



Food and Agriculture
Organization of the
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STRENGTHENING SECTOR POLICIES FOR BETTER FOOD SECURITY AND NUTRITION RESULTS

Food systems for healthy diets



These policy guidance notes have been produced in the frame of the strategic partnership between the Food and Agriculture Organization of the United Nations (FAO) and the Directorate for International Cooperation and Development of the European Commission to boost food and nutrition security, sustainable agriculture and resilience.

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This policy guidance note is part of a series that the Food and Agriculture Organization of the United Nations (FAO), the Directorate for International Cooperation and Development (DEVCO) of the European Commission and partners are producing to support policy makers address the food security and nutrition situation in their country. Each note provides guidance on how to sharpen the focus of sector policies in order to achieve sustainable food security and nutrition outcomes.

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Introduction

The multiple burdens of malnutrition consist of undernutrition, micronutrient deficiencies, and overweight and obesity. Different forms of malnutrition can co-exist within the same country, the same household and even the same individual during their life course (FAO, 2017a). The 2017 Global Nutrition Report shows that 88 percent of countries are reeling from two or three forms of malnutrition, and that, despite good progress in some countries, the world is off track to reduce and reverse this trend (Development Initiatives, 2017a). In 2017, 821 million people globally were estimated to be undernourished, and nearly 151 million and over 50 million children under five years of age stunted and wasted, respectively (FAO *et al.*, 2018). Meanwhile, overweight, obesity and diet-related non-communicable diseases are increasing worldwide in all population groups. Almost two-thirds of the world's obese people now live in low- and middle-income countries (LMICs) (Greenberg and Deckelbaum, 2016). The prevalence of overweight and obesity is rising in all regions and population groups in the world, contributing to the global burden of non-communicable diseases (NCDs), which are currently the leading causes of death worldwide (Box 1). No country to date has successfully managed to reverse the rise in obesity prevalence once it develops, and no real national success stories have been reported in the past 30 years (Ng *et al.*, 2014). At the same time, stunting prevalence is decreasing but far too slowly. NCDs (e.g. cardiovascular diseases, cancers, chronic respiratory diseases and diabetes) are largely caused by preventable risk factors such as unhealthy diet, tobacco use, physical inactivity and the harmful use of alcohol (WHO, 2018a).

→ Key messages

- Food systems and the way they are set up to provide healthy diets are a key driver of malnutrition in all its forms (undernutrition, micronutrient deficiency and overweight and obesity).
- In order to provide better access to affordable and healthy diets, food systems need to be transformed, particularly to address the rising burden of overweight, obesity and diet-related non-communicable diseases.
- It is important to take a food systems approach comprising four functions – food production; food handling, storage and processing; food trade and marketing; and consumer demand, food preparation and preferences – and to coordinate interventions across these functions.
- The food environment – the places and ways in which food is sold and accessed by people – is important to consider in addressing nutritional outcomes, as it serves as the interface between the food system and an individual's diet.
- The stepwise approach proposed in this guidance note uses existing evidence, frameworks and databases to identify the nutrition and food system challenges in a country, maps current policies, identifies policy opportunities for enabling healthy diets through the food system, and assesses the political economy to bring about policy change.

Poor dietary habits are among the leading risk factors for global deaths and global disease burden (GBD 2016 Risk Factors Collaborators, 2017). Besides overweight and obesity, child and maternal undernutrition are also among the top risk factors for the global burden of disease (GBD 2016 Causes of Death Collaborators, 2017). Undernutrition during pregnancy and its effects on foetal growth is a major determinant of stunting in children. Stunting in early childhood increases the risk of obesity and diet-related NCDs later in adulthood (HLPE, 2017).

Maintaining a healthy diet throughout life helps to prevent malnutrition in all its forms, including overweight and obesity, as well as NCDs. These outcomes are preventable, in particular, through action that simultaneously addresses different sectors contributing to the production, distribution and marketing of food, while concurrently shaping a supportive food environment which makes healthy eating the easiest choice (WHO, 2014). People's ability to choose a healthy diet is also influenced by factors such as convenience, preferences, cultural norms and knowledge and perceptions about nutrition and health (GLOPAN, 2017). Promoting gender equality and women's empowerment is inextricably linked to the strengthening of food systems to fight hunger and malnutrition, and improving the lives and livelihoods of rural populations.

According to the World Health Organization, a **healthy diet** contains fruits and vegetables, whole grains, fibres, nuts and seeds, and with limited free sugars, sugary snacks and beverages, processed meat and salt. In a healthy diet, saturated and industrial trans-fats are replaced with unsaturated fats (WHO, 2018c).

Food and the agriculture sector play a major role in nourishing people by increasing the availability of and access to diverse, safe, nutritious foods that contribute to healthy diets in alignment with dietary recommendations and

environmental sustainability (FAO, 2015a). Hence, food systems determine the quantity, quality, diversity and nutritional content of the foods available for consumption. Most of today's food systems need to be re-aligned from just supplying food to sustainably providing high-quality foods that support healthy diets for all (FAO, 2013a). In many of today's food systems, nutritious foods that constitute a healthy diet are not available or affordable for many people. Data from some high-income countries, for example the United States of America and Canada, show that around 60 percent of household calories come from categories of food or drink that are major sources of added sugar, fats and salts (Moubarac *et al.*, 2013; Stern *et al.*, 2016).

Increased production of processed food, rapid urbanization and changing lifestyles have led to a shift in dietary patterns (WHO, 2018c). Since the 1990s, globally there has been a profound decrease in trans-fats, and the consumption of processed foods, often energy-dense and high in fat, sugar and/or salt (e.g. sugar-sweetened beverages, processed meat) has increased relative to the consumption of nutritious foods (e.g. fruits, vegetables, whole grain, seafood) although different increases have been noted across regions (GLOPAN, 2016). Globally dietary patterns have changed from diets rich in legumes, vegetables and coarse grains to diets with high intakes of refined carbohydrates, added sugars, fats, and animal-source foods even in LMICs (Imamura *et al.*, 2015; FAO, 2017a). The shift is commonly seen as a country's economic conditions improve and the urban population increases, and is generally accompanied by more sedentary lifestyles. As consumers shift towards lifestyles with less time available for food preparation, the demand for processed food has grown. At the same time, globalization and trade liberalization have increased the presence of processed foods in LMICs, and both of these factors have changed the nature of and demands on food systems. Data available for LMICs document this trend in all urban areas and increasingly in rural areas (Popkin *et al.*, 2012).

Box 1

Global magnitude of overweight, obesity and diet-related non-communicable diseases

In 2016, more than 1.9 billion adults aged 18 years and older were overweight (WHO, 2018b). Of these 672 million were obese (FAO *et al.*, 2018). A review by Kanter and Caballero (2012) concludes that the prevalence of overweight and obesity among men and women varies greatly within and between countries, and overall, women are more obese than men.

These gender disparities in overweight and obesity are exacerbated among women in low-income countries, particularly in the Middle East and North Africa. Yet, in developed countries, more men are overweight than women.

In 2016, over 340 million children and adolescents aged 5-19 years were overweight or obese; the estimated prevalence of overweight (including obesity) globally was 19% among boys and 18% among girls (WHO, 2018b).

In 2017, the estimated prevalence of overweight among children under five years was 5.6% (38 million children), with 46% of all overweight children living in Asia and 25% in Africa. The number of overweight children under five years in lower-middle-income countries has increased more rapidly than in other countries (FAO *et al.*, 2018).

In 2010, overweight and obesity accounted for 3.4 million deaths, 4% of years of life lost, and 4% of disability-adjusted life years (DALYs) worldwide (Lim *et al.*, 2012).

In 2016, NCDs were responsible for 41 million (71%) of the world's 57 million deaths. Overweight and obesity are major risk factors for NCDs like diabetes, hypertension, coronary heart disease, stroke, musculoskeletal disorders and certain types of cancer, resulting in high demands on health systems (WHO, 2014; WHO, 2018d). Globally, 44% of adult diabetes cases, 23% of ischaemic heart disease and 7 to 41% of certain cancers are attributable to overweight and obesity (WHO, 2009). Evidence shows that childhood overweight increases the risk of early onset of diabetes and hypertension (Kelsey *et al.*, 2014). Early preventive interventions, in particular during childhood, represent opportunities to reduce comorbidities in children and the future burden of NCDs (Commission on Ending Childhood Obesity, 2016).

The economic cost of overweight and obesity arises primarily from increased spending on health care and reduced economic productivity (WHO, 2011). The cost of all obesity- and overweight-related NCDs was estimated at US\$1.4 trillion in 2010 (FAO, 2013a). The World Economic Forum estimated in 2011 that if nothing is done to reduce the risk of NCDs, US\$47 trillion will be lost over the next two decades due to overweight- and obesity-related NCDs (Bloom *et al.*, 2011). If low- and lower-middle-income countries put in place the most cost-effective interventions for NCDs, by 2030 they would see a return of US\$7 per person for every dollar invested (WHO, 2018a).

Purpose of this guidance note

This guidance note supports the use of a comprehensive food systems approach (rather than a sectoral approach) and gives guidance on how to use food systems entry points to guide the delivery of healthy diets and subsequently address all forms of malnutrition. However, particular focus is given to tackling overweight and obesity and preventing NCDs through healthier diets because of their increasing prevalence globally. The food systems approach detailed in this guidance note encompasses the creation of enabling food environments alongside cross-government policy dialogue. It aims to support decision-makers and stakeholders in the food and agriculture sector by addressing the following questions:

- How can each domain of the food system be coordinated to better contribute to healthy diets in order to prevent all forms of malnutrition, in particular overweight and obesity as well as diet-related NCDs?
- What changes in the food system are needed? What are the policy options that would positively impact people's diets?
- What is the best way to actually bring about policy change?

This policy guidance note examines the various policy and intervention opportunities arising across the food system to support increased availability of and better access to affordable healthy diets. Through a stepwise approach, the guidance note supports decision-makers and stakeholders to better understand the interactions between the relevant policy instruments for reshaping food systems and creating enabling food environments in support of healthy diets, identify policy options and understand the political economy in order to facilitate policy change.



Global frameworks tackling obesity and/or non-communicable diseases

Successful implementation of effective obesity preventive policy measures by governments depends on strong political commitment by the government, full involvement of all government sectors (e.g. food and agriculture, health, education, finance, trade, commerce, social protection, transport, urban planning) and effective coordination (Branca *et al.*, 2007). Global policy frameworks give direction and often provide a set of policy measures which governments may incorporate as appropriate into their national policies and action plans (FAO and WHO, 2014).

Two International Conferences on Nutrition (ICN) have been organized thus far, both organized by FAO and the World Health Organization (WHO) and convened in Rome, Italy. While the first ICN, held in 1992, provided the basis for the development of national nutrition policies globally for achieving and maintaining health and nutritional well-being of all people (FAO and WHO, 1992), the second ICN, held in 2014, called on country representatives to adopt a common vision for global action to eradicate hunger and end all forms of malnutrition worldwide (FAO and WHO, 2014). At ICN2, two outcome documents were adopted: the *Rome Declaration on Nutrition* with ten commitments; and the *Framework for Action* with 60 voluntary policy options and strategies. ICN2 has also reiterated that the persistence of gender inequalities and the continued violations of women's rights are among the root causes of women and child malnutrition. This is why nutrition-related policies should pay special attention to women and empower women and girls. One ICN2 commitment specifically refers to food systems: "*enhance food systems by developing coherent public policies from production to consumption across relevant sectors to provide year-round access to food that meets people's*

nutrition needs and promote safe and diversified healthy diets" (FAO and WHO, 2014). The ICN2 Framework for Action recognizes that sustainable food systems are key to promoting healthy diets and provides a set of nine supporting recommendations (#8-#16). Concurrently, recommendations #38 to #41 in the ICN2 Framework for Action target actions to specifically address childhood overweight and obesity (Box 2).

Recognizing the heavy and growing burden of NCDs, the World Health Assembly endorsed various strategies for the prevention and control of NCDs (WHO, 2000, 2004, 2008, 2013a). The 2004 *Global Strategy on Diet, Physical Activity and Health*, in particular, states that governments have the responsibility to ensure that "national food and agricultural policies are consistent with the protection and promotion of public health. Where needed, governments should consider policies that facilitate the adoption of a healthy diet. Food and nutrition policy should also cover food safety and sustainable food security. Governments should be encouraged to examine food and agricultural policies for potential health effects on the food supply" (WHO, 2004).

The United Nations (UN) General Assembly acknowledged the ICN2 commitments by including in the 2030 Agenda for Sustainable Development a specific Sustainable Development Goal (SDG) to end hunger, achieve food security and improved nutrition, and promote sustainable agriculture (SDG2), as well as embedding nutrition-related concerns in the other SDGs, such as in SDG3 "Ensure healthy lives and promote wellbeing for all at all ages" (UN, 2015).

Proclaiming the years 2016 to 2025 as the UN Decade of Action on Nutrition, the UN General Assembly in April 2016 committed Member States to ten years of sustained and coherent nutrition action (UN, 2016). The primary objective of the Nutrition Decade is to increase nutrition investments and implement policies and programmes to improve food security and nutrition within the framework agreed at ICN2. The Nutrition Decade, under the normative framework of ICN2

Box 2 ICN2 Framework for Action (FAO and WHO, 2014)
Recommended actions for sustainable food systems promoting healthy diets

Recommendation 8: Review national policies and investments and integrate nutrition objectives into food and agriculture policy, programme design and implementation, to enhance nutrition sensitive agriculture, ensure food security and enable healthy diets.

Recommendation 9: Strengthen local food production and processing, especially by smallholder and family farmers, giving special attention to women's empowerment, while recognizing that efficient and effective trade is key to achieving nutrition objectives.

Recommendation 10: Promote the diversification of crops including underutilized traditional crops, more production of fruits and vegetables, and appropriate production of animal-source products as needed, applying sustainable food production and natural resource management practices.

Recommendation 11: Improve storage, preservation, transport and distribution technologies and infrastructure to reduce seasonal food insecurity, food and nutrient loss and waste.

Recommendation 12: Establish and strengthen institutions, policies, programmes and services to enhance the resilience of the food supply in crisis-prone areas, including areas affected by climate change.

Recommendation 13: Develop, adopt and adapt, where appropriate, international guidelines on healthy diets.

Recommendation 14: Encourage gradual reduction of saturated fat, sugars and salt/sodium and trans-fat from foods and beverages to prevent excessive intake by consumers and improve nutrient content of foods, as needed.

Recommendation 15: Explore regulatory and voluntary instruments – such as marketing, publicity and labelling policies, economic incentives or disincentives in accordance with Codex Alimentarius and World Trade Organization rules – to promote healthy diets.

Recommendation 16: Establish food or nutrient-based standards to make healthy diets and safe drinking water accessible in public facilities such as hospitals, childcare facilities, workplaces, universities, schools, food and catering services, government offices and prisons, and encourage the establishment of facilities for breastfeeding.

Recommended actions to address childhood overweight and obesity

Recommendation 38: Provide dietary counselling to women during pregnancy for healthy weight gain and adequate nutrition.

Recommendation 39: Improve child nutritional status and growth, particularly by addressing maternal exposure to the availability and marketing of complementary foods, and by improving supplementary feeding programmes for infants and young children.

Recommendation 40: Regulate the marketing of food and non-alcoholic beverages to children in accordance with WHO recommendations.

Recommendation 41: Create a conducive environment that promotes physical activity to address sedentary lifestyle from the early stages of life.

and the 2030 Agenda for Sustainable Development, marks a new ambition and direction in global nutrition action: to eradicate hunger, end malnutrition in all its forms (undernutrition, micronutrient deficiencies, overweight or obesity) and reduce the burden of diet-related NCDs in all age groups.

In addition to global frameworks, there are various examples of regional initiatives or translation of global policy frameworks into regional strategies addressing the prevention and control of NCDs and/or obesity through the promotion of healthy diets (Annex).

A food systems approach to healthy diets

A food systems approach to healthy diets focuses on using entry points within the food systems to influence the consumption of healthy diets by populations with the aim of attaining optimal nutritional status. The concept of a food system encompasses all of the processes and people involved in taking food from agricultural production through to consumption. FAO defines the food system as: “encompass[ing] the entire range of activities involved in the production, processing, marketing, consumption and disposal of goods that originate from agriculture, forestry or fisheries, including the inputs needed and the outputs generated at each of these steps. Food systems also involve the people and institutions that initiate or inhibit change in the system as well as the sociopolitical, economic and technological environment in which these activities take place” (FAO, 2013a).

