

The Alliance for Food & Health

White Paper No. 1

How to Increase Fruit and Vegetable Consumption

A Multi-Stakeholder Approach for Improved Health Outcomes

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About Us

The Alliance for Food & Health (“AFH”) is a multistakeholder platform that brings together diverse stakeholders from both the public health community, and the food and agriculture community, to find innovative ways of addressing nutrition-related noncommunicable diseases (“NCDs”).

With more than 240 participants from academia, civil society, governments, international organizations, and the private sector, the AFH is creating a model that encourages cooperation and builds linkages to address critical health issues. Through stakeholder engagement, the AFH can generate actionable ideas to influence policy and propose interventions to inform the debate on food-related NCDs. These ideas and recommendations will be presented in a series of White Papers with topics suggested and chosen by AFH participants.

The AFH model is distinctive in the following ways:

It is mission-focused. By positioning itself at the nexus between food and health to fight NCDs, the AFH bridges a gap through information-gathering and consensus-building.

It is action-oriented. The AFH White Papers will deliver actionable proposals to all stakeholders. Since AFH strives for maximum social impact, it builds on existing initiatives and focuses on innovation rather than on finding an acceptable but ultimately ineffective lowest common denominator.

It is balanced. The AFH has a governance structure that requires balance in all its deliberations and structure—from the working groups to its leadership and to future funding. Of particular value is the balance between the food and agriculture participants and the global health participants, each of whom welcomes the opportunity to learn from the other. This overlapping system of checks and balances increases the chances for a group consensus and minimizes interest group biases in favor of advancing the common good.

It is based in science. The AFH White Papers will be data-driven and evidence-based. To ensure quality, these will draw from participant subject matter expertise and from peer-reviewed scientific literature.

It is diverse. With participants ranging from farming groups to public health experts, the AFH considers the food and health system as a whole—instead of just its isolated parts. To ensure maximum participation, it does not have a formal membership structure—but instead engages with participants on an informal but substantive basis. In addition to promoting strength through diversity, the model offers a highly interdisciplinary platform that includes public health, economics, nutrition, logistics, public administration, and marketing, among other fields. It intends to create a hybrid vigor of ideas to transform how stakeholders can respond with actionable, sustainable solutions to the NCD challenge.

It values learning. Feedback from diverse stakeholders informs AFH discussions and enables them to evolve and improve. As an example, AFH foundational documents have seen 30 revisions in response to comments from participants. Through this process, AFH participants educate themselves and each other toward the common goals of reducing NCD morbidity and mortality.

It values trust. By encouraging participant feedback, the AFH has shown steady growth in its number of participants. As a testament to the stakeholders' appreciation for the diverse dialogue, word of mouth from existing members continues to attract new participants. In order to build confidence in the process and openness in communication, the dialogue follows the Chatham House Rule, where participants can share ideas in confidence and commit to solving problems together. These approaches have enabled the AFH to maintain trust as it has expanded.

While the White Paper's reference section indicates some of the depth of work that has gone into development of this paper, and of the AFH in general, AFH's discussions and outreach to stakeholders is just beginning. The more voices that are involved in the AFH discussions, the stronger and more valuable will be its impact. It is critical that the AFH is aligned with thought leadership in this space. AFH invites readers to join and contribute their voice to these discussions, outreach, and future White Papers.

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Table of Contents

Executive Summary	1
Top Line Recommendations	1
Who is the Alliance for Food & Health?	2
Introduction	2
Problem Statement & Background	2
Major Stakeholders	3
Current Situation and Interventions	3
Current Status	3
Current Approaches	4
Policy Approaches	4
Private Sector Approaches	6
School, Workplace, and Community Wellness Interventions	7
Models and Expected Impacts	8
Recommendations	9
Suggestions for the Public Sector, Private Sector, and Civil Society	9
Summary	10
Appendix	11
Knowledge Gaps.....	11
Tables and Figures	11
Figure 1. Socio-ecological barriers to fruit and vegetable consumption	11
Table 1. Role of Governments within Recommendations	12
Table 2. Role of Private Sector within Recommendations	14
Table 3. Role of Civil Society within Recommendations	16
Table 4. Examples of Successful Public Sector, Private Sector, and Civil Society Collaborations	18
Sustainable Development Goals	18
WHO/FAO Second International Conference on Nutrition (ICN2) Commitments.....	19
United Nations Decade of Action on Nutrition Action Areas	19
References	20

Executive Summary

Nutrition is the fundamental bridge between food and health. Inadequate fruit and vegetable (“FV”) consumption has been linked to an increase in global noncommunicable diseases, which places a greater burden on health systems.¹ Despite much emphasis from the World Health Organization (“WHO”) and the Food and Agriculture Organization of the United Nations (“FAO”) on the benefits of increased FV consumption, neither results, nor an understanding of the complexity of food security and the actions of a diverse array of stakeholders needed to achieve outcomes, have been attained. To address this challenge, the Alliance for Food & Health uses a multi-stakeholder approach to engage cross-sector solutions. This paper, the first in a series, addresses the global challenge of FV consumption by examining and synthesizing current practices and outcomes, and providing actionable recommendations for governments, private sector, and civil society stakeholders. To effectively reduce the global NCD burden, it is critical that stakeholders work in concordance with the WHO/FAO Second International Conference on Nutrition (“ICN2”) commitments, United Nations (“UN”) Decade of Action on Nutrition Action Areas, and the UN Sustainable Development Goals (“SDGs”) applicable to this issue (see appendix).

Top Line Recommendations

AFH’s top line recommendations align with multiple UN SDGs.² All recommendations connect with the following three SDGs: #2: “Zero Hunger,” #3: “Good Health & Well-Being,” and #17: “Partnerships for the Goals.” This indicates AFH’s integration of the food, agriculture, and global health communities in efforts to combat NCDs. A variety of recommendations align with #9: “Industry, Innovation, & Infrastructure,” #11: “Sustainable Cities & Communities,” and #12: “Responsible Consumption & Production.”

Recommendation	Key benefit(s)	SDG Correlation
<p>#1: Harness multi-sector support for policy research to close intervention knowledge gaps between low, middle, and high-income countries</p> <ul style="list-style-type: none"> • Stakeholder(s): Governments, private sector, civil society 	<p>-Global trends and patterns can be estimated accurately</p> <p>-Populations particularly needing interventions can be identified worldwide</p>	<p>#2: Zero Hunger</p> <p>#3: Good Health & Well-Being</p> <p>#9: Industry, Innovation, & Infrastructure</p> <p>#12: Responsible Consumption & Production</p> <p>#17: Partnerships for the Goals</p>
<p>#2: Elaborate upon policy initiatives; define clear stakeholder roles & responsibilities, targets, and methods & measurements for evaluation</p> <ul style="list-style-type: none"> • Stakeholder(s): Governments, private sector, civil society 	<p>-Delineates methodology for interventions</p> <p>-Identifies areas of success & needed improvement</p>	<p>#2: Zero Hunger</p> <p>#3: Good Health & Well-Being</p> <p>#12: Responsible Consumption & Production</p> <p>#17: Partnerships for the Goals</p>
<p>#3: Work to maintain & expand multilateral and public-private partnerships</p> <ul style="list-style-type: none"> • Stakeholder(s): Governments, private sector, civil society 	<p>-Maximizes global impact of initiatives across the spectrum of low, middle, & high-income countries</p>	<p>#2: Zero Hunger</p> <p>#3: Good Health & Well-Being</p> <p>#9: Industry, Innovation, & Infrastructure</p> <p>#17: Partnerships for the Goals</p>
<p>#4: Harness multi-sector support to encourage innovative product and infrastructure development</p> <ul style="list-style-type: none"> • Stakeholder(s): Governments, private sector, civil society 	<p>-Improves accessibility of sustainable and diverse FVs in all forms, in urban and rural communities</p>	<p>#2: Zero Hunger</p> <p>#3: Good Health & Well-Being</p> <p>#9: Industry, Innovation, & Infrastructure</p> <p>#11: Sustainable Cities & Communities</p> <p>#12: Responsible Consumption & Production</p> <p>#17: Partnerships for the Goals</p>

Who is the Alliance for Food & Health?

The Alliance for Food & Health is a multi-stakeholder coalition that integrates the food and agriculture community in the global health community's efforts to reduce morbidity and mortality from food and nutrition-related NCDs. AFH convenes its expert participants from the food and agriculture community, and from the global health community, to discuss and develop integrated, effective, and actionable policy recommendations for governments, the private sector, and civil society. The AFH approach is to:

- Consider food system effects on nutrition and health by examining the interrelatedness of public health, economics, nutrition, supply chains, public administration, marketing and other fields;
- Facilitate communication among diverse stakeholders, including nongovernmental organizations, governments, academia, the public health & medical communities, and food & agriculture industry;
- Recognize both the complexity of the problems and the need for inclusion of, and cooperation among, all stakeholders

The AFH operates under the Chatham House Rule—although any input and information shared by participants may be freely used, neither the identity nor the affiliation of the speaker(s) and participant(s) is divulged. In these ways, this organization adds value by providing a forum where stakeholders convene to address these issues in a collaborative and amicable manner.

Importantly, AFH identifies ways it can leverage the diverse and complementary knowledge and experiences of stakeholder groups it brings together to amplify existing initiatives, build upon current research, and identify gaps that will strengthen the global food system. AFH does not seek to compete with other organizations.

AFH's goal is to find a better way—together.

Introduction

Problem Statement & Background—Relationship between Global noncommunicable disease burden and inadequate fruit and vegetable consumption

Global communicable disease disability-adjusted life-years (DALYs) declined from 1.19 billion in 1990 to 769.3 million in 2013; at the same time, global NCD DALYs increased from 1.08 billion in 1990 to 1.43 billion in 2013.³ These data support the notion of a global epidemiological transition—the shift of disease burden from communicable disease to non-communicable disease. A Joint WHO/FAO Expert Consultation recognized a significant contribution to this shift in disease burden in both developed and developing countries, in addition to decreasing physical activity levels, was related to dietary and lifestyle changes.⁴ NCDs resulting from dietary patterns include obesity, diabetes, cardiovascular disease (CVD), hypertension, stroke, and esophageal, stomach, and lung cancer, among others.^{3,5,6} As part of this shift in dietary patterns, a significant global disease burden—approximately 1.7 million deaths—is attributed to inadequate FV consumption (<400g/day); furthermore, inadequate consumption is among the top 10 selected risk factors for global mortality.^{7,8,9} While the country-specific NCD burden due to inadequate FV consumption may vary, one study found that overall, 77.6% of men and 78.4% of women from 52 mainly low- and middle-income countries (LMICs) geographically representing the six WHO regions, consume less than the minimum WHO-recommended 400g of combined FVs per day.^{1,10} In 2010, a systematic analysis of 187 countries found that only 2 such countries—Jamaica and Malaysia (0.4% of the global adult population)—had a mean fruit consumption of at least 300g/day. The same analysis found that only 4 of 187 countries (again, 0.4% of the global adult population) had vegetable intake levels of at least 400g/day.¹¹ This WHO recommendation is with reason—there is “convincing evidence” that increased FV consumption reduces risk of hypertension, coronary heart disease, and stroke.^{6,12} Studies also support a significant reduction in the risks of esophageal, lung, stomach, and colorectal cancer with increased FV intake; breast cancer with vegetables, but not fruit; and bladder cancer with fruit, but not vegetables.¹³

Given evidence supporting the intersection of FV consumption and global NCD burden, public health policies that aim to reduce NCDs should place special emphasis on increased FV intake in all forms—fresh, frozen,

How to Increase Fruit and Vegetable Consumption: *A multi-stakeholder approach for improved health outcomes*

canned, dried, and juiced—and in both raw and cooked methods. To increase fruit consumption, emphasis should be on eating whole fruit. While 100% fruit juice can contribute to overall fruit intake, it is lower than whole fruit in dietary fiber and, when consumed in excess, can contribute extra calories.^{14,15} A variety of vegetables from all culturally appropriate vegetable subgroups should be consumed—for example, in the United States, dark green, red and orange, legumes (beans and peas), and starchy.¹⁴

One of the two outcome documents of the Second International Conference on Nutrition (ICN2), the Framework for Action (FfA), provides commitments outlining the need for such public health policies that address this issue in novel and collaborative ways.¹⁶

Major Stakeholders

Because food systems and NCDs are so complex, a variety of stakeholders is essential to evolving a food and food policy system that reduces global NCD burden via increased FV consumption. Stakeholders and their roles include but are not limited to:

- **Academics and research organizations:** provide scientific evidence for actionable policy recommendations and evaluate existing policy and interventions.
- **Governmental organizations and country-specific departments of health:** reduce NCD burden within their own geographies, and maintain and improve international relations by collaborating with their global counterparts
- **Multilateral and intergovernmental organizations (IGOs), and donor governments:** support international economic development, global disease reduction efforts, and global hunger alleviation
- **Non-governmental organizations (NGOs):** raise awareness and provide support for policy initiatives at both the local and global levels
- **Private sector, including agricultural sector:** provides FVs on a global scale, and supports novel, sustainable solutions to increase agricultural products' consumption

AFH emphasizes that *there is a role for everyone* to play in combatting NCDs.

