanitation facilities, and reduction of fecal matter (both human and animal) in the environment (including soil and children's play areas); availability of water and soap for handwashing; and behavioral issues, such as instilling the habit of handwashing with soap at critical times (after using the toilet, before preparation of food, after cleaning babies, before eating, and so forth).

Ensure the availability of national, sub-national and ethnicity disaggregated nutrition and nutrition-related data to inform targeted policy advice and programs. Data for critical nutrition indicators are usually not routinely available nor adequately disaggregated which leads to generalizations and inefficient use of resources. Nutrition data are essential to better inform policy makers, program managers, and practitioners so they can be held accountable, identify bottlenecks, and demonstrate progress. Therefore, it is imperative that ASEAN Member States develop and/or strengthen nutrition monitoring systems for selected process, output, and outcome indicators and to consider harmonization of nutrition surveillance across Member States with regards to indicators, methodologies and timing of data collection and also making the data open and available.

Countries with high stunting should also implement key measures to prevent obesity (see below). Proactively developing some relatively low-cost policies and regulations to improve the food environment and food system will help ensure that development is associated with movements to low stunting and low overweight, rather than low stunting but high overweight. Prevention of overweight/obesity is much more cost-effective than treatment.

Countries with high burden of overweight and obesity

Action at multiple levels is needed to halt the rise of overweight, including by changing social norms (Dobbs 2015; WHO 2016). Reducing excessive weight gain and ultimately overweight and/or obesity will require a multisectoral approach. A coordinated package of interventions is required to promote healthy diets, ranging from systems-level policy measures to sector-specific solutions that promote behavior change at the community and individual levels (Table 7).

Table 7. The NOURISHING Framework

Domain	Action
Food Environment	Nutrition label standards and regulations on the use of claims and implied claims on foods
	Offer healthy foods and set standards in public institutions and other specific settings
	Use economic tools to address food affordability and purchase incentives
	Restrict food advertising and other forms of commercial promotion
	Improve nutritional quality of the whole food supply
	Set incentives and rules to create a healthy retail and food service environment
Food System	Harness food supply chain and actions across sectors to ensure coherence with health
Behavior Change	Inform people about food and nutrition through public awareness
	Nutrition advice and counselling in health care settings
	Provide nutrition education and skills

Source: Hawkes, Jewell, and Allen 2013.

Note: The framework was set out by the World Cancer Research Foundation, and many interventions have been affirmed by the WHO Commission on Ending Childhood Obesity (WHO 2016).

At the systems level, regulatory and policy actions are warranted in a number of domains to reduce overweight/obesity, many of which fall outside of the purview of the health sector. Overconsumption of unhealthy foods reflects market failures. For instance, consumers are often provided with incomplete information. And products exploit biological, psychological, and socioeconomic propensities toward overconsumption of foods high in fat, sugar, and salt, with neither the producer nor the consumer bearing the full social, economic, or health care cost of overweight. This creates the need for interventions, including nutrition standards and labelling, restrictions on advertising, and use of economic and other incentives to influence food purchases and consumption. Other complementary policies may be needed, including supporting better consumer nutrition knowledge, and counselling and equipping consumers with skills for healthier food consumption (Sassi 2016). Strong political will is needed for governments to take leadership and ownership over anti-obesity interventions.

- **Improve nutrition information by regulating food marketing, improving food labelling (particularly front-of-pack labelling), and scaling up nutrition education.** The unregulated marketing of unhealthy foods and sugar-sweetened beverages is associated with childhood obesity (WHO 2016). Government regulation can prevent the marketing of unhealthy foods to children. Front-of-Pack labelling with clear information on total energy intake (kcal), sugars, sodium, fat and other nutrients will provide consumers with better information on healthier food and beverages to encourage a healthy and balanced diet. The use of Front-of-Pack labeling will also encourage reformulation and production of healthier food and beverage options by setting limits for salt, sugar and fat as well as increasing nutrients such as fiber and micronutrient in food and beverages.

- **Moreover, nutrition labelling will allow consumers to be better informed of the health implications of food choices.** There are regulations in most of ASEAN countries for product labelling to reduce total energy intake (kcal), carbohydrate (including total sugars), protein, and fats. As individuals in ASEAN countries begin eating outside the home in greater numbers, municipalities may consider extending nutrition labelling to restaurants and ready-to-eat food retailers.

- **Improve nutrition education and literacy through mass media and behavior change communications.** A variety of delivery mechanisms are possible, including mass media, health and education facilities, and community-based interpersonal communication.

- **Prevent or mitigate overweight and obesity through dietary changes by enforcing targeted taxes and subsidies .** Fiscal measures can be a mechanism to influence consumer behavior by changing the relative prices of healthy compared to less healthy foods, or by manipulating incomes. Studies have demonstrated that larger taxes and taxes on noncore food such as confectionary and sweetened beverages have large effects on food consumption habits (Thow et al, 2011). At the country and household levels the effects are strongest among the poor, in part because the taxation is sometime regressive, but the positive impacts on overweight, diabetes, and premature deaths are larger among the poor.

