

5. Helping consumers achieve better nutrition

To improve nutritional outcomes, food systems need to provide consumers with abundant, affordable, diverse and nutritious foods, and consumers need to choose balanced diets that provide adequate but not excessive amounts of energy. Previous chapters have discussed ways to make food systems more supportive of food security and better nutrition. Nutrition-sensitive food systems can give consumers better options, but ultimately it is consumers who choose what they eat. What consumers choose to eat influences their own nutritional outcomes and sends signals back through the food system – to retailers, processors and producers – that shape both what is produced and how sustainably it is produced.

Consumers need adequate incomes and knowledge with which to make better nutritional choices. Even when adequate food is available, the poorest households or those hit by external shocks may need food-based assistance programmes to access the food they need. In households where income is not a significant constraint to good nutrition, poor food and lifestyle choices mean that malnutrition may persist in the form of micronutrient deficiencies, overweight and obesity. This suggests that additional measures – education and incentives – may be necessary to encourage households to choose more appropriate foods as part of a diverse, nutritious diet for all family members.

This chapter reviews (i) food-based assistance programmes, including general food subsidies; (ii) nutrition-specific incentives, such as targeted food subsidies and taxes aimed at influencing food choices; and (iii) nutrition education programmes, including formal training, public information campaigns, regulation of advertising and labelling and measures aimed at improving the local food environment. Evidence shows that many of these interventions can help

people achieve better nutrition, but they are often more effective in combination than alone. Integrated programmes that improve the food environment, enhance consumer awareness and provide incentives for healthier eating can motivate the life-long behavioural changes necessary to ensure that everyone is well nourished.

Food assistance programmes for better nutrition²⁰

Governments have long used food assistance programmes to guarantee access of vulnerable populations to adequate food.²¹ Food assistance programmes may deliver food directly to recipients or improve their ability to access food through voucher programmes or cash transfers. They may be part of broader social protection policies or be aimed more narrowly at increasing food consumption. The programmes may be targeted at specific vulnerable populations or provide food access support to the general population. The traditional focus has been on the provision of a minimum ration of basic staple foods, but the overall nutritional impacts of food assistance programmes have not always been given adequate attention. This section focuses on ways in which such programmes can promote good nutritional outcomes.

General food assistance programmes

Many developing countries and international donors use general food assistance programmes to protect food-insecure

²⁰ This section is based on Lentz and Barrett (2012).

²¹ Many different kinds of social protection programmes exist, with additional objectives beyond food assistance. For example, cash- or food-for-work schemes focus more on providing food as a means of alleviating poverty; conditional cash transfers seek mostly to build human capital; and emergency food assistance programmes focus more on halting hunger and deteriorations in nutritional status.

people. Food assistance transfers can be given in the form of food, vouchers or cash, or as subsidized prices for targeted groups or the general population. Food assistance programmes and general food subsidies often apply to starchy staples such as bread and rice and to energy-dense foods such as sugar and cooking oil. Thus, they can provide an essential safety net for food-insecure populations; at the same time, they can also lead to monotonous diets with excessive energy and inadequate micronutrient content.

The impact of food assistance programmes on food security and nutrition depends on a host of factors related to local context and programme design (Bryce *et al.*, 2008; Barrett and Lentz, 2010). No single programming approach can meet all objectives in all contexts, and trade-offs will be unavoidable. General food assistance programmes can be more supportive of good nutritional outcomes, but this means giving nutrition higher priority in programme design.

The form in which food assistance is provided has a direct impact on nutritional outcomes. The percentage of the transfer actually consumed by recipients as food varies according to its form: it is highest when the transfer is given in the form of food, lowest when given as cash and somewhere in between if vouchers are used (del Ninno and Dorosh, 2003; Ahmed *et al.*, 2010).

The form in which a food assistance transfer is given also influences the diversity of foods consumed. For example, providing staple foods may alleviate hunger and increase energy intake but may not address micronutrient deficiencies. Cash transfers tend to result in more diverse diets, as they give recipients more choice over the food basket. For similar reasons, vouchers have been linked to increased dietary diversity when compared with in-kind food distributions based on staples (Meyer, 2007). On the other hand, in-kind food and commodity-denominated vouchers can allow agencies to target specific food interventions, such as vitamin-fortified vegetable oil, biofortified beans or micronutrient powders (Ryckembusch *et al.*, 2013).

The nutritional quality of in-kind food assistance can be improved and could constitute a cost-effective means of improving nutritional outcomes for

vulnerable populations. Improving the quality of food aid rations by, for example, substituting fortified milled grains for whole grains, improving the standard maize-soy and wheat-soy blends, and delivering the appropriate levels of vegetable oil could increase the costs of current emergency and development food aid projects by 6.6 percent, but the expected nutritional gains would outweigh these costs (Webb *et al.*, 2011).