Current Situation and Interventions

Current Status

There are significant barriers (appendix, Figure 1) to the implementation of sustainable interventions that seek to increase FV consumption. A multitude of factors, across the spectrum of food production, interact and shape individual and population consumption patterns. To begin, there is an estimated 22% supply gap in meeting current need for FVs, with low-income countries bearing the brunt of the discrepancy.¹⁷ Although, in 2008, the European Union implemented subsidies for FV production,^{18,19} in most developed and developing countries, there are few policy incentives to grow and market FVs.^{17,20,21,22} Much of the abundant indigenous FV species in LMICs are underutilized and under-researched. A focus on indigenous FV species represents an untapped potential solution to increase availability, access, affordability, and acceptability. Furthermore, on the production side, such barriers include: lack of FV agriculture diversification in order to ensure sustainability and protect crop strength, non-availability of good-quality seeds, limited utilization of, and research on, indigenous FV species, under-utilized or non-existent public-private partnership instruments, inadequate quality control (globally, 30-35% of FVs perish during harvest, storage, transport, packaging, and distribution), and weak infrastructure that can negatively impact transport and distribution.²³ It is globally recognized that increased utilization of a temperature-controlled supply chain has potential to reduce post-harvest loss and food waste.

Socio-ecological factors may impact demand and consumption at the individual, relationship, community, and broader societal levels.²⁴ At the individual level, income and lack of necessary skills to prepare FVs are crucial factors affecting consumption. In addition, some consumers perceive that they already eat enough FVs or that these commodities have a higher cost or are too time-consuming to cook.²⁵ Sensory perception—taste, smell, and

How to Increase Fruit and Vegetable Consumption: *A multi-stakeholder approach for improved health outcomes*

texture—also plays a role in consumption.²⁶ Furthermore, personal eating habits formed over a lifetime can be difficult to change. These habits and perceptions may be influenced further through consumer relationships with peers and family members. At the community level, barriers include a lack of FVs offered at food outlets, poor product quality or higher cost relative to other foods^{22,27}, insufficient cookware and clean water needed to prepare foods, and nutrition education not incorporated in all school environments.²²

At a broader, societal level, different geographies face different issues; communities focus resources on issues of greatest salience to their populace, which in some cases may not be nutrition. This may contribute to a lack of priority setting, clear and thorough elaboration on policy initiatives, and coordinated leadership necessary to follow through on policy recommendations and develop broad, sustainable interventions. Among policies seeking to reduce NCD through diet modification in LMICs, only a minority include a budget, implementation plan, time frame, or delineation of stakeholder responsibilities.²⁰

AFH acknowledges multiple at-risk populations are disproportionately affected by inadequate FV consumption and particular attention needs to be paid to these groups. These “at-risk groups,” as defined by the ICN2 as women, children, migrants, the elderly, persons with disabilities, other vulnerable groups, and people in humanitarian emergencies have unique health and societal issues that must be addressed accordingly.²⁸

AFH also acknowledges that improving long-term FV access and consumption ultimately extends beyond the capacity of solely food and agriculture sector stakeholders; rather, the achievement of this outcome requires various social determinants—such as poverty alleviation, social equity, additions to the built environment, etc.—be addressed in unison with food and agriculture-focused interventions.

Current Approaches

In 2015, the Food Climate Research Network (FCRN) conducted a review of current interventions aimed at shifting diets in a healthier direction and identified a “Typology of Interventions” summarizing current global methods.²⁹ Examples of these approaches will be highlighted in the following sections of this paper.

Food Climate Research Network’s (FCRN) Typology of Interventions²⁹

Approach	Examples
Dis-incentivize or incentivize choices via fiscal measures	Taxes, subsidies, trading
Change the governance of production	Macroeconomic policies, national public procurement policies
Encourage collaboration and shared agreements	Voluntary industry agreements, certification schemes
Changing the context, defaults, and norms of consumption	Changing choice architecture, store layouts, catering, etc.
Inform, educate, promote, or empower through community initiatives, and other means	Labeling, gardening, cooking projects; media campaigns, education programs, food policy councils

Policy Approaches

There are a variety of policy interventions; some with universal applicability and others more applicable for specific countries.^{20,25,30,31,32} AFH identified eight: 1) dietary guidelines; 2) subsidies; 3) advertising controls; 4) public information campaigns; 5) nutrition labeling laws; 6) supplemental income programs; 7) Department of Agriculture (DoA) commitments to increase consumption; 8) food policy coalitions.

Policy	Impact
Food-based dietary guidelines	100+ countries: have developed guidelines adapted to nutrition situation, food availability, culinary cultures and eating habits; guidelines foster health diet. ³³
FV subsidies	South Africa: 1% reduction in price, led to 0.35% increase in FV purchases ³⁵ U.S.: 1% retail price subsidy on FVs→avg. cost per life saved by avoiding heart disease & stroke is \$1.29 million. ³⁴
Advertising controls	France: questionable; evaluations measure message exposure, not health & diet change ³²
Public information campaigns	Italy, Poland, Denmark: no significant evidence of changes in nutritional intake or health markers (i.e. body mass, cholesterol, blood pressure) ³²

How to Increase Fruit and Vegetable Consumption: *A multi-stakeholder approach for improved health outcomes*

Nutrition labeling laws	France, U.S.: Positive health outcomes (higher fiber, iron intakes; lower intakes of calories from total fat, saturated fat) for consumers who used labels to inform purchases ³⁷
Supplemental income programs	Kenya, Zambia: Improved household food security, food consumption, & diet diversity ⁴⁸
DoA commitments to FV consumption	Brazil, Ecuador: Government SMART (specific, measurable, achievable, relevant, time-bound) commitments to increase FV consumption in the adult population by 17.8% ^{50,51}
Localized food policy coalitions	Australia, Canada, UK, US: Community stakeholders make specific, multi-sector policy recommendations to promote culturally appropriate FV consumption ⁵¹⁻⁵⁵

Dietary guidelines can be developed by government as consumer education tools to increase awareness of the FV benefits in a high-quality diet. To best ensure effectiveness, it is important that these guidelines are appropriately and consistently promoted and implemented. Among fiscal policy approaches, subsidies are promising. Studies project FV subsidies may result in reduced NCDs.³⁵ For the U.S., a 10 percent produce subsidy would result in more than 150,000 “prevented or postponed deaths due to cardiovascular disease by 2030.”³⁶ Lower FV prices are generally associated with lower body weight outcomes among low-income children and adults, suggesting that “subsidies may be effective in reducing obesity” among these populations.³⁷

Other policy approaches include advertising controls, public information campaigns, nutrition labeling laws, and supplemental income programs. One French law regarding food advertising mandates that each food advertisement must include the public health message, “For your health, eat at least five fruits and vegetables a day.”³⁸ In a review of public information campaigns, all the countries surveyed had enforced at least one intervention aimed at promoting FV intake.³² Many such campaigns formerly used the WHO “5 portions a day” message—now re-branded as the “Fruits & Veggies—More Matters” message to communicate a more compelling emotional benefit to consumers—to increase FV consumption.³⁹ However, the effectiveness of these campaigns is questionable; there is no significant evidence of changes in nutritional intake or health markers.³²

Studies show positive health outcomes for consumers who use labels to inform purchases.³⁷ Nutrition labeling measures exist throughout Europe and the U.S., with the U.S. Nutrition Labeling and Education Act mandating packages include a Nutrition Facts Panel. Similar nutrition facts panels are required in Canada, Taiwan, and other countries of varying income.⁴⁰ To make nutrition facts easier for consumers to understand, countries have begun examining front-of-pack (FOP) labeling, which may be either fact-based (i.e. displaying icons listing the content of calories, fat, sodium, sugar, and percent total daily intake) or interpretive (i.e. color-coded icons for products with high, medium, or low nutrient content). FOP labels may be government requirements (e.g. Mexico’s fact-based GDA labels, Chile’s interpretive FOP labels) or voluntarily adopted by industry (e.g. U.S. Facts Up Front program, UK color-coded labels, Australia Health Stars label).^{41,42,43}

Some countries provide supplemental income that supports food purchases. In the United States, the Women, Infants and Children (WIC) nutrition assistance program allows for a cash value voucher (CVV) to be used for FVs.⁴⁴ Additionally, the Food Insecurity Nutrition Incentive (FINI) Grant—part of the 2014 U.S. Farm Bill—supports projects that increase purchase of FVs by low-income beneficiaries by providing incentives at the point of purchase.^{45,46,47} The point-of-purchase and cash voucher models utilized by WIC and FINI could potentially be replicated in LMICs. Per a 2015 World Bank report, cash transfer programs in Kenya and Zambia have shown significant increases in household food security; similar programs in Ecuador, Nicaragua, Peru, and Brazil have shown large increases in household food spending.⁴⁸ Brazil has adopted several of its policies to include promotion of local and indigenous FVs. Actions taken in Brazil include promoting diverse, healthy, native foods in dietary guidelines, as well as supporting production of food biodiversity through public procurement strategies (e.g. for foods in schools) and in relevant national strategies/action plans and agriculture and nutrition policies.⁴⁹ For countries unable to independently sustain such a program, global development agencies, multilateral organizations, and donor governments may be able to provide auxiliary support.

Additionally, using the UN Decade of Action on Nutrition 2016-2025, countries can make SMART (specific, measurable, achievable, relevant, time-bound) commitments and form action networks to increase food

How to Increase Fruit and Vegetable Consumption: *A multi-stakeholder approach for improved health outcomes*

security and FV consumption in their countries. Brazil and Ecuador have made SMART commitments to increase FV consumption in the adult population by 17.8%—this is a step in the right direction.^{50,51}

At the local level, in Australia, the United Kingdom, Canada, and the United States, food policy councils are gaining interest as a mechanism for coalitions composed of government officials, health professionals, educators, private sector, and other key community stakeholders to collaborate on nutrition issues.^{29,52,53,54,55} Similar organizations have also been seen in Brazil and Cuba.⁵¹ These coalitions can increase focus on public education to improve FV intake and make recommendations to local governments regarding policies affecting community gardens, mobile markets, farmers’ markets, and urban agriculture promotion—all with the aim of increasing FV consumption that is culturally appropriate, as committed to by Member States in the ICN2.