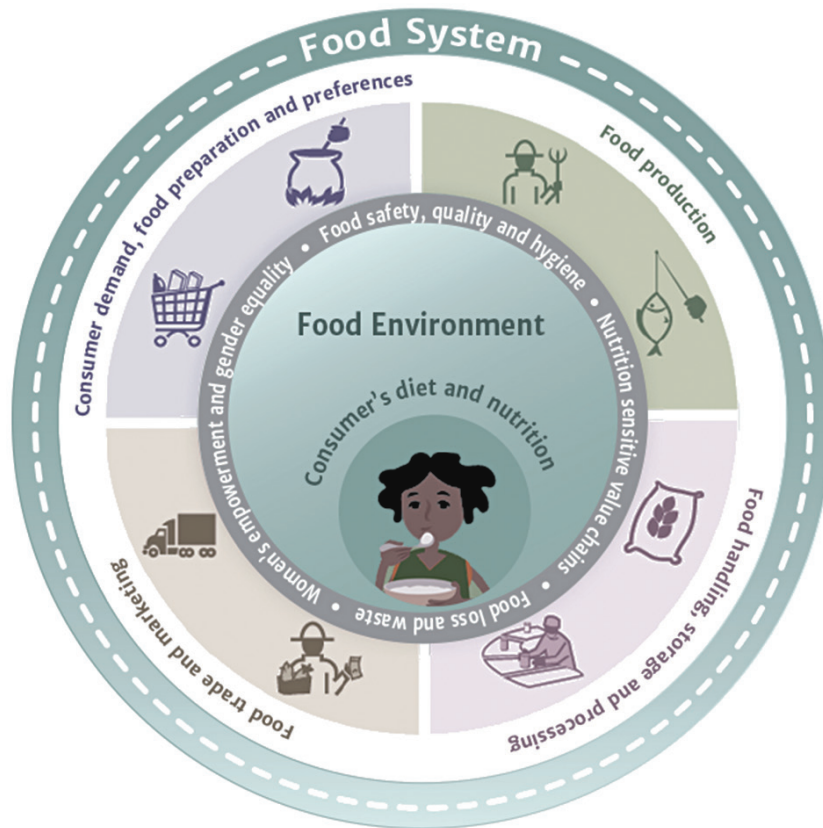
Importantly, incorporated within the concept of a food system is the broader notion of a “system,” which implies that the component parts work together and are in a dynamic relationship with one another. Therefore, making a change in one part of the food system can have an impact on another part of the system. This is called a complex adaptive system (Institute of Medicine and National Research Council, 2015). This dynamic relationship is the underlying rationale for addressing healthy diets and good nutrition

through a food systems approach: changing one part of the food system can help shift the whole system towards better supporting healthy diets and improving nutrition, which ultimately means it is easier for the population to access and maintain a healthy diet. However, changing one aspect of the food system can also result in unintended or unexpected consequences to other parts of the system, and these trade-offs need to be considered in food systems diagnosis and analysis for policy-making. Every aspect of the food system can influence the availability, quality and accessibility of diverse, safe and nutritious foods and thus the ability of consumers to opt for healthy diets and develop healthy eating habits at all stages of their life.

Despite this dynamic relationship between food systems and diets, agriculture, food and dietary policies are rarely designed in concert. Agricultural production policies do not typically incorporate a nutrition perspective – for example, how production of one crop over another could affect the nutritional status of the population. Likewise, nutrition policies typically do not incorporate the status and potential limitations of the food system – for example, recommending populations to eat daily at least 400 grams of fruits and vegetables (excluding potatoes and other starchy tubers) without considering if the food system will provide that quantity of fruits and vegetables at an affordable price to the entire population (Institute of Medicine and National Research Council, 2015). A food systems approach to healthy diets aims to make these interlinkages explicit in policy development and implementation (FAO, 2013b).

The functions of a food system can be grouped in various ways. Figure 1 gives an example of a grouping, which presents four broad categories: food production; food handling, storage and processing; food trade and marketing; and consumer demand, food preparation and preferences (FAO, 2017a). Food system policies can be developed to address each of these four functions, as will be discussed later in the document.

FIGURE 1: Functions of the food system in linkage with consumers through the food environment as the interface



Source: Adapted from FAO, 2017a.

The interface between the four functions of the food system and consumers' diets is the food environment. It is referred to as the settings where foods are made available and accessible for purchase and consumption: supermarkets, small retail outlets, wet markets, street food stalls, cafes, tea houses, school and workplace premises (e.g. canteens, vending machines), restaurants and all the other places where people buy and eat food. The food environment determines what food consumers can access at a given moment in time, at what price and with what degree of convenience and desirability, thus greatly influencing their dietary intake (FAO, 2016b). Food environments influence the impact of the four functions of the food system on individual diet choice and diet quality through a variety of factors (FAO, 2016b), including food labelling, food marketing, food prices, physical access, and nutrient quality and taste (Swinburn *et al.*, 2013). In other words, food environments are the places where food supply and food demand interface – the physical, political and socio-cultural contexts in which consumers engage with the food system and make decisions about acquiring, preparing and consuming food (HLPE, 2017). As discussed above, the food environment is rapidly changing in many countries due to globalization and trade liberalization.

■ Food production

Food production encompasses crop production, livestock rearing, fisheries and forestry, and each of these can operate in rural and urban settings and within small-, medium- and large-scale operations. Food production also covers management of natural resources and infrastructures that support production, such as how soil and biodiversity are preserved. Food production systems feed into the rest of the food system, and are essential to ensure that safe, sufficient, diversified and nutritious food is available and affordable for the entire population. In addition, food production methods play a critical role in sustaining rural livelihoods and shaping – and ideally protecting – natural environments and landscapes (FAO, 2017a).

The link between food production and healthy diets is clearly illustrated with the case of fruits and vegetables. Sufficient daily intake of fruits and vegetables of at least 400 grams reduces the risk of NCDs such as cardiovascular diseases and certain cancers (FAO and WHO, 2005). However, should the entire global population attempt to achieve this level of fruit and vegetable intake, their current supply would not meet demand (Siegel *et al.*, 2014). In certain countries, pulses, nuts and adequate animal-source foods are also not available or affordable enough for everyone to have sufficient intake (Herforth, 2015). This is due, in part, to a heavy focus on staple food production and public support policies and investments towards these foods, which have made grains and starchy staples relatively cheaper than more nutritious non-staples such as fruits, vegetables, nuts and pulses. Furthermore, global demand for these more nutritious foods is increasing, and yet this increasing demand has not yet been translated into increased supply due to higher risks involved in producing these foods and incentive structures which help to maintain a focus on staple food production (Pingali, 2015).

■ **Food handling, storage and processing**

Post-harvest food handling, storage and processing refer to the ways in which crops are transformed in preparation for sale in the market. This includes processing of produce, transportation, storage and packaging, among others. These steps are essential for preserving food, increasing its shelf-life and preventing food loss, which in turn stabilizes food supply and prices throughout the year. Proper food handling, storage and processing also broaden the range of food products that can be consumed and improve safety, digestibility and palatability (FAO, 2017a). Taking into account the role of women in food handling and processing at household level is also of high importance. As they are very often the main food handlers within rural household as well as the main players

in food preparation, it is paramount to target them in sensitization and training on safe food handling and processing.

Food handling is an important and necessary step in improving the supply of food for healthy diets and improved nutrition. This is particularly true for nutrient-dense foods, such as vegetables and animal-source proteins, which are more perishable; for example, drying and freezing are examples of processes to protect the nutritional value of foods and extend their shelf-life. However, food processing can also adversely affect the profile of a product in such a way that it does not contribute to healthy dietary practices – for instance, if large amounts of saturated and trans-fats, sugar and/or salt are used to enhance shelf-life or improve taste profiles. Processing can also result in the removal of whole grains and dietary fibre. There is increasing evidence that highly processed food products are typically energy-dense and higher in levels of fat, sugar and/or salt and are associated with increased risk for NCDs and obesity (Monteiro *et al.*, 2011). These products are becoming increasingly available globally, including in lower-income countries (Monteiro *et al.*, 2013).

■ **Food trade and marketing**

Food trade serves to bring food to consumers from the locations where it is produced and processed. In today's globalized world, food trade operates at multiple levels, including domestic, regional and international. Food trade can influence nutrition through the stability, diversity and price of the food supply, and increasing trade may be associated with increased incomes to enable better access to food. The influences of trade on healthy diets can also be negative, particularly if trade increases the availability and accessibility of less nutritious foods through the global market (FAO, 2015b).

Food trade also encompasses food marketing, which refers to all activities, actors and related infrastructures and regulations around

the physical sale of food (e.g. wholesale, retail, catering) and its promotion (e.g. labelling, pricing, branding, advertising) (FAO, 2017a). The food retail sector heavily influences the food that people buy, as it plays a key role in providing year-round access to foods that cover people's nutrient needs. This is important given that almost all people purchase some or all of their food (FAO, 2016b, 2017a). Even the majority of smallholder farmers and growers are net buyers of food, meaning they buy more than they sell (FAO, 2011). Consumer choices are influenced by how foods are presented, how retail outlets are organized physically, and the relative prices of nutritious and less nutritious foods (FAO, 2017a). Therefore, in order to reduce malnutrition in all its forms, food system policies need to include a focus on what markets provide and how they are influencing consumers' diets. Widespread marketing communications for foods high in sugar and/or fat targeted at children are of particular concern, as these communications influence their eating behaviour and preferences (Sadeghirad *et al.*, 2016) – which can track well into adulthood and increase the risk of obesity and NCDs. In contrast, products that are minimally processed, such as fruits and vegetables, may not be branded and therefore are usually less prominent in food marketing.

■ **Consumer demand, food preparation and preferences**

The preferences and purchases of consumers influence and are influenced by the food system. Household purchasing power, culinary heritage, the age and health of an individual and their taste preferences shape what they buy, but these choices are always made within a food environment which offers a specific array (rather than a limitless list) of choices, which in turn shape food preferences (Birch, 1999). This overall choice architecture interacts with individual factors to deliver specific food choices. Once food is purchased, a host of

factors also influence an individual's food consumption, including household food preservation, preparation and cooking practices, and intra-household distribution of food (i.e. if one household member is allocated more food than another) (Brug, 2008; Wibowo *et al.*, 2015). To support a market for diverse and nutritious food, consumer demand and preferences need to be aligned with a healthy diet. In order to stimulate this demand and shift food preferences, the food system and food environment must be supportive and healthy. Social protection schemes such as subsidies, school feeding programmes and consumer education are important mechanisms for supporting consumer demand, consumption of affordable, palatable nutritious food, and shaping food preferences including convenience for the longer term (FAO, 2017a). All efforts to improve nutritional knowledge and eating behaviours are preferably underpinned by national or regional food-based dietary guidelines (WHO and FAO, 1998). As consumers are becoming increasingly dependent upon processed foods, it can be difficult for them to know the nutritional profile of these foods and how to apply advice for a healthy diet. Therefore, it is important that consumers have access to easy-to-understand labelling of ingredients and nutrients at the point of purchase or consumption (Cowburn and Stockley, 2005). However, taking a food systems perspective, nutrition labelling in isolation is unlikely to achieve a shift towards healthier diets – it must be done in combination with other policies (such as reformulation of foods that are high in fat, sugar and/or salt) and efforts to improve food environments and enable consumers to shift towards healthier food choices (Roberto *et al.*, 2015). It is important to note that food system actors have a variety of techniques for understanding and shaping consumer demand, including surveying their customers, trialling new or reformulated products, and varying the position of products and their promotions

within the retail environment. However, their understanding of consumer demand, and the interactive nature of food offer and demand, may include assumptions which can result in a mismatch between what is supplied and what would be consumed if the choices on offer were different (Moisander *et al.*, 2010).

■ **Food system-wide policies**

The food system and the food environment provide various entry points for nutrition-sensitive or nutrition-driven policy measures and interventions. However, no single intervention will reverse or halt the increasing prevalence of overweight and obesity and the disease burden of NCDs. Thus, a food systems approach to diets necessarily requires comprehensive programmes and coherent public policies that address both the supply and demand sides of food as well as interventions related to the food environment. These policies and interventions will be described in detail in the next section of this document.

An investment policy, programme or project can be considered **nutrition-sensitive** if it aims to contribute to better nutrition by addressing some of the underlying determinants of nutrition – access to safe and nutritious foods (quantity and quality/diversity), adequate care, and a healthy and hygienic environment (FAO, 2016a).

■ **Stakeholders in a food systems approach to healthy diets**

Implementing comprehensive and coherent food system policies will require the participation of a number of key stakeholders and sectors, ranging from government to large food manufacturers, to smallholder farmers and more. Some of the key stakeholders and partners in a food systems approach to healthy diets are described in the paragraphs that follow.

Government - A variety of national government departments and policies affect the food system, including agriculture and trade policies and government investment in infrastructure and research and development programmes (FAO, 2013a). Policies targeting consumers and their behaviours, such as excise taxes on certain food products or government-run or -supported food programmes, such as school meals, also have an impact on the food system. Government departments and agencies involved in the food system span across sectors, including those that deal with agriculture, health, food safety, international trade, budget and taxation, education, and employment and working standards. Government at the local city level is also important because it can play a large role in shaping the local food environment. Regional and international governance arrangements also have an impact on food systems, particularly the international regulations around trade as stipulated by the World Trade Organization.

Producers, farmers and fishers - The farming sector ranges from large-scale industrialized farms, which typically specialize in one or a few crops for the local or international markets, to small-scale family farms that grow a variety of subsistence and cash crops. Both wild and farmed fish are included in the fishery sector, and fish products are widely traded in developing countries (FAO, 2017a). This sector is responsible for the primary production of food and is therefore heavily influential in the availability and affordability of diverse and nutritious food.

Processors, wholesalers and manufacturers - Apart from traditional food systems, a small amount of food in the system passes directly from producers to consumers (e.g. through a farmers' market), whereas the majority of food produced on farms is sold to a processor, wholesaler or manufacturer for processing, packing, storage, and/or transformation of the crop or commodity. These entities range from small commodity trading companies and cooperatives of farmers to small and medium enterprises to large food manufacturers that transform the raw material into processed and packaged food products (Institute of Medicine and National Research Council, 2015).

Retailers, caterers and out-of-home food providers - Businesses that sell food products directly to the consumer are retailers, caterers and out-of-home food providers, and serve as the link between processors, wholesalers, manufacturers and the consumer. Typically a retailer refers to a store selling food products that will need to be prepared, assembled, heated or cooked at home, in contrast to caterers and out-of-home food providers

(e.g. restaurants), which sell fully prepared and ready-to-eat foods. In many countries, there is an increasing trend towards consolidation in the food retail sector (from individual salespeople to retail businesses), as domestic and multinational retailers become larger and present in more countries (Stiegert and Kim, 2009). Similarly, the out-of-home eating environment is changing in many countries with the arrival and proliferation of multinational fast food companies which compete with traditional or local street food and restaurants (FAO, 2004).

Consumers and citizens - Consumer preferences and purchases, influenced by income, relative food prices, knowledge and skills, time and convenience, culture and other factors, drive the demand for foods, which in turn influences and supports the system of food production as well as its sale and marketing (FAO, 2013a). Consumers can also actively change their food environments and demand changes to food systems. Therefore, consumers are not passive recipients in the food system; through consumer demand, action and advocacy, they can be important actors in the system.



Stepwise approach Policy focus on “nutrition-sensitive” food systems

To tackle the overarching question of *what changes are needed to existing policies spanning the food system to enable healthy diets and how might these changes be achieved*, a stepwise approach is suggested. However, though this approach is presented here in discrete steps, it is not a linear process in practice and often involves a cycle of review, evaluation and prioritization, and repeated attempts at policy change will likely be necessary (Figure 2).

The first step is a country situational analysis, to understand a country’s food systems and how they contribute to the nutrition challenges in the country. The second step maps the key policies shaping the food system. The third step seeks to identify the specific policy levers that could be applied at various entry points throughout food systems to enable healthy diets and nutrition-sensitive food systems and thus improve the nutritional outcomes of the population. The fourth step focuses on how to facilitate policy change.