Targeted food assistance programmes

Better targeting of vulnerable populations can improve the effectiveness and efficiency of transfers aimed at increasing food security and nutrition (Lentz and Barrett, 2007). Women tend to dedicate more of any social security transfer to food and child health care services than do men, making gender a good targeting criterion in many circumstances (Attanasio, Battistin and Mesnard, 2009; Barber and Gertler, 2010; Broussard, 2012). Food assistance programmes that have nutrition objectives frequently target vulnerable demographic groups.

Prenatal and early childhood

Prenatal and early childhood programmes are widely regarded as among the most effective food-based programmes. Such programmes can address the energy and micronutrient needs of children under 24 months and their mothers through the use of targeted vouchers, micronutrient supplements and improved complementary foods.²² They are most effective when designed to meet local needs and local contexts.

One of the best-studied prenatal and early childhood food assistance interventions is the United States Supplemental Nutrition Program for Women, Infants, and Children (WIC), established in 1972 to improve the health status of women, infants and children. WIC seeks to affect the dietary quality and habits of participants by providing nutrition education and foods designed to meet the special nutritional needs of low-income pregnant women and mothers with children up to five years of age. Food vouchers

²² "Complementary" feeding interventions are considered more suitable for treating and preventing moderate malnutrition, while "therapeutic" feeding interventions are suitable for treating severe malnutrition and are generally considered medical interventions (Horton *et al.*, 2010).

issued under the programme are limited to a list of foods with specific nutrients (protein, calcium, iron, vitamins A, B₆, C and D and folate). A summary of the vast literature evaluating WIC concludes that this combination of education plus vouchers “is associated with ... positive effects on child growth, improved dietary status, and greater access to and use of health care” (Devaney, 2007, p.16).

An increasingly common approach to addressing micronutrient deficiencies in early childhood is through distribution of multiple micronutrient powders. These powders are generally incorporated into the child’s usual foods. For children who do not have access to adequate micronutrients and are also energy-deficient, a broader focus on improving the energy and micronutrient content of the diet, with supplements where necessary, may be more appropriate than micronutrient powders. Neumann *et al.* (2003) write that food-based approaches offer more protection than pharmaceutical approaches such as micronutrient powders because food is more locally available, because protein–energy malnutrition often coexists with micronutrient deficiencies and because food includes multiple micronutrients and thus may address deficiencies more effectively than single micronutrients or combinations of micronutrients.

In an evaluation of the impact of such powders, De-Regil *et al.* (2011) reviewed results from eight trials in developing countries and found that home use of multiple micronutrient powders containing at least iron, vitamin A and zinc reduces anaemia and iron deficiency among children aged 6–23 months. Evaluations of the long-term impact of a food supplement provided to Guatemalan children in the 1960s and 1970s showed that boys who received a more nutritious supplement earned higher hourly wages as men than did boys who did not (Hoddinott *et al.*, 2008). Girls who received the more nutritious supplement grew up to have children with higher birth weights and better anthropometric measures of nutritional status than girls who did not (Berhman *et al.*, 2009).

Based on a review of complementary feeding evaluations, Dewey and Adu-Afarwuah (2008) concluded that a combination of distribution of

complementary foods and nutrition education achieves better growth outcomes than education-only projects, yet education-only participants had better growth outcomes than those in the control group. As noted above, distributing the right kinds of complementary foods (or weaning foods for children transitioning away from breastfeeding) is important.

School-aged children

School-feeding programmes typically have multiple objectives, including school enrolment and educational attainment, especially by girls, as well as nutritional outcomes. Evidence for the cost-effectiveness of school-feeding across these objectives is limited (Margolies and Hoddinott, 2012). Some researchers argue that school-feeding programmes are more effective in achieving educational goals than in improving broader measures of children’s nutritional status (Afridi, 2011). Other researchers suggest that other programmes, such as conditional cash-transfers, are more effective even in terms of non-nutritional goals such as increased enrolment (Coady and Parker, 2004).