Private Sector Approaches

AFH identified three ways private sector can effectively increase FV consumption: 1) facilitate FV growth; 2) provide rebates/subsidies; and 3) incentivize through media or other outlets. Additionally, the efforts in this section are not intended to be exhaustive, but to indicate a sampling of ongoing private sector efforts to support—in partnership with civil society—increased FV consumption.

Approach	Example
1) Facilitate FV growth	-Unilever/Knorr: Global “Landmark Farm” ambassadors promote sustainable FV growth ⁶⁰ -South Africa: Growing agro-processing industry stimulates job creation & FV production ⁶¹ -PepsiCo: FV Innovation Centres for healthier products & technologies ^{67,68} -Kraft: Project Laser Beam (partnership w/ UN World Food Programme) educates and empowers women to grow and market FVs ⁷⁰
2) Provide rebates/subsidies	-Vitality (South Africa): 10% & 25% cash rebate for healthy food purchases increased ratio of expenditure on FVs to total food expenditure by 5.7% and 8.5%, respectively ⁶²
3) Incentivize through media or other outlets	-Walt Disney Co: “Outdoor Kitchens” ⁶³ ; co-market Disney characters, FVs w/ Dole Foods ⁶⁴ -McDonald’s: incorporation of FVs in Happy Meals ^{65,66}

Environmental sustainability and human health can be related; there is strong evidence—supported by Life Cycle Assessment—that certain kinds of environmentally-conscious food production can have a positive impact on diet and health outcomes.^{56,57,58,59} Unilever/Knorr, one of the world’s largest food brands sold in nearly 90 countries, is committed to the sustainable foods movement. In 2013, the Knorr Foods Attitude study—conducted in China, Brazil, South Africa, France, Germany, India, Italy, the Philippines, Poland, Russia, and the U.K.—found 74% of consumers believe sustainably sourced ingredients mean better quality food, and 76% of people are more likely to buy products with sustainably sourced ingredients.⁶⁰ In 2015, 92% of the top 13 vegetables and herbs used in Knorr’s sauces, soups, and seasonings were grown sustainably. The highest performing sustainable producers are utilized as “Knorr Landmark Farm” ambassadors; these ambassadors, numbering roughly 40 worldwide, educate consumers, communities, and other farmers about the positive impact of sustainable FV agriculture.⁶⁰

A crucial step in ensuring consumers can access FVs is to ensure FVs are adequately grown and equitably distributed. In the private sector, there are a variety of approaches currently in place. The Limpopo region, which covers 10.2% of the total land area of northern South Africa, is a major producer of FVs—for example, in 2013, the region produced 600,000 tons of tomatoes.⁶¹ This production is only expected to increase as the country’s agro-processing industry—which transforms raw agricultural materials into marketable food products—continues to stimulate job creation and contribute to the increased supply of, and demand for, domestic agricultural products.

Innovative approaches to health incentives include actions by industries not directly engaged in agriculture and food production. The HealthyFood cash rebate program is offered through South African health insurer, Discovery, as part of its health promotion program known as Vitality. This opt-in program provides a cash rebate of up to 25% on eligible healthy food purchases in more than 400 designated supermarkets throughout the country, and all Vitality members are eligible.⁶² Members receive a 10% rebate for healthy food purchases, which becomes a

How to Increase Fruit and Vegetable Consumption: *A multi-stakeholder approach for improved health outcomes*

25% rebate upon completion of an online health risk assessment questionnaire. The rebate is limited to \$480 in monthly purchases per household. It should be noted that the HealthyFood program primarily reaches South Africa's upper middle- and high-income populations with access to insurance.

Other companies in various sectors have attempted to innovatively incentivize FV intake through media and other outlets. For example, The Walt Disney Company has incorporated edible gardens, or “Outdoor Kitchens,” within several international parks. At these gardens, located in Italy, Germany, and Mexico, among others, guests can access and consume a variety of FVs.⁶³ Furthermore, Disney has partnered with Dole Food Company to co-market FVs with Disney characters, with the intention of more effectively reaching children and families across the globe.⁶⁴ In 2012, McDonald's began automatically including apple slices in kids' meals and has served over 1.2 billion bags of apple slices since, in addition to providing Cuties California Clementines as a whole fruit side item.⁶⁵ McDonald's estimates Happy Meal revisions will save 49 billion calories in American kids' diets annually.⁶⁶ Increased private sector-driven advertising and promotional initiatives for FVs—including educational messages—presents an opportunity for increased demand for, and consumption of, FVs. Such initiatives may simultaneously increase sales revenue, balance FV and non-FV food marketing activities, and improve long-term health outcomes.

Another multinational, PepsiCo, has supported increased FV intake by developing global “Fruit & Vegetables Innovation Centres,” currently located in Germany and Russia.^{67,68} This infrastructure allows PepsiCo to develop new products and technologies to further the company's Fruit & Vegetables Innovation agenda, which includes the goal of having the rate of sales growth of “Everyday Nutrition” products (including FVs) outpace the rate of sales growth of the rest of PepsiCo's portfolio by 2025.⁶⁹

PepsiCo is not alone—Kraft Foods Inc. benefits public health through a series of global grants and partnerships. In Indonesia and Bangladesh, the multinational has engaged in a 5-year, \$50 million public-private partnership with the UN World Food Programme. A program borne from this partnership, Project Laser Beam, helps establish women-operated rural farms that grow vegetables, helps women establish retail carts that sell nutritious foods and agricultural supplies, and trains community leaders to deliver nutrition education at schools and other places where families gather.⁷⁰ Gender equity and women's empowerment are paramount in improving nutrition outcomes—research suggests that income controlled by women is more likely to positively influence child nutrition and household food security than income controlled by men.⁷¹ In Indonesia and the Philippines, Kraft partners with Save the Children, which supports community-based meal distribution and urban gardens reaching nearly 200,000 children and families.⁷⁰ Kraft supports Charities Aid Foundation (CAF) Russia to aid in nutrition education efforts, including learning to grow vegetables, for more than 10,000 children and their families as part of CAF Russia's Health4Schools initiative.^{70,72} Furthermore, by partnering with INMED's Partnerships for Children program in Brazil, Kraft supports nutrition education for more than 675,000 students in six cities, as well as family gardens for fresh produce as part of INMED's Health in Action Initiative.^{70,73} It should be noted that these examples were part of the company's portfolio before the merger of Kraft and Heinz in July 2015.

School, Workplace, and Community Wellness Interventions

Evidence suggests schools and workplaces as a platform for increasing FV consumption. AFH identified two ways in which these entities can do so: 1) improve and/or increase food offerings in school/workplace settings; 2) educate students/workers on healthy diets and FV choices. In addition to institutional actors, civil society plays a key role in these interventions, which may serve as models for expanded global implementation.

- **Approach #1: Improve and/or increase FV offerings in school and workplace settings**
 - Schools: quality standards and guidelines for meal and snack options have proven to be effective in increasing consumption in both developing and developed countries.^{74,75,76,77,78}
 - Schools: middle- and high- income countries using methods implemented through public, private, and civil society partnerships (e.g. free provision of FVs, curriculum additions, improvement of environment to enable healthy choices) have increased FV consumption.^{75,79,80,81}

How to Increase Fruit and Vegetable Consumption: *A multi-stakeholder approach for improved health outcomes*

- Home grown school feeding schemes promote increased FV intake and support local farmers
- Australia: EON Foundation’s Thriving Communities Program partners with indigenous schools, communities to provide a secure, cheap FV supply and build long-term capacity via horticultural training, school gardens, and resource materials for teachers, community members.⁸²
- Denmark: daily FV intake increased by 0.5 servings in workplace canteens.⁸³ Successful strategies incorporated FV in stews, garnishes, staple foods, and ethnic cuisines.
- **Approach #2: Educate students and workers on healthy diets and FV choices**
 - India: Arogya World’s Healthy Schools program uses influencers (i.e. teachers and peer leaders) to implement behavior change among youth and adolescents. During the first two years of the program, daily intake of vegetables increased from 61.2% to 76.9%.^{84,85}
 - Commitment to Healthy Communities (CHC) private sector-civil society partnership provided thousands of U.S. schools and communities with health and wellness tools and information.⁸⁶
 - Multiple studies support the efficacy of workplace interventions such as menu planning, food presentations, motivational strategies, and provision of nutrition information^{87,88}; one such study found that Brazilian workers’ average FV consumption increased by 11g.⁸⁹

Models and Expected Impacts

Models for success exist across the globe (appendix, Table 4) that provide insights into effective interventions. These are examples that can be replicated or scaled to contribute to increased consumption of a diverse array of FVs in all forms—fresh, frozen, canned, dried, and juiced. However, further research is needed to better identify, understand, and evaluate best practices in LMICs and provide balanced, innovative, and effective global interventions with multi-stakeholder involvement. The following table outlines expected impacts of 3 interventions in a lower-middle-income and high-income country.

Income Status	Country	Intervention	Outcome
High-income:	Sweden ⁹⁰	Voluntary nutrition labeling	2009: 98% of Swedes responsible for food shopping knew/had heard of label; most knew label indicates healthier choice; participants who were recommended labeled products: FV intake doubled ⁹¹
	United States	Nutritional quality standards/guidelines	Among students in grades 3-8, vegetable consumption increased by 16.2%, fruit consumption remained the same ⁹²
	New Zealand	Nutrition education program in schools	12.5% increase in FV intake between start and follow-up among children 5-12yrs ⁷⁹
Lower-middle-income:	Nigeria ^{93, 94}	Voluntary nutrition labeling	2014: only 5 of 300 Nigerian food companies adopted labeling ⁹⁵ ; no FV intake data available
	Mauritius ^{96, 97}	Nutritional quality standards/guidelines	No evaluation data available
	India	Nutrition education program in schools	2011-13: increased daily intake of vegetables from 61.2% to 76.9% among children 11-14yrs; avg. servings of FVs increased ^{84,85}

Recommendations

Suggestions for the public sector, private sector, and civil society (with corresponding SDGs)

There are specific roles for stakeholders to play (appendix, Tables 1-3) and opportunities for collaboration within each recommendation. While tradeoffs may exist in specific countries and among target populations, through a multi-stakeholder approach, the positive impact of these recommendations can be maximized.