FIGURE 2: Four steps to sharpen the policy focus on “nutrition-sensitive” food systems



Step 1 CONDUCTING A SITUATIONAL ANALYSIS

The first step is to better understand food system developments and the impacts that these can have, including on the prevalence of undernutrition, overweight, obesity and diet-related NCDs among various population groups. This analysis includes assessing the nature of the food environment in various settings as well as existing food consumption patterns, and drivers of food choices for both the current situation and likely future trends.

The situational analysis should answer the following questions, which will lead to an understanding and categorization of the food system(s) in the country:

- What is the current situation and potential future trend in terms of undernutrition, micronutrient deficiencies, overweight, obesity and NCDs? Which population groups are most affected (age, sex, ethnicity, socio-economic status and geography)?
- What are the elements of the existing food system(s) that contribute to less desirable nutritional outcomes, undernutrition, overweight, obesity and diet-related NCDs?
- How does usual dietary intake compare to the country's food-based dietary guidelines? Which foods/food groups are particularly problematic due to excessive or limited consumption?
- How accessible and affordable is nutritious food? How much does it cost

to purchase a healthy and sufficient basket of foods? What is the relative cost of nutritious and less nutritious foods (e.g. foods and beverages that are high in fat, sugar and/or salt)? Are food prices stable or sensitive to shocks?

- What proportion of the diet is coming from eating at home versus eating out of the home? What are the important food settings (e.g. schools or workplaces) for at-risk groups? What types of food are commonly consumed outside the home?
- What other aspects of the food environment are likely to be influencing consumption (e.g. convenience, advertising, formulation/recipes of processed products or prepared meals, safety, labelling)?

Case study for conducting a situational analysis from the UK

A think tank in the UK conducted a situational analysis of the food system through the lens of a typical British family of average income, with two children. They first took the national data on overweight, obesity, type-2 diabetes and dental cavities and disaggregated the prevalence for households of average income. They then looked at consumption data to understand the nutrients in their diet and how these compared with the national dietary guidelines. They looked at the national food expenditure survey to understand how much they were spending on food (both for eating at home and for eating out). They used commercially sourced data on retail purchases to obtain a breakdown of the typical items in the shopping basket of a typical family, as well as looking at the most popular places to eat out for this income household. They then used published literature and primary data, gathered through snapshot surveys, to

explore the typical drivers of food choice and characteristics of the food environment. To do this, they charted trend data on the availability of outlets to buy and eat food, the nature of food advertising, the relative prices of nutritious and less nutritious foods in both the retail and eating-out facilities, the nutritional profile of processed products which were among the top 20 items in the typical family's basket, and the quality of labelling on these products. They then took 3 items among the top 10 in the family's basket and traced these items back to the producers, outlining the processes which were undertaken and timeline followed from production to purchase. This information was gathered using focus group interviews and web research.

This systematic account, using primarily secondary sources, took approximately six months to complete but served to document the ways in which the food system and the food environment were contributing to extremely poor diets and high levels of dietary disease for typical British families (Food Foundation, no date).

TABLE 1: Situational analysis indicators and data sources

Key Indicator	Potential Data Sources
Status of underweight, stunting, micronutrient deficiency, overweight and obesity	<ul style="list-style-type: none"> ■ Nationally representative health surveys (if available) ■ Literature review of existing research ■ WHO Nutrition Landscape Information System, Global Nutrition Monitoring Framework, global databases on body mass index and child growth and malnutrition
Usual dietary intake and food behaviours	<ul style="list-style-type: none"> ■ Nationally representative dietary intake and food behaviour surveys ■ Food availability data from FAO ■ The FAO/WHO Global Individual Food Consumption Data Tool and the Global Dietary Database ■ Literature review of existing research
Affordability of a healthy diet	<ul style="list-style-type: none"> ■ Nationally representative food purchase/expenditure surveys (if available) - Calculate expenditure on a healthy shopping basket and if affordable for the majority of the population compared to a less nutritious shopping basket ■ Literature review of existing research ■ Indicators and tools for cost of diets (Cost of Nutrition Diets Consortium, 2018) ■ FAO Food Price Monitoring and Analysis and FAOSTAT
Diversity and stability of the food supply	<ul style="list-style-type: none"> ■ Food availability data and assessment of food security from FAOSTAT
Healthfulness of the food environment in various settings	<ul style="list-style-type: none"> ■ Surveys and analysis of the food environment from existing research (if available) ■ Systematic walks in city environments to document food availability, in-store labelling spot-checks, review of websites for manufactured products ■ Public procurement guidelines compared to food-based dietary guidelines

- Where does food come from and at what times of the year? What are the levels of self-sufficiency for different food categories? What countries is food coming from? What is the security of supply?
- Which actors and sectors can influence national determinants of dietary habits and policies which affect the food system? What are the entry points for influencing change?

- Who is mainly responsible for food purchases and food preparation? What cultural and other contextual factors affect the diet (e.g. religious behaviours, cultural taboos)?
- Potential data sources for answering these questions are described in Table 1; however, there may be existing reviews and evidence that can be built upon or updated.

Once these indicators have been collected, one will have an indication of the functionality of the food system from the nutrition perspective.

The next step is to classify the type of food system operating in the country as proposed by the High Level Panel of Experts (HLPE) (Table 2). However, it is important to note that multiple food systems can be present in a country, and that while classification is helpful in prioritizing policy options, food systems are dynamic and interactive, and the typology of food systems should not be seen as a rigid system. The three broad types of food systems are traditional, mixed and modern, and their characteristics are summarized in Table 2.

In order to identify the overarching type of food system in a country, the situational analysis should include assessing food production, storage and distribution, processing and packaging, and retail markets. The information in Table 2 indicates which aspects of these categories to assess – for example, in food production one would look at the size and location of food producers and whether they are primarily local smallholder farmers or large global food producers. The typology from the HLPE, however is only one possible classification for food systems, and others are available including from the UN System Standing Committee on Nutrition (UNSCN, 2016b).

TABLE 2: Food system types and their food supply chains

Food supply chains	Traditional food systems	Mixed food systems	Modern food systems
Production (availability)	Food is mainly produced by smallholders in the area and most of the foods available are local and seasonal.	Food production takes place at both local smallholder farms and larger farms that are farther away. There is greater access to foods outside their typical season.	A wide array of foods is produced at farms ranging from small to industrial in size. Production is global, so foods are available from anywhere and at any time.
Storage and distribution	Lack of adequate roads makes transporting food difficult and slow, leading to food waste. Poor storage facilities and lack of cold storage makes storing food, especially perishables, difficult and leads to food safety concerns and waste.	There are improvements in infrastructure with better roads, storage facilities and increased access to cold storage; however, these are usually not equally accessible, especially for the rural poor.	Modern roads, storage facilities and cold storage make it easy to transport food on long distances and store it safely for long periods of time.
Processing and packaging	Basic processing is available such as drying fruits, milling flour or processing dairy. Little or limited packaging occurs.	Highly processed packaged foods emerge and are more accessible. These extend the shelf life of foods.	Many processed packaged foods are easily available, often cheap and convenient to eat, but sometimes less nutritious.
Retail and markets	Low diversity and density of food retail options leads to a heavy reliance on informal kiosk and wet markets.	Greater diversity of both informal and formal bodegas, corner stores and markets. More access to meals eaten outside the home, including street food and fast food.	High diversity and density of "food entry points", including all of the options in the other systems as well as larger super- and hypermarkets, fast casual food and fine dining restaurants.

Source: Adapted from HLPE, 2017.

The overarching type of food system in the country and its functionality from the nutrition perspective is the starting place for assessing the potential for food system policy changes for healthy diets. The next step is to undertake a more comprehensive analysis of food system policies rooted in the country's context.

Step 2 MAPPING THE POLICY LANDSCAPE

This step identifies and describes the main policy instruments in place (or lacking) in relation to the food system and addressing nutrition challenges.

- What are main national policy instruments for food, supporting healthy diets and the prevention of overweight, obesity and diet-related NCDs in the country? These policies typically fall under the following topics:
 - Health policies and priorities
 - Agriculture and food security policies
 - Environmental policies
 - Education policies
 - Social protection policies including welfare
 - Gender equality policies and strategies
 - Development, women's development and population policies
 - Other policies related to food supplies and nutrition
 - Macroeconomic policies, for example relating to exchange rates, wages, prices and foreign trade

Examples of global and regional policy frameworks that address policy measures for improving nutrition as well as preventing obesity or NCDs can be found in the Annex.

■ **Policy options by food system function**

The evidence is strong that a comprehensive package of policies can promote healthier eating and prevent obesity and NCDs (Swinburn *et al.*, 2011; IFPRI, 2016; HLPE, 2017). Each of the four food system functions can support a healthy diet, whereby the more nutritious option can be the easy, accessible and affordable option for the population (WHO,

2018b). This step 2 section will outline the policy options across the four food system functions that support a healthy diet, and Table 3 gives an overview of examples of policy measures within each function of the food system that intend to support the promotion of healthy diets in a given context. While this table presents the policy options by food system function, it is important for policies, interventions and investments to be coherent across the food system to ensure that nutritious foods produced are available and accessible to all populations.

■ **Food production**

Policies and interventions in the food production category aim to improve the nutritional content of the food that is produced by the country's agricultural system, and therefore influence the price and accessibility of the food that is available. These include investments in infrastructure and research and development (R&D) for fruit and vegetable production, as well as incentives such as subsidies for fruits and vegetables (FAO, 2013a; Pingali, 2015). Other policies in this category seek to improve the production and sourcing of nutritious and sustainable sources of protein, such as beans, legumes, fish and sustainably produced lean meats. Policies in this function of the food system might support small and medium producers, invest in infrastructure and R&D for nutritious food production, for instance micronutrient-rich biofortified crops (e.g. iron, zinc or vitamin A-rich crops), or promote school and home gardens. It is also important to preserve traditional foods and local biodiversity (Khoury and Jarvis, 2014). This can be done through the implementation of voluntary standards (e.g. organic agriculture), guidelines (FAO, 2015c) or the recognition of Globally Important Agricultural Heritage Systems.

■ **Food handling, storage and processing**

Policies and interventions in this category aim to improve the nutritional content of foods and beverages as they are processed. This includes

TABLE 3: Examples of existing policy measures across four functions of the food system that intend to support the promotion of healthy diets in a given context

Food production	Food handling, storage and processing	Food trade and marketing	Consumer demand, food preparation and preferences
<p>Examples include...</p> <hr/> <p>Incentives to encourage fruit and vegetable production (such as subsidies, special lines of credit for infrastructure, and funding facilities for marketing) (Dangour <i>et al.</i>, 2013; Mozaffarian <i>et al.</i>, 2012; Herforth, 2010)</p> <hr/> <p>Policies which support nutrition-promoting farming systems, agronomic practices and crops; micronutrient fertilizers; biofortified crops; integrated farming systems, including fisheries and forestry; crop and livestock diversification (FAO, 2013a)</p> <hr/> <p>Promotion of school and home gardens (Ohly <i>et al.</i>, 2016; Masset <i>et al.</i>, 2011)</p> <hr/> <p>Voluntary standards (such as Geographical Indications) and Globally Important Agricultural Heritage Systems to safeguard traditional food and biodiversity (HLPE, 2017)</p>	<p>Examples include...</p> <hr/> <p>Standards for food hygiene and safety for street food vendors and other food service establishments to ensure that food is safe to eat (HLPE, 2017)</p> <hr/> <p>Investment in cold chain infrastructure including transportation and storage to improve access to healthy, perishable products (FAO, 2013a)</p> <hr/> <p>Reformulation of processed foods to deliver better nutritional profiles (e.g. reduction of salt, including adjusting iodine content where relevant, and elimination of trans-fats) (He and MacGregor, 2009; WHO-EURO, 2015a)</p> <hr/> <p>Milling standards (degree of refinement and micronutrient fortification) which influence the nutritional quality of milled staples (FAO, 2013a)</p> <hr/> <p>Support to small and medium enterprises for nutritious food (lower business rates, technical assistance, access to credit) (FAO, 2017a)</p>	<p>Examples include...</p> <hr/> <p>Taxation measures to influence the relative prices of nutritious and less nutritious foods (Thow <i>et al.</i>, 2010; Mozaffarian <i>et al.</i>, 2012)</p> <hr/> <p>Regulations which control advertising and marketing of foods and soft drinks high in fat, sugar and/or salt to children (WHO, 2010)</p> <hr/> <p>Regulations controlling retail and food service chains, particularly those affecting licensing, urban planning and foreign direct investment</p> <hr/> <p>Support for business models which link small producers to consumers and lead to shorter supply chains (e.g. community supported agriculture) (Curtis <i>et al.</i>, 2013)</p>	<p>Examples include...</p> <hr/> <p>Food labelling policy, including nutrition information and health and nutrition claims. Labelling can apply to food products and to menus (Cecchini and Warin, 2016; Mozaffarian <i>et al.</i>, 2012)</p> <hr/> <p>Standards and rating schemes for retailers and food service businesses which evaluate the healthiness of their offer (Hillier-Brown <i>et al.</i>, 2017)</p> <hr/> <p>Government-endorsed nutrient profiles to identify foods and beverages that are high in fat, sugar and/or salt and food-based dietary guidelines. Both of these can be used to inform policies across the food system guidelines to guide how citizens should eat and how procurement policies should be developed (FAO and University of Oxford, 2016; WHO-EURO, 2015b)</p> <hr/> <p>Procurement policies for food served in public places (e.g. schools, hospitals, prisons, and armed forces) (Ganann <i>et al.</i>, 2014; Niebylski <i>et al.</i>, 2015)</p>

policies to improve food hygiene and safety, investment in the cold chain infrastructure to improve storage and access to nutritious perishable products, solar drying techniques in preservation of crops, and other standards to improve the nutritional content of foods as they are processed. Policies in this realm also seek to improve market-level efficiencies and access to nutritious foods such as fruits and vegetables, for example by promoting investments in storage facilities at marketplaces or by reducing food loss and waste through appropriate packaging. Well-functioning market linkages can serve to reduce food losses (e.g. of perishable fruits and vegetables), thereby increasing the overall supply of nutritious foods supportive of a healthy diet.

This category also includes food product reformulation policies, which encourage or require manufacturers to reduce the amount of fat, sugars, salt or calories in their products, and they have been successfully used in the UK, Denmark and Hungary (He *et al.*, 2014; Restrepo and Rieger, 2016). Policies to eliminate trans-fats in processed foods have been particularly successful (WHO-EURO, 2015a). However, reformulation efforts that are entirely voluntary, rather than mandated by government, have been less successful (Knai *et al.*, 2015; Mozaffarian, 2014). To reduce micronutrient deficiency, mandatory food fortification policies can also be adopted, such as salt iodization or flour fortification with vitamin A and/or iron. However, both reformulation and fortification are two of many potential integrated measures and need to be considered as short- to medium-term solutions to more food-based measures.

■ **Food trade and marketing**

Policies addressing food trade and marketing have been high on the agenda in multiple countries. This is particularly the case for policies that seek to reduce the consumption of foods or beverages that are high in fat, sugar and/or salt. For example, taxation of sugary drinks is an evidence-based policy that can lower their consumption and therefore reduce obesity, type-2 diabetes

and tooth decay (WHO, 2017). The sugary drink tax in Mexico has resulted in some evidence of the effectiveness of this policy in LMICs (Box 4). In Hungary, a “public health product tax” entered into force in September 2011, with the aim to “reduce the consumption of food products that are not useful from a public health point of view and to promote a healthy diet ... to make healthy food choices accessible and to improve public funding for health care services, especially public health programmes”. An impact assessment of this tax was carried out in 2014 and showed a long-term impact of sustained reduced consumption of the targeted products (WHO-EURO, 2016). In 2016, The Kingdom of Tonga introduced a tax on fatty foods that included turkey tails, chicken leg quarters, mutton flaps/lamb breast and lamb flaps, mayonnaise and lard/dripping. Concurrently, products such as imported fruits and vegetables had duties removed (FAO and C-POND, 2017). Other policies in the food trade and marketing function of the food system include regulations on the marketing of foods and beverages that are high in fat, sugar and/or salt and planning regulations that restrict the location or operations of particular types of food retail and food service chains. Policy schemes can promote voluntary labels such as Geographical Indication or Participatory Guarantee Systems to make traditional and healthy foods recognizable in the market. Policies can also create incentives for the establishment of farmers’ markets to make fresh fruits and vegetables more available.