Nutrition evaluations show that school-feeding programmes can affect child nutritional status, particularly when they incorporate certain types of food. For example, including biofortified orange-fleshed sweet potato, which is high in beta-carotene, into a South African school-feeding programme raised levels of vitamin A (van Jaarsveld *et al.*, 2005). In a controlled primary school-feeding study in Kenya, children receiving milk and/or meat supplements with mid-morning snacks had higher intakes of several nutrients, including vitamins A and B₁₂, calcium, iron or zinc, and greater dietary energy (Murphy *et al.*, 2003; Neumann *et al.*, 2003). Fortifying rice served in school lunches in India led to statistically significant declines in iron-deficiency anaemia, from 30 percent to 15 percent for the treatment group, while anaemia remained essentially unchanged for the control group (Moretti *et al.*, 2006).²³

Despite the mixed evidence regarding the cost-effectiveness of school-feeding

²³ Importantly, unlike other foods, in which iron is detectable and therefore inhibits consumption, rice fortified with iron seems to be indistinguishable from non-fortified rice (Moretti *et al.*, 2006).

programmes in achieving nutritional objectives, they remain politically popular, perhaps because they address multiple socially desirable goals such as female school attendance. In some cases, school-feeding programmes use a holistic approach to improving nutrition by not only providing food but also using school gardens, including nutrition in the curricula and other related activities. Such integrated programmes tend to be more effective and may also help to establish good lifelong eating and exercise habits, especially when combined with broader nutrition education programmes (see below).

Food assistance programmes for adults with special nutritional needs

Some food assistance programmes target vulnerable adults who need external support, such as those who are unlikely to be economically independent and thus unable to meet their basic needs. Elderly people, households with HIV-positive members, disabled people and others facing chronic illnesses are likely to fall in this category. For these people, food assistance programmes can be a major source of reliable support. External assistance can also alleviate the demands they make on local community reserves to meet needs in times of crisis.

Food assistance can provide important support to the health of HIV-positive individuals and may delay or prevent the progression of the virus. International guidance on the intersection of nutrition, food security and HIV/AIDS does exist, but work remains to be done to understand fully which foods can best support the health and nutrition of persons living with HIV/AIDS (World Bank, 2007b; Ivers *et al.*, 2009).

The evidence base on the cost-effectiveness of food assistance programmes targeting adults with special needs also needs to be strengthened. Most such interventions are motivated on humanitarian grounds, which may help explain the paucity of evidence.

Food security and nutrition interventions in protracted crises

The nutritional needs of people in countries suffering from protracted crises are a particular concern. In these countries, the proportion of people undernourished is almost three times as high as in other

developing countries. The levels of stunting and the mortality rate of children under five years of age are also much worse (FAO and WFP, 2010).

These countries often need significant assistance because, in most cases, their population is facing the collapse of livelihood systems and the country has insufficient institutional capabilities to deal with crises. Most of the aid to countries in protracted crisis is humanitarian, notably food aid, while much less is development assistance (Afghanistan and Iraq are exceptions). Relatively small amounts of aid flow to agriculture and education, two sectors of particular importance for food security and nutrition. For example, only 3.1 percent of overseas development assistance received by countries in protracted crisis in the period 2005–08 was dedicated to agriculture (FAO and WFP, 2010).

The nature of the aid is also a reflection that, in the short term, immediate nutritional needs must be met. Food-assistance safety nets, such as food or cash transfers, mother and child nutrition programmes and school meal programmes, are life-saving interventions that also help preserve human capital in these countries.

In the longer term, however, programmes need to support livelihoods and build the livelihood resilience of households so they can avoid divesting themselves of their current assets and, instead, build the foundation of long-term food and nutrition security – including being able to prepare for and deal with future risks (FAO and WFP, 2010).

Nutrition-specific food price subsidies and taxes

Beyond the general food subsidies that have been used to protect food security and to increase the consumption of staple foods, food price interventions can be used more systematically to promote nutritious diets. The economic costs to society imposed by malnutrition – in terms of lost productivity and health care costs – may justify government intervention in markets through nutrition-specific food price subsidies and taxes to shape consumption patterns and diets.

As discussed above, staple foods such as rice and wheat have long been subsidized in many countries to address problems of food insecurity. Less commonly, price subsidies have been used to encourage the consumption of more diverse foods such as fruits and vegetables. Taxes can also be used to discourage the consumption of foods and beverages that are deemed less nutritious. Proposals for such taxes are increasingly common and they have been tried in several places (Capacci *et al.*, 2012; Eyles *et al.*, 2012; Mozaffarian *et al.*, 2012).

Assessments of the nutritional impacts of nutrition-specific food subsidies and taxes vary, but are generally consistent with economic theory; that is, people tend to consume more of foods that are subsidized and less of foods that are taxed. Such policies may have unintended effects, however, because a price change for one item can affect demand for that good as well as for goods that substitute for it (e.g. a tax on sugar-sweetened beverages may increase demand for beer) or that complement it (e.g. a tax on salt may reduce consumption of vegetables). Some of these cross-price effects may not lead to better nutritional choices. Because poor consumers are more responsive to price changes than affluent consumers, tax and subsidy policies may have disproportional impacts on different population groups. Moreover, many foods contain a combination of nutrients that may be beneficial or harmful depending on the amount consumed and the nutritional status of the consumer. These and other factors pose challenges to the effective use of nutrition-specific taxes and subsidies to improve dietary choices and nutritional outcomes.