	Recommendation	SDG Correlation
1	Develop effective, accurate, comprehensive, & standardized individual-level dietary surveillance and reporting measures as part of national level health surveys, particularly in LMICs, such that global trends and patterns can be estimated accurately & populations that need interventions can be identified worldwide <ul style="list-style-type: none"> • Stakeholder(s): Governments, private sector, civil society 	#2: Zero Hunger #3: Good Health and Well-Being #12: Responsible Consumption & Production #17: Partnerships for the Goals
2	Harness multi-sector support for policy research regarding FV consumption to close knowledge gaps between low, middle, and high-income countries <ul style="list-style-type: none"> • Stakeholder(s): Governments, private sector, civil society 	#2: Zero Hunger #3: Good Health and Well-Being #12: Responsible Consumption & Production #17: Partnerships for the Goals
3	Elaborate upon policy initiatives and define clear stakeholder roles & responsibilities, targets, and methods & measurements for evaluation <ul style="list-style-type: none"> • Stakeholder(s): Governments, private sector, civil society Targets include: budget, time frame, clear and measurable outcomes	#2: Zero Hunger #3: Good Health & Well-Being #9: Industry, Innovation, & Infrastructure #11: Sustainable Cities & Communities #12: Responsible Consumption & Production #17: Partnerships for the Goals
4	Work to maintain & expand multilateral and public-private partnerships <ul style="list-style-type: none"> • Stakeholder(s): Governments, private sector, civil society 	#2: Zero Hunger #3: Good Health & Well-Being #9: Industry, Innovation, & Infrastructure #11: Sustainable Cities & Communities #12: Responsible Consumption & Production #17: Partnerships for the Goals
5	Harness multi-sector support to encourage innovative product, technology, and infrastructure development <ul style="list-style-type: none"> • Stakeholder(s): Governments, private sector, civil society • e.g. Civil society actor, Institute for the Future (IFTF), developed “Seeds of Disruption” forecast map as a tool to start conversations about how emerging technologies can close food system gaps.^{98,99} • Global Cold Chain Alliance (GCCA) builds & strengthens global cold chains to help the populations access safe, high quality food products¹⁰⁰ ; mDiabetes text messaging program, supported by private sector & civil society, reached 1 million individuals in India & increased FV consumption.¹⁰¹ 	#2: Zero Hunger #9: Industry, Innovation, and Infrastructure #17: Partnerships for the Goals
6	Support innovations in healthy building/community design and school & workplace interventions <ul style="list-style-type: none"> • Stakeholder(s): Governments, private sector, civil society • e.g. encourage urban agriculture & community gardens, facilitate rural farmer access to urban markets 	#2: Zero Hunger #3: Good Health and Well-Being #9: Industry, Innovation, and Infrastructure #11: Sustainable Cities and Communities #17: Partnerships for the Goals
7	Ensure incentives for FV growth & marketing in developing countries <ul style="list-style-type: none"> • Stakeholder(s): Governments, private sector, civil society 	#2: Zero Hunger #3: Good Health and Well-Being #11: Sustainable Cities and Communities

How to Increase Fruit and Vegetable Consumption: *A multi-stakeholder approach for improved health outcomes*

8	<p>Support and develop policies and programs—in collaboration with local entities and political economies—promoting FV consumption</p> <ul style="list-style-type: none"> • Stakeholder(s): Governments, private sector, civil society • e.g. FV subsidies, in-school nutrition education, supplemental income programs, point-of-purchase incentives, rebate schemes for consumer FV purchases, incorporating the importance of consuming all forms of FVs into constituent-facing messaging and communications 	<p>#2: Zero Hunger #3: Good Health and Well-Being #9: Industry, Innovation, and Infrastructure #11: Sustainable Cities and Communities #12: Responsible Consumption & Production #17: Partnerships for the Goals</p>
9	<p>Ensure labeling requirements are conducive to innovation and product formulation incentives</p> <ul style="list-style-type: none"> • Stakeholder(s): Governments, private sector, civil society • e.g. Ensuring requirements permit science-based health claims & are compatible with innovative approaches to formulation & serving sizes 	<p>#2: Zero Hunger #3: Good Health and Well-Being #9: Industry, Innovation, & Infrastructure #12: Responsible Consumption & Production</p>
10	<p>Maintain & develop LMIC infrastructure (e.g. roads, agricultural & cold chain technology, sustainable seed provision) to promote FV access</p> <ul style="list-style-type: none"> • Stakeholder(s): Governments, private sector, civil society 	<p>#2: Zero Hunger #9: Industry, Innovation, and Infrastructure #12: Responsible Consumption & Production</p>
11	<p>Reduce food loss & waste</p> <ul style="list-style-type: none"> • Stakeholder(s): Governments, private sector, civil society 	<p>#2: Zero Hunger #3: Good Health and Well-Being #11: Sustainable Cities and Communities</p>
12	<p>Ensure trade policies facilitate trade of safe food products to increase FV access in all geographic locations & during all seasons</p> <ul style="list-style-type: none"> • Stakeholder(s): Governments, private sector 	<p>#2: Zero Hunger #3: Good Health and Well-Being #11: Sustainable Cities and Communities</p>
13	<p>Continued investment in research & development to stimulate in-store & product innovation</p> <ul style="list-style-type: none"> • Stakeholder(s): Private sector • e.g. Tesco (UK) removed unhealthy foods from checkout, provides free fruit to children¹⁰²; PepsiCo invests in FV R&D centers 	<p>#2: Zero Hunger #3: Good Health and Well-Being #9: Industry, Innovation, and Infrastructure #12: Responsible Consumption & Production</p>

Summary

This paper is the first in a series that will lay the foundation for a multi-stakeholder approach to combatting food and nutrition-related NCDs. However, there is a current lack of evidence for effective interventions in LMICs. As such, experimentation with interventions may be needed to determine what can be most cost-effectively implemented in LMICs. Additionally, to help build and share the evidence base for effective and innovative interventions, AFH invites submission of relevant case studies and models of success. Through collective, collaborative action from governments, the private sector, and civil society, we can close this knowledge gap and continue paving a better way forward to fight NCDs—together.

Appendix

Knowledge Gaps

- There is a current lack of evidence for effective interventions in LMICs. Further research is needed to close the knowledge gap between interventions in higher-income countries and LMICs, and bring a balanced global focus to the former and the latter regarding increasing FV consumption.
- Increased FV *purchases* does not necessarily indicate increased FV *intake*.
- There is a lack of individual FV intake data. For example, in the Danish workplace canteen study, data was based on total consumption of FVs in canteens related to the number of customers, *not* on individual intake levels. Additional data about the types, forms of FVs that individuals are consuming are critical to revealing potential intervention strategies.
- Consistent monitoring and evaluation is needed to determine, maintain, and improve intervention efficacy (e.g. relationship between health outcomes and farmers’ markets).

Tables and Figures

Figure 1. Socio-ecological barriers to FV consumption (from “*Current Approaches*”)

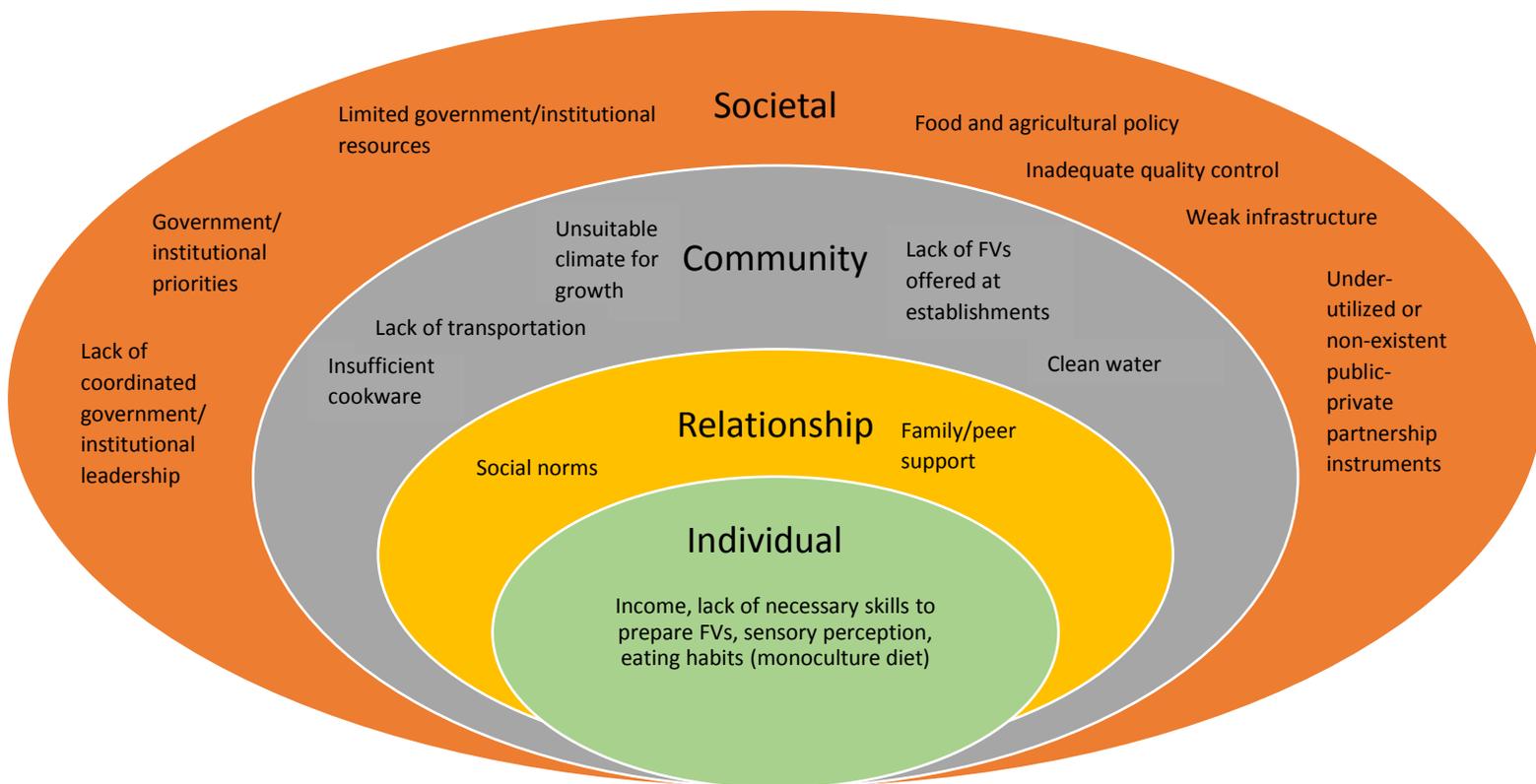


Table 1. Role of Governments within Recommendations

	Recommendation	Potential Role(s)
1	Develop effective, accurate, comprehensive, & standardized individual-level dietary surveillance and reporting measures as part of national level health surveys, particularly in LMICs, such that global trends and patterns can be estimated accurately & populations that need interventions can be identified worldwide	<ul style="list-style-type: none"> • Review national level health survey practices and materials to ensure appropriate data is collected • Ensure appropriate financial and human resources are available to support surveillance and reporting efforts
2	Harness multi-sector support for policy research regarding FV consumption to close knowledge gaps between low, middle, and high-income countries	<ul style="list-style-type: none"> • In LMICs, partner with private sector, civil society, academic and research institutions to collect data regarding FV products sold and distributed
3	Elaborate upon policy initiatives and define clear stakeholder roles & responsibilities, targets, and methods & measurements for evaluation <ul style="list-style-type: none"> • Targets include: budget, time frame, clear and measurable outcomes 	<ul style="list-style-type: none"> • Ensure targets, methods, and measurements for evaluation are feasible and based on best practices • Collaborate with private sector and civil society to ensure that defined roles within policy initiatives are conducive to stakeholder knowledge and skill set, so as to provide optimal added value to policy
4	Work to maintain & expand multilateral and public-private partnerships	<ul style="list-style-type: none"> • Continue to collaborate with private sector and civil society to identify novel ways to achieve common objectives • Participate in roundtables to share thought leadership and advance policy initiatives
5	Harness multi-sector support to encourage innovative product, technology, and infrastructure development	<ul style="list-style-type: none"> • Establish government advisory councils composed of government, private sector, and civil society stakeholders that seek to improve FV consumption • Consider recommendations from coalitions that may simultaneously improve public health outcomes, private sector, and civil society objectives
6	Support innovations in healthy building/community design and school & workplace interventions <ul style="list-style-type: none"> • e.g. encourage urban agriculture & community gardens, facilitate rural farmer access to urban markets 	<ul style="list-style-type: none"> • Consider the need for these innovations when drafting fiscal year budgets • Collaborate with and/or establish food policy councils to develop and encourage interventions that are optimal for specific urban and rural communities
7	Ensure incentives exist for growing and marketing of FVs in developing countries	<ul style="list-style-type: none"> • Support policy research and/or experimentation to determine optimal incentives for target countries • Consider policies and/or financial support programs supporting projects that increase FV purchases by providing incentives at the point of purchase <ul style="list-style-type: none"> ○ U.S. Food Security Nutrition Incentive (FINI) Grant⁴⁴⁻⁴⁶ could serve as model for