- **Taxation policy can influence consumer choices.** Although many people purchase the same amount of certain foods whether or not the prices of those foods increase or drop, several studies have however found that larger excise taxes on unhealthy food products (including confectionary and sweetened beverages) have led to price increase among the products subject to excise taxes, and in turn led to reduced consumption of these foods (Thow et al. 2011 and Osornprasop et al. 2019).[26] Moreover, at both the country and household level, this reduction is strongest among the poor.[27] While this might be interpreted as an example of regressive taxation, the impact of overweight through diabetes and premature deaths is also regressive.

- **Promote dietary change by regulating food composition.** Industry self-regulation can achieve some changes, but in other cases government regulation will be required. Food composition targets for salt, trans fats, saturated fats, and sugar can be developed for both packaged/processed foods and food service retailers. The WHO has identified regulations to reduce trans fats as "most effective" in preventing NCDs at the population level. However, experience with tobacco regulation, as well as early experiences with food industry regulation, illustrate that efforts at regulation will be challenged.

Countries facing both high stunting and high overweight/obesity

In addition to the measures recommended for countries facing either overweight/obesity or undernutrition, there are special considerations for countries experiencing the dual burden of malnutrition.

The key challenge is to address food insecurity without adding to the burden of overweight/obesity. Some ASEAN Member States have adopted a food policy centered on self-sufficiency in rice. For example, subsidies for rice and cereals result in the low cost of starchy staple foods and edible oils— which in turn contributes to the pervasive availability of processed, energy-dense, and micronutrient-poor foods—compared to the relatively high cost of whole grains, fruits, vegetables, and low-fat animal source foods. In these countries, there are sufficient calories available to lead to the accumulation of excess body weight, but micronutrients and healthy protein sources may be beyond the economic reach of poor families. Food policy in these countries needs to be rebalanced to not only address the distortions created by policies that favor staple grains, but also incentivize the diversification of food production. Input subsidies, public agricultural advisory services, and irrigation investments must not create obstacles to farmers aiming to diversify production and specialize in higher-value, nutrient-dense foods.

[26] While there is evidence that tax increase that led to price increase lead to reduced consumption of the products subject to tax increase, the study also finds that consumers may also shift to cheaper substitutes that are not subject to tax (Osornprasop et al, 2019).

[27] Food demand is relatively more sensitive to price and income changes among low-income households, and in low-income countries.

Rethink food-based safety nets. Where countries provide complementary foods for young children, transfer programs have contributed to increased overweight and obesity in mothers in Mexico (Leroy et al. 2013) and Columbia (Forde et al. 2012) as well as young children in Mexico (Leroy et al. 2010) and the United States (Akee et al. 2013). A variety of program design choices can help mitigate these risks. In Mexico, the benefits package of supplements and counselling was modified to respond to the different nutrient gaps of urban and rural populations (Neufeld et al. 2011). Fortified milk distribution continued in remote communities with low access to services; where risk of overnutrition was high, food supplements were modified to reduce calories but retain micronutrients. In addition, individual counselling sessions are being scaled up to promote breastfeeding, healthy complementary feeding, and the avoidance of excess weight gain in preschool-age children (Kroker-Lobos et al. 2014).

Urban Planning: **transport policy and environmental design have fundamental effects on the determinants of physical activity and therefore influence the risk of obesity and other chronic diseases.** Limiting the role of automobiles is one important intervention area and can be achieved through a variety of channels, including making private car ownership and use more expensive, through higher taxes on cars and fuel, and introducing road tolls and congestion charges, as well as parking fees. Walking and biking can also be encouraged by creating special bike lanes, as well as by making town centers pedestrian-only precincts. Increasing the space available for leisure activities such as playing fields, parks, and public gardens, will also encourage more walking, running and sports.

VII. Conclusions

ASEAN Member States face significant challenges with respect to both undernutrition and overnutrition. Economic growth has been insufficient to eliminate undernutrition among the region's poorer countries. At the same time, an increasing propensity toward sedentary lifestyles, and changes in food availability that have facilitated a shift in diets toward greater intake of animal-source, highly processed foods, sugar and sweeteners, oils, and salt, which have contributed to increased overweight and obesity rates.

The health sector alone cannot address these challenges and their social and economic costs. Countries in the region must make targeted investments in nutrition programs (particularly in early life), in health, social protection, agriculture, and education, and develop the frameworks to promote healthy diets, physical activity, and urban planning. In turn, this will help create a healthy workforce capable of adapting to the rapidly changing global economic landscape.

Finally, strong management information system, surveillance as well as monitoring and evaluation (M&E) mechanisms, including regular national nutrition surveys, are needed to support ending all forms of malnutrition in ASEAN. In addition to effective multisectoral interventions to address the double burden of malnutrition, it is important to ensure that there is a strong surveillance and M&E framework with clear targets and timeline. It is crucial that the implementation progress is regularly tracked and that any lack of progress is addressed promptly.

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