Consumer food price subsidies

Consumer price subsidies have long been used to lower consumer prices of staple foods in an effort to increase consumption of those staples by the general population or by targeted groups within the larger population. Examples include subsidies on cereals in China and India (Shimokawa, 2010; Sharma, 2012).

In response to the rice price crisis of 2007 and 2008, several Asian countries used consumer price subsidies and reductions in value-added taxes (along with other types of market intervention) to moderate

domestic prices of staple foods (ESCAP, 2009). Caution must be exercised in designing such subsidies, because they can be expensive and difficult to remove. In some cases, particularly when not effectively targeted, they can lead to increased prevalence of overweight and obesity when they encourage overconsumption of energy-rich, less-nutritious foods. In Egypt, subsidies on bread, wheat flour, sugar and cooking oil are considered by some to have led to excessive energy intake and to be partly responsible for the country's high prevalence of overweight and obesity (Asfaw, 2007).

The use of subsidies to encourage the consumption of more nutritious foods, including fruits and vegetables, is a recent phenomenon (Mozaffarian *et al.*, 2012; Capacci *et al.*, 2012). Several studies have shown that lowering the price of low-fat foods available in vending machines is associated with increased consumption of those foods. Some interventions have indicated that even after removing subsidies from the healthier food products, participants continued to consume relatively larger amounts than previously. This suggests that changes in preference for more healthy foods may be sustainable once new habits are established (Mozaffarian *et al.*, 2012).

Taxes on consumer food prices

As noted earlier, reductions in value-added taxes on staple foods have been used to increase food consumption to a level that satisfies energy requirements. However, food taxes to improve nutrition are normally considered in terms of how increased taxes can be used to address problems of overweight and obesity by discouraging the consumption of foods thought to be less nutritious (such as foods and beverages that are high in sugar or fat content).

Many studies of the impact of food taxes are based on simulation exercises. A recent systematic review of 32 simulation studies in OECD countries found that taxes on soft drinks and foods high in saturated fats could reduce consumption and improve health outcomes (Eyles *et al.*, 2012). A simulation exercise in the United States of America showed that among adolescents a 10 percent increase in the price of a fast-food meal was associated with a 3 percent higher probability of consuming fruits and

vegetables and a 6 percent lower probability of being overweight (Powell *et al.*, 2007). A simulation study from the United Kingdom showed that taxing less-healthy foods by 17.5 percent could avert as many as 2 900 deaths a year due to cardiovascular disease and cancer, and that using the revenues from these taxes to subsidize fruits and vegetables could avert an additional 6 400 such deaths (Nnoaham *et al.*, 2009).

Studies of existing food tax policies in Europe and Northern America generally find that tax rates are too low to have a noticeable impact on consumption patterns (Mozaffarian, 2012; Capacci *et al.*, 2012; Mazzocchi, Shankar and Traill, 2012; Eyles *et al.*, 2012). Such taxes are, however, effective in raising government revenue that may be used to cover the health costs associated with overweight and obesity or to promote consumption of more nutritious foods. A simulation study in the United States of America showed that a 1 percent value-added tax on salty snacks would not reduce sales greatly, but it would generate up to US\$100 million in annual revenues, which could be used for nutrition programmes (Kuchler, Tegene and Harris, 2004).

Sugar-sweetened beverage consumption by young people has emerged in recent years as a particular focus of public policy. In the United States of America, 33 states levy taxes of around 5 percent on the sale of such drinks. Simulation studies suggest that taxes of 15–20 percent would be required to have an appreciable effect on consumption (Brownell *et al.*, 2009). A 20 percent tax on all sugar-sweetened beverages could reduce consumption by only about 7 kcal per person per day, while a 40 percent tax could reduce consumption by about 12 kcal per day (Finkelstein *et al.*, 2010). Although small, these changes could contribute to weight losses of 0.3–0.6 kg per person per year and generate up to US\$2.5 billion in tax revenue (Finkelstein *et al.*, 2010).

These simulations illustrate the complexity involved in designing interventions that improve nutritional outcomes for everyone. Taxing pork in China, for example, could reduce consumption of excess energy and saturated fats by higher-income consumers who are at risk of overweight and obesity, while at the same time cause an undesired decline in protein consumption by the

poor (Guo *et al.*, 1999). Thus, taxes on some energy-dense foods could help address overweight and obesity but exacerbate problems of undernutrition and micronutrient deficiencies for members of poor households.