How to Increase Fruit and Vegetable Consumption: *A multi-stakeholder approach for improved health outcomes*

		<p>replication/adaptation</p> <ul style="list-style-type: none"> • Subsidize consumer FV purchases
8	Support and develop policies and programs, in collaboration with local entities and political economies, promoting FV consumption	<ul style="list-style-type: none"> • Subsidize consumer FV purchases • Develop policy incorporating more FVs in vending machines • Establish local ordinances calling for food policy councils/coalitions • Develop supplemental income programs (e.g. cash transfer programs, cash value voucher programs) that provide financial support for consumer FV purchases
9	Ensure labeling requirements are conducive to innovation and product formulation incentives	<ul style="list-style-type: none"> • Ensure requirements permit science-based health claims & are compatible with innovative approaches to formulation & serving sizes • Solicit private sector feedback when developing labeling requirements
10	Maintain & develop LMIC infrastructure (e.g. roads, agricultural technology, cold chain technology, sustainable seed provision) to promote FV access	<ul style="list-style-type: none"> • Collaborate with private sector and civil society to ensure proper financial and human resources are available to sustainably support infrastructure development
11	Reduce food loss & waste	<ul style="list-style-type: none"> • Provide financial incentive(s) for food producers to retain safe produce, with uncompromised nutritional value, that may not be marketable for aesthetic/other reasons • Establish national, food-based dietary guidelines with recommended portion sizes to reduce consumer food waste
12	Ensure trade policies facilitate trade of safe food products to increase FV access in all geographic locations & seasons	<ul style="list-style-type: none"> • Collaborate with partner governments to ensure policies are conducive to the political economy, geography, and environmental climate of target countries

Table 2. Role of Private Sector within Recommendations

	Recommendation	Potential Role(s)
1	Develop effective, accurate, comprehensive, & standardized individual-level dietary surveillance and reporting measures as part of national level health surveys, particularly in LMICs, such that global trends and patterns can be estimated accurately & populations that need interventions can be identified worldwide	<ul style="list-style-type: none"> Support civil society and governmental data collection efforts; this data can be used to identify better ways to develop & market healthy products
2	Harness multi-sector support for policy research regarding FV consumption to close knowledge gaps between low, middle, and high-income countries	<ul style="list-style-type: none"> In LMICs, partner with governments, civil society, academic and research institutions to collect data regarding FV products sold and distributed
3	Elaborate upon policy initiatives and define clear stakeholder roles & responsibilities, targets, and methods & measurements for evaluation <ul style="list-style-type: none"> Targets include: budget, time frame, clear and measurable outcomes 	<ul style="list-style-type: none"> Collaborate with governments to ensure that defined roles of private sector within policy initiatives are conducive to stakeholder knowledge and skill set, so as to provide optimal added value to policy
4	Work to maintain & expand multilateral and public-private partnerships	<ul style="list-style-type: none"> Continue to collaborate with governments and civil society to identify novel ways to achieve common objectives Host and/or participate in roundtables to share thought leadership and advance initiatives
5	Harness multi-sector support to encourage innovative product, technology, and infrastructure development	<ul style="list-style-type: none"> Develop tools and platforms (e.g. IFTF's "Seeds of Disruption" map^{98,99}) to catalyze multi-sector conversations regarding innovative solutions Collaborate with governments and civil society to identify and develop sustainable funding methods for innovation
6	Support innovations in healthy building/community design and school & workplace interventions <ul style="list-style-type: none"> e.g. encourage urban agriculture & community gardens, facilitate rural farmer access to urban markets 	<ul style="list-style-type: none"> Continue to place emphasis on environmental and public health-oriented engineering Consider capital investment in community initiatives and interventions (e.g. community gardens, school & workplace nutrition programs)
7	Ensure incentives exist for growing and marketing of FVs in developing countries	<ul style="list-style-type: none"> Support policy research and/or experimentation to determine optimal incentives for target countries Consider rebate schemes and other similar projects to increase consumer FV purchases
8	Support and develop policies and programs, in collaboration with local entities and political economies, promoting FV consumption	<ul style="list-style-type: none"> Consider rebate schemes and other similar projects to increase consumer FV purchases Encourage more proactive FV advertising so as to increase media presence and balance FV and non-FV food marketing share Incorporate FVs in fast food & restaurant menus

How to Increase Fruit and Vegetable Consumption: *A multi-stakeholder approach for improved health outcomes*

		<ul style="list-style-type: none"> • Incorporate the importance of consuming all forms of FVs into constituent-facing messaging and communications • Develop products to support the incorporation of more FVs in vending machines and similar distribution mechanisms
9	Ensure labeling requirements are conducive to innovation and product formulation incentives	<ul style="list-style-type: none"> • Provide policy input to governments developing labeling requirements, so as to best ensure that requirements are conducive to innovation
10	Maintain & develop LMIC infrastructure (e.g. roads, agricultural technology, cold chain technology, sustainable seed provision) to promote FV access	<ul style="list-style-type: none"> • Collaborate with governments and civil society to sustainably support infrastructure development through in-kind, capital, and/or other investment
11	Reduce food loss & waste	<ul style="list-style-type: none"> • Retailers should use misshapen produce deemed unfit for sale by commercial supermarkets and sell produce at a discounted price • Collaborate with civil society and local entities to allow safe, unsold produce with uncompromised nutritional value to be distributed at schools, food banks, and other relevant institutions
12	Ensure trade policies facilitate trade of safe food products to increase FV access in all geographic locations & during all seasons	<ul style="list-style-type: none"> • Collaborate with governments to ensure policies are conducive to the political economy, geography, and environmental climate of target countries
13	Continued investment in research & development to stimulate in-store & product innovation	<ul style="list-style-type: none"> • Consider removing unhealthy foods from checkout areas in retail establishments • Invest in fruit and vegetable research and development infrastructure to catalyze innovative production of healthier foods

Table 3. Role of Civil Society within Recommendations

	Recommendation	Potential Role(s)
1	Develop effective, accurate, comprehensive, & standardized individual-level dietary surveillance and reporting measures as part of national level health surveys, particularly in LMICs, such that global trends and patterns can be estimated accurately & populations that need interventions can be identified worldwide.	<ul style="list-style-type: none"> • Research and academic institutions should help inform structure and content of surveillance and reporting measures
2	Harness multi-sector support for policy research regarding FV consumption to close knowledge gaps between low, middle, and high-income countries	<ul style="list-style-type: none"> • In LMICs, partner with governments, private sector, academic and research institutions to collect data regarding FV products sold and distributed
3	Elaborate upon policy initiatives and define clear stakeholder roles & responsibilities, targets, and methods & measurements for evaluation Targets include: budget, time frame, clear and measurable outcomes	<ul style="list-style-type: none"> • Collaborate with governments to ensure that defined roles of civil society within policy initiatives are conducive to stakeholder knowledge and skill set, so as to provide optimal added value to policy
4	Work to maintain & expand multilateral and public-private partnerships	<ul style="list-style-type: none"> • Continue to collaborate with governments and private sector to identify novel ways to achieve common objectives • Host and/or participate in roundtables to share thought leadership and advance initiatives
5	Harness multi-sector support to encourage innovative product, technology, and infrastructure development	<ul style="list-style-type: none"> • Develop tools and platforms (e.g. IFTF's "Seeds of Disruption" map^{98,99}) to catalyze multi-sector conversations regarding innovative solutions • Collaborate with governments and private sector to identify and develop sustainable funding methods for innovation • Research and academic institutions continue to support and cultivate the next generation of thought leaders and change agents
6	Support innovations in healthy building/community design and school & workplace interventions <ul style="list-style-type: none"> • e.g. encourage urban agriculture & community gardens, facilitate rural farmer access to urban markets 	<ul style="list-style-type: none"> • Collaborate with and/or help establish food policy councils to develop and encourage interventions that are optimal for specific urban and rural communities • Help communicate these innovations to target populations through grassroots action & advocacy
7	Ensure incentives exist for growing and marketing of FVs in developing countries	<ul style="list-style-type: none"> • Support and advocate for policy research and/or experimentation to determine optimal incentives for target countries
8	Support and develop policies and programs, in collaboration with local entities and political economies, promoting FV consumption <ul style="list-style-type: none"> • e.g. FV subsidies, FV vending policy, food policy councils, in-school nutrition education, supplemental income programs, point-of-purchase incentives, rebate schemes for 	<ul style="list-style-type: none"> • Collaborate with private sector to tailor constituent-facing messaging communications and ensure cultural appropriateness • Collaborate with and/or help establish food policy councils to develop and encourage

How to Increase Fruit and Vegetable Consumption: *A multi-stakeholder approach for improved health outcomes*

	<p>consumer FV purchases, incorporation of FV items in fast food and restaurant menus, incorporating the importance of consuming all forms of FVs into constituent-facing messaging and communications</p>	<p>interventions that are optimal for specific urban and rural communities</p> <ul style="list-style-type: none"> • Use successful civil society efforts as basis for policy recommendations that can be replicated, adapted, and/or scaled
9	<p>Ensure labeling requirements are conducive to innovation and product formulation incentives</p> <ul style="list-style-type: none"> • e.g. Ensuring requirements permit science-based health claims & are compatible with innovative approaches to formulation & serving sizes 	<ul style="list-style-type: none"> • Provide input to governments and private sector developing labeling requirements, so as to best ensure that labels are appropriately communicated to target populations
10	<p>Maintain & develop LMIC infrastructure (e.g. roads, agricultural technology, cold chain technology, sustainable seed provision) to promote FV access</p>	<ul style="list-style-type: none"> • Collaborate with governments and private sector to sustainably support infrastructure development through in-kind, capital, and/or other investment
11	<p>Reduce food loss & waste</p>	<ul style="list-style-type: none"> • Collaborate with private sector to allow safe, unsold produce with uncompromised nutritional value to be distributed at schools, food banks, and other relevant institutions • Collaborate with governments and target populations to ensure national dietary guidelines are communicated, understood, and acted upon
12	<p>Ensure trade policies facilitate trade of safe food products to increase FV access in all geographic locations & during all seasons</p>	<ul style="list-style-type: none"> • Collaborate with governments to ensure policies are conducive to the political economy, geography, and environmental climate of target countries

Table 4. Examples of Successful Public Sector, Private Sector, and Civil Society Collaborations