■ **Consumer demand, food preparation and preferences**

Various nutrition and food policies seek to improve consumer demand and preferences for nutritious food. These policies can be particularly powerful and effective when they are combined with policies and interventions in the other realms of the food system – thereby addressing supply and demand simultaneously – as the case from Brazil will illustrate below (Box 5). Policies aimed at consumer demand can be classified under the “4Ps” approach: product, price, promotion and place. This would include addressing

Box 4 Case study: Mexico's sugary drink tax

Over 70% of adults and 30% of children in Mexico are overweight or obese, and the main causes of death and disability are diet-related (heart disease and diabetes) (IHME, 2017). Epidemiological data have highlighted sugary drinks as one of the main dietary risk factors for obesity and diabetes – Mexico has the second highest per capita sugary drink consumption globally (Luxton, 2015). In order to tackle the growing economic and health consequences of overweight and diabetes, in 2010 the Mexican Government developed a National Agreement for Healthy Nutrition (Barquera *et al.*, 2013).

Building from this, in 2014 Mexico introduced a 10% tax on sugar-sweetened beverages, with the intention of using the revenues to support programmes addressing malnutrition, obesity and NDCs. Over the first two years (2014–16), the tax resulted in a 7.6% decrease in sugary drink consumption, with households in the lowest socio-economic level

reducing their purchases the most (Colchero *et al.*, 2016). However, the revenues are currently being allocated to the general budget, as so-called “earmarking” of funds is not allowed under Mexican fiscal policy. The tax has also been heavily criticized and challenged by the beverage industry, for which Mexico is one of their biggest markets (Soares, 2016).

This case study demonstrates three key lessons:

- Sugary beverage taxes are effective in reducing consumption, and evidence suggests that higher taxes of 20% may be even more effective (Wright *et al.*, 2017).
- Inter-government collaboration on nutrition and food system policies is essential – for example, in this case the need for coherence between the health and fiscal departments in order to earmark the funds for public health programmes.
- At times, food system policies involve challenges from businesses and food system actors that will not benefit from the policy.

Policy-makers undertaking food system policies must therefore prepare and plan for policy coherence and challenges from some food system actors.

the formulation or product mix, the relative prices of nutritious and less nutritious foods, where foods are allowed to be advertised and where foods are provided/sold, including schools and workplaces, among others (Lloyd-Williams *et al.*, 2014). Strategic alliances with chefs and the gastronomy sector can also be fostered through appropriate policy schemes, thus raising awareness on how nutritious food can be prepared and valued.

■ Policy options for different food environments

It is helpful to describe the potential for consumer demand/preferences policies by segmenting them into the various settings of the food

environment that consumers interact with on a daily basis: schools and universities, workplaces, street food, cafeterias and restaurants, food markets and retailers. All of these policies would ideally be based on the relevant food-based dietary guidelines for the country, which may be a necessary first step if they are not already in place. Their development would pose an opportunity to incorporate a food systems approach from the very beginning by, for example, incorporating agricultural, environmental and societal considerations (FAO, 2016b). These consumer-based policies work directly to influence population

knowledge and consumer behaviours, but can also be used to drive up demand for diverse and nutritious foods in the food system, thereby helping to shift the broader food system in order to meet that demand.

■ **Schools and universities**

Nutrition guidelines and price interventions (such as reducing the price of more nutritious options) have been shown to positively influence the nutritional intake in the school setting (Jaime and Lock, 2009). The Brazilian School Feeding Programme is an example of a food systems government policy that links nutrition guidelines in the school food environment with agricultural production and distribution (Box 5). School garden programmes, such as the Vegetables Go To School project in Bhutan, Burkina Faso, Indonesia and Nepal, have also been shown to improve students' preferences for fruits and vegetables (World Vegetable Center,

2017). Other policies in the school setting include nutrition education in the curriculum, school fruit and vegetable schemes, and vending machines with nutritious options (Jaime and Lock, 2009).

■ **Workplaces**

Interventions in the workplace typically target improving the nutritional quality of the food in the staff canteens and education on health and nutrition for employees. Both of these, alone and together, have been shown to modestly improve the dietary intake of staff, for example increasing fruit and vegetable intake (Geaney *et al.*, 2013). Government policies can encourage these changes directly in public workplaces, through public procurement guidelines and nutrition guidelines in public offices, and in private workplaces through public-private partnerships and engagement.

Box 5

Case study: Brazil's School Feeding Programme

Over the past few decades, Brazil has transitioned from primarily facing the challenge of undernutrition to having a high prevalence of both overweight and undernutrition and food insecurity. Nearly 75% of adults are overweight or obese and 7% of children are overweight. However, on the undernutrition side, an equal number of children are stunted and 2% are wasted (Development Initiatives, 2017b). One way the Government is seeking to address this dual burden of malnutrition among children is through the national school feeding programme.

School feeding programmes have been operating in Brazil since 1995. In 2009, the Government made the feeding programme mandatory for schools – a process that involved multiple stakeholders, including civil society organizations

(Sidaner *et al.*, 2013). However, the Government also incorporated a food systems perspective into the feeding programme by requiring 30% of the programme's budget to be spent on the purchase of locally farmed or grown products – thus acting in the food production and consumer categories of the food system. In addition to addressing the dual burden of malnutrition, the school feeding programme is also promoting the sustainable development of the farming sector and the local economy. These changes were complemented by a policy to strengthen the nutritional requirements of the meals served and to improve the healthfulness of the school food environment more broadly.

Since introduction of these policies, 90% of schools are offering vegetables, up from 57% in 2004, 50% of municipalities have purchased foods from a local farm, and the policies have been associated with increased agricultural production in some regions in Brazil (Silveira *et al.*, 2011; Villar *et al.*, 2013; Baccarin *et al.*, 2017).

■ Cafeterias and restaurants

Cafeterias and restaurants are a large portion of the out-of-home food environment and can benefit from a multitude of nutrition and food policy changes. Policy options include mandating the labelling of menus with calories and other nutrition information, or introducing standards for catering of nutritious foods that support a healthy diet, which are used to rate different outlets. A food systems approach, however, would also encourage the connection between food service and ingredient production/sourcing and consider, for example, whether supply chains for fresh produce could be strengthened in order to support their use in restaurant and catering settings, or to subsidize the cost of healthier cooking oils until demand was high enough to pull prices down. It is also a good way to increase valuing traditional, biodiverse and sustainably grown food through partnerships with chefs and the gastronomy sector.

■ Retail

Policies in the retail environment, including grocery stores and markets, include some of the policies previously described in the food trade and marketing section, such as food reformulation. However, a broader set of policies is available for addressing the environment of the retail setting, rather than only the foods within it. Notably in this environment, package labelling is an important policy. Food labels and health claims on packages can serve two purposes: to inform the consumer, but more importantly from a food systems perspective, to create an incentive for manufacturers to improve their products so that they qualify for a health claim (Magnusson and Reeve, 2015). Policies can also include measures to help shift consumer food purchases towards nutritious options that support healthy dietary practices. These include the way foods are positioned in the store/market (e.g. fruits and vegetables near the front of the store and the less nutritious foods in a less accessible position), and by increasing the promotions and marketing of more nutritious products, particularly fruits and vegetables (e.g. through

farmers' markets and other short-chain food systems). In addition, nutrition information at the point-of-purchase (e.g. on the store shelf) can also help to shift food consumption towards healthier products (Story *et al.*, 2008).

■ Methods and data

In addition to national databases, websites and documents, the FAO Policy Decision Analysis web-based tool, the FAOLEX Database and the WHO Global Database on the Implementation of Nutrition Action provide a starting place for gathering information to map existing policies.

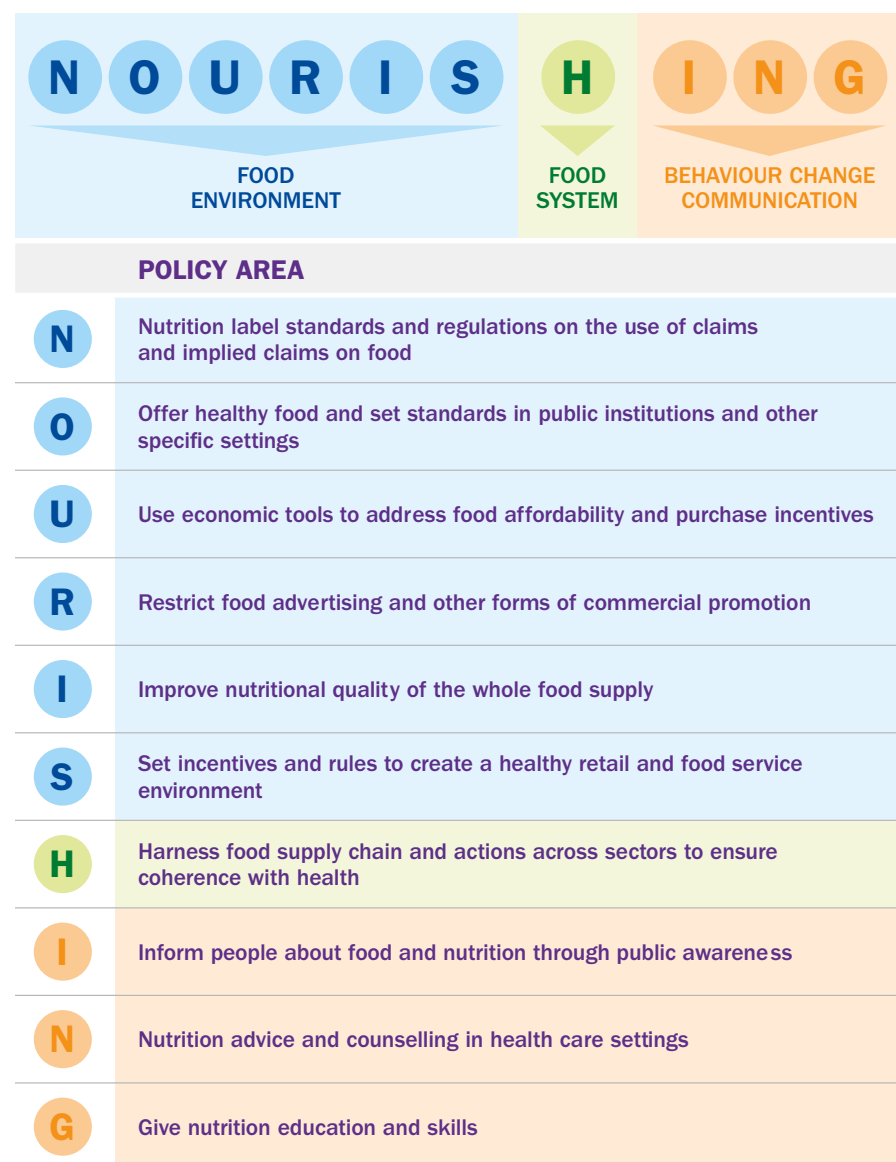
The mapping process can be done in each of the four domains of the food system as set out by the Global Panel on Agriculture and Food Systems for Nutrition (GLOPAN, 2014). Another complementary method can be to use the NOURISHING Framework from the World Cancer Research Fund International (WCRF). The NOURISHING framework can be used to structure the policy-mapping process by looking at existing policies in each of the framework categories (Figure 3). It formalizes what a comprehensive package of policies entails and encompasses all elements of the food system from production to consumption (WCRF, 2017).

Since a food systems approach to better nutrition and preventing obesity would also need to involve mapping existing policies in agriculture, food production and trade that impact on nutrition, this component of the NOURISHING Framework is particularly important in incorporating the food systems approach into government policy. The framework includes a number of policy examples that could potentially fit underneath the 'H' food system category, including Singapore's policy to provide food suppliers with access to healthier ingredients (Box 6).

Step 3 ANALYSING THE POLICY FRAMEWORK

In this step, the set of possible food system policy measures are analysed for their impacts on access to affordable healthy diets. The aim is to identify good entry points for policy change that directly and indirectly impact consumers'

FIGURE 3: **The NOURISHING Framework**



Box 6

Case study: Singapore’s Healthier Dining and Ingredients Policy

In 2011, the Singapore Government launched a programme aimed at improving the nutrition of meals eaten out –the Healthier Hawkers Programme. It was then replaced with the Healthier Dining Programme (Health Promotion Board Singapore, 2018a). This programme aimed to improve nutritional outcomes by addressing the healthfulness of the “consumer demand and food preparation” functions of the food system.

The programmes had significant potential impact as 60% of people in Singapore ate out in Hawkers centres – food centres or markets with individual traders/stalls selling a variety of prepared local dishes at an affordable price – at least four times per week in 2010 (Ministry of Health Singapore, 2011). The Government encouraged food and beverage traders in hawker centres to sell lower-calorie meals. The traders were supported to improve the nutritional value of their meal offerings through government grants and were given incentives to participate as they would be able to use a “healthy choice symbol” for marketing dishes that met the criteria of a nutritious meal. The Government reports that “as of August 2017, there are over 3,100 food and beverage stalls across 67 hawker centres and 450 coffee shops offering at least one ‘healthier’ option in their menus” (Lai, 2017).

In July 2017, the Government built upon the success of this scheme – and linked in with the food processing and handling function of the food system – by launching the Healthier Ingredient Development Scheme to increase the availability and use of “healthier” ingredients in the Healthier Dining Programme. This included improving the supply of cooking oils that are lower in saturated fat, wholegrain noodles and brown rice. The Health Promotion Board will evaluate the scheme over time to determine whether other ingredients should be added (Health Promotion Board Singapore, 2018b).

diets. The process of selecting policy measures includes an analysis of their relevance in the national context, cost-effectiveness and priority setting. Ideally this process would be conducted through a multisectoral stakeholder group with expert advice from researchers and local policy experts.

This step would seek to answer the following questions:

- Based on the situational analysis and policy mapping, where are the key gaps in policy, which policies are failing in practice and which new or additional policy options would improve access to affordable healthy diets?
- What areas of existing progress can be leveraged to influence broader change?
- Which existing policies affecting the functioning of the food system are discouraging the availability of and access to healthy diets? Can these policies be modified to lead to better nutrition?
- Are the existing or proposed policies making it easier for people in all socio-economic groups to access healthy and affordable diets? Are the policies tackling or increasing dietary inequalities?
- Based on urgency of need, and their potential effectiveness, which policy options should be prioritized?

The specific policies and policy areas to be analysed in this section would depend on the policy mapping and situational analysis above. The situational analysis should help shed light on which issues in the food system need the most urgent attention, and can help determine which policy areas to focus on in this analysis and prioritization. The policy mapping should highlight where there are gaps or inconsistencies in the existing policy framework. Through this process, a broad set of potential policy options will emerge, which can then be prioritized based on their potential effectiveness and cost-effectiveness. However, it is important to note that the political reality in a country may also serve to narrow the options for prioritization (discussed further in Step 4).

However, in general the assessment and prioritization could focus on a number of potential policy or intervention options spanning the four functions of the food system: food production, food handling/storage, food trade/marketing and consumer demand/preferences. Given the variety of food system policies that are available, the type of food system present in a country can also help determine which policies are to be prioritized for political and capital investment. Also important are any overarching investment policies to improve infrastructure, encourage nutrition-sensitive value chains and support smallholder farmers (UNSCN, 2016b). Policies and suggested actions, where relevant, should be gender-sensitive (e.g. special lines of credit for women agri-entrepreneurs, social campaigning with messages specific to women).

It is important to bear in mind that securing the right policy environment to control the rise in consumption of highly processed foods might be much easier to achieve in advance rather than in retrospect, and so thinking ahead about upcoming trends needs to be part of the prioritization process. Any one policy in isolation will not solve the various forms of malnutrition. The strength of a food systems perspective is that it encourages a framework of policies across the food system to coherently address the issues from multiple angles. In particular, it enables any incoherence in the policy framework to be identified – for example, if policies to promote healthy diets are in place in the consumer demand function of the food system but policies in other functions of the food system discourage healthy dietary practices. Policy coherence will be discussed further in Step 4 on the political economy.