Taxing a single food or food ingredient may not lead to an overall improvement in diets because people could increase consumption of other similarly unhealthy items. Real-world experience from Denmark, France, Hungary, the United States of America and elsewhere suggests that such taxes are difficult to implement and politically unpopular. Denmark, for example, instituted a tax on fatty foods in 2011, including dairy products, meat and high-fat processed foods, but repealed it one year later. The tax was unpopular because it applied to a wide variety of foods, including traditional local delicacies such as cheeses, and it was commonly circumvented by shoppers who could easily shop in neighbouring countries (Strom, 2012).

Nutrition education

Education, including both general education and nutrition-specific education, are effective means of improving nutrition (Webb and Block, 2004; World Bank, 2007b; Headey, 2011). Maternal education – including education that improves the mother’s care for herself as well as the care and feeding behaviours she provides for her family – is particularly important. Education that occurs in conjunction with other interventions to improve access to diverse, nutritious foods can be particularly effective, as noted in the discussion of food assistance programmes above.

Nutrition education is often defined broadly as holistic programmes that include an ensemble of information-related interventions aimed at increasing consumers’ knowledge of what constitutes good nutrition. The ultimate goal is a change in behaviour so that individuals choose more nutritious diets and healthier lifestyles. Such programmes may include elements of nutrition training, public information campaigns and regulation of advertising and labelling, as well as improvements to the local food environment.

Nutrition training

Nutrition training provided to mothers can have a positive effect on child growth and micronutrient deficiencies, primarily through improving breastfeeding practices and complementary feeding during the weaning of young children (Bhutta *et al.*, 2008; Horton, Alderman and Rivera, 2008). Impacts are heightened when the interventions are culturally sensitive, easily accessible and based on local products (Shi and Zhang, 2011). A recent global review of 17 studies conducted in low- and middle-income countries confirmed that provision of nutritional counselling to mothers along with nutritious complementary foods can lead to significant gains in the weight and height of children aged 6-24 months (Imdad, Yakoob and Bhutta, 2011). Nutrition training can also guide households in how to consume adequate amounts of energy and micronutrients through dietary diversification. The content of such education programmes can provide knowledge and practical skills for acquiring and preparing nutritious, balanced diets.

The most effective way to ensure that education results in actual changes in behaviour is to ensure a supportive environment, because it is difficult for households to use new knowledge if other factors discourage its use (McNulty, 2013). For example, Sherman and Muehlhoff (2007) found that nutrition education is more effective when accompanied by improvements to sanitation.

Other factors, such as women's empowerment, better access to health services, or the accompanying provision of complementary foods, can also help create a supportive environment and improve nutritional outcomes. Interventions should take care to address these issues, by not only providing information about the importance of dietary diversity, for example, but suggesting specific ways to achieve it within the household budget. Peru's programme, "La Mejor Compra", is one such example (INCAP, 2013).

Notwithstanding the need for a supportive food environment, evidence shows that nutrition education can have a positive impact on dietary choices even when households face constraints. When confronted with sharp increases in staple

food prices, for example, Indonesian households that were knowledgeable about nutrition attempted to protect their consumption of micronutrient-rich foods relatively more than those without such knowledge (Block, 2003).

In contrast, as mentioned in Chapter 3, households lacking such knowledge tend to reduce consumption of micronutrient-rich foods when faced with price shocks. Other factors being equal, mothers who had practical nutritional knowledge and skills allocated a larger share of their food budget to micronutrient-rich foods. Significantly, this difference was even larger at lower-income levels. This suggests that knowledge about the importance of foods rich in micronutrients can increase demand for them.

Nutrition education in schools is likewise effective in addressing problems of overweight and obesity and associated non-communicable diseases, especially when combined with efforts to improve the diversity and nutritional quality of foods available. In 2011, WHO and other international organizations launched the Nutrition-Friendly Schools Initiative, which provides a framework for implementing integrated intervention programmes to improve the health and nutritional status of school-age children and adolescents and uses the school as the programme setting (including nurseries and kindergartens). This initiative brings together parents, the local community and health services to promote children's health and nutritional well-being (WHO, 2011b). It encourages pairing nutrition training with increased availability of healthier foods and restrictions on less-healthy foods and beverages in schools in order to have the greatest impact.

A review of 19 evaluations of school-based interventions found that nutrition training in schools was effective in addressing overweight and obesity, particularly when combined with efforts to increase physical activity (Mozaffarian *et al.*, 2012). Evaluations of various school-based nutrition education programmes to address overweight and obesity in Italy and Portugal found positive effects on consumption and health (Capacci *et al.*, 2012).

Comprehensive nutrition and health interventions in the workplace that include

training components can also be effective (Mozaffarian *et al.*, 2012; Hawkes, 2013). WHO's Global Strategy on Diet, Physical Activity and Health and the 2011 Political Declaration of the UN High Level Meeting on the Prevention and Control of Non-communicable Diseases both support such workplace-based interventions (WHO, 2004; United Nations, 2011a).