- Indonesia, Bangladesh, Philippines, Russia, Brazil, China: Kraft Foods Inc.’s investment in global FV-centered agriculture and nutrition education.⁷⁰
- Japan, Mexico, China, Morocco, Germany, Italy, Caribbean, U.K., USA, France: Walt Disney Company’s “Outdoor Kitchens” that increase guests’ direct access to FVs while visiting theme parks.⁶³
- France, United States: Public health-focused advertising and nutrition labeling measures show positive health outcomes (higher fiber and iron intakes; lower intakes of calories from total fat and saturated fat) for consumers who used labels to inform purchases.^{30,35,36,38-40}
- Germany, Russia: PepsiCo’s “Fruit and Vegetable Innovation Centres”^{67,68}
- Limpopo, South Africa: Agro-processing investment has helped create jobs; increase supply of, and demand for, FVs within the region.⁶¹
- South Africa: 10% and 25% rebates on healthy food purchases were associated with an increase in the ratio of expenditure on FVs to total food expenditure by 5.7% and 8.5%, respectively.⁶²
- South Africa: Subsidy on FVs—one model found that for each 1% reduction in price as a result of a subsidy, there was a 0.35% increase in FV purchases.³²
- Turkey, Spain, New Zealand, etc.: Unilever/Knorr’s Landmark Farms number roughly 40 worldwide and help to educate global consumers, communities, and other farmers about the positive impact of sustainable FV agriculture.⁶⁰
- United States: McDonald’s incorporation of fruit in Happy Meals: will save an estimated 49 billion calories in American children’s diets annually.⁶⁵
- Bahrain, Bermuda, Chile, France, Iran, Kuwait, Mauritius, Slovenia (list not exhaustive): quality standards and guidelines for meal and snack options have proven to be effective in increasing consumption in both developing and developed countries.⁷³⁻⁷⁶
- India, Western Australia, United States, Denmark: School, workplace, and community workplace programs (e.g. free provision of FVs, curriculum additions, and improvement of environment to enable healthy choices) have been shown to increase FV consumption.^{77-80, 84}

Sustainable Development Goals, as defined by the United Nations²

- ***SDG #2: Zero Hunger***
 - Definition: End hunger, achieve food security and improved nutrition, and promote sustainable agriculture.
- ***SDG #3: Good Health and Well-Being***
 - Definition: Ensure healthy lives and promote well-being for all at all ages.
- ***SDG #9: Industry, Innovation, and Infrastructure***
 - Definition: Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation.
- ***SDG #11: Sustainable Cities and Communities***
 - Definition: Make cities and human settlements inclusive, safe, resilient, and sustainable.
- ***SDG #12: Responsible Consumption and Production***
 - Definition: Ensure sustainable consumption and production patterns.
- ***SDG #17: Partnerships for the Goals***
 - Definition: Strengthen the means of implementation and revitalize the global partnership for sustainable development.

*WHO/FAO Second International Conference on Nutrition (ICN2) Commitments*¹⁶

- **Purpose and targets** (from Conference Outcome Document: Framework for Action)
 - “The nature of this Framework for Action is voluntary. Its purpose is to guide the implementation of the commitments of the Rome Declaration on Nutrition adopted by the Second International Conference on Nutrition held in Rome, Italy, on 19-21 November 2014. Building on existing commitments, goals and targets, this Framework for Action provides a set of policy options and strategies which governments, acting in cooperation with other stakeholders, may incorporate, as appropriate, into their national nutrition, health, agriculture, development and investment plans, and consider in negotiating international agreements to achieve better nutrition for all.”
 - “As governments have primary responsibility for acting at the country level, in dialogue with a wide range of stakeholders, including affected communities, the recommendations are principally addressed to government leaders. They will consider the appropriateness of the recommended policies and actions in relation to national needs and conditions, as well as regional and national priorities, including in legal frameworks. For accountability, this Framework for Action adopts existing global targets for improving maternal, infant and young child nutrition and for NCD risk factor reduction to be achieved by 2025.”
- For a list of all 60 commitments, please see: <http://www.fao.org/3/a-mm215e.pdf>

*United Nations Decade of Action on Nutrition Action Areas*¹⁰³

*Note: Countries are invited to set up action networks (i.e. coalitions) in these areas.

1. Sustainable, resilient food systems for healthy diets
2. Aligned health systems providing universal coverage of essential nutrition actions
3. Social protection and nutrition education
4. Trade and investment for improved nutrition
5. Safe and supportive environments for nutrition at all ages
6. Strengthened governance and accountability for nutrition

References:

- ¹ Hall, J. N., Moore, S., Harper, S. B., & Lynch, J. W. (2009). Global variability in fruit and vegetable consumption. *American journal of preventive medicine*, 36(5), 402-409. doi: <http://dx.doi.org/10.1016/j.amepre.2009.01.029>
- ² United Nations Department of Public Information. (2015). *Sustainable Development Goals*. Retrieved from: <https://sustainabledevelopment.un.org/?menu=1300>
- ³ Murray, C. J., Barber, R. M., Foreman, K. J., Ozgoren, A. A., Abd-Allah, F., Abera, S. F., ... & Abu-Rmeileh, N. M. (2015). Global, regional, and national disability-adjusted life years (DALYs) for 306 diseases and injuries and healthy life expectancy (HALE) for 188 countries, 1990–2013: quantifying the epidemiological transition. *The Lancet*, 386(10009), 2145-2191. doi: [http://dx.doi.org/10.1016/S0140-6736\(15\)61340-X](http://dx.doi.org/10.1016/S0140-6736(15)61340-X)
- ⁴ Joint WHO/FAO Expert Consultation on Diet, Nutrition and the Prevention of Chronic Diseases. (2002). *Diet, nutrition and the prevention of chronic diseases: report of a joint WHO/FAO expert consultation*. Geneva, Switzerland: WHO. Retrieved from: http://apps.who.int/iris/bitstream/10665/42665/1/WHO_TRS_916.pdf
- ⁵ WHO technical staff. (2014, September). *Increasing fruit and vegetable consumption to reduce the risk of noncommunicable diseases*. Retrieved from http://www.who.int/elena/titles/bbc/fruit_vegetables_ncds/en/
- ⁶ Boeing, H., Bechthold, A., Bub, A., Ellinger, S., Haller, D., Kroke, A., ... & Watzl, B. . (2012). Critical review: vegetables and fruit in the prevention of chronic diseases. *European Journal of Nutrition*. 51(6), 637-663. doi: <http://dx.doi.org/10.1007/s00394-012-0380-y>
- ⁷ World Health Organization. (2017). *Global Strategy on Diet, Physical Activity and Health: Promoting fruit and vegetable consumption around the world*. Retrieved from: <http://www.who.int/dietphysicalactivity/fruit/en/index2.html>
- ⁸ World Health Organization. (2017). *Global Health Observatory (GHO) data: Unhealthy diet*. Retrieved from http://www.who.int/gho/ncd/risk_factors/unhealthy_diet_text/en/
- ⁹ Lim, S. S., Vos, T., Flaxman, A. D., Danaei, G., Shibuya, K., Adair-Rohani, H., ... & Aryee, M. (2013). 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. *The lancet*, 380(9859), 2224-2260. doi: [http://dx.doi.org/10.1016/S0140-6736\(12\)61766-8](http://dx.doi.org/10.1016/S0140-6736(12)61766-8)
- ¹⁰ World Health Organization. (2017). *e-Library of Evidence for Nutrition Actions (eLENA)*. Retrieved from Increasing fruit and vegetable consumption to reduce the risk of noncommunicable diseases: http://www.who.int/elena/titles/fruit_vegetables_ncds/en/
- ¹¹ Micha, R., Khatibzadeh, S., Shi, P. on behalf of the Global Burden of Diseases Nutrition and Chronic Diseases Expert Group (NutriCoDE). (2015). Global, regional and national consumption of major food groups in 1990 and 2010: a systematic analysis including 266 country-specific nutrition surveys worldwide. *BMJ Open*, 5,e008705. doi: 10.1136/bmjopen-2015-008705
- ¹² Van Duyn, M. A. S., & Pivonka, E. (2000). Overview of the health benefits of fruit and vegetable consumption for the dietetics professional: selected literature. *Journal of the American Dietetic Association*, 100(12), 1511-1521.
- ¹³ Riboli, E., & Norat, T. (2003). Epidemiologic evidence of the protective effect of fruit and vegetables on cancer risk. *The American journal of clinical nutrition*, 78(3), 559S-569S.

- ¹⁴ U.S. Department of Health and Human Services and U.S. Department of Agriculture. (2015, December) *2015–2020 Dietary Guidelines for Americans*. 8th Edition. Retrieved from: <http://health.gov/dietaryguidelines/2015/guidelines>
- ¹⁵ Harvard T.H. Chan School of Public Health. (2017). *Healthy Beverage Guidelines*. Retrieved from: <https://www.hsph.harvard.edu/nutritionsource/healthy-drinks-full-story/#level-4>
- ¹⁶ Food and Agriculture Organisation of the United Nations, World Health Organization. (2014). Second International Conference on Nutrition (ICN2): Conference Outcome Document: Framework for Action. Rome. Retrieved from <http://www.fao.org/3/a-mm215e.pdf>
- ¹⁷ 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.
- ¹⁸ Birt, C. A. (2016). Food and Agriculture Policy in Europe. *AIMS Public Health*, 3(1), 131-140.
- ¹⁹ European Commission, D. G. (2010, May). *The 2007 reform of the reform for fruits and vegetables*. Retrieved from European Commission: Retrieved from: https://ec.europa.eu/agriculture/sites/agriculture/files/fruit-and-vegetables/2007-reform/details_en.pdf
- ²⁰ Lachat, C., Otchere, S., Roberfroid, D., Abdulai, A., Seret, F. M. A., Milesevic, J., ... & Kolsteren, P. (2013). Diet and physical activity for the prevention of noncommunicable diseases in low-and middle-income countries: a systematic policy review. *PLoS Med*, 10(6), e1001465. doi: <http://dx.doi.org/10.1371/journal.pmed.1001465>
- ²¹ United States Department of Agriculture Economic Research Service (2016, October 26). *Policy*. Retrieved from United States Department of Agriculture Economic Research Service: <https://www.ers.usda.gov/topics/crops/fruit-tree-nuts/policy/>
- ²² Mendis, S. (2010). The policy agenda for prevention and control of non-communicable diseases. *British medical bulletin*, 1dq037. doi: <https://doi.org/10.1093/bmb/1dq037>
- ²³ Sachdeva, S., Sachdev, T. R., & Sachdeva, R. (2014). Increasing fruit and vegetable consumption: challenges and opportunities. Available at SSRN: <https://ssrn.com/abstract=2463501>
- ²⁴ Centers for Disease Control and Prevention. (2015). *The Social Ecological Model: a Framework for Prevention*. Retrieved from: <https://www.cdc.gov/violenceprevention/overview/social-ecologicalmodel.html>
- ²⁵ Pomerleau, J., Lock, K., Knai, C., & McKee, M. (2005). Interventions designed to increase adult fruit and vegetable intake can be effective: a systematic review of the literature. *The Journal of nutrition*, 135(10), 2486-2495. Retrieved from: <http://jn.nutrition.org/content/135/10/2486.full>
- ²⁶ Sørensen, L. B., Møller, P., Flint, A., Martens, M., Raben, A. (2003). Effect of sensory perception of foods on appetite and food intake: a review of studies on humans. *International Journal of Obesity*, 27, 1152-1166. doi: 10.1038/sj.ijo.0802391
- ²⁷ Rao, M, Afshin, A, Singh, G. Do healthier foods and diet patterns cost more than less healthy options? A systematic review and meta-analysis. (2013). *BMJ Open*, 3,e004277. doi: 10.1136/bmjopen-2013-004277
- ²⁸ Food and Agriculture Organisation of the United Nations, World Health Organization. (2014). *Second International Conference on Nutrition (ICN2): Report of the Joint FAO/WHO Secretariat on the Conference*. Rome. Retrieved from <http://www.fao.org/3/a-mm531e.pdf>
- ²⁹ Food Climate Research Network (2015). *Policies and actions to shift eating patterns: What works?*. Retrieved From http://www.fcrn.org.uk/sites/default/files/fcrn_chatham_house_0.pdf