■ **Methods and data**

One method of conducting this assessment is through the Food Environment Policy Index (Food-EPI), described in Box 7. The Food-EPI builds on the policy mapping completed in Step 2 to compare those policies identified to a set of gold-standard policies, to identify the gaps, and to go through a prioritization exercise with independent experts to identify policy areas that need to be implemented or changed. However,

the Food-EPI focuses largely on the food environment end of the food system, and additional components on agriculture and food production may need to be included.

Prioritization can also be done in the form of an impact assessment. This is building on the process of situational analysis and mapping described here to model or predict the population impact of the policies identified ex-ante. These impact assessments can take three possible approaches:

- Assessing the food environment and dietary impacts of individual food system policies based on existing or new modelling/impact data.
- Using a policy portfolio review to assess the “cumulative food environment and diet impact of the existing policy portfolio, and where opportunities lie...” (UNSCN, 2016a). For example, an impact assessment can be done for each of the food system functions described above.
- Incorporating food environment and dietary impact assessment into any existing health, social and/or environmental impact assessments (UNSCN, 2016a).

Depending on the extensiveness of the national evidence base, existing data can typically be used to complete the policy analysis and prioritization in this step (grey literature reports and academic literature). Where country-specific data are not available, this step can be informed by new policy analyses or policy evaluations carried out in other countries; however, these may or may not be directly applicable to another context. A good summary of the evidence on food system policies was recently compiled by the HPLE, who identified priority actions in each of the functions of the food system, and would be a good starting point for gathering evidence (HPLPE, 2017). Another recent review by Gillespie and van den Bold was published in the academic literature (Gillespie and van den Bold, 2017).

WHO has also assessed a number of food environment policies and determined a set of “best buy” policies that will be effective and cost-effective

for reducing the burden of NCDs. They were updated in 2017, and for food and nutrition the WHO best buys are: reduced salt intake through reformulation, lower sodium options in public institutions, mass communication and front-of-pack labelling; banning the use of trans-fats in the food supply chain; and reducing sugar consumption through taxation on sugar-sweetened beverages. They also recommend implementing subsidies to increase fruit and vegetable consumption, replacing trans- and saturated fat with unsaturated fat, and nutrition labelling, among others (WHO, 2017). WHO also has a database of evidence in its e-Library of Evidence for Nutrition Actions.

As part of the NOURISHING Framework described above, WCRF has built a database of policies based on the Framework which includes links to a number of policy evaluations within each of the Framework categories. The database can be used to identify policies that have been implemented and evaluated, which can inform the prioritization process (WCRF, 2017). Similarly, the Informas Network, which developed the Food-EPI method, has developed a list of international best-practice examples of policies according to each of their domains along with a list of published impact evaluations (see Box 7) (Food Foundation, 2016).

Step 4 BRINGING ABOUT POLICY CHANGE

This final step focuses on the best ways to bring about policy change, in particular when addressing obesity and NCDs is not the main objective of the targeted policy domain. Further, while the policy analysis could yield various options for policy adjustments that are deemed important and technically viable, they may be politically infeasible. Therefore, careful judgement is needed to determine which policy changes should be advocated for. FAO has produced a guidance note on undertaking a political economy analysis (FAO, 2017b), which is an in-depth document on how to understand and work within the political economy. Here we highlight a few issues specifically relevant to food system policies for healthier diets.

Box 7 The Food Environment Policy Index Methodology

The Food-EPI is a tool that combines policy mapping (Step 2) and identifying policy options (Step 3). The Food-EPI is used to identify and prioritize gaps in government food environment policies and is a useful benchmarking tool for tracking progress over time and comparing with other countries. The tool assesses government policies and infrastructure support in 13 areas of the food environment and supporting infrastructure: food composition, labelling, promotion, provision, retail, prices, trade and investment; and leadership, governance, monitoring and intelligence, funding and resources, platforms for interaction and health-in-all-policies approaches.

Importantly, when undertaking the Food-EPI, the local context needs to be considered, which is why classifying the type of food systems in place in a country is important (Step 1). One part of the Food-EPI process is to compare the local policy environment to a list of “gold standard” policies as set out by INFORMAS. However, not all of the gold standard policies may be feasible in all countries, particularly as the gold standard was primarily formulated based on the policies in high-income countries. For example, standardized nutrition-facts labels may not be possible if a country does not first have food-based dietary guidelines. However, it is nonetheless

important to use the gold standard policies as a benchmark to establish the potential gaps and areas for improvement in a country.

The steps of the Food-EPI are:

1. Compile evidence on policies and actions of the government according to the method’s domains and good-practice statements to create healthy food environments and validate the evidence with government officials
2. Compare the policies and evidence identified with the international gold standard policies, and use independent experts to evaluate the evidence and identify policy and infrastructure gaps
3. Develop and prioritize consensus-based action statements on the gaps identified
4. Advocate to the government for changes to improve food system policies
5. Monitor progress and change over time.

Evidence compilation is a crucial step in the Food-EPI process, as it sets the baseline for the subsequent steps. Evidence should be gathered through a variety of means, including online document searches and assessment of policy documents obtained through consultation with government officials. Once the evidence is compiled and summarized, it should be circulated to government officials and public bodies to check for inaccuracies and omissions.

Food-EPI’s have been conducted in 13 countries, and many have been published. For further information on the Food-EPI process and its outcomes, see: Vandevijvere and Swinburn (2014, 2015); and Food Foundation (2016).

■ Identify policy change opportunities

Policy change often occurs during a “window of opportunity” (Kingdon, 1984), which can be a change of government, after a major disaster, discovery (e.g. new and compelling data or research finding), or following a global or national forum such as the agreement of the

Sustainable Development Goals (Shiffman and Smith, 2007). On the other hand, policy-makers may align with a particular world view or political belief system which will constrain the policy options they consider acceptable (Entman, 1993). Specifically related to food systems and healthy diets, these beliefs may mean that a government

or decision-maker emphasizes the need for economic growth in the agriculture sector over health aims, or focuses on the need for personal responsibility in achieving nutrition goals, rather than addressing the systemic causes of malnutrition in all its forms.

These factors and many other political factors need to be considered, and the policy options and priorities generated in Step 3 should be analysed for political feasibility. This will result in a sub-list of priority policy options which are deemed the most and least politically feasible. This is not to say that policy options which are less politically feasible should not be advocated for, especially if they are assessed to be the most effective and important, but that more resources and effort will be required to effect change.

■ **Take multisectoral action**

The policies and interventions discussed in this guidance note are necessarily multidisciplinary, as the food system encompasses a wide variety of actors and sectors. Government, parliament, experts, civil society, campaigners and private organizations all have their respective roles in the policy change process. Government and parliament are the primary bodies responsible for formulating policy and legislation; however, they are informed by the evidence of experts, by the calls from civil society and campaigners, and by the views and interests of private organizations, which are often achieved through a multisectoral consultation process, but also takes place in the public discourse (e.g. media) and in private conversations between stakeholders. In practice, this means that food system policies will likely need to involve multiple government ministries in the policy-making process, and will need to be informed by the private and public sector organizations that will be implementing the policies. Nutrition policies have typically fallen under the purview of the health ministry/department. However, in a food systems approach many of the policies will need to originate from the agricultural, trade, planning and finance ministries. Furthermore, policies that are in place in the agricultural and finance ministries may, at times, be at odds or

incoherent with the nutrition goals of health ministry work – and adopting a food systems approach will require identifying these conflicts (through the mapping process) and taking steps to improve policy coherence across ministries. This is broadly referred to as a health-in-all-policies approach. In practice, it will mean ensuring that agricultural subsidies or financial policies do not encourage production of less nutritious foods, and that health policies are enacted in consideration of the objectives of the agricultural and finance ministries, which might be primarily concerned with economic growth. For example, pursuing a reformulation programme could be seen as undermining the markets of major manufacturers and impacting on jobs and the economy. Networking and collaborating are essential to achieving a coherent food systems approach to nutrition and obesity policy.

The initial situational analysis and policy-mapping work proposed in the guidance note should help to inform such negotiations, and the various policy actors and departments involved in the negotiations should be transparent in their trade-offs, interests, challenges and priorities.

■ **Select the policy mechanism**

A variety of governance systems can be used in implementing food system policies for obesity and NCDs, ranging from government legislation and regulation, quasi-regulatory approaches, public-private partnerships and voluntary self-regulation. Each mechanism has its benefits and challenges and requires varying levels of political capital.

When choosing a policy governance mechanism, consideration must be given to interests and influence of the stakeholders involved in the policy. As demonstrated in the Mexico case study (Box 4), and a wealth of existing evidence, the food and beverage industry is an influential stakeholder in food policy development (Nestle, 2002; Brownell and Warner, 2009; Miller and Harkins, 2010; Jenkin *et al.*, 2012; Fooks and Gilmore, 2013; Mialon *et al.*, 2016). Policies that seek to improve the food system can be at odds with the business operations of many food and beverage companies, which earn their profits by

continuing to increase demand for their products – typically highly processed products high in fat, sugar and/or salt. In these cases, the industry is not incentivized to change and self-regulated or partnership-based initiatives will be limited in their ability to achieve the level of food system change desired (Sharma *et al.*, 2010; Bryden *et al.*, 2013). For example, voluntary initiatives to improve marketing of food and beverages to children and purely voluntary food reformulation initiatives have had significant limitations (Freedhoff and Hébert, 2011; Panjwani and Caraher, 2014; Ronit and Jensen, 2014; Knai *et al.*, 2015; Mozaffarian, 2014; Reeve, 2016; Théodore *et al.*, 2016). In these cases and others where business interests are at odds with the policy change proposed, government legislation or regulation would be recommended in order to create a level playing field for all businesses to operate within, but this will necessarily involve high levels of political involvement and capital (Haufler, 2001; Sharma *et al.*, 2010; Moodie *et al.*, 2013). Decision-makers must also expect and be prepared for negatively affected industries to attempt to influence or obstruct the process through a number of sophisticated methods (Brownell and Warner, 2009; Mialon *et al.*, 2015; Roberto *et al.*, 2015; Scott *et al.*, 2017). The evidence-based, stepwise process for identifying policy priorities recommended in this guidance note will help in providing a solid rationale for policy change and in building political consensus in order to counteract the potential political influence of private industries.

However, if incentives align, food system policies can also leverage the business interests of a private sector stakeholder – including small and medium enterprises and smallholder farmers. For example, policies that aim to increase fruit and vegetable consumption will positively benefit fruit and vegetable producers and retailers. In these instances, self-regulation and public-private partnership can be successful and require significantly less political capital to enact (Haufler, 2001). To ensure meaningful collaboration, a few steps are recommended: that leadership rests with the government (or a non-vested interest party), that common goals and parameters are established

from the beginning, and that there are clear sanctions for non-compliance (Sharma *et al.*, 2010; Bryden *et al.*, 2013), such as through performance-based regulations whereby progressive targets are introduced with regulatory options in place if companies fail to comply (Sugarman and Sandman, 2007; Magnusson and Reeve, 2015). The FAO Strategy for Partnerships with the Private Sector provides more information on these types of engagements (FAO, 2013c). However, it is important to note that policy outcomes must not be influenced by conflicts of interest with the private sector (WHO, 2016).

■ **Identify policies with win-win outcomes and find champions**

As a number of countries have successfully adopted policies that embrace a food systems approach to food and nutrition, there are lessons to be learned about how to overcome the challenges described above. In particular, the policies that have been successful have often resulted in win-win outcomes for multiple government departments. This is particularly evident in the increasing number of countries that have enacted sugary drink taxation policies, typically led by the health and treasury departments. The taxes have supported reductions in sugary drink consumption, and generated revenue for the government – which can then be used to invest in further food system policies and interventions. Mutually beneficial outcomes can also be seen in the Brazilian example (Box 5), whereby the school purchasing policy positively impacts on the local agricultural industry and therefore the local economy. Ensuring that food system policies result in these types of win-win outcomes will help to smooth their political path.

That said, policy proposals will need a championing department or ministry to see them through to implementation. To date, nutrition policies for obesity and NCD have typically been led by health ministries. However, there is a huge opportunity to improve the healthfulness of the production and processing components of the food system, and in these categories the leadership of the agricultural ministry could be more effective than that of the health ministry.

Concluding remarks

This guidance note has presented how a food systems approach can guide the delivery of healthy diets and the steps to take to identify policy options and drive policy change. The food systems approach to healthy diets is a framework for addressing malnutrition in all its forms and ensuring policy coherence as it focuses on the four functions of the food system as drivers of our diets – food production, food handling/storage, food trade/marketing and consumer demand/preferences – and considers how these functions interact with consumers in their specific food environments. This guidance note pays particular attention to food system policies for overweight, obesity and NCDs, as their prevalence is rapidly increasing in the majority of countries around the world, including LMICs. Following the stepwise approach proposed in this note will result in:

- A clearer understanding of the nature of a country's food system and its associated dietary outcomes (underweight, micronutrient deficiency, overweight/obesity and NCDs)
- A map of existing food system policies that affect diets
- A priority list of food system policy options for improving the healthfulness of the diet and addressing malnutrition in all forms
- A clearer understanding of the critical elements for affecting policy change and an assessment of the political feasibility of implementing policy options generated in Step 3.

Identifying and implementing a food systems approach to healthy diets is not necessarily a linear process. A food systems approach is necessarily broad, but the processes described in this report can help to generate consensus on priority actions for healthy diets. However, policy change will require analysis of the political economy and champions who drive the priority initiatives forward.

Selection of global and regional policy frameworks related to nutrition, obesity or non-communicable diseases

GLOBAL

- World Declaration and Plan of Action for Nutrition (FAO and WHO, 1992)
- Global Strategy for the Prevention and Control of Noncommunicable Diseases (WHO, 2000)
- Global Strategy on Diet, Physical Activity and Health (WHO, 2004)
- 2008–2013 Action Plan for the Global Strategy for the Prevention and Control of Noncommunicable Diseases (WHO, 2008)
- Moscow Declaration: commitment to act, way forward (Participants Ministerial Conference, 2011)
- UN General Assembly resolution A/RES/66/2 on the Political Declaration of the High-level Meeting of the General Assembly on the Prevention and Control of Non-communicable Diseases (UN, 2011)
- World Health Assembly resolution WHA65.6 on the comprehensive implementation plan on maternal, infant and young child nutrition (WHO, 2012)
- World Health Assembly resolution WHA66.10 on the follow-up to the Political Declaration of the High-level Meeting of the General Assembly on the Prevention and Control of Non-communicable Diseases (WHO, 2013a)
- Global Action Plan for the Prevention and Control of Noncommunicable Diseases 2013–2020 (WHO, 2013b)
- Rome Declaration on Nutrition and Framework for Action (FAO and WHO, 2014)
- UN General Assembly resolution A/RES/70/1 on transforming our world: the 2030 Agenda for Sustainable Development (UN, 2015)

- UN General Assembly resolution A/RES/70/259 on the United Nations Decade of Action on Nutrition (2016–2025) (UN, 2016)
- CFS engagement in advancing nutrition (CFS, 2016)
- UN General Assembly resolution A/RES/73/2 on the Political Declaration of the Third High-Level Meeting of the General Assembly on the Prevention and Control of Non-communicable Diseases (UN, 2018)

AFRICA

- Libreville Declaration on Health and Environment in Africa (WHO-AFRO, 2009)
- Brazzaville Declaration on NCDs (WHO-AFRO, 2011)
- African Regional Nutrition Strategy (2005–2015) (AU, 2015)
- Food and Nutrition Security Strategy 2015–2025 (SADC, 2014)
- Dar Es Salaam Call to Action on Diabetes and other Non-communicable Diseases (East Africa Diabetes Study Group *et al.*, 2016)

ASIA AND THE PACIFIC

- Western Pacific Regional Action Plan for noncommunicable diseases (WHO-WPRO, 2009)
- Towards a food secure Pacific: Framework for Action on food security in the Pacific (SPC, 2010)
- Seoul Declaration on NCD Prevention and Control in the Western Pacific Region (WHO-WPRO, 2011)
- Honiara Communiqué on the Pacific noncommunicable disease crisis (WHO-WPRO and SPC, 2011)
- Resolution on noncommunicable diseases, mental health and neurological disorders (WHO-SEARO, 2012a)
- Resolution on Scaling up nutrition in the Western Pacific Region (WHO-WPRO, 2012)
- Regional Nutrition Strategy: addressing malnutrition and micronutrient deficiencies (2011–2015) (WHO-SEARO, 2012b)