Nutrition programmes in the workplace obviously need to involve private-sector employers, and some efforts are already being made. Along these lines, the World Economic Forum, has, for example, created a Workplace Wellness Alliance, a consortium of companies committed to improving health through workplace-based initiatives (World Economic Forum, 2012). Nestlé has implemented a nutrition education programme targeted at its more than 300 000 employees, which aims to improve their knowledge of nutrition so they can make better decisions for themselves and also improve product design (Hawkes, 2013).

Nutrition training can also be delivered in community centres and other locations. The Expanded Food and Nutrition Education Program in the United States of America is a large community-based programme sponsored by the government. Targeting low-income adults, its objective is to improve their nutritional knowledge and their ability to prepare healthy meals for their families. Programme activities are delivered in locations such as health clinics, children's centres, family resource centres, job clubs, and in the home. Recent evaluations indicate that participants are more likely to follow national food-based dietary guidelines, pay attention to nutrition labels, increase their consumption of fruits and vegetables and improve their meal planning (USDA, 2009).

Public information campaigns

Public information campaigns also play an important role in addressing malnutrition by improving households' understanding of what constitutes a nutritious diet. These campaigns have been implemented by governments and the private sector and through public-private partnerships. Such campaigns are also known as "social marketing" as they use commercial marketing methods to achieve the social good. Although comparatively inexpensive,

the sustainability of public information campaigns is often tenuous, because they may rely solely on public funds, with support depending on political trends, or on private companies, which generally must justify the use of such "public" campaigns in terms of private gains.

One example of a joint public-private effort is the United Kingdom's Change4Life campaign. This aims to raise awareness, through use of the media, about the health risks associated with overweight and obesity and the importance of nutritious diets and of physical activity for good health. The programme consists of four phases: awareness-raising; assessment of the diets and physical activity levels of children; distribution of customized "family information packs" and distribution of additional information to lower-income families (Crocker, Lucas and Wardle, 2012).

National food-based dietary guidelines are widely used as part of broad public information campaigns. They communicate in simple terms what constitutes an adequate and nutritious diet, thereby simplifying technical information developed by nutritionists in a way that is intelligible to the general public. They typically include a food guide, often in graphic form, such as the Chinese pagoda, the Thai nutrition flag or the United States food pyramid, which provides daily recommended intakes for different types of food. Campaigns on specific issues are also frequently used; examples include the "no sugar kid's network" in Thailand, as well as "breastfeeding week" and "micronutrient day" in Viet Nam (WHO, 2011c).

FAO and WHO have been promoting the use of such guidelines since the International Conference on Nutrition in 1992. They have evolved to include not only nutrition concerns but also food safety and recommendations concerning physical activity (Hawkes, 2013). Important recommendations for reducing malnutrition among infants are the early initiation of breastfeeding, exclusive breastfeeding for the first six months, as well as the timely introduction of complementary foods (WHO, 2011c).

Food-based dietary guidelines are widely used, though their prevalence varies by region; Hawkes (2013) has identified at

least 81 countries that have developed and implemented them (4 countries in sub-Saharan Africa, 9 in the Near East and North African region, 15 in Asia and the Pacific; 2 in Northern America; 23 in Latin America and the Caribbean; and 28 in Europe). Their impact on consumption and nutritional outcomes has not been widely studied, but some evidence indicates that they improve awareness of proper nutrition (Hawkes, 2013). Nevertheless, conceptualizing, formulating and implementing these guidelines is a complex undertaking (FAO and WHO, 2006).

The impact of broad, general information campaigns on consumer behaviour appears to be somewhat limited. Capacci *et al.* (2012) assessed ten public information campaigns throughout Europe and found increased awareness and knowledge but little impact on behaviour and nutritional outcomes. These findings are consistent with an evaluation of the Change4life programme (Croker, Lucas and Wardle, 2012), as well as earlier systematic reviews of other similar programmes (National Institute for Health and Clinical Excellence, 2007; Mazzocchi, Traill and Shogren, 2009). The apparently low effectiveness of general public information campaigns may be explained by the lengthy timeframe needed to affect nutritional outcomes (Mozaffarian *et al.*, 2012). The modest size and duration of public information campaigns compared with private-sector advertising campaigns, for example, may also limit their effectiveness (California Pan-Ethnic Health Network and Consumers Union, 2005).

Public information campaigns that have a more targeted message, focusing on promoting the consumption of certain foods such as fruits and vegetables or discouraging the consumption of specific foods such as sugar, sodium and trans-fats may have greater impact. These more targeted campaigns often include complementary activities that increase the availability and accessibility of healthier choices. Campaigns to encourage increased consumption of fruits and vegetables have been undertaken in several developing countries including, Argentina, Brazil, Chile, Mexico and South Africa as well as in high-income countries in Australasia, Europe and Northern America (Hawkes, 2013).