- ³⁰ Dallongeville, J., Dauchet, L., de Mouzon, O., Réquillart, V., Soler, L.G. Increasing fruit and vegetable consumption: a cost-effectiveness analysis of public policies. (2011) *Eur J Public Health*, 21 (1): 69-73. doi: 10.1093/eurpub/ckq013. Retrieved from: <https://academic.oup.com/eurpub/article/21/1/69/476988/Increasing-fruit-and-vegetable-consumption-a-cost>
- ³¹ Cobiac, L. J., Vos, T., & Veerman, J. L. (2010). Cost-effectiveness of interventions to promote fruit and vegetable consumption. *PLoS One*, 5(11), e14148. Retrieved from: <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0014148>
- ³² Capacci, S., Mazzocchi, M., Shankar, B., Macias, J. B., Verbeke, W., Pérez-Cueto, F. J., ... & Saba, A. (2012). Policies to promote healthy eating in Europe: a structured review of policies and their effectiveness. *Nutrition reviews*, 70(3), 188-200. doi: <https://doi.org/10.1111/j.1753-4887.2011.00442.x>
- ³³ Food and Agriculture Organization of the United Nations (2017). *Food-based dietary guidelines*. Retrieved from Food and Agriculture Organization of the United Nations: <http://www.fao.org/nutrition/education/food-dietary-guidelines/home/en/>
- ³⁴ Cash, S. B., Sunding, D. L., & Zilberman, D. (2005). Fat taxes and thin subsidies: prices, diet, and health outcomes. *Acta Agriculturae Scand Section C*, 2(3-4), 167-174. Retrieved from: https://www.researchgate.net/publication/23505386_Fat_taxes_and_thin_subsidies_Prices_diet_and_health_outcomes
- ³⁵ Eyles, H., Mhurchu, C. N., Nghiem, N., & Blakely, T. (2012). Food pricing strategies, population diets, and non-communicable disease: a systematic review of simulation studies. *PLoS Med*, 9(12), e1001353. doi: <http://dx.doi.org/10.1371/journal.pmed.1001353>
- ³⁶ Pearson-Stuttard, J., Bandosz, P., Rehm, C. D., Penalvo, J., Whitsel, L., Gaziano, T., ... & Capewell, S. (2017). Reducing US cardiovascular disease burden and disparities through national and targeted dietary policies: A modelling study. *PLoS Medicine*, 14(6), e1002311. doi: <https://doi.org/10.1371/journal.pmed.1002311>
- ³⁷ Powell, L. M., Chriqui, J. F., Khan, T., Wada, R., & Chaloupka, F. J. (2013). Assessing the potential effectiveness of food and beverage taxes and subsidies for improving public health: a systematic review of prices, demand and body weight outcomes. *Obesity reviews*, 14(2), 110-128. doi: 10.1111/obr.12002
- ³⁸ Prescrire Int. (2007). *Nutritional health warnings: just for show*. Retrieved from: <http://english.prescrire.org/en/80/160/46239/0/PositionDetails.aspx>
- ³⁹ Produce for Better Health Foundation. (2017). *Fruits & Veggies—More Matters Market Research*. Retrieved from: http://www.pbhfoundation.org/about/res/fvmm_res
- ⁴⁰ World Cancer Research Fund International (2011). *NOURISHING framework: Nutrition label standards and regulations on the use of claims and implied claims on food*. Retrieved from World Cancer Research Fund International: http://www.wcrf.org/sites/default/files/1_Nutrition%20labels_Feb_2017_v2.pdf
- ⁴¹ Grocery Manufacturers Association (2017). *Facts Up Front Front-of-Pack Labeling Initiative*. Retrieved from Grocery Manufacturers Association: <http://www.gmaonline.org/issues-policy/health-nutrition/facts-up-front-front-of-pack-labeling-initiative/>
- ⁴² World Health Organization. (2013, May 16). *Joint FAO/WHO workshop on Front-of-Pack Nutrition Labelling*. Retrieved from World Health Organization: http://www.who.int/nutrition/events/2013_FAO_WHO_workshop_frontofpack_nutritionlabelling/en/
- ⁴³ Instituto Nacional de Salud Publica de Mexico (2016). *Review of current labelling regulations and practices for food and beverage targeting children and adolescents in Latin America countries (Mexico, Chile, Costa Rica and Argentina) and recommendations for facilitating consumer information*. United Nations Children's Fund, UNICEF. Retrieved from [https://www.unicef.org/lac/20161122_UNICEF_LACRO_Labeling_Report_LR\(1\).pdf](https://www.unicef.org/lac/20161122_UNICEF_LACRO_Labeling_Report_LR(1).pdf)

-
- ⁴⁴ USDA Food and Nutrition Service. (2013). *Women, Infants and Children (WIC): Cash Value Voucher Report*. Retrieved from: <https://www.fns.usda.gov/wic/cash-value-voucher-report>
- ⁴⁵ American Academy of Pediatrics, the National WIC Association, Center for Science in the Public Interest, First Focus, March of Dimes. (2015). *Response to the release of the Institute of Medicine's report, Review of WIC Food Packages: An Evaluation of White Potatoes in the Cash Value Voucher*. American Academy of Pediatrics, the National WIC Association, Center for Science in the Public Interest, First Focus, March of Dimes. Retrieved from https://s3.amazonaws.com/aws.upl/nwica.org/2-3-15-iom-report-statement-final_logos.pdf
- ⁴⁶ The National Academies of Sciences, Engineering, and Medicine: Health and Medicine Division. (2017). *Review of WIC Food Packages: Improving Balance and Choice: Final Report*. The National Academies of Sciences, Engineering, and Medicine: Health and Medicine Division. Retrieved from <http://www.nationalacademies.org/hmd/Reports/2017/review-of-wic-food-packages-improving-balance-and-choice.aspx>
- ⁴⁷ USDA National Institute of Food and Agriculture. (n.d.). *Food Insecurity Nutrition Incentive (FINI) Grant Program*. Retrieved from: <https://nifa.usda.gov/program/food-insecurity-nutrition-incentive-fini-grant-program>
- ⁴⁸ World Bank Group. (2015). *The State of Social Safety Nets*. Page 50. Retrieved from: <http://documents.worldbank.org/curated/en/415491467994645020/pdf/97882-PUB-REVISED-Box393232B-PUBLIC-DOCDATE-6-29-2015-DOI-10-1596978-1-4648-0543-1-EPI-1464805431.pdf>.
- ⁴⁹ Bioversity International (2016, July 7). *Putting biodiversity back on the menu in Brazil*. Retrieved from Bioversity International: <http://www.bioversityinternational.org/news/detail/putting-biodiversity-back-on-the-menu-in-brazil/>
- ⁵⁰ World Health Organization. (2016). *The UN Decade of Action on Nutrition 2016-2025*. Retrieved from World Health Organization: http://www.who.int/nutrition/events/2016_side-event_43rd_session-CFS_19Oct_Rome/en/
- ⁵¹ World Health Organization. (2017, May 22). *Brazil first country to make specific commitments in UN Decade of Action on Nutrition*. Retrieved from World Health Organization: <http://www.who.int/nutrition/decade-of-action/brazil-commitment-22may2017/en/>
- ⁵² Schiff, R. (2008). The role of food policy councils in developing sustainable food systems. *Journal of Hunger & Environmental Nutrition*, 3(2-3), 206-228. Retrieved from <http://www.tandfonline.com/doi/abs/10.1080/19320240802244017>
- ⁵³ Barling, D., Lang, T., & Caraher, M. (2002). Joined-up food policy? The trials of governance, public policy and the food system. *Social Policy & Administration*, 36(6), 556-574. Retrieved from: <http://onlinelibrary.wiley.com/doi/10.1111/1467-9515.t01-1-00304/full>
- ⁵⁴ Lang, T., Rayner, G., Rayner, M., Barling, D., & Millstone, E. (2005). Policy councils on food, nutrition and physical activity: the UK as a case study. *Public Health Nutrition*, 8(1), 11. Retrieved from: <http://search.proquest.com/openview/8ba1fe3b57f278af3b717f0a299776a4/1?pq-origsite=gscholar&cbl=26856>
- ⁵⁵ Schiff, R. (2007). *Food Policy Councils: An examination of organisational structure, process, and contribution to alternative food movements* (Doctoral dissertation, Murdoch University). Retrieved from: <http://researchrepository.murdoch.edu.au/id/eprint/293/2/02Whole.pdf>
- ⁵⁶ Tilman, D., & Clark, M. (2014). Global diets link environmental sustainability and human health. *Nature*, 515(7528), 518-522. Retrieved from: <http://www.nature.com/nature/journal/v515/n7528/abs/nature13959.html>
- ⁵⁷ Pimentel, D., & Pimentel, M. (2003). Sustainability of meat-based and plant-based diets and the environment. *The American journal of clinical nutrition*, 78(3), 660S-663S. Retrieved from: <http://ajcn.nutrition.org/content/78/3/660S.full.pdf+html>

- ⁵⁸ Klöpffer, W. Environ. Sci. & Pollut. Res. (1997) 4: 223. doi:10.1007/BF02986351. Retrieved from: <https://link.springer.com/article/10.1007%2FBF02986351?LI=true>
- ⁵⁹ Stoessel, F., Juraske, R., Pfister, S., & Hellweg, S. (2012). Life cycle inventory and carbon and water footprint of fruits and vegetables: application to a Swiss retailer. *Environmental science & technology*, 46(6), 3253-3262. Retrieved from: <http://pubs.acs.org/doi/abs/10.1021/es2030577>
- ⁶⁰ Unilever. (2017). *Sustainable fruits & vegetables*. Retrieved from: <https://www.unilever.com/sustainable-living/the-sustainable-living-plan/reducing-environmental-impact/sustainable-sourcing/our-approach-to-sustainable-sourcing/sustainable-fruit-and-veg.html>
- ⁶¹ Molele, C. (2016, November). *Cultivating agri-business in Limpopo*. Retrieved from: <https://mg.co.za/article/2016-11-25-00-cultivating-agri-business-in-limpopo>
- ⁶² Sturm, R., An, R., Segal, D., & Patel, D. (2013). A cash-back rebate program for healthy food purchases in South Africa: results from scanner data. *American journal of preventive medicine*, 44(6), 567-572. <http://dx.doi.org/10.1016/j.amepre.2013.02.011>
- ⁶³ Brandon, P. (2016, March). *Edible Gardens Feature Fruits, Veggies Served at Outdoor Kitchens in Epcot International Flower & Garden Festival*. Retrieved from: <https://disneyarks.disney.go.com/blog/2016/03/edible-gardens-feature-fruits-veggies-served-at-outdoor-kitchens-at-epcot-international-flower-garden-festival/>
- ⁶⁴ BusinessWire: A Berkshire Hathaway Company. (2017, March). *Dole and The Walt Disney Company Help Parents Encourage Healthier Eating through the Magic of Disney Characters and Storytelling*. Retrieved from: <http://www.businesswire.com/news/home/20170314006092/en/Dole-Walt-Disney-Company-Parents-Encourage-Healthier>
- ⁶⁵ McDonald's USA. (2014, December 1). *McDonald's Introduces Fresh, Whole Fruit Option in Happy Meals*. Retrieved from: <http://news.mcdonalds.com/US/releases/McDONALD%E2%80%99S-INTRODUCES-FRESH--WHOLE-FRUIT-OPTION-IN>
- ⁶⁶ Kindelan, K. (2011, July 26). *McDonald's Wins First Lady's Approval With Happy Meal Makeover*. Retrieved from: <http://abcnews.go.com/Health/mcdonalds-puts-fruit-veggies-happy-meals/story?id=14159121>
- ⁶⁷ PepsiCo. (2012, January 12). *PepsiCo opens Fruit & Vegetables Innovation Centre in Hamburg*. Retrieved from: <http://www.pepsico.com/live/story/pepsico-opens-fruit--vegetables-innovation-centre-in-hamburg01122012314>
- ⁶⁸ PepsiCo. (2011, December 5). *New PepsiCo Fruit and Vegetable R&D Center opens in Russia*. Retrieved from: <http://www.pepsico.com/live/story/new-pepsico-fruit-and-vegetable-rd-center-opens-in-russia12052011278>
- ⁶⁹ PepsiCo. (2016, October 17). *PepsiCo Launches 2025 Sustainability Agenda Designed to Meet Changing Consumer and Societal Needs*. Retrieved from: <http://www.pepsico.com/live/pressrelease/pepsico-launches-2025-sustainability-agenda-designed-to-meet-changing-consumer-a10172016>
- ⁷⁰ U.S. Chamber of Commerce Foundation. (2011). *Best Corporate Steward – Finalist, Kraft Foods*. Retrieved from: <https://www.uschamberfoundation.org/article/best-corporate-steward-finalist-kraft-foods>
- ⁷¹ Haddad, L., Hoddinott, J. (1994). Women's income and boy-girl anthropometric status in the Côte d'Ivoire. *World Development* 22, no. 4: 543 -. Retrieved from: <http://microdata.worldbank.org/index.php/citations/1778>
- ⁷² Civic Chamber of the Russian Federation. (2012, November 08). *The CAF Russia Foundation will educate school students how to eat healthy*. Retrieved from: <https://www.oprf.ru/en/press/1815/newsitem/19678>
- ⁷³ INMED Partnerships for Children. (n.d.) *Health in Action Brazil*. Retrieved from: <http://inmed.org/what-we-do/health-and-nutrition/health-in-action/>