- Apia Communiqué on Healthy Islands, NCDs and the Post-2015 Development Agenda (WHO-WPRO and SPC, 2013)
- Bandar Seri Begawan Declaration on Noncommunicable Diseases in ASEAN (ASEAN, 2013)
- Western Pacific Regional Action Plan for the Prevention and Control of Noncommunicable Diseases (2014–2020) (WHO-WPRO, 2014)
- Action Plan to reduce the double burden of malnutrition in the Western Pacific Region (2015-2020) (WHO-WPRO, 2015)
- Global Action Programme on Food Security and Nutrition in Small Island Developing States (FAO *et al.*, 2017)

EUROPE AND CENTRAL ASIA

- First Action Plan for Food and Nutrition Policy: WHO European Region 2000–2005 (WHO-EURO, 2001)
- Gaining Health: European Strategy for the Prevention and Control of Noncommunicable Diseases (WHO-EURO, 2006a)
- European Charter on Counteracting Obesity (WHO-EURO, 2006b)
- White paper on “A Strategy for Europe on Nutrition, Overweight and Obesity related health issues” (EC, 2007)
- WHO European Action Plan for Food and Nutrition Policy 2007–2012 (WHO-EURO, 2008)
- Action plan for implementation of the European Strategy for the Prevention and Control of Noncommunicable Diseases 2012–2016 (WHO-EURO, 2012)
- Health 2020 (WHO-EURO, 2013a)
- Vienna Declaration on Nutrition and NCDs in the Context of Health 2020 (WHO-EURO, 2013b)
- EU Action Plan on Childhood Obesity 2014–2020 (EC, 2014)
- European Food and Nutrition Action Plan 2015–2020 (WHO-EURO, 2014a)
- Investing in children: the European Child and Adolescent Health Strategy 2015–2020 (WHO-EURO, 2014b)

LATIN AMERICA AND THE CARIBBEAN

- Regional Strategy and Plan of Action on an Integrated Approach to the Prevention and Control of Chronic Diseases (PAHO & WHO-AMRO, 2007)
- Declaration of Port-of-Spain: Uniting to stop the epidemic of chronic NCDs (CARICOM, 2007)
- Declaration of commitment of Port-of-Spain (Organization of American States, 2009)
- Statement on Commonwealth Action to combat NCDs (Commonwealth, 2009)
- Ministerial Declaration for Prevention and Control of Noncommunicable Diseases (Participants High-Level Regional Consultation of the Americas, 2011)
- The Aruba Call for Action on Obesity: Throughout Life... at All Ages (Participants Pan American Conference, 2011)
- Strategy for the Prevention and Control of Noncommunicable Diseases (PAHO and WHO-AMRO, 2012)
- Plan of Action for the Prevention and Control of Noncommunicable Diseases in the Americas 2013–2029 (PAHO and WHO-AMRO, 2014)
- The CELAC Plan for Food and Nutrition Security and the Eradication of Hunger 2025 (CELAC, 2014)
- Plan of Action for the Prevention of Obesity in Children and Adolescents (PAHO and WHO-AMRO, 2015)

NEAR EAST AND NORTH AFRICA

- Dubai Declaration on Diabetes and Chronic Non-Communicable Diseases in the Middle East and Northern Africa (MENA) Region (Representatives MENA Forum, 2010)
- Regional Strategy on Nutrition 2010–2019 and Plan of Action (WHO-EMRO, 2011)
- Framework for action to implement the United Nations Political Declaration on Noncommunicable Diseases (WHO-EMRO, 2015)

References

- African Union (AU). 2015. *African regional nutrition strategy (2005–2015)*. Addis Ababa. Available at https://au.int/sites/default/files/pages/32895-file-arns_english.pdf
- Association of Southeast Asian Nations (ASEAN). 2013. *Bandar Seri Begawan Declaration on noncommunicable diseases in ASEAN*. Bandar Seri Begawan. Available at www.asean.org/storage/images/archive/23rdASEANSummit/3.%20bsb%20declaration%20on%20ncd%20in%20asean-%20final-endorsed%2023%20september%202013.pdf
- Baccarin, J., Triches, R., Teo, C. & Silva, D. 2017. Indicadores de avaliação das compras da agricultura familiar para alimentação escolar no paran, Santa Catarina e So Paulo. *Revista de Economia e Sociologia Rural*, 55(1): 103–122.
- Barquera, S., Campos, I. & Rivera, J.A. 2013. Mexico attempts to tackle obesity: the process, results, push backs and future challenges. *Obesity Reviews*, 14(suppl 2): 69–78.
- Birch, L.L. 1999. Development of food preferences. *Annual Review of Nutrition*, 19: 41–62.
- Bloom, D.E., Cafiero, E.T., Jan-Llopis, E., Abrahams-Gessel, S., Bloom, L.R., Fathima, S., Feigl, A.B., et al. 2011. *The global economic burden of non-communicable diseases*. Geneva, World Economic Forum. Available at www3.weforum.org/docs/WEF_Harvard_HE_GlobalEconomicBurdenNonCommunicableDiseases_2011.pdf
- Branca, F., Nikigosian, H. & Lobstein, T., eds. 2007. *The challenge of obesity in the WHO European Region and the strategies for response: summary*. Copenhagen, WHO Regional Office for Europe. Available at www.euro.who.int/__data/assets/pdf_file/0008/98243/E89858.pdf
- Brownell, K.D. & Warner, K.E. 2009. The perils of ignoring history: Big Tobacco played dirty and millions died. How similar is Big Food? *The Milbank Quarterly*, 87(1): 259–294.
- Brug, J. 2008. Determinants of healthy eating: motivation, abilities and environmental opportunities. *Family Practice*, 25(suppl 1): i50–i55.
- Bryden, A., Petticrew, M., Mays, N., Eastmure, E. & Knai, C. 2013. Voluntary agreements between government and business: a scoping review of the literature with specific reference to the Public Health Responsibility Deal. *Health Policy*, 110(2–3): 186–197.
- Caribbean Community (CARICOM). 2007. *Declaration of Port-of-Spain: uniting to stop the epidemic of chronic NCDs* [online]. Port-of-Spain. [cited 2 September 2018]. <http://caricom.org/media-center/communications/statements-from-caricom-meetings/declaration-of-port-of-spain-uniting-to-stop-the-epidemic-of-chronic-ncds>
- Cecchini, M. & Warin, L. 2016. Impact of food labelling systems on food choices and eating behaviours: a systematic review and meta-analysis of randomized studies. *Obesity Reviews*, 17(3): 201–210.
- Colchero, M.A., Popkin, B.M., Rivera, J.A. & Ng, S.W. 2016. Beverage purchases from stores in Mexico under the excise tax on sugar sweetened beverages: observational study. *British Medical Journal*, 352: h6704.
- Commission on Ending Childhood Obesity. 2016. *Report of the Commission on Ending Childhood Obesity*. Geneva, WHO. Available at http://apps.who.int/iris/bitstream/handle/10665/204176/9789241510066_eng.pdf
- Committee on World Food Security (CFS). 2016. *CFS engagement in advancing nutrition*. Rome. Available at www.fao.org/3/a-mr186e.pdf
- Commonwealth. 2009. *Statement on Commonwealth action to combat NCDs*. Port-of-Spain. Available at <https://www.healthycaribbean.org/wp-content/uploads/2017/05/Statement-on-Commonwealth-Action-to-Combat-Non-Communicable-Diseases.pdf>
- Community of Latin American and Caribbean States (CELAC). 2014. *The CELAC plan for food and nutrition security and the eradication of hunger 2025*. Santiago, FAO. Available at www.fao.org/3/a-bo925e.pdf

- Cost of Nutritious Diets Consortium. 2018. *Indicators and tools for the cost of nutritious diets*. Boston: Tufts University. Available at https://fscluster.org/sites/default/files/documents/cod_indicators_tools_updated_may2018.pdf
- Cowburn, G. & Stockley, L. 2005. Consumer understanding and use of nutrition labelling: a systematic review. *Public Health Nutrition*, 8(1): 21–28.
- Curtis, K., Ward, R., Allen, K. & Slocum, S. 2013. Impacts of community supported agriculture program participation on consumer food purchases and dietary choice. *Journal of Food Distribution Research*, 44(1): 42–51.
- Dangour, A.D., Hawkesworth, S., Shankar, B., Watson, L., Srinivasan, C.S., Morgan, E.H., Haddad, L. & Waage, J. 2013. Can nutrition be promoted through agriculture-led food price policies? A systematic review. *BMJ Open*, 3(6): e002937.
- Development Initiatives. 2017a. *Global nutrition report 2017: nourishing the SDGs*. Bristol. Available at http://globalnutritionreport.org/wp-content/uploads/2017/11/Report_2017-2.pdf
- Development Initiatives. 2017b. *Global nutrition report: nutrition country profile Brazil*. Bristol. Available at <http://globalnutritionreport.org/wp-content/uploads/2017/12/gnr17-Brazil.pdf>
- East Africa Diabetes Study Group, World Diabetes Foundation & Ministry of Health, Community Development, Gender, Elderly and Children [Tanzania]. 2016. *Dar Es Salaam call to action on diabetes and other non-communicable diseases*. Dar es Salaam. Available at https://www.worlddiabetesfoundation.org/sites/default/files/2016/06/DAR%20ES%20SALAAM%20CALL%20TO%20ACTION%20ON%20DIABETES%20AND%20OTHER%20NON-COMMUNICABLE%20DISEASES%20-%20ENDORSED%20-%20final%20_0.pdf
- Entman, R.M. 1993. Framing: toward clarification of a fractured paradigm. *Journal of Communication*, 43(4): 51–58.
- European Commission (EC). 2007. *White paper on a strategy for Europe on nutrition, overweight and obesity related health issues*. Brussels. Available at http://ec.europa.eu/health/ph_determinants/life_style/nutrition/documents/nutrition_wp_en.pdf
- European Commission (EC). 2014. *EU action plan on childhood obesity 2014–2020*. Brussels. Available at https://ec.europa.eu/health/sites/health/files/nutrition_physical_activity/docs/childhoodobesity_actionplan_2014_2020_en.pdf
- FAO. 2004. *Globalization of food systems in developing countries: impact on food security and nutrition*. FAO Food and Nutrition Paper 83. Rome. Available at www.fao.org/3/a-y5736e.pdf
- FAO. 2011. *The state of food insecurity in the world 2011: how does international price volatility affect domestic economies and food security?* Rome. Available at www.fao.org/docrep/014/i2330e/i2330e.pdf
- FAO. 2013a. *The state of food and agriculture 2013*. Rome. Available at www.fao.org/docrep/018/i3300e/i3300e.pdf
- FAO. 2013b. *Synthesis of guiding principles on agriculture programming for nutrition*. Rome. Available at www.fao.org/docrep/017/aq194e/aq194e.pdf
- FAO. 2013c. *FAO strategy for partnerships with the private sector*. Rome. Available at www.fao.org/3/a-i3444e.pdf
- FAO. 2015a. *Designing nutrition-sensitive agriculture investments: checklist and guidance for programme formulation*. Rome. Available at www.fao.org/3/a-i5107e.pdf
- FAO. 2015b. *Nutrition in the trade and food security nexus*. Rome. Available at www.fao.org/3/a-i5223e.pdf
- FAO. 2015c. *Voluntary guidelines for mainstreaming biodiversity into policies, programmes and national and regional plans of action on nutrition*. Rome. Available at www.fao.org/3/a-i5248e.pdf
- FAO. 2016a. *Compendium of indicators for nutrition-sensitive agriculture*. Rome. Available at www.fao.org/3/a-i6275e.pdf
- FAO. 2016b. *Influencing food environments for healthy diets*. Rome. Available at www.fao.org/3/a-i6484e.pdf

- FAO. 2017a. *Nutrition-sensitive agriculture and food systems in practice: options for intervention*. Rome. Available at www.fao.org/3/a-i7848e.pdf
- FAO. 2017b. *Strengthening sector policies for better food security and nutrition results: political economy analysis*. Rome. Available at www.fao.org/3/a-i7212e.pdf
- FAO & Fiji National University Pacific Research Centre for the Prevention of Obesity and Non-communicable Diseases (C-POND). 2017. *Effects of food taxation in Tonga: a snapshot*. Rome. Available at www.fao.org/3/a-i8052e.pdf
- FAO, International Fund for Agricultural Development (IFAD), United Nations Children's Fund (UNICEF), World Food Programme (WFP) & WHO. 2018. *The state of food security and nutrition in the world 2018*. Rome, FAO. Available at www.fao.org/3/I9553EN/i9553en.pdf
- FAO, UN Department of Economic and Social Affairs (UN-DESA) & UN Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States (UN-OHRLS). *Global action programme on food security and nutrition in Small Island Developing States*. 2017. Rome, FAO. Available at www.fao.org/3/a-i7297e.pdf
- FAO & University of Oxford. 2016. *Plates, pyramids and planets: developments in national healthy and sustainable dietary guidelines, a state of play assessment*. Rome, FAO. Available at www.fao.org/3/a-i5640e.pdf
- FAO & WHO. 1992. *International Conference on Nutrition. Final report of the Conference. Rome, December 1992*. Rome, FAO, and Geneva, WHO. Available at www.fao.org/docrep/015/u9265e/u9265e00.pdf
- FAO & WHO. 2005. *Fruit and vegetables for health. Report of a joint FAO/WHO workshop, 1–3 September 2004, Kobe, Japan*. Rome, FAO, and Geneva, WHO. Available at http://apps.who.int/iris/bitstream/handle/10665/43143/9241592818_eng.pdf
- FAO & WHO. 2014. *Second International Conference on Nutrition. Report of the joint FAO/WHO secretariat on the Conference*. Rome, FAO, and Geneva, WHO. Available at www.fao.org/3/a-i4436e.pdf
- Food Foundation. (No date). *Force-fed: does the food system constrict healthy choices for typical British families?* London. Available at <https://foodfoundation.org.uk/wp-content/uploads/2016/07/The-Food-Foundation-64pp-A4-Landscape-Brochure-AW-V32.pdf>
- Food Foundation. 2016. *Food environment policy index (Food-EPI) for England*. London. Available at <https://foodfoundation.org.uk/wp-content/uploads/2016/11/ENGLAND-Food-EPI-Report-FINAL1.pdf>
- Fooks, G.J. & Gilmore, A.B. 2013. Corporate philanthropy, political influence, and health policy. *PLoS One*, 8(11): e80864.
- Freedhoff, Y. & Hébert, P.C. 2011. Partnerships between health organizations and the food industry risk derailing public health nutrition. *Canadian Medical Association Journal*, 183(3): 291–292.
- Ganann, R., Fitzpatrick-Lewis, D., Ciliska, D., Peirson, L.J., Warren, R.L., Fieldhouse, P., Delgado-Noguera, M., *et al.* 2014. Enhancing nutritional environments through access to fruit and vegetables in schools and homes among children and youth: a systematic review. *BMC Research Notes*, 7(1): 422.
- GBD 2016 Causes of Death Collaborators. 2017. Global, regional, and national age-sex specific mortality for 264 causes of death, 1980–2016: a systematic analysis for the global burden of disease study 2016. *Lancet*, 390(10100): 1151–1210.
- GBD 2016 Risk Factors Collaborators. 2017. Global, regional, and national comparative risk assessment of 84 behavioural, environmental and occupational, and metabolic risks or clusters of risks, 1990–2016: a systematic analysis for the global burden of disease study 2016. *Lancet*, 390(10100): 1345–1422.
- Geaney, F., Kelly, C., Greiner, B.A., Harrington, J.M., Perry, I.J. & Beirne, P. 2013. The effectiveness of workplace dietary modification interventions: a systematic review. *Preventive Medicine*, 57(5): 438–447.
- Gillespie, S. & van den Bold, M. 2017. Agriculture, food systems, and nutrition: meeting the challenge. *Global Challenges*, 1(3): 1600002.