The United Kingdom's "5 a day" campaign promoted the consumption of five servings of fruits and vegetables through a school-based programme that combined an educational component with collaboration with suppliers to increase the availability of fruits and vegetables in school lunches. An evaluation of the campaign found a 27 percent increase in fruit and vegetable consumption after the first year (Capacci and Mazzocchi, 2011).

A similar initiative in Australia, the "Go for 2 & 5", also led to increases in household consumption of the targeted food group (Pollard *et al.*, 2008). In Chile, the "5 al día" programme led to increased awareness of the health benefits of fruit and vegetable consumption among participants, but little change was seen in their consumption of such foods (Hawkes, 2013). As with the nutrition education programmes discussed above, public information campaigns may be more effective in combination with efforts to create a more supportive environment that helps consumers make better choices.

Regulation of advertising and labelling

Whether or not advertising by food and beverage manufacturers and retailers has contributed to the rise in overweight and obesity is a matter of growing concern and sharp debate (Harris and Graff, 2012; Keller and Schulz, 2011). Commercial advertising almost certainly influences consumers' food choices and diets – otherwise, companies would be unlikely to spend the sums they do. In light of this, 85 percent of the 73 countries surveyed in a WHO review regulated television advertising targeting children (Hawkes, 2004). At the same time, many governments and international organizations have begun to call for regulation of food and beverage advertising, especially to children (Garde, 2008; Hawkes, 2013). WHO Member States have already endorsed a *Set of recommendations on the marketing of foods and non-alcoholic beverages to children*. These provide guidance to governments on the design of policies to reduce the impact on children of the marketing of foods high in saturated fats, trans-fatty acids, free sugars and salt (WHO, 2010).

The effectiveness of advertising restrictions in influencing healthy food choices and

improving nutritional outcomes is debated (Mozaffarian *et al.*, 2012; Capacci *et al.*, 2012; Hawkes, 2013). Many studies in this area are based on hypothetical rather than actual restrictions. The impacts of actual restrictions seem to depend on the precise nature of the restriction and a variety of other factors that are difficult for researchers to control. For example, studies of proposed bans on food advertising to children in the United States of America suggested they would result in potential reductions of almost 15 percent in the prevalence of overweight and obesity among children (Chou, Rashad and Grossman, 2008; Veerman *et al.*, 2009). Yet evidence from regions and countries where food advertising bans have been implemented is mixed. For example, in Quebec, Canada, all food advertising to children was banned in 1980, and the ban seems to have reduced the consumption of fast foods (Dhar and Baylis, 2011). Sweden has also banned food advertising to children, but with no measurable impact on child obesity rates (Lobstein and Frelut, 2003).

Standardized nutrition labels are a source of information for consumers, with the aim of helping them make more nutritious food choices. The Joint FAO/WHO Codex Alimentarius Commission provides guidelines to governments on the use of nutrient lists for processed and packaged foods and recommends mandatory labelling when nutritional claims are made (FAO and WHO, 2012). Most developed countries require nutrient labels on all processed and packaged foods and many are also extending this requirement to foods consumed away from home. Many developing countries are also beginning to require nutrient labels on processed and packaged foods.

Studies generally show that nutrient labels influence consumer decisions, although perhaps not strongly (Variyam, 2007; Capacci *et al.*, 2012; Mozaffarian *et al.*, 2012; Siu and Man-yi Tsoi, 1998; Colón-Ramos *et al.*, 2007). Consumers seem most likely to use the information on nutrient labels when they already have enough knowledge to understand the information and have the resources to be able to act on it. Ease of use is a determining factor in the effectiveness of labels (Signal *et al.*, 2007).

Labels can be relatively ineffective in influencing the dietary choices of the poor for a variety of reasons. Poor consumers appear to attach more importance to price than to label information (Drichoutis, Panagiotis and Nayga, 2006). Furthermore, labels are used primarily for processed and packaged products and very rarely in wet markets (where the poor in developing countries are more likely to shop, see Chapter 4). For processed foods, however, when combined with nutrition education, nutrition labels are likely to encourage better food choices, more nutritious diets and better nutritional outcomes.

In addition to influencing consumers, mandatory disclosure of information about the nutritional content of food can influence the behaviour of food processors and retailers, even encouraging the reformulation of products (Ippolito and Mathias, 1993; Golan and Unnevehr, 2008; Mozaffarian *et al.*, 2012). For example, in the United States of America, the mandatory inclusion of trans-fats on nutrition labels in 2006 quickly led major brands to substitute away from trans-fats so they could position their products as trans-fat-free (Rahkovsky, Martinez and Kuchler, 2012). This shift started even before the regulation took effect, as the media, law suits and local regulation had already brought attention to the issue. It reverberated throughout the supply chain, and agricultural producers reacted by expanding production of low-linoleic soybeans (Unnevehr and Jagmanaitė, 2008). The success of this labelling policy, combined with increased consumer awareness of the negative effects of trans-fats on health, was reflected in a drop of 58 percent in observed levels of trans-fats in blood samples taken from white adults between 2000 and 2009 (CDC, 2012).