- ⁷⁴ World Cancer Research Fund International. (2017, February). *NOURISHING framework: Offer healthy foods and set standards in public institutions and other specific settings*. Retrieved from World Cancer Research Fund International: http://www.wcrf.org/sites/default/files/2_Offer%20healthy%20food_Feb%202017%20v2.pdf
- ⁷⁵ de Sa, J., & Lock, K. (2007). School-based fruit and vegetable schemes: A review of the evidence. *London: London School of Hygiene and Tropical Medicine, Department of Public Health and Policy*. Retrieved from: https://ec.europa.eu/agriculture/sites/agriculture/files/sfs/documents/de_sa_lock_en.pdf
- ⁷⁶ Harvard T.H. Chan School of Public Health. (2014, March 4). *New school meal standards significantly increase fruit, vegetable consumption*. Retrieved from Harvard T.H. Chan School of Public Health: <https://www.hsph.harvard.edu/news/press-releases/school-meal-standards-increase-fruit-and-vegetable-consumption/>
- ⁷⁷ Cohen, J. F., Richardson, S., Parker, E., Catalano, P. J., & Rimm, E. B. (2014). Impact of the new US Department of Agriculture school meal standards on food selection, consumption, and waste. *American journal of preventive medicine*, 46(4), 388-394. [http://www.ajpmonline.org/article/S0749-3797\(13\)00635-1/abstract](http://www.ajpmonline.org/article/S0749-3797(13)00635-1/abstract)
- ⁷⁸ American Academy of Pediatrics (2017). *Federal Advocacy: School Nutrition*. Retrieved from American Academy of Pediatrics: <https://www.aap.org/en-us/advocacy-and-policy/federal-advocacy/Pages/SchoolNutrition.aspx>
- ⁷⁹ Evans, C. E., Christian, M. S., Cleghorn, C. L., Greenwood, D. C., & Cade, J. E. (2012). Systematic review and meta-analysis of school-based interventions to improve daily fruit and vegetable intake in children aged 5 to 12 y. *The American journal of clinical nutrition*, 96(4), 889-901. Retrieved from: <http://ajcn.nutrition.org/content/96/4/889.full.pdf>
- ⁸⁰ World Health Organization for Europe: Programme for Nutrition and Food Security. (2006). *Food and nutrition policy for schools: A tool for the development of school nutrition programmes in the European Region*. Copenhagen: World Health Organization. Retrieved from: http://www.euro.who.int/_data/assets/pdf_file/0019/152218/E89501.pdf
- ⁸¹ de Sa, J., & Lock, K. (2008). Will European agricultural policy for school fruit and vegetables improve public health? A review of school fruit and vegetable programmes. *The European Journal of Public Health*, 18(6), 558-568. Retrieved from: <https://www.ncbi.nlm.nih.gov/pubmed/18719006>
- ⁸² EON Foundation Inc. (2015). *EON Thriving Communities*. Retrieved from EON Foundation Inc.: <http://eon.org.au/eon-thriving-communities/>
- ⁸³ Lassen, A., Thorsen, A. V., Trolle, E., Elsig, M. M., Ovesen, L. (2004). "Successful strategies to increase the consumption of fruits and vegetables: results from the Danish '6 a day' Work-site Canteen Model Study." *Public Health Nutrition* 7.02, 263-270. doi: <https://doi.org/10.1079/PHN2003532>
- ⁸⁴ Arogya World. (2017). *Healthy Schools*. Retrieved from Arogya World: <http://arogyaworld.org/programs/healthy-schools/>
- ⁸⁵ Arogya World. (n.d.). *Arogya World Healthy Schools*. Retrieved from Arogya World: <http://ghbb.globalhealth.org/wp-content/uploads/2017/01/Arogya-World-Healthy-Schools.pdf>
- ⁸⁶ CUNY School of Public Health (2017). *CHC Final Report: Executive Summary*. Healthy Weight Commitment Foundation. Retrieved from http://www.healthyweightcommit.org/wp-content/uploads/2017/04/CHC_Executive_Summary_Feb_2017_Final.pdf
- ⁸⁷ Kushida, O., & Murayama, N. (2014). Effects of environmental intervention in workplace cafeterias on vegetable consumption by male workers. *Journal of nutrition education and behavior*, 46(5), 350-358. Retrieved from: <https://www.ncbi.nlm.nih.gov/pubmed/24974354>
- ⁸⁸ Quintiliani, L., Poulsen, S., & Sorensen, G. (2010). Healthy eating strategies in the workplace. *International journal of workplace health management*, 3(3), 182-196. Retrieved from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3737584/>

- ⁸⁹ Bandoni, D. H., Sarno, F., & Jaime, P. C. (2011). Impact of an intervention on the availability and consumption of fruits and vegetables in the workplace. *Public health nutrition*, 14(6), 975-981. Retrieved from: <https://www.ncbi.nlm.nih.gov/pubmed/21205408>
- ⁹⁰ Norwegian Food Safety Authority, N. D. (2010, April 28). *The Keyhole*. Retrieved from Nokkelhullsmerket: http://www.nokkelhullsmerket.no/frontpage_en/article427.ece/binary/Fact%20sheet%20about%20the%20Keyhole
- ⁹¹ Järvi, A., Karlström, B., Vessby, B., & Becker, W. (2016). Increased intake of fruits and vegetables in overweight subjects: effects on body weight, body composition, metabolic risk factors and dietary intake. *British Journal of Nutrition*, 115(10), 1760-1768. Retrieved from: <https://www.cambridge.org/core/services/aop-cambridge-core/content/view/ECD175108A6D6CDB7CAE400F64C95B01/S0007114516000970a.pdf/increased-intake-of-fruits-and-vegetables-in-overweight-subjects-effects-on-body-weight-body-composition-metabolic-risk-factors-and-dietary-intake.pdf>
- ⁹² Cohen, J. F., Richardson, S., Parker, E., Catalano, P. J., & Rimm, E. B. (2014). Impact of the new US Department of Agriculture school meal standards on food selection, consumption, and waste. *American journal of preventive medicine*, 46(4), 388-394. Retrieved from: [http://www.ajpmonline.org/article/S0749-3797\(13\)00635-1/pdf](http://www.ajpmonline.org/article/S0749-3797(13)00635-1/pdf)
- ⁹³ Nigerian Heart Foundation (2016). *Heart Check Food Labelling Programme*. Retrieved from Nigerian Heart Foundation: <http://www.nigerianheart.org/ApprovedProducts.html>
- ⁹⁴ Nigerian Heart Foundation (2016). *Consensus Statement of Nigerian Heart Foundation National Heart Health And Nutrition Summit: Lipids and Cardiovascular Health in the Nigerian Population*. Nigerian Heart Foundation. Retrieved from <http://nigerianheart.org/images/Consensus%20Statement%20of%20Nigerian%20Heart%20Foundation%20Heart%20Health%20and%20Nutrition%20Summit%20on%20Lipids%20and%20Cardiovascular%20Health%20in%20the%20Nigerian%20Population.pdf>
- ⁹⁵ Ogundipe, S., Obinna, C. (2015, March 18). *Nigerian food companies shun labelling requirement*. Retrieved from Vanguard: <http://www.vanguardngr.com/2014/03/nigerian-food-companies-shun-labelling-requirement/>
- ⁹⁶ Republic of Mauritius (2009). *National Plan of Action for Nutrition 2009-2010: Final Report*. Republic of Mauritius. Retrieved from <https://extranet.who.int/nutrition/gina/sites/default/files/MUS%202009%20National%20Plan%20of%20Action%20for%20Nutrition.pdf>
- ⁹⁷ Mauritius Institute of Health: Ministry of Health and Quality of Life (n.d.). *Dietary guidelines for the prevention of NCD's in Mauritius*. Mauritius Institute of Health: Ministry of Health and Quality of Life. Retrieved from <http://mih.govmu.org/English/Documents/Info%20Gateway%20-%20Guidelines%20and%20Protocols/Dietary%20guidelines%20for%20the%20prevention%20of%20NCD%27s%20i n%20Mauritius.pdf>
- ⁹⁸ Food Tech Connect (2015). *70 Organizations Growing the Good Food Innovation Movement*. Retrieved from Food Tech Connect: <https://foodtechconnect.com/2015/08/05/70-organizations-growing-the-good-food-innovation-movement/>
- ⁹⁹ Institute for the Future. (2014, December). *Seeds of Disruption: How Technology is Remaking the Future of Food*. Retrieved from Institute for the Future: <http://www.iftf.org/our-work/global-landscape/foodforfuture/seeds-of-disruption/>
- ¹⁰⁰ Global Cold Chain Alliance (2017). *Reducing Post-Harvest Losses Worldwide with Cold Chain Development*. Retrieved from: <http://www.gcca.org/coldcon/2016/01/15/reducing-post-harvest-losses-worldwide-cold-chain-development/>
- ¹⁰¹ Pfammatter, A., Spring, B., Saligram, N., Davé, R., Gowda, A., Blais, L., ... & Reddy, S. (2016). mHealth intervention to improve diabetes risk behaviors in India: a prospective, parallel group cohort study. *Journal of medical Internet research*, 18(8). Retrieved from: <https://www.jmir.org/2016/8/e207/>

¹⁰² Packham, A. (2016, July 29). *Tesco Launches 'Free Fruit for Kids' Initiative To Encourage Healthy Eating Habits*. Retrieved from HuffPost United Kingdom: http://www.huffingtonpost.co.uk/entry/tesco-free-fruit-for-kids_uk_5799e43ae4b02508de484a34

¹⁰³ World Health Organization. (2017). *United Nations Decade of Action on Nutrition (2016-2025): Work Programme*. World Health Organization. Retrieved from <http://www.who.int/nutrition/decade-of-action/workprogramme-doa2016to2025-en.pdf?ua=1>