- GLOPAN. 2014. *Technical brief: how can agriculture and food system policies improve nutrition?* London. Available at www.glopan.org/sites/default/files/Global%20Panel%20Technical%20Brief%20Final.pdf
- GLOPAN. 2016. *Food systems and diets: facing the challenges of the 21st century*. London. Available at <http://glopan.org/sites/default/files/ForesightReport.pdf>
- GLOPAN. 2017. *Policy brief: policy actions to support enhanced consumer behaviour for high quality diets*. London. Available at <https://www.glopan.org/sites/default/files/Downloads/GlobalPanelConsumerBehaviourBrief.pdf>
- Greenberg, H. & Deckelbaum, R. 2016. Diet and non-communicable diseases: an urgent need for new paradigms. In M. Eggersdorfer, K. Kraemer, J.B. Cordaro, J. Fanzo, M. Gibney, E. Kennedy, A. Labrique & J. Steffen, eds. *Good nutrition: perspectives for the 21st century*, pp. 105–118. Basel, New York, Karger. Available at <https://www.karger.com/Article/Pdf/452379>
- Haufler, V. 2001. *A public role for the private sector: industry self-regulation in a global economy*. Washington, Carnegie Endowment for International Peace.
- He, F.J., Brinsden, H.C. & MacGregor, G.A. 2014. Salt reduction in the United Kingdom: a successful experiment in public health. *Journal of Human Hypertension*, 28(6): 345–352.
- He, F.J. & MacGregor, G.A. 2009. A comprehensive review on salt and health and current experience of worldwide salt reduction programmes. *Journal of Human Hypertension*, 23(6): 363–384.
- Health Promotion Board Singapore. 2018a. *Healthier dining programme* [online]. Singapore. [cited 2 September 2018]. <https://www.hpb.gov.sg/healthy-living/food-beverage/healthier-dining-programme>
- Health Promotion Board Singapore. 2018b. *Healthier ingredient development scheme (HIDS)* [online]. Singapore. [cited 2 September 2018]. <https://www.hpb.gov.sg/healthy-living/food-beverage/healthier-ingredient-schemes/about-the-healthier-ingredient-development-scheme>
- Herforth, A. 2010. *Promotion of traditional African vegetables in Kenya and Tanzania: a case study of an intervention representing emerging imperatives in global nutrition* [dissertation]. Ithaca, Cornell University.
- Herforth, A. 2015. Access to adequate nutritious food: new indicators to track progress and inform action. In D.E. Sahn, ed. *The fight against hunger and malnutrition: the role of food, agriculture, and targeted policies*. New York, Oxford University Press.
- Hillier-Brown, F.C., Summerbell, C.D., Moore, H.J., Wrieden, W.L., Adams, J., Abraham, C., Adamson, A., Araújo-Soares, V., White, M. & Lake, A.A. 2017. A description of interventions promoting healthier ready-to-eat meals (to eat in, to take away, or to be delivered) sold by specific food outlets in England: a systematic mapping and evidence synthesis. *BMC Public Health*, 17(1): 93.
- HLPE. 2017. *Nutrition and food systems: a report by the high level panel of experts on food security and nutrition*. Rome, Committee on World Food Security. Available at www.fao.org/3/a-i7846e.pdf
- Imamura, F., Micha, R., Khatibzadeh, S., Fahimi, S., Shi, P., Powless, J. & Mozaffarian, D. 2015. Dietary quality among men and women in 187 countries in 1990 and 2010: a systematic assessment. *The Lancet Global Health*, 3(3): e132–e142.
- Institute for Health Metrics and Evaluation (IHME). 2017. *Mexico* [online]. Seattle. [cited 2 September 2018]. www.healthdata.org/mexico
- Institute of Medicine and National Research Council. 2015. *A framework for assessing effects of the food system*. Washington, The National Academies Press.
- International Food Policy Research Institute (IFPRI). 2016. *Global nutrition report 2016: from promise to impact: ending malnutrition by 2030*. Washington. Available at <http://ebrary.ifpri.org/utills/getfile/collection/p15738coll2/id/130354/filename/130565.pdf>
- Jaime, P.C. & Lock, K. 2009. Do school-based food and nutrition policies improve diet and reduce obesity? *Preventive Medicine*, 48(1): 45–53.

- Jenkin, G., Signal, L. & Thomson, G. 2012. Nutrition policy in whose interests? A New Zealand case study. *Public Health Nutrition*, 15(8): 1483–1488.
- Kanter, R. & Caballero, B. 2012. Global gender disparities in obesity: a review. *Advances in Nutrition*, 3(4): 491–498.
- Kelsey, M.M., Zaepfel, A., Bjornstad, P. & Nadeau, K.J. 2014. Age-related consequences of childhood obesity. *Gerontology*, 60(3): 222–228.
- Khoury, C. & Jarvis, A. 2014. *The changing composition of the global diet: implications for CGIAR research*. CIAT policy brief No. 18. Cali, International Center for Tropical Agriculture. Available at https://cgspace.cgiar.org/bitstream/handle/10568/56788/policy_brief_global_diets.pdf
- Kingdon, J.W. 1984. *Agendas, alternatives, and public policies*. Boston, Little, Brown.
- Knai, C., Petticrew, M., Durand, M.A., Eastmure, E., James, L., Mehrotra, A., Scott, C. & Mays, N. 2015. Has a public–private partnership resulted in action on healthier diets in England? An analysis of the public health responsibility deal food pledges. *Food Policy*, 54: 1–10.
- Lai, L. 2017. *HPB serves up plan for healthier hawker food option* [online]. Singapore, The Straits Times. [cited 2 September 2018]. <https://www.straitstimes.com/singapore/health/hpb-serves-up-plan-for-healthier-hawker-food-option>
- Lim, S.S., Vos, T., Flaxman, A.D., Danaei, G., Shibuya, K., Adair-Rohani, H., Amann, M., et al. 2012. A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990–2010: a systematic analysis for the global burden of disease study 2010. *Lancet*, 380(9859): 2224–2260.
- Lloyd-Williams, F., Bromley, H., Orton, L., Hawkes, C., Taylor-Robinson, D., O’Flaherty, M., McGill, R., et al. 2014. Smorgasbord or symphony? Assessing public health nutrition policies across 30 European countries using a novel framework. *BMC Public Health*, 14: 1195.
- Luxton, E. 2015. *Which countries consume the most sugary drinks?* [online]. Coligny/Geneva, World Economic Forum. [cited 2 September 2018]. <https://www.weforum.org/agenda/2015/12/which-countries-consume-the-most-sugary-drinks/>
- Magnusson, R. & Reeve, B. 2015. Food reformulation, responsive regulation, and “regulatory scaffolding”: strengthening performance of salt reduction programs in Australia and the United Kingdom. *Nutrients*, 7(7): 5281–5308.
- Masset, E., Haddad, L., Cornelius, A. & Isaza-Castro, J. 2011. *A systematic review of agricultural interventions that aim to improve nutritional status of children*. London, Evidence for Policy and Practice Information and Co-ordinating Centre, Social Science Research Unit, Institute of Education, University of London. Available at <https://eppi.ioe.ac.uk/cms/Portals/0/PDF%20reviews%20and%20summaries/Agriculture%20DfID%202011Masset.pdf>
- Mialon, M., Swinburn, B., Allender, S. & Sacks, G. 2016. Systematic examination of publicly available information reveals the diverse and extensive corporate political activity of the food industry in Australia. *BMC Public Health*, 16: 283.
- Mialon, M., Swinburn, B. & Sacks, G. 2015. A proposed approach to systematically identify and monitor the corporate political activity of the food industry with respect to public health using publicly available information. *Obesity Reviews*, 16(7): 519–530.
- Miller, D. & Harkins, C. 2010. Corporate strategy, corporate capture: food and alcohol industry lobbying and public health. *Critical Social Policy*, 30(4): 564–589.
- Ministry of Health Singapore. 2011. *National Health Survey 2010*. Singapore. Available at <https://www.moh.gov.sg/docs/librariesprovider5/resources-statistics/reports/nhs2010---low-res.pdf>
- Moisander, J., Markkula, A. & Eräranta, K. 2010. Construction of consumer choice in the market: challenges for environmental policy. *International Journal of Consumer Studies*, 34(1): 73–79.
- Monteiro, C.A., Levy, R.B., Claro, R.M., de Castro, I.R. & Cannon, G. 2011. Increasing consumption of ultra-processed foods and likely impact on human health: evidence from Brazil. *Public Health Nutrition*, 14(1): 5–13.

- Monteiro, C.A., Moubarac, J.C., Cannon, G., Ng, S.W. & Popkin, B. 2013. Ultra-processed products are becoming dominant in the global food system. *Obesity Reviews*, 14(suppl 2): 21–28.
- Moodie, R., Stuckler, D., Monteiro, C., Sheron, N., Neal, B., Thamarangsi, T., Lincoln, P. & Casswell, S. 2013. Profits and pandemics: prevention of harmful effects of tobacco, alcohol, and ultra-processed food and drink industries. *Lancet*, 381(9867): 670–679.
- Moubarac, J.C., Martins, A.P., Claro, R.M., Levy, R.B., Cannon, G. & Monteiro, C.A. 2013. Consumption of ultra-processed foods and likely impact on human health: evidence from Canada. *Public Health Nutrition*, 16(12): 2240–2248.
- Mozaffarian, D. 2014. The healthy weight commitment foundation trillion calorie pledge: lessons from a marketig ploy? *American Journal of Preventive Medicine*, 47(4): e9–e10.
- Mozaffarian, D., Afshin, A., Benowitz, N.L., Bittner, V., Daniels, S.R., Franch, H.A., Jacobs, D.R. Jr., et al. 2012. Population approaches to improve diet, physical activity, and smoking habits: a scientific statement from the American Heart Association. *Circulation*, 126(12):1514–1563.
- Nestle, M. 2002. *Food politics: how the food industry influences nutrition and health*. Berkeley and Los Angeles: University of California Press.
- Ng, M., Fleming, T., Robinson, M., Thomson, B., Graetz, N., Margono, C., Mullany, E.C., et al. 2014. Global, regional, and national prevalence of overweight and obesity in children and adults during 1980–2013: a systematic analysis for the global burden of disease study 2013. *Lancet*, 384(9945): 766–781.
- Niebylski, M., Redburn, K.A., Duhaney, T. & Campbell, N.R. 2015. Healthy food subsidies and unhealthy food taxation: a systematic review of the evidence. *Nutrition*, 31(6): 787–795.
- Ohly, H., Gentry, S., Wigglesworth, R., Bethel, A., Lovell, R. & Garside, R. 2016. A systematic review of the health and well-being impacts of school gardening: synthesis of quantitative and qualitative evidence. *BMC Public Health*, 16: 286.
- Organization of American States. 2009. *Declaration of commitment of Port-of-Spain*. Port-of-Spain. Available at <https://www.state.gov/documents/organization/122843.pdf>
- Pan American Health Organization (PAHO) & WHO Regional Office for the Americas (AMRO). 2007. *Regional strategy and plan of action on an integrated approach to the prevention and control of chronic diseases*. Washington, PAHO. Available at www1.paho.org/english/ad/dpc/nc/reg-strat-cncls.pdf
- Pan American Health Organization (PAHO) & WHO Regional Office for the Americas (AMRO). 2012. *Strategy for the prevention and control of noncommunicable diseases*. Washington, PAHO. Available at <https://www.paho.org/hq/dmdocuments/2012/CSP28-9-e.pdf>
- Pan American Health Organization (PAHO) & WHO Regional Office for the Americas (AMRO). 2014. *Plan of action for the prevention and control of noncommunicable diseases in the Americas 2013–2029*. Washington, PAHO. Available at <https://www.paho.org/hq/dmdocuments/2014/NCD-en-lowres.pdf>
- Pan American Health Organization (PAHO) & WHO Regional Office for the Americas (AMRO). 2015. *Plan of action for the prevention of obesity in children and adolescents*. Washington, PAHO. Available at <https://www.paho.org/hq/dmdocuments/2015/Obesity-Plan-Of-Action-Child-Eng-2015.pdf>
- Panjwani, C. & Caraher, M. 2014. The public health responsibility deal: brokering a deal for public health, but on whose terms? *Health Policy*, 114(2): 163–173.
- Participants High-Level Regional Consultation of the Americas. 2011. *Ministerial Declaration for prevention and control of noncommunicable diseases*. Mexico City. Available at <https://www.paho.org/hq/dmdocuments/2011/NCDs-Ministerial-Declaration-for-2011.pdf>

- Participants Ministerial Conference. 2011. *Moscow Declaration: commitment to act, way forward. First Global Ministerial Conference on Healthy Lifestyles and Noncommunicable Disease Control, Moscow, 28–29 April 2011*. Geneva, WHO. Available at www.who.int/nmh/events/moscow_ncds_2011/conference_documents/moscow_declaration_en.pdf
- Participants Pan American Conference. 2011. *Report on the Pan American Conference on obesity with special attention to childhood obesity*. Aruba. Available at <https://www.paho.org/hq/dmdocuments/2011/obesidad-Conferencia-Panamericana-sobre-la-obesidad.pdf>
- Pingali, P. 2015. Agricultural policy and nutrition outcomes: getting beyond the preoccupation with staple grains. *Food Security*, 7(3): 583–591.
- Popkin, B.M., Adair, L.S. & Ng, S.W. 2012. Now and then: the global nutrition transition, the pandemic of obesity in developing countries. *Nutrition Reviews*, 70(1): 3–21.
- Reeve, B. 2016. Self-regulation of food advertising to children: an effective tool for improving the food marketing environment? *Monash University Law Review*, 42(2): 419–457.
- Representatives MENA Forum. 2010. *Dubai Declaration on diabetes and chronic non-communicable diseases in the Middle East and Northern Africa (MENA) Region*. Dubai. Available at https://www.novonordisk.com/content/dam/Denmark/HQ/aboutus/documents/changing-diabetes-leadership-forums/Dubai%20Declaration%20on%20Diabetes%20and%20Chronic%20NCDs_EN_FINAL.pdf
- Restrepo, B.J. & Rieger, M. 2016. Denmark's policy on artificial trans fat and cardiovascular disease. *American Journal of Preventive Medicine*, 50(1): 69–76.
- Roberto, C.A., Swinburn, B., Hawkes, C., Huang, T.T., Costa, S.A., Ashe, M., Zwicker, L., Cawley, J.H. & Brownell, K.D. 2015. Patchy progress on obesity prevention: emerging examples, entrenched barriers, and new thinking. *Lancet*, 385(9985): 2400–2409.
- Ronit, K. & Jensen, J.D. 2014. Obesity and industry self-regulation of food and beverage marketing: a literature review. *European Journal of Clinical Nutrition*, 68(7): 753–759.
- Sadeghirad, B., Duhaney, T., Motaghipisheh, S., Campbell, N.R. & Johnston, B. 2016. Influence of unhealthy food and beverage marketing on children's dietary intake and preference: a systematic review and meta-analysis of randomized trials. *Obesity Reviews*, 17(10): 945–959.
- Scott, C., Hawkins, B. & Knai, C. 2017. Food and beverage product reformulation as a corporate political strategy. *Social Science & Medicine*, 172(1–2): 37–45.
- Secretariat of the Pacific Community (SPC). 2010. *Towards a food secure Pacific: framework for action on food security in the Pacific*. Noumea. Available at http://lrd.spc.int/pubs/doc_download/1055-towards-a-food-secure-pacific-2011-2015-pdf
- Sharma, L.L., Teret, S.P. & Brownell, K.D. 2010. The food industry and self-regulation: standards to promote success and to avoid public health failures. *American Journal of Public Health*, 100(2): 240–246.
- Shiffman, J. & Smith, S. 2007. Generation of political priority for global health initiatives: a framework and case study of maternal mortality. *Lancet*, 370(9595): 1370–1379.
- Sidaner, E., Balaban, D. & Burlandy, L. 2013. The Brazilian school feeding programme: an example of an integrated programme in support of food and nutrition security. *Public Health Nutrition*, 16(6): 989–994.
- Siegel, K.R., Ali, M.K., Srinivasiah, A., Nugent, R.A. & Narayan, K.V. 2014. Do we produce enough fruits and vegetables to meet global health need? *PLoS One*, 9(8): e104059.
- Silveira, J.A., Taddei, J.A., Guerra, P.H. & Nobre, M.R. 2011. Effectiveness of school-based nutrition education interventions to prevent and reduce excessive weight gain in children and adolescents: a systematic review. *Jornal de Pediatria*, 87(5): 382–392.