In general, then, evidence regarding the effectiveness of advertising and nutrient labelling regulations on consumer behaviour and nutritional outcomes shows that such efforts can be effective, but the results are not always as predictable and also depend on a variety of other factors. Nutrition education and information are more likely to help consumers make healthy dietary choices when other parts of the food system are equally supportive.

Improving the local food environment

The local food environment, that is, the ease with which people have access to diverse nutritious food, influences their dietary choices. Measures that can improve the local food environment include increasing the availability of supermarkets, grocery stores, farmers' markets and community gardens; changing the types of foods available in stores and schools; and reducing the availability of fast-food restaurants and convenience stores (Mozaffarian *et al.*, 2012).

Governments can exert direct leverage in schools to increase the availability of nutritious foods and limit access to less-nutritious ones. Public authorities may establish standards or otherwise control the availability of the foods and beverages they offer in school cafeterias and vending machines, for example (Hawkes, 2013). Engagement with the private sector, at least in industrialized countries, has revolved largely around sugar-sweetened beverages and offerings of food products in vending machines. Though controversial, Capacci *et al.* (2012) find some evidence of the positive impact on dietary intake of regulating school vending machines.

One of the most ambitious programmes aimed at increasing the availability of nutritious foods to schoolchildren is the EU's School Fruit Scheme, introduced in 2008. The programme supports country-level initiatives to provide fruits and vegetables to schoolchildren and by 2011 had been implemented in most EU Member States (European Commission, 2012a). Evaluations indicate that it has successfully increased fruit and vegetable consumption among youth (European Commission, 2012b). Capacci *et al.* (2012) find similar results for the impact on dietary intake of other school fruit and vegetable schemes.

As suggested above, schools can serve as important platforms through which to improve food consumption and dietary patterns. The National School Lunch Program in the United States of America, for instance, provides more than 31 million children per day with a nutritious lunch and other millions of students with after-school snacks. The programme has suffered criticisms of the quality of its meals, but its menu and

nutritional standards have been updated in recent years to meet the country's current dietary guidelines. This has resulted in more fruits, vegetables and whole grains on the menu (USDA, 2012).

Mozaffarian *et al.* (2012) found that holistic school-based approaches – ones that aim to improve diet and physical activity and the food environment – are the most successful in changing child nutrition. The authors note that both school-gardening programmes and programmes providing students with fruits and vegetables as snacks can increase fruit and vegetable consumption. Jaime and Lock's (2009) review of research on changes to the school food environment supports this conclusion, noting that students improved their dietary intakes following a range of interventions, such as increased availability of fruits and vegetables at school and reduced fat content of school meals.

With regard to the workplace, Mozaffarian *et al.* (2012) similarly argue for holistic worksite wellness programmes that incorporate various measures to improve food consumption patterns, including education as well as improvements to the food environment. Few of these efforts have so far been evaluated for impact (Capacci *et al.*, 2012).

Conclusions and key messages

Consumer choices are at the nexus of nutrition and sustainability. Their choices influence consumers' own nutritional status as well as what is produced by food systems and how sustainable production and consumption patterns can be. Evidence shows that consumer choices are influenced by their access to nutritious foods, their knowledge regarding healthy diets and direct incentives and disincentives for the consumption of particular foods. Governments can influence the design of food assistance programmes to promote better nutritional outcomes. They can regulate the nutrition training, public information, advertising and labelling to which consumers are exposed and they can influence the quality of local food environments by encouraging the availability of more diverse foods. Governments can

give consumers the information they need and make it easier for them to make healthy choices, but ultimately consumers must choose.

Key messages

- Nutritional outcomes ultimately depend on consumer choices. Governments play an important role in shaping the food environment and ensuring that consumers have the knowledge and information they need to make healthy choices.
- Food assistance programmes could improve nutritional outcomes by better targeting of more flexible forms of assistance. Food assistance may be more effective in achieving nutritional goals when combined with nutrition education.
- Incentives can play an important role in shaping consumer behaviour and nutritional outcomes, but they may have unintended consequences. Such policies should be based on sound evidence regarding what constitutes a healthy diet.
- Nutrition education is likely to be more effective when it consists of a set of interventions including, for example, elements of nutrition training, public information campaigns, improved food environments, and training and awareness-raising about the importance of physical activity.