- Soares, A.A. 2016. Putting taxes into the diet equation. *Bulletin of the World Health Organization*, 94(4): 239–240.
- Southern African Development Community (SADC). 2014. *Food and nutrition security strategy 2015–2025*. Gaborone. Available at https://www.researchgate.net/profile/Abhishek_Raj15/post/Whether_food_security_and_nutritional_security_complement_each_other/attachment/5a1063fa4cde2608381456d7/AS:562087916249088@1511023610005/download/SADC_Food_%26_Nutrition_Strategy_%28Final%29_for_Publication_12_Sep_2014.pdf
- Stern, D., Ng, S. W. & Popkin, B.M. 2016. The nutrient content of U.S. household food purchases by store type. *American Journal of Preventive Medicine*, 50(2): 180–190.
- Stiegert, K.W. & Kim, D.H., eds. 2009. *Structural changes in food retailing: six country case studies*. Madison, University of Wisconsin-Madison. Available at http://ageconsearch.umn.edu/record/100443/files/_book%20entire.pdf
- Story, M., Kaphingst, K.M., Robinson-O'Brien, R. & Glanz, K. 2008. Creating healthy food and eating environments: policy and environmental approaches. *Annual Review of Public Health*, 29(1): 253–272.
- Sugarman, S. D. & Sandman, N. 2007. Fighting childhood obesity through performance-based regulation of the food industry. *Duke Law Journal*, 56(6): 1403–1490.
- Swinburn, B.A., Sacks, G., Hall, K.D., McPherson, K., Finegood, D.T., Moodie, M.L. & Gortmaker, S.L. 2011. The global obesity pandemic: shaped by global drivers and local environments. *Lancet*, 378(9793): 804–814.
- Swinburn, B., Sacks, G., Vandewijvere, S., Kumanyika, S., Lobstein, T., Neal, B., Barquera, S., *et al.* 2013. INFORMAS (International Network for Food and Obesity/non-communicable diseases Research, Monitoring and Action Support): overview and key principles. *Obesity Reviews*, 14(suppl 1): 1–12.
- Théodore, F.L., Tolentino-Mayo, L., Hernández-Zenil, E., Bahena, L., Velasco, A., Popkin, B., Rivera, J.A. & Barquera, S. 2017. Pitfalls of the self-regulation of advertisements directed at children on Mexican television. *Pediatric Obesity*, 12(4): 312–319.
- Thow, A.M., Jan, S., Leeder, S. & Swinburn, B. 2010. The effect of fiscal policy on diet, obesity and chronic disease: a systematic review. *Bulletin of the World Health Organization*, 88(8): 609–614.
- UN. 2011. *General Assembly resolution A/RES/66/2 on the Political Declaration of the High-level Meeting of the General Assembly on the prevention and control of non-communicable diseases*. New York. Available at www.who.int/nmh/events/un_ncd_summit2011/political_declaration_en.pdf
- UN. 2015. *General Assembly resolution A/RES/70/1 on transforming our world: the 2030 Agenda for Sustainable Development*. New York. Available at www.un.org/en/ga/search/view_doc.asp?symbol=A/RES/70/1
- UN. 2016. *General Assembly resolution A/RES/70/259 on the United Nations Decade of Action on Nutrition (2016–2025)*. New York. Available at www.un.org/en/ga/search/view_doc.asp?symbol=A/RES/70/259
- UN. 2018. *General Assembly resolution A/RES/73/2 on the Political Declaration of the third high-level meeting of the General Assembly on the prevention and control of non-communicable diseases*. New York. Available at www.un.org/en/ga/search/view_doc.asp?symbol=A/RES/73/2
- UNSCN. 2016a. *Impact assessment of policies to support healthy food environments and healthy diets: implementing the Framework for Action of the Second International Conference on Nutrition*. Rome. Available at <https://www.unscn.org/uploads/web/news/document/DiscPaper3-EN-WEB.pdf>
- UNSCN. 2016b. *Investments for healthy food systems: a framework analysis and review of evidence on food system investments for improving nutrition. Implementing the Framework for Action of the Second International Conference on Nutrition*. Rome. Available at https://www.unscn.org/files/ICN2_TPM/EN_final_Investments_for_Healthy_Food_Systems_UNSCN.pdf
- Vandewijvere, S. & Swinburn, B. 2014. Creating healthy food environments through global benchmarking of government nutrition policies and food industry practices. *Archives of Public Health*, 72(1): 7.

- Vandevijvere, S. & Swinburn, B. 2015. Pilot test of the healthy food environment policy index (Food-EPI) to increase government actions for creating healthy food environments. *BMJ Open*, 5(1): e006194.
- Villar, B.S., Schwartzman, F., Januario, B.L. & Ramos, J.F. 2013. Situation of the municipalities of São Paulo state in relation to the purchase of products directly from family farms for the national school feeding program (PNAE). *Revista Brasileira de Epidemiologia*, 16(1): 223–226.
- WCRF. 2017. *Nourishing database* [online]. London. [cited 2 September 2018]. <https://www.wcrf.org/int/policy/nourishing-database>
- WHO. 2000. *World Health Assembly resolution WHA53.14 on the global strategy for the prevention and control of noncommunicable diseases*. Geneva. Available at http://apps.who.int/gb/archive/pdf_files/WHA53/ea14.pdf
- WHO. 2004. *World Health Assembly resolution WHA57.17 on the global strategy on diet, physical activity and health*. Geneva. Available at http://apps.who.int/gb/ebwha/pdf_files/WHA57/A57_R17-en.pdf
- WHO. 2008. *2008–2013 Action plan for the global strategy for the prevention and control of noncommunicable diseases*. Geneva. Available at http://apps.who.int/iris/bitstream/10665/44009/1/9789241597418_eng.pdf
- WHO. 2009. *Global health risks: mortality and burden of disease attributable to selected major risks*. Geneva. Available at www.who.int/healthinfo/global_burden_disease/GlobalHealthRisks_report_full.pdf
- WHO. 2010. *Set of recommendations on the marketing of foods and non-alcoholic beverages to children*. Geneva. Available at http://apps.who.int/iris/bitstream/handle/10665/44416/9789241500210_eng.pdf
- WHO. 2011. *Global status report on noncommunicable diseases 2010*. Geneva. Available at http://apps.who.int/iris/bitstream/handle/10665/44579/9789240686458_eng.pdf
- WHO. 2012. *World Health Assembly resolution WHA65.6 on the comprehensive implementation plan on maternal, infant and young child nutrition*. Geneva. Available at www.who.int/nutrition/topics/WHA65.6_resolution_en.pdf
- WHO. 2013a. *World Health Assembly resolution WHA66.10 on the follow-up to the Political Declaration of the High-level Meeting of the General Assembly on the prevention and control of non-communicable diseases*. Geneva. Available at http://apps.who.int/gb/ebwha/pdf_files/wha66/a66_r10-en.pdf
- WHO. 2013b. *Global action plan for the prevention and control of noncommunicable diseases 2013–2020*. Geneva. Available at http://apps.who.int/iris/bitstream/10665/94384/1/9789241506236_eng.pdf
- WHO. 2014. *Global status report on noncommunicable diseases 2014*. Geneva. Available at http://apps.who.int/iris/bitstream/handle/10665/148114/9789241564854_eng.pdf
- WHO. 2016. *Addressing and managing conflicts of interest in the planning and delivery of nutrition programmes at country level. Report of a technical consultation convened in Geneva, Switzerland, on 8–9 October 2015*. Geneva. Available at http://apps.who.int/iris/bitstream/handle/10665/206554/9789241510530_eng.pdf
- WHO. 2017. *'Best buys' and other recommended interventions for the prevention and control of noncommunicable diseases. Updated (2017) Appendix 3 of the global action plan for the prevention and control of noncommunicable diseases 2013–2020*. Geneva. Available at www.who.int/ncds/management/WHO_Appendix_BestBuys.pdf
- WHO. 2018a. *Time to deliver. Report of the WHO Independent High-Level Commission on Noncommunicable Diseases*. Geneva. Available at <http://apps.who.int/iris/bitstream/handle/10665/272710/9789241514163-eng.pdf>
- WHO. 2018b. *Obesity and overweight* [online]. Geneva. [cited 2 September 2018]. www.who.int/news-room/fact-sheets/detail/obesity-and-overweight
- WHO. 2018c. *Healthy diet* [online]. Geneva. [cited 2 September 2018]. www.who.int/mediacentre/factsheets/fs394/en/

- WHO. 2018d. Noncommunicable diseases [online]. Geneva. [cited 2 September 2018]. www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases
- WHO & FAO. 1998. *Preparation and use of food-based dietary guidelines. Report of a joint FAO/WHO consultation*. Geneva, WHO. Available at http://apps.who.int/iris/bitstream/handle/10665/42051/WHO_TRS_880.pdf
- WHO Regional Office for Africa (AFRO). 2009. *Libreville Declaration on health and environment in Africa*. Brazzaville. Available at www.ehrn.co.za/download/libreville_declaration.pdf
- WHO Regional Office for Africa (AFRO). 2011. *The Brazzaville Declaration on noncommunicable diseases, prevention and control in the WHO African Region*. Brazzaville. Available at www.who.int/nmh/events/2011/ncds_brazzaville_declaration.pdf
- WHO Regional Office for Europe (EURO). 2001. *The first action plan for food and nutrition policy: WHO European Region, 2000–2005*. Copenhagen. Available at www.euro.who.int/__data/assets/pdf_file/0013/120244/E72199.pdf
- WHO Regional Office for Europe (EURO). 2006a. *Gaining health: the European strategy for the prevention and control of noncommunicable diseases*. Copenhagen. Available at www.euro.who.int/__data/assets/pdf_file/0008/76526/E89306.pdf
- WHO Regional Office for Europe (EURO). 2006b. *European charter on counteracting obesity*. Copenhagen. Available at www.euro.who.int/__data/assets/pdf_file/0009/87462/E89567.pdf
- WHO Regional Office for Europe (EURO). 2008. *WHO European action plan for food and nutrition policy 2007–2012*. Copenhagen. Available at www.euro.who.int/__data/assets/pdf_file/0017/74402/E91153.pdf
- WHO Regional Office for Europe (EURO). 2012. *Action Plan for implementation of the European strategy for the prevention and control of noncommunicable diseases 2012–2016*. Copenhagen. Available at <http://apps.who.int/medicinedocs/documents/s19752en/s19752en.pdf>
- WHO Regional Office for Europe (EURO). 2013a. *Health 2020: a European policy framework and strategy for the 21st century*. Copenhagen. Available at www.euro.who.int/__data/assets/pdf_file/0011/199532/Health2020-Long.pdf
- WHO Regional Office for Europe (EURO). 2013b. *Vienna Declaration on nutrition and noncommunicable diseases in the context of health 2020*. Copenhagen. Available at www.euro.who.int/__data/assets/pdf_file/0005/193253/CONSENSUS-Vienna-Declaration-5-July-2013.pdf
- WHO Regional Office for Europe (EURO). 2014a. *European food and nutrition action plan 2015–2020*. Copenhagen. Available at www.euro.who.int/__data/assets/pdf_file/0003/294474/European-Food-Nutrition-Action-Plan-20152020-en.pdf
- WHO Regional Office for Europe (EURO). 2014b. *Investing in children: the European child and adolescent health strategy 2015–2020*. Copenhagen. Available at www.euro.who.int/__data/assets/pdf_file/0010/253729/64wd12e_InvestCAHstrategy_140440.pdf
- WHO Regional Office for Europe (EURO). 2015a. *Eliminating trans fats in Europe: a policy brief*. Copenhagen. Available at www.euro.who.int/__data/assets/pdf_file/0010/288442/Eliminating-trans-fats-in-Europe-A-policy-brief.pdf
- WHO Regional Office for Europe (EURO). 2015b. *WHO Regional Office for Europe nutrient profile model*. Copenhagen. Available at www.euro.who.int/__data/assets/pdf_file/0005/270716/Nutrient-children_web-new.pdf
- WHO Regional Office for Europe (EURO). 2016. *Assessment of the impact of a public health product tax*. Copenhagen. Available at www.euro.who.int/__data/assets/pdf_file/0008/332882/assessment-impact-PH-tax-report.pdf
- WHO Regional Office for South-East Asia (SEARO). 2012a. *WHO Regional Committee for South-East Asia resolution SEA/RC65/R5 on noncommunicable diseases, mental health and neurological disorders*. New Delhi. Available at www.searo.who.int/about/governing_bodies/regional_committee/65/rc65_r5.pdf

- WHO Regional Office for South-East Asia (SEARO). 2012b. *Regional nutrition strategy: addressing malnutrition and micronutrient deficiencies (2011–2015)*. New Delhi. Available at <http://apps.who.int/iris/bitstream/handle/10665/205804/B4819.pdf>
- WHO Regional Office for the Eastern Mediterranean (EMRO). 2011. *Regional strategy on nutrition 2010–2019 and plan of action*. Cairo. Available at <http://applications.emro.who.int/dsaf/dsa1230.pdf>
- WHO Regional Office for the Eastern Mediterranean (EMRO). 2015. *Framework for action to implement the United Nations Political Declaration on noncommunicable diseases: including indicators to assess country progress by 2018*. Cairo. Available at http://applications.emro.who.int/docs/Framework_action_implement_UN_political_declaration_NCD_October_2015_EN.pdf
- WHO Regional Office for the Western Pacific (WPRO). 2009. *Western Pacific regional action plan for noncommunicable diseases*. Manila. Available at www.wpro.who.int/noncommunicable_diseases/WHO_NCD_RAP.pdf
- WHO Regional Office for the Western Pacific (WPRO). 2011. *Seoul Declaration on noncommunicable disease prevention and control in the Western Pacific Region*. Manila. Available at www.wpro.who.int/noncommunicable_diseases/seoul_declaration.pdf
- WHO Regional Office for the Western Pacific (WPRO). 2012. *WHO Regional Committee for the Western Pacific resolution WPR/RC63.R2 on scaling up nutrition in the Western Pacific Region*. Manila. Available at http://iris.wpro.who.int/bitstream/handle/10665.1/8021/WPR_RC063_Res02_2012_en.pdf
- WHO Regional Office for the Western Pacific (WPRO). 2014. *Western Pacific Regional action plan for the prevention and control of noncommunicable diseases (2014–2020)*. Manila. Available at www.wpro.who.int/noncommunicable_diseases/about/NCDRAP_2014-2020_full.pdf
- WHO Regional Office for the Western Pacific (WPRO). 2015. *Action plan to reduce the double burden of malnutrition in the Western Pacific Region (2015–2020)*. Manila. Available at www.wpro.who.int/noncommunicable_diseases/about/NCDRAP_2014-2020_full.pdf
- WHO Regional Office for the Western Pacific (WPRO) & Secretariat of the Pacific Community (SPC). 2011. *Honiara outcome. Ninth Meeting of Ministers of Health for the Pacific Island Countries. June 2011*. Manila. Available at www.wpro.who.int/southpacific/pic_meeting/reports/honiaracommitment.PDF
- WHO Regional Office for the Western Pacific (WPRO) & Secretariat of the Pacific Community (SPC). 2013. *Apia outcome. Tenth Pacific Health Ministers Meeting, 2–4 July 2013*. Manila, WHO-WPRO. Available at www.wpro.who.int/southpacific/pic_meeting/reports/apia_outcomefull3.pdf
- World Vegetable Center. 2017. *Vegetables go to school* [online]. Shanhua. [cited 2 September 2018]. <http://vgts.avrdc.org/>
- Wibowo, Y., Sutrisna, B., Hardinsyah, H., Djuwita, R., Korib, M.M., Syafiq, A., Tilden, A. & Najib, M. 2015. Relationship between intra-household food distribution and coexistence of dual forms of malnutrition. *Nutrition Research and Practice*, 9(2): 174–179.
- Wright, A., Smith, K.E. & Hellowell, M. 2017. Policy lessons from health taxes: a systematic review of empirical studies. *BMC Public Health*, 17(1): 583.





www.fao.org/3/CA2797EN/CA2797EN.